

The value of **prevention** through Vaccination



ΣfEE

HELLENIC ASSOCIATION OF
PHARMACEUTICAL COMPANIES

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Summary

Vaccines are one of the most effective tools for protecting public health worldwide. Immunisation prevents 2-3 million deaths every year across the world. This is why it is important to achieve the highest possible immunisation coverage of the population.

The benefits of vaccination in terms of preventing and protecting against communicable diseases extend beyond the people vaccinated to the entire community, through “herd immunity”, which prevents the transmission of diseases even to those who have not been vaccinated or cannot be vaccinated (such as pregnant women, immunocompromised persons, neonates).

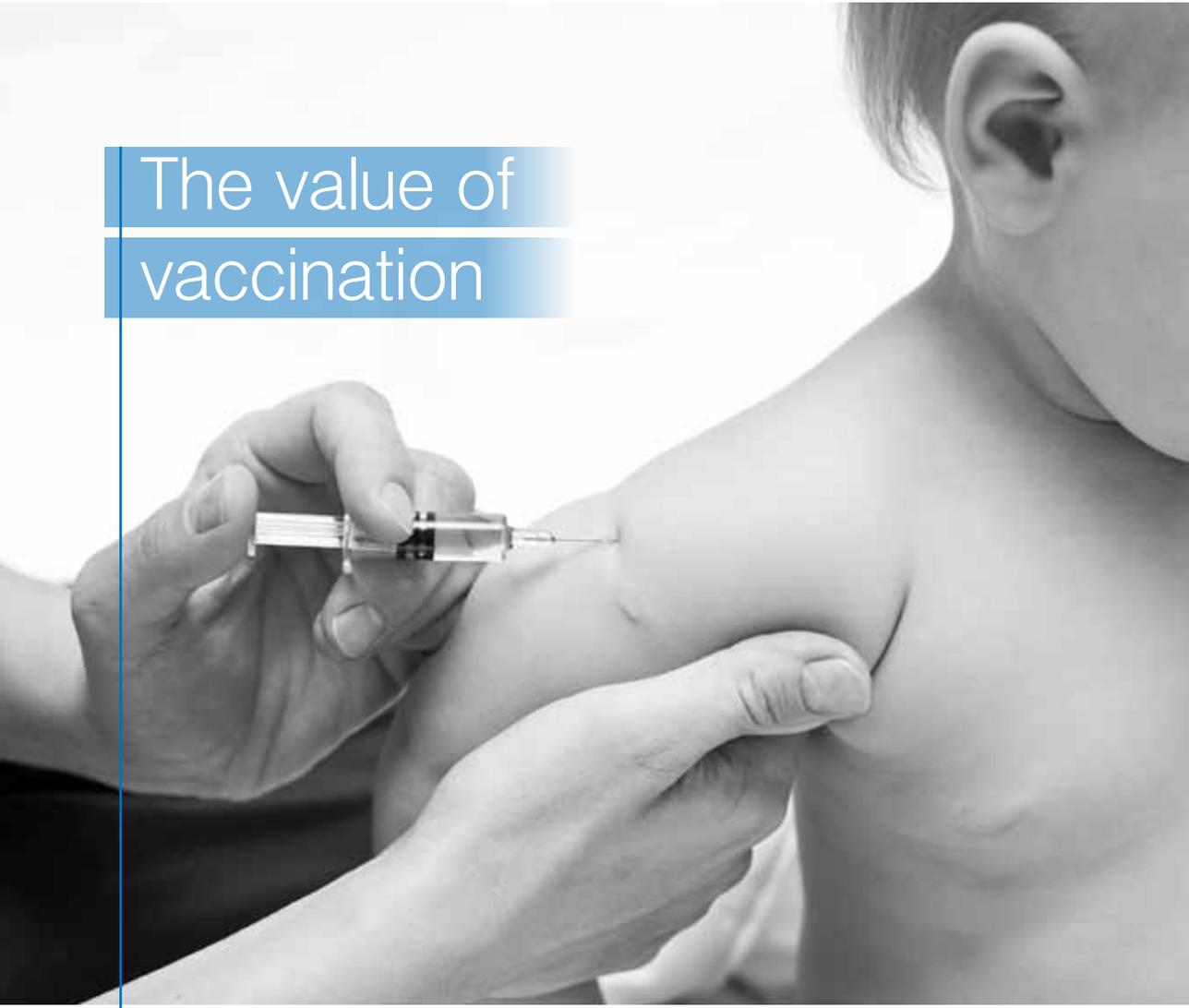
Vaccination is one of the most cost-effective public health interventions and is an investment for the healthcare system and for the population, as the benefit from the implementation of a vaccination programme far outweighs the cost involved. In the United States, for every dollar invested in immunisation, there is a return of 3% in the form of lower medical costs and 10% overall through a reduction of the cost of communicable diseases for the society.

