



Commentary

The life-course approach to vaccination: Harnessing the benefits of vaccination throughout life



Jody Tate^{a,*}, Teresa Aguado^b, Jan De Belie^c, Daphne Holt^d, Emilie Karafillakis^e, Heidi J. Larson^e, Sam Nye^f, David Salisbury^g, Mariano Votta^h, Suzanne Wait^a

^a The Health Policy Partnership, 68–69 St Martin's Lane, London WC2N 4JS, United Kingdom

^b ISGlobal, C/Roselló 132, 08036 Barcelona, Spain

^c Pharmaceutical Group of the European Union (PGEU), Rue du Luxembourg 19, 1000 Brussels, Belgium

^d Coalition for Life Course Immunisation (CLCI), Horts House, 22 Whitecourt, GL11 5TG, United Kingdom

^e Vaccine Confidence Project, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT, United Kingdom

^f Confederation of Meningitis Organisations (CoMO), Newminster House, Baldwin Street, Bristol, BS1 1L, United Kingdom

^g Centre on Global Health Security, The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London, SW1Y 4LE, United Kingdom

^h Cittadinanzattiva-Active Citizenship Network (ACN), Via Cereate 6, 00183 Rome, Italy

ARTICLE INFO

Article history:

Received 22 July 2019

Received in revised form 30 August 2019

Accepted 5 September 2019

Available online 23 September 2019

Keywords:

Life-course

Vaccination

Policy

ABSTRACT

Vaccination beyond childhood brings significant benefits at the individual, community and socio-economic levels. Despite this, immunisation programmes often fail to deliver the vaccines which could protect those at risk of vaccine-preventable diseases. In this commentary, we argue that the benefits of vaccination beyond childhood must be more widely understood and furthermore, that action must be taken by policymakers, healthcare professionals and patient and civil society organisations to ensure that the benefits of vaccination are fully realised. We outline five areas where change is needed to ensure vaccination across the life-course becomes truly embedded in national immunisation programmes. This includes investing in robust data collection and analysis; ensuring coordinated, multidisciplinary leadership from the top; engaging healthcare professionals; changing public perceptions of vaccination; and integrating vaccination into schools and workplaces.

© 2019 Elsevier Ltd. All rights reserved.

1. Introduction

Vaccination in children is vital but we should not stop there. To ensure that vaccination achieves its full potential to reduce morbidity and mortality and improve quality of life, its value needs to be recognised across all generations and population groups.

Although the need for a life course approach to vaccination is being increasingly acknowledged, there is a lack of consensus about its benefits, what it means from a policy perspective and, more importantly, how it can be implemented. In order to address this, we outline some key benefits of vaccination throughout life and suggest five priority policy areas for change, to ensure the benefits of vaccination are fully realised.

2. Who can benefit from vaccination? Looking beyond childhood

Different aspects of people's lives may put them at higher risk of catching and spreading disease. Reaching adolescence, pregnancy, becoming a parent, travel, working with vulnerable people, developing a chronic condition, and simply ageing can put people at risk of catching and spreading vaccine-preventable diseases. Immunisation programmes which target individuals with appropriate vaccines at the right time can, however, protect them.

Currently, national immunisation schedules vary greatly in how they support vaccination beyond childhood, even in Europe. Some countries such as Austria, Germany and the UK have immunisation calendars which cover most stages in life. Immunisation recommendations in countries including Poland, Romania and Bulgaria are more limited [1]. Furthermore, even where recommendations for different groups are in place, such as for people with chronic conditions, or health and care home workers, uptake is often low.

* Corresponding author.

E-mail addresses: jody.tate@hpolicy.com (J. Tate), teresa.aguado@isglobal.org (T. Aguado), j.de-belie@pgeu.eu (J.D. Belie), daphne.holt3@orange.fr (D. Holt), Emilie.Karafillakis@lshtm.ac.uk (E. Karafillakis), Heidi.Larson@LSHTM.ac.uk (H.J. Larson), sam.nye@comomeningitis.org (S. Nye), david.salisbury@btinternet.com (D. Salisbury), m.votta@activecitizenship.net (M. Votta), Suzanne.wait@hpolicy.com (S. Wait).

3. What are the benefits of a life-course approach to vaccination?

Vaccination across the lifecourse not only aims to reduce mortality, a key driver of childhood immunisation programmes, but also morbidity. It therefore supports people to maintain good health throughout their lives, contributing to healthy ageing and quality of life. The benefits of this approach can be felt on three levels:

3.1. Benefits for the individual

Individuals can benefit from vaccines at different ages. Changes to the body's immune function mean older people are more prone to vaccine-preventable diseases as they age and less able to benefit from the vaccines they received during childhood. Booster doses to protect against diseases such as pertussis, diphtheria and tetanus however, delivered at regular intervals during adolescence and adulthood, can maintain immunity over a longer period of time [2]. In addition, vaccines against diseases such as influenza, pneumococcus, herpes zoster and a number of vaccines currently under development can increase protection against vaccine-preventable diseases among older people. These may use novel formulations or schedules [3] although more research is needed in this area.

