COMMENTARY

Improving vaccine coverage in adolescence and beyond

Michelle Falconer

Immunization, Hepatitis and Blood Safety Department, National Infection Service, Public Health England, London, UK

ABSTRACT

High vaccine coverage is required to ensure population protection, including protection of those that cannot receive vaccines either due to contraindications or age. Despite this, some areas continue to report low vaccine coverage. Reasons for this may vary but can include factors such as difficulties accessing services, conflicting priorities and false contraindications or fear of potential side effects. Population groups with reported low vaccine coverage include pregnant women, adolescents and those aged 70–80 years and eligible to receive the shingles vaccine. The afternoon symposium included presentations from speakers each describing interventions for promoting vaccine uptake in these particular groups. Such interventions may include:

- Ensuring effective leadership with clear aims for the delivery and on-going evaluation of the program
- Providing health care workers with training and access to factually correct immunization resources
- Offering a flexible service with vaccination in venues that are easy to access

Introduction

One of the afternoon symposiums at NIC27 focussed on improving vaccine coverage in adolescence and beyond. In the UK, the vaccination program is lifelong. The routine vaccination schedule commences at the age of eight weeks and specific vaccines are also recommended for certain population groups on the basis of their level of risk and / or age. Vaccine coverage indicates the level of protection that a population has against the disease and drops in vaccine coverage can help to identify a drop-in population protection before an increase in the incidence of a disease is observed. High vaccine coverage is essential for the success of vaccination programs as it provides some confidence for those vaccinated that they will be protected from disease and it also ensures that those members of the population that cannot be vaccinated, either because they are too young to receive the vaccine or because the vaccine is contraindicated, have some protection. Reasons for low vaccine coverage vary but may include difficulty accessing immunization services, the attitudes and practices of health staff, the reliability of services, false contraindications to vaccination, parents' beliefs and their practical knowledge of vaccination, fear of side effects and conflicting priorities. This report summarises the presentations and the suggested strategies and practical solutions to achieving high vaccine coverage in three specific groups: pregnant women, adolescents and older adults eligible for the shingles vaccine.

Pregnant women

The World Health Organization has previously described how the pregnant woman and her developing child face various health risks. Vaccine preventable disease, such as influenza, is one such risk that can have severe and potentially fatal consequences for both the pregnant woman and the unborn child.2

Before the introduction of rubella vaccination for schoolgirls and women of childbearing age during the 1970s, rubella infection in pregnant women was associated with congenital rubella syndrome (CRS) in the unborn baby. This led to pregnancies being terminated and to babies being born with disabilities such as hearing loss, cardiac problems and cataracts.4

When the MMR vaccine was introduced to the routine childhood schedule during 1988, the vaccine was offered to both boys and girls. Despite a reduction in vaccine coverage in previous years, current MMR coverage is now sufficient to ensure that women in the UK are unlikely to be exposed to rubella infection during pregnancy.5

High uptake of MMR vaccination in the UK has had a positive impact on the incidence of CRS, between January 2014 and March 2015, there were 3 CRS births reported. These were in women born abroad who were not immunised as children. As a result of this, the rubella screening program, which identified pregnant women non-immune to rubella during the antenatal period, ceased during 2016. The current advice to any woman of childbearing age is to ensure they have two documented doses of MMR vaccine before becoming pregnant to protect any future pregnancies.

Pertussis is another vaccine-preventable disease with potentially fatal consequences. It is an acute bacterial infection that is highly contagious and although there are high rates of complications in infants and young children, most deaths occur in infants less than three months of age.6
During 2012, there was a dramatic increase in the number of cases of pertussis, and although the number of cases was highest in adult age groups, the rate of infection was found to be far higher in infants than in any other age group. In order for infants to obtain the maximum benefit from the vaccination program, all doses of vaccine should be administered at the recommended age, but of the infants that were diagnosed with confirmed pertussis during 2012, a high number of them were infected before they had their first scheduled dose of vaccine at eight weeks of age and 14 of these infants died. All were less than 10 weeks of age.

In response to this, the prenatal pertussis vaccination program was introduced during the autumn of 2012. The aim of the program was to offer every pregnant woman a pertussis containing vaccine during her pregnancy. This would boost her antibodies and provide protection for her unborn baby through the transfer of maternal antibodies. The vaccine is now recommended to be administered from 16 weeks gestation and vaccine effectiveness against infant death is estimated at 95%. Pregnant women are also recommended to have an influenza vaccine which will protect both the pregnant woman and her unborn child. The UK obstetric surveillance system analysed data collected during 2009 and found that perinatal mortality was higher among infants born to infected women when compared to non-infected women and that infants of infected women were also more likely to be born prematurely.

Findings from a survey exploring attitudes to immunization in pregnancy suggest that most women would accept a vaccine that would protect their baby against a life-threatening illness, and that less than 1% of the mothers that responded would definitely not be immunised to protect themselves (0.8%) or their baby (0.5%). Their key considerations when making a decision were vaccine safety for themselves and their baby, vaccine effectiveness and their perceived seriousness of the disease.