Lack of compliance with the recommendations of the National Immunization Programme leads to outbreaks of epidemics (e.g. measles) or pandemics, with significant consequences for the health of the population and for health systems.

Greece has one of the most up-to-date Immunization Programmes. In order to maximise the benefit to Public Health, the State should, as a matter of top priority, set and strive to meet vaccination targets.

It is urgently necessary to develop an integrated immunisation coverage recording system, set vaccination targets and constantly update the National Immunization Programme.

Raising public awareness of the benefits of vaccination requires commitment from all the stakeholders involved in the healthcare system (Public Authorities, Medical Community, Industry).



The value of vaccination

Clinical value

Vaccination is one of the ten most important public health achievements of the 20th century¹. Thanks to the discovery of vaccines and the widespread implementation of immunization programmes, a number of deadly infectious diseases (diphtheria, polio) have been eradicated; the burden of communicable diseases has been reduced; and resources of healthcare systems have been saved.

1. Centers for Disease Control and Prevention. Ten great public health achievements – United States, 1900-1999, MMWR. 1999; 48(12): 241-243.

According to the World Health Organization (WHO), it is estimated that every year 2-3 million deaths around the globe are prevented through vaccination² and 750,000 children are saved from disability³, while an additional 1.5 million deaths could be avoided if global vaccination coverage improves⁴. In the United States, among children born during 1994-2013, vaccination will prevent an estimated 322 million illnesses, 21 million hospitalisations and 731,000 deaths over the course of their lifetimes⁵.

Recognising the benefits of vaccination for Public Health, the WHO General Assembly, as part of its «Decade of Vaccines» Programme, adopted the Global Vaccine Action Plan (GVAP) aiming to achieve 90% immunisation coverage for all vaccines in national immunisation programmes by 2020⁶.

→ Benefits to Public Health

Vaccines are the single most important primary prevention tool in the fight against communicable diseases, as well as the most effective way of protection against potentially deadly infectious diseases such as rubella, poliomyelitis or meningitis. Indeed, the number of reported varicella cases in the US fell from 30,000 in 1988 to zero in 2014. Also, the number of polio cases at a global level decreased from 350,000 in 1988 to only 360 in 2014.

Mass vaccination offers multiple benefits to patients with chronic conditions. For example, influenza vaccination reduces the incidence of heart attacks by 50%, the number of deaths in diabetic patients by 28%, and the risk of stroke in patients with respiratory diseases by 24%. Moreover, vaccination helps to curb antimicrobial resistance, by drastically reducing the use of antibiotics, as in the case of the anti-pneumococcal vaccine.

Finally, vaccination as an act of individual responsibility that has far-reaching social and economic implications. Specifically:

2. Hellenic Centre for Disease Control and Prevention (KEELPNO), European Vaccination Week. Vaccination in Europe and Greece. <http://www.keelpno.gr/elgr/e%CF%85%CF%81%CF%89%CF%80%CE%B5%CE%B2%CE%B4%CE%BF%CE%BC%CE%AC%CE%B4%CE%B1%CE%B5%CE%BC%CE%B2%CE%BF%CE%BB%CE%B9%CE%B1%CF%83%CE%BC%CE%BF%CF%8D.aspx>. Accessed 20-4-2017