Vaccination of adults with chronic conditions can also bring significant benefits. Influenza increases the risk of an acute cardiovascular event among those with an existing chronic condition, but the influenza vaccination reduces this risk [4]. While all EU countries recommend the vaccine for people with certain chronic conditions, in 2014–2015, median uptake among the nine countries reporting data was only 50.3% [5].

3.2. Benefits to public health

A key benefit of vaccination beyond childhood at the population level is herd immunity, which occurs when high levels of vaccination among the general population prevent disease being passed to those who are unvaccinated, including those who cannot receive vaccines due to a compromised immune response. In the case of measles, herd immunity is achieved when coverage levels are above 95%, however this has only been achieved in four EU countries. Recent outbreaks in Europe have been fuelled by gaps in vaccination coverage at all ages with 53% of measles infections in 2017 being among people aged over 14 [6].

Vaccination across the lifecourse can also contribute to significantly lowering the use of antibiotics, thereby reducing the spread of antimicrobial resistance. Antibiotic prescription rates for influenza are high even though they are appropriate in only a small proportion of cases where a secondary bacterial infection is present. Influenza vaccination can reduce rates of infection and subsequently the appropriate and inappropriate use of antibiotics. In Ontario, Canada for example, the influenza vaccine was associated with a 64% reduction in antibiotic prescriptions for respiratory infections among all ages [7].

3.3. Socio-economic benefits

Vaccination at any age can deliver direct economic benefits including reduced medicine consumption and shorter hospital stays. For those of working age, when costs such as lost productivity are included, vaccination can even be cost-saving [8].

In addition, vaccination across the lifecourse is affordable. Estimates suggest it would cost less than €4000 to deliver up to 17 vaccines throughout life in Europe, considerably less than other population-wide prevention approaches [9].

4. What changes are needed?

We identify five priority areas where change is most needed to ensure the benefits of vaccination are fully appreciated, regardless of age:

4.1. Improving surveillance and data for vaccination beyond childhood

Concerted investment is needed in the systematic collection, analysis and use of high-quality infectious disease and vaccination data, to support decisions on improving vaccine use and informing immunisation schedules.

Immunisation information systems – including the extent to which they collect information on vaccination across the lifecourse – vary greatly between countries, even in Europe [10]. In addition, there is wide variation in the extent to which countries collect, analyse and use infectious disease data or collect information on comorbidities and outcomes among infected people.

Investment in robust collection and analysis of vaccination utilisation data is an important priority. These data are often scattered across databases with estimates often used to compensate for missing data. Combining datasets to understand trends in infectious diseases including among patients with comorbidities and in vaccine delivery and uptake is critical for evidence-based policies, setting appropriate coverage targets and monitoring progress.

4.2. Focused leadership from the top

National and regional policymakers, patient and civil society organisations and advocacy groups must collaborate to ensure the importance of a life-course approach is prioritised, understood, shared and implemented.

While some countries implement policies and programmes which embed different aspects of the life-course approach, these can be piecemeal rather than embedded within a framework to maximise health across the lifecourse. This must be addressed.

Regional policymakers can play a critical role. In Europe, a Council Recommendation on Strengthened Cooperation Against Vaccine Preventable Diseases recognises the need for member states to take a life-course approach to vaccination for healthy living, healthy ageing and healthcare sustainability.

4.3. Engaging healthcare professionals

Improving life-course vaccination knowledge among healthcare professionals and integrating community-based healthcare professionals, such as pharmacists, in vaccine delivery should be prioritised.

Healthcare professional advice and vaccine-related knowledge are key influencers on the choices people make about vaccine acceptance. This points to the need for greater education among healthcare professionals – especially for those who work in primary care – on vaccine safety, confidence, importance, communication and responses to hesitancy for people considering vaccination at any age.

Allowing appropriately trained pharmacists or community care providers to vaccinate all age groups in the community could increase uptake among those who may not come into contact with other health services [11].

4.4. Changing the public perception of vaccination

Evidence-based interventions to engage civil society and address vaccine hesitancy, tailored to different population groups across all ages, must be urgently implemented.

Vaccine hesitancy has been recognised by the World Health Organization as a top 10 global health threat. Some excellent strategies have been developed to address this challenge but the evidence on what works is still evolving and largely focuses on childhood vaccination. Lessons from successful programmes should form the basis for evidence-based interventions, tailored to priority groups during childhood and beyond. Engaging civil society in the delivery of these strategies is critical, harnessing the energy of citizens who are committed to increasing confidence, knowledge and vaccination coverage.

4.5. Integrating vaccination in non-health settings such as schools and workplaces

Increasing vaccine uptake beyond early childhood is a challenge. A lack of convenience can be a barrier, suggesting a potential role for access to vaccines through school and work-based settings.