Pregnant women place a high level of trust in midwives and 90% of respondents in this survey identified the midwife as their ideal source of information if being offered a vaccine during pregnancy. Other preferred sources of information included general practitioner (GP; 71%), leaflets or factsheets (24%), nurse in a GP clinic (23%) and antenatal class or group (20%).

Actions to promote high vaccine coverage in this group:
- Healthcare workers with contact with pregnant women should ensure they have access to up to date immunization information to enable them to confidently discuss the vaccines being offered to pregnant women and their effectiveness.
- Leaflets focussing on immunization during pregnancy are available and should be offered to pregnant women as a source of information.

Adolescents and young people

There are many reasons as to why adolescents and young people should be followed up for vaccination. It may be an opportunity to compete a course of vaccines, they may have missed immunizations as a child (e.g., MMR vaccine), they may be approaching or reaching their sexual debut, they may have an increased risk of exposure to some vaccine preventable diseases, they may be in the process of seeking a new career or taking up educational or travel opportunities, and if not immunised, they would remain potentially vulnerable to infections and a source of infection to others.

The changing epidemiology of vaccine-preventable disease is also a key risk factor for this group. During recent years, there has been an increase in cases of Meningitis W in young people. This was considered to be a public health emergency and there was a direct replacement of the MenC vaccine with the MenACWY vaccine to address this.

Between February 2016 and August 2016, 464 cases of measles were confirmed. The majority of cases were unvaccinated and 53% were aged 18 and over with 1 in 4 born abroad. The key age group was 15 – 24 years, 40% were admitted to hospital and 10% experienced complications; 22 cases were reported in health care workers and 52 cases were linked to music and arts festivals.

Two doses of MMR vaccine are required to provide long lasting protection and there are many opportunities throughout the life course to offer vaccination opportunistically to those that have not received two doses. Ideally the vaccines would be administered at the recommended ages of 12 months and 3 years 4 months but opportunities present on many occasions. Examples of such opportunities include during adolescence when school leavers vaccines are being scheduled, during health assessments of new entrants to the UK, during a GP new patient registration appointment, pre-conceptually and / or postnatally to ensure that future pregnancies are protected, at entry to university or with other recommended vaccines for fresher’s such as the MenACWY vaccine, during armed forces health care assessment or prior to deployment and during travel health assessments.

**Actions to promote high vaccine coverage in this group:**
- Use every opportunity to assess whether a course of vaccine has been completed and offer catch up doses when required.
- Ensure that adolescents and young people are aware of the vaccines recommended for them and why they are recommended.
- Vaccination programs delivered in the school setting achieve higher uptake in school aged children – “young people have better things to do” (than attend the GP for vaccination).

**Older adults eligible for the shingles vaccine**

The most recently published coverage data for the shingles vaccination program shows the lowest vaccine coverage for both the routine cohort and the catch-up cohort since the program began. Shingles vaccine coverage estimates to end February 2017 (compared to February 2016) show 42.0% coverage for the 70-year-old routine cohort (a decrease of 4.0%), and 42.4% coverage for the 78-year-old catch-up cohort (a decrease of 3.6%).

Several factors have been identified that are thought to have contributed to the decline in shingles vaccine coverage and include “difficulties in practices identifying the eligible patients during busy influenza immunization clinics, a lack of call/re-
call in the service specification to allow mop-up sessions for those who missed immunizations during the flu season, patients receiving flu vaccine at pharmacies or other providers than their GP practice and therefore are not identified for shingles vaccination during flu immunization sessions, and possible lowering of patients’ awareness of the vaccine since its introduction in 2013.\textsuperscript{13}$

In order to simplify the program, the eligibility criteria changed during April 2016 to the date a person becomes 70 years of age (routine program) and 78 years (catch up).\textsuperscript{16}

The third session of the symposium offered practical actions to undertake to achieve high shingles vaccine coverage. These were developed following a survey of GP practices that had achieved high shingles vaccine coverage including one practice that had achieved 92% uptake of the shingles vaccine in their eligible population, their success was attributed to being organised, having effective communication during the program and maintaining a motivated team. Challenges reported by the survey participants included staff time to deliver the program, competing priorities and confusion about the eligibility criteria for the program.

**Actions to achieve high vaccine coverage include:**

- Identifying an immunization lead or champion in the practice and promoting a team approach to the organisation and delivery of the program.
- Ensuring that all staff involved in immunization had clear roles and responsibilities and that they understood them.
- Planning early and developing a practice strategy and protocols for staff to work to for the delivery of the program, this including setting a target for the completion of the program.
- Holding regular meetings with the team and providing feedback to all staff on progress made with the delivery of the program.
- Ensuring that all staff, including reception staff, attend training to ensure up to date and relevant knowledge of the program and eligibility criteria and ensure that staff have access to program updates and resources to promote the program.
- Regular communication and sharing of good practice with other partners such as nursing home staff and Practice Nurse forums.
- Conducting monthly and quarterly searches of eligible patients and having an up to date call / re-call register with active follow up of non-responders to an invitation for vaccination.
- Providing relevant information for the patient at the time of the appointment offer including a leaflet and dates / times when appointments were available and using alternative methods of communication as required including text messages and phone calls (telephone calls were found to be more costly but also more effective).
- Ensuring flexibility with the delivery of the program: offering shingles vaccine all year round to eligible patients, not just during flu season, providing home visits for the housebound and ensuring the vaccine is available during chronic disease clinics, flu clinics and opportunistically during general appointments.
- Actively increasing awareness of the program using leaflets, posters, materials shown on the TV in the waiting room and the patient participation group.
- Maintaining staff motivation to succeed, this included providing a reward to staff when the program was completed and was in the form of a meal out for the team.