3. WHO. http://apps.who.int/iris/bitstream/10665/63043/1/WHO_GPV_PR_96.01.pdf , Accessed 11/8/17

4. WHO. <http://www.who.int/features/factfiles/immunization/en/>, Accessed 23/4/2018

5. CDC Weekly, "Benefits from Immunization During the Vaccines for Children Program Era — United States, 1994–2013", April 25, 2014 / 63(16);352-355 <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6316a4.htm> Accessed 19/1/2018

6. WHO, Global Vaccine Action Plan 2011-2020, http://www.who.int/immunization/global_vaccine_action_plan/GVAP_doc_2011_2020/en/ , Accessed 223/4/2018

- Herd immunity: High vaccination coverage of all age groups of the population provides “herd immunity”, which has a positive impact and indirectly protects non-vaccinated individuals as well, due to the lower circulation of pathogens among healthy people. The importance of the highest possible vaccination coverage becomes even more crucial, taking into account the increased cross-border movement of populations which significantly facilitates the spread of pathogenic and potentially deadly infectious agents on a now global scale.
- Protection of specific vulnerable social groups for whom vaccination is not appropriate (pregnant women, immunocompromised persons, newborns for certain diseases).
- The reduction in disease incidence is greater, as vaccination reduces the spread of an infectious agent. The immunity achieved in people who have been vaccinated against a specific disease stops the disease from spreading across the community.

→ Economic value

The widespread implementation of vaccination programmes reduces both the direct costs (medical care) associated with the treatment of diseases caused by infectious agents and the indirect costs resulting from loss of productivity (e.g. work hours lost).

A recent study by the US Center for Disease Control and Prevention (CDC) suggests that every dollar spent on childhood vaccination saves \$3 in direct costs and \$10 in total societal costs⁴.

In many cases the economic burden of a disease is already very high, sometimes far exceeding the cost of immunization. A WHO study estimates the economic impact of seasonal influenza at between one and six million dollars per 100,000 inhabitants⁷ in Germany, France and the United States, whereas the European Commission estimates the total annual cost for all European countries at between €5.9 and €27.7 billion⁸. Equally important are the benefits of childhood vaccination programmes. In Spain, the cost of treating a pneumococcal case has been estimated at €14,533 with an average hospitalisation time of 11 days. Vaccination against rotavirus has led to savings of €63 million in France and €67-80 million in Italy by avoiding over 87,000 hospitalisations per year. In the Netherlands, with 2,700 reported cases of measles in 2013-2014, the total cost of this epidemic outbreak was estimated at \$4.7 million⁹. Similarly, vaccination against human papillomavirus can prevent cases of various related cancers such as cervical cancer associated with costs of €8,000-€12,000 to cope with each incident. At the same time, the anti-HPV vaccine protects against genital warts, for which 600,000 new cases occur in Europe with a direct medical cost of €23 million per year.

7. WHO. Influenza vaccines, WHO position paper. *Weekly Epidemiol Rec* 2005;33:279-287.

8. Commission of the European Communities. Proposal for a Council Recommendation on seasonal influenza vaccination. COM(2009);353:final/2.

9. https://wwwnc.cdc.gov/eid/article/21/11/15-0410_article

The development of antimicrobial resistance due to the overuse/misuse of antibiotics in the community poses a huge threat to public health, as persistent infections have a high cost of treatment and some patients do not survive. Vaccination of humans and animals effectively prevents the disease, thereby avoiding the use of antibiotics. Increased vaccination coverage will reduce the consumption of antibiotics and the development of antimicrobial resistance. According to WHO, if every child in the world were vaccinated against *Streptococcus pneumoniae* bacteria, 11 million days of antibiotic treatment would be avoided worldwide¹⁰.

In addition to protection against communicable diseases and direct medical cost savings, vaccines can also reduce the risk of secondary infections. In particular, the need for hospitalisation of healthy people in Primary and Secondary Healthcare Centres is reduced, thereby avoiding the exposure of vaccinated individuals to multidrug-resistant pathogens that cause hospital-acquired infections.



The special nature of vaccines

Key features

Vaccines have specific characteristics, which determine their demand and consumption. Specifically:

- they are given to healthy populations;
- they have a specific dosing regimen, which upon completion does not require additional dosing;
- they concern specific age groups (in line with the recommendations of the National Vaccination Programme).