Vaccination programmes implemented in school settings can improve uptake. They also provide an opportunity to support education on the role of vaccination among young people, their parents and teachers.

Selective vaccination in the workplace also offers opportunities. Vaccination of healthcare workers is recommended – and even mandated in some countries – due to the critical role they can play in spreading disease; however, uptake can be low. Greater attention is needed to ensure anyone whose occupation puts them at risk of vaccine-preventable diseases is encouraged to understand the importance of vaccination and is supported to take it up.

5. Conclusion

The evidence for the life-course approach to vaccination is compelling but there are significant gaps in uptake of vaccination beyond childhood. Targeting the right vaccines at the right time to those most at risk, regardless of their age, has the potential to improve health and quality of life on a population-wide level while contributing to more economically sustainable healthcare systems.

We have outlined five priority areas where action is needed to advance the life-course approach and ensure vaccination reaches its full potential. We call on policymakers, healthcare professionals and patient and civil society organisations to appreciate the importance of this approach and support its implementation.

6. Contributors

This article was developed following collaboration by the authors on a report on this topic, published in 2018. All authors participated in drafting, review and have approved the final version of this article. JT is the corresponding author, guarantor and coordinated the overall preparation of the manuscript.

Funding

This work was initiated and funded by MSD who provided funding to JT and SW to coordinate this article and the report on which it was based. The other authors were not paid for their time.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing

interests: JT and SW received fees from MSD to coordinate this work on behalf of the independent and unpaid co-authors. TA has undertaken paid consultancies for public sector organisations and occasionally for vaccine companies. JDB is a paid employee of the Pharmacists Group of the European Union. DH is the Chair of the Coalition for Life-Course Immunisation (CLCI) and has received honoraria and travel expenses for attendance at meetings funded by vaccine manufacturers. She is also a Past Governing Council member of The Confederation of Meningitis Organisations (CoMO) (2010 – 2017). EK and HL are staff members of the LSHTM research group “The Vaccine Confidence Project” which has received funding for other studies and projects from the European Commission, the EU Innovative Medicines Initiative, GSK, MSD, National Institute for Health Research (UK), and ECDC. SN is a paid employee of CoMO which occasionally receives grants from pharmaceutical companies in exchange for consultancy work that she is involved in delivering and is on the board of CLCI. DS has undertaken paid consultancies from vaccine companies and received paid travel. MV is director of Active Citizenship Network which has received funding from pharmaceutical companies for activities. JT and SW are employees of The Health Policy Partnership, which has received funding from MSD to develop a research report, infographics, an animation and a conference session on the topic of a life-course approach to vaccination.

Acknowledgements

The following individuals were involved in the report from which this article was developed, either as authors or contributors but they were not involved in the development of this article: Arnold Bosman, Transmissible; Sandra Evans, previously of The Health Policy Partnership; Jamie Wilkinson previously of PGEU.

References

- [1] Sheikh S, Biundo E, Courcier S, Damm O, Launay O, Maes E, et al. A report on the status of vaccination in Europe. *Vaccine* 2018;36:4979–92.
- [2] Zepp F, Heininger U, Mertsola J, Bernatowska E, Guiso N, Roord J, et al. Rationale for pertussis booster vaccination throughout life in Europe. *Lancet Infect Dis* 2011;11:557–70.
- [3] Loukov D, Naidoo A, Bowdish DM. Immunosenescence: implications for vaccination programs in the elderly. *Vaccine Develop Theory* 2015;5:17–29.
- [4] Clar C, Oseni Z, Flowers N, Keshkar-Jahromi M, Rees K. Influenza vaccines for preventing cardiovascular disease. *Cochrane Database Syst Rev* 2015;5: Cd005050.
- [5] Mereckiene J. European Centre for Disease Prevention and Control (ECDC) Technical Report: seasonal influenza vaccination in Europe. Vaccination recommendations and coverage rates in the EU Member States for eight influenza seasons. 2007–2008 to 2014–2015. Stockholm 2017.
- [6] ECDC. Monthly measles and rubella monitoring report: August 2019. Stockholm 2019.
- [7] Kwong JC, Maaten S, Upshur RE, Patrick DM, Marra F. The effect of universal influenza immunization on antibiotic prescriptions: an ecological study. *Clin Infect Dis* 2009;49:750–6.
- [8] Wateska AR, Nowalk MP, Zimmerman RK, Smith KJ, Lin CJ. Cost-effectiveness of increasing vaccination in high-risk adults aged 18–64 Years: a model-based decision analysis. *BMC Infect Dis* 2018;18:52.
- [9] Ethgen O, Cornier M, Chriv E, Baron-Papillon F. The cost of vaccination throughout life: a western European overview. *Hum Vaccin Immunother* 2016;12:2029–37.
- [10] ECDC. Immunisation information systems in the EU and EEA results of a survey on implementation and system characteristics. Stockholm 2017.
- [11] Expert panel on effective ways of investing in health. Vaccination Programmes and Health Systems in the European Union. Luxembourg 2018.