**Abbreviations**

CRS congenital rubella syndrome  
GP general practitioner  
MRR measles, mumps, and rubella  
UK United Kingdom

**Disclosure of potential conflicts of interest**

No potential conflicts of interest were disclosed.

**References**

1. Favin M, Steinglass R, Fields R, Banerjee K, Sawhney M. Why children are not vaccinated: a review of the grey literature. Int Health. 2012;4:229–38. doi:10.1016/j.inhe.2012.07.004
2. Maternal, Newborn and Infant Clinical Outcome Review Programme. Surveillance of maternal deaths in the UK 2012–14 and lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009–14. 2016. Available at: https://www.npeu.ox.ac.uk/downloads/files/mbrace-uk/reports/MBRRACE-UK%20Maternal%20DeathReport%202016%20%20website.pdf (accessed July 2017).
3. World Health Organization. Integrated Management Of Pregnancy And Childbirth: Managing Complications in Pregnancy and Childbirth: A guide for midwives and doctors. 2nd ed. Geneva: World Health Organization; 2017; Licence: CC BY-NC-SA 3.0 IGO. Available at: http://apps.who.int/iris/bitstream/10665/255760/1/9789241565493-eng.pdf?ua=1) (accessed July 2017).
4. Green Book Chapter 28. Rubella. Immunisation against infectious disease, Public Health England Chapter 28; 2013. p. 343–365. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/148498/Green-Book-Chapter-28-v2_0.pdf (accessed July 2017).
5. NHS Infectious Diseases in Pregnancy Screening Programme: notification of cessation date for antenatal rubella susceptibility screening in England. Public Health England Gateway number 2015–602, 2016. Available at: https://phescreening.blog.gov.uk/wp-content/uploads/sites/152/2016/03/Gateway-letter-cessation-date-for-antenatal-rubella-screening.pdf (accessed July 2017).
6. Campbell H, Amirthalingam G, Andrews G, Fry NK, George RC, Harrison T, Miller E. Accelerating Control of Pertussis in England and Wales. Emerg Infect Dis. 2012;18:38–47. doi:10.3201/cid.1801.110784.
7. Amirthalingam G, Gupta S, Campbell H. Pertussis immunisation and control in England and Wales, 1957 to 2012: a historical review. Euro Surveill. 2013;18(38):. doi:10.2807/1560-7917.ES2013.18.38.20587.
8. Green Book Chapter 24. Immunisation against infectious disease, Pertussis. Public Health England, Chapter 24; 2016. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/514363/Pertussis_Green_Book_Chapter_24_Ap2016.pdf (accessed July 2017).
9. Amirthalingam G, Campbell H, Ribeiro S, Fry NK, Ramsay M, Miller E, Andrews N. Sustained Effectiveness of the Maternal Pertussis Immunization Program in England 3 Years Following Introduction. Clin Infect Dis. 2016;63:5236–43. doi:10.1093/cid/ciw559.
10. Pierce M, Kurinczuk JJ, Spark P, Brocklehurst P, Knight M; UKOSS. Perinatal outcomes after maternal 2009/H1N1 infection: national
11. Campbell H, Van Hoek AJ, Bedford H, Craig L, Yeowell A-L, Green D, Yarwood J, Ramsay M, Amirthalingam G. Attitudes to immunisation in pregnancy among women in the UK targeted by such programmes. Br J Midwif. 2015;23:566–73. doi:10.12968/bjom.2015.23.8.566.

12. Meningococcal ACWY conjugate vaccination (MenACWY). Public Health England. 2015. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/437901/150622_ACWY_bipartite_letter.pdf. (accessed July 2017).

13. Measles: confirmed cases. Public Health England. 2017. Available at: https://www.gov.uk/government/publications/measles-confirmed-cases (accessed July 2017).

14. Shingles vaccine coverage report, England, September 2016 to February 2017. Public Health England. Health Protection Report. Infection report / Immunisation. 2017;11(16):p. 2. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/611730/hpr1617_shngls-vc.pdf (accessed July 2017).

15. Shingles vaccine coverage report, England, September to November 2016. Public Health England. Health Protection Report. Infection report / Immunisation. 2017;11(4):p. 2. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/586837/hpr0417_shngls.pdf (accessed July 2017).

16. Vaccine update. Public Health England. 2017;261. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/608537/Vaccine_Update_261_April_2017_.pdf (accessed July 2017).