→ Development & Production

Vaccine development is a complex and time-consuming process, quite different from the development of conventional pharmaceuticals. The development of a vaccine requires a long-term research, study and testing process, lasting some 12 to 15 years.

Equally demanding is their production process, as multiple stages of inactivation and purification of antigens and tests are required along the production process until the final product can be launched. Rigorous controls are performed through tests of high accuracy and sensitivity. Further to testing at the manufacturer, before a vaccine can be released to the public, it must be checked and approved by accredited independent testing laboratories, which adds to the lead time required until the launch of the product.

Given the high quality requirements and long production cycles, vaccine production is subject to constraints which affect the availability of the quantities required to meet global needs. At the same time, extraordinary situations create additional needs and raise supply adequacy concerns. As known, world vaccine production is less than the respective demand, and it is with a great effort that the quantities of vaccines are secured every year to meet Greek needs.

Vaccination in Greece

Greece has one of the most up-to-date immunization programmes both for children and adolescents and for adult population. The Ministry of Health, after consulting the National Immunization Committee, updates the National Immunization Programme. The vaccines in the National Immunization Programme are fully reimbursed by EOPYY according to the latest Integrated Healthcare Regulation.





The new environment and the importance of vaccination programmes

The resurfacing of old diseases and the emergence of new ones

Although marked progress has been made in improving socio-economic conditions, in discovery of vaccines and in the use of antibiotics, some of the old communicable diseases appear again, while new ones are emerging that pose significant threats to the health of the population. The resurfacing of diseases that had been eliminated by extensive vaccination programmes proves wrong the perception that these diseases are no longer a public health problem in developed countries. Also, the fear of virus mutation gives rise to serious concerns about the effectiveness of existing pharmaceutical preparations and the ability of health systems to cope with such challenges.

→ Refugee flows

The prospect of medium-to-long-term stay of a significant number of refugees, asylum seekers and immigrants in our country since March 2016 has brought about a new situation and a need to organise vaccination for children living in refugees, asylum seekers and immigrants. A risk assessment carried out in 2015 by the European Centre for Disease Prevention and Control (ECDC) for infectious diseases involving newly arrived refugees, asylum seekers and migrants in European countries highlighted the importance of vaccine-preventable diseases. As priority vaccines for refugees and asylum seekers, our country has identified the vaccines against measles, rubella, mumps, diphtheria, tetanus, pertussis, poliomyelitis (DTaP-IPV) and BCG in infancy.

However, the large number of refugees and suboptimal living conditions call for urgent measures to safeguard public health. In addition, it should be noted that a large number of migrants and refugees use Greece as a transit country, which increases the risk of viral agents spreading in the community.

→ Inadequate recording of vaccination coverage of the population

As mentioned above, the absence of a mechanism for recording vaccination coverage is one of the major problems in the implementation of vaccination programmes. The

lack of relevant data poses significant risks to public health and the health system, as it prevents proper planning of resources and prioritisation of needs.

In most of the developed countries, vaccination coverage is systematically recorded and reviewed in order to determine, monitor implementation and periodically update national vaccination strategies. In Greece, there are numerous studies and surveys at local level and very few at national level. The latest nationwide study was published in 2012 and focused on child population.

Significant gaps are also observed in the recording of vaccination coverage of adults and high-risk groups.

A more recent example is the upsurge of measles in Europe and Greece. In our country, more than 2,500 thousand measles cases have been reported between the epidemic outbreak on 1 May 2017 and mid-April 2018, according to KEELPNO epidemiological data – with the majority of patients belonging to hard-to-reach groups (Roma).

→ **The anti-vaccination movement**

The anti-vaccination movement has contributed to the return of epidemics of “extinct diseases”. Either because of complacency as a result of the eradication of some diseases, or due to a lack of access to health services or misinformation, anti-vaccinationists have grown in numbers in recent years in Europe and Greece. Developing a common understanding of the benefits of vaccination requires concerted action to educate the population. A key component is the common attitude of healthcare professionals and the continuous encouragement of the population to comply with the recommendations of the National Immunization Programme.

→ **Negative birth/death balance and the implications of non-vaccination**

Given the increase in life expectancy and the growing problem of infertility in Greece, the relative importance of adult vaccination seems to be particularly high. It is characteristic that the serious cases of influenza and the number of influenza-induced deaths increased dramatically over the period 2011-2016 from 127 to 435 and from 56 to 197, respectively. Consequently, preventive investment in vaccination, especially for the elderly, will have immediate results both in preventing outbreaks of infectious diseases and in avoiding the financial burden on the health system.

Vaccination
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population



The widespread implementation of prevention programmes is a top priority of health systems in Western European countries. However, Greece seems to spend just 1.3% of total public health expenditure on prevention¹¹. This is the second lowest percentage among the 34 OECD countries. Also, Greece's spending on vaccination is nearly \$5 per capita - the lowest among the 34 OECD countries.

11. OECD Health Working Papers No. 101, How much do OECD countries spend on prevention?



The future of vaccination in Greece

Our country has one of the most up-to-date vaccination programmes. However, the new challenges call for measures towards a broader implementation of the vaccination programme broadly. In this respect, possible lines of government action are the following:

→ **Raising public awareness of the value and benefits of vaccination**

Keeping the public and healthcare professionals regularly informed about the value and benefits of vaccination strengthens confidence in vaccines and prevention and shores against any misgivings that may be felt from time to time. Apart from the frequency, however, the effectiveness of public information campaigns crucially hinges upon the capacity and plurality of the media used to convey the message across the entire population.

→ **Systematic recording of vaccination coverage**

Controlling infectious diseases contributes to the development of societies, saves resources by reducing hospitalisations and increases productivity.

Against this background, it is of the utmost importance to develop a vaccination coverage recording system, which, on the one hand, will enable to identify priorities and, on the other, will provide data for an evidence-based assessment of the immunization programme.

→ Setting national vaccination targets

The setting of vaccination targets is one of the primary steps of a national plan for the prevention and safeguarding of public health, as the achievement of the targets typically leads to herd immunity and protection of the population. If vaccination coverage is far from the desirable level, the staggered vaccination schedule should be staggered, aiming at achieving herd immunity over a longer period of time.

Since 2009, the European Union has indicated the need to establish vaccination coverage targets¹². Similarly, the WHO's European Vaccine Action Plan 2015-2020 includes goals such as sustaining Europe's polio-free status; eliminating measles and rubella by ensuring high coverage and closing the immunity gaps; controlling hepatitis B; and meeting regional vaccination coverage targets, e.g. $\geq 95\%$ for the DTP vaccine in 48 out of 53 countries (90%)¹³.

Such targets could be set in our country too, in a possible review of the Action Plan on Prevention and Immunisation¹⁴.

→ The importance of revising the National Immunization Program on a continuous basis

Updating the vaccination programme is one of the most effective practices in defending and protecting Public Health, as it aims to address current and future risks to community health.

→ Exclusion of vaccines from fiscal measures

Excluding vaccines from fiscal measures to control public outpatient pharmaceutical expenditure and making vaccination spending part of a broader prevention framework will enable financial recourses to be channeled into actions aimed to enhance vaccination coverage, ensure recording and monitoring and constantly raise public awareness of the value of vaccination. Such actions can thus not only become more targeted, but also gain active support from all stakeholders, without the current constraints¹⁵.

12. https://ec.europa.eu/health/ph_threats/com/Influenza/docs/com481_2009_en.pdf

13. WHO, European Vaccine Action Plan 2015–2020 (EVAP)

14. <http://www.moh.gov.gr/articles/health/domes-kai-draseis-gia-thn-ygeia/ethnika-sxedia-drashs/95-ethnika-sxedia-drashs?fdl=230>

15. The cost of vaccination is part of the EOPYY budget of public outpatient healthcare expenditure. In recent years, this budget has remained limited, at €1.945 billion; as total pharmaceutical costs are much higher than this amount, overruns occur which pharmaceutical companies are required to cover through the claw-back mechanism.



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