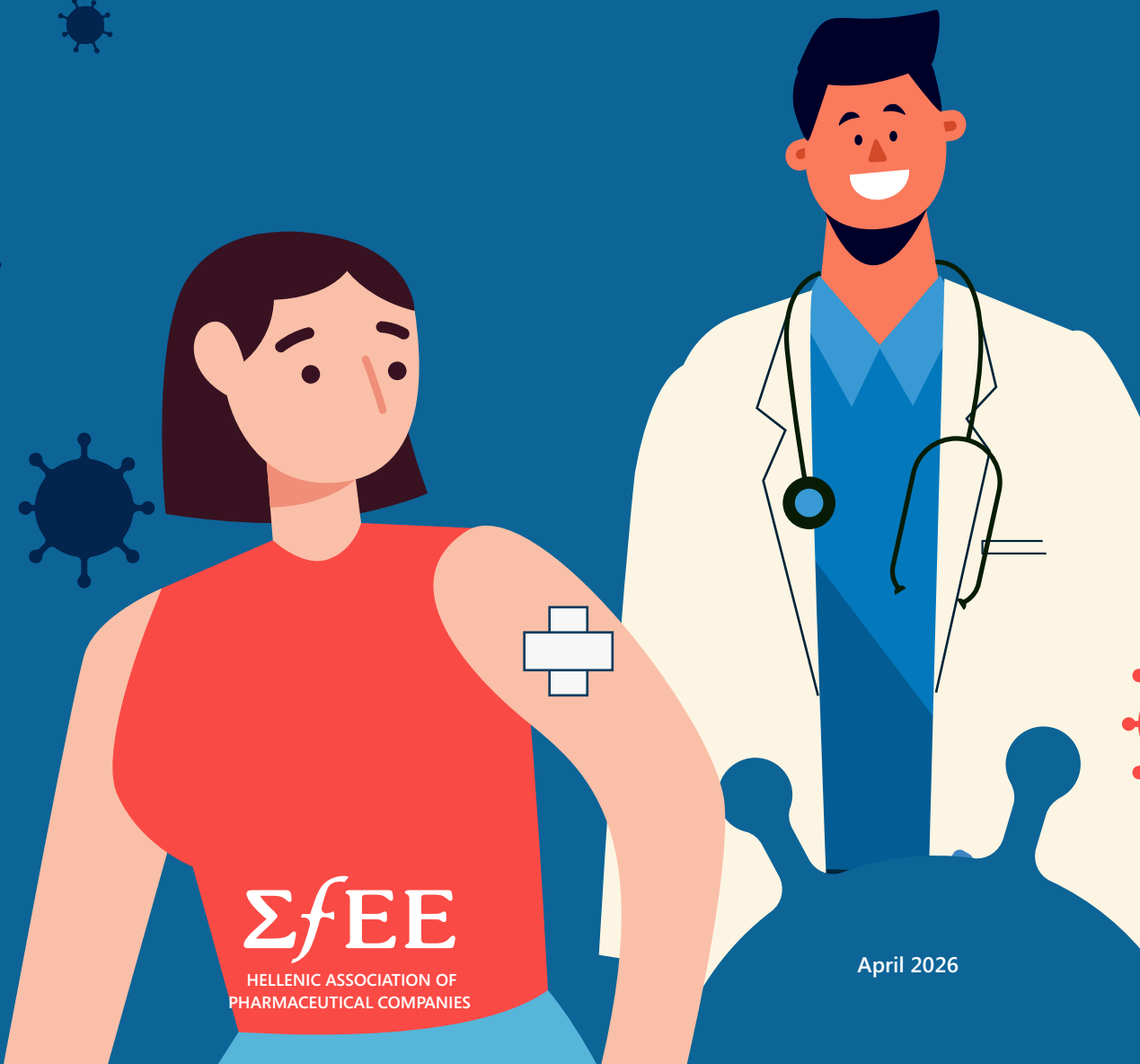


# Vaccination Programs: A Fundamental Pillar of Public Health



**ΣφΕΕ**

HELLENIC ASSOCIATION OF  
PHARMACEUTICAL COMPANIES

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# SUMMARY

- Vaccines constitute one of the most effective public health interventions.
- Vaccination is an act of both individual and collective responsibility, as through “herd immunity” its benefits extend to the entire population and, consequently, to the healthcare system.
- The recent public health crisis—the COVID-19 pandemic—once again highlighted the value of vaccines, as they contributed to limiting the spread of the virus and enabling the global community to return to normality.
- Vaccines constitute a strong shield against modern challenges.
- Our country has one of the most advanced vaccination programs, aiming to protect all age groups.
- The development and research pipeline for new vaccines is characterized by technological diversification, a broader focus on diseases, and a mature portfolio in advanced stages of development.
- The continuation of supportive policies, simplification of regulatory processes, and sustained investment in innovation are crucial to ensuring that these scientific advances translate into tangible public health benefits.
- The creation of alliances aimed at highlighting the value of lifelong vaccination underscores its critical role in protecting public health.

# 1. CONTEMPORARY CHALLENGES AND THE IMPORTANCE OF POPULATION IMMUNIZATION

Vaccination programs are an investment with multiple and multiplicative benefits for the social and economic environment. In particular, together with access to safe water, they are considered among the public health interventions with the greatest impact on reducing mortality and controlling population growth.<sup>1</sup> Their proper implementation reduces the fiscal burden caused by vaccine-preventable diseases, contributes to the reduction of lost working hours, and increases workforce productivity<sup>2</sup>.

The recent public health crisis highlighted the immediate and long-term impact of vaccines as a multidimensional investment in the health and well-being of the population.<sup>3</sup> Specifically, data from a recent study showed that during the period 2020–2024, COVID-19 vaccination saved 2.5 million lives worldwide, corresponding to 15 million life-years gained<sup>4</sup>.

Especially today, as the global community faces challenges such as population aging, climate change, migration flows, antimicrobial resistance, and ongoing armed conflicts, vaccines serve as a protective shield for the sustainability of healthcare systems and social well-being. At the core of demographic changes, investment in prevention and health promotion reduces future pressure on systems, making them more resilient, as population aging increases the demand

for healthcare and long-term care services. According to the World Health Organization (WHO), by 2050, 1 in 6 people will be over the age of 60, while the number of individuals aged 80 and above will reach 426 million<sup>5</sup>. In Greece, the proportion of individuals aged 65 and over increased from 17% in 2000 to 23% in 2024. This percentage is projected to rise further to 34% by 2050, which will be the highest in the EU, alongside Italy and Portugal. In this context, the need to adopt a life-course vaccination approach—ensuring that people of all ages receive the vaccines they need—emerges as a fundamental element in achieving the Sustainable Development Goals, the United Nations Decade of Healthy Ageing (2021–2030), and the Immunization Agenda 2030 of the World Health Organization<sup>6</sup>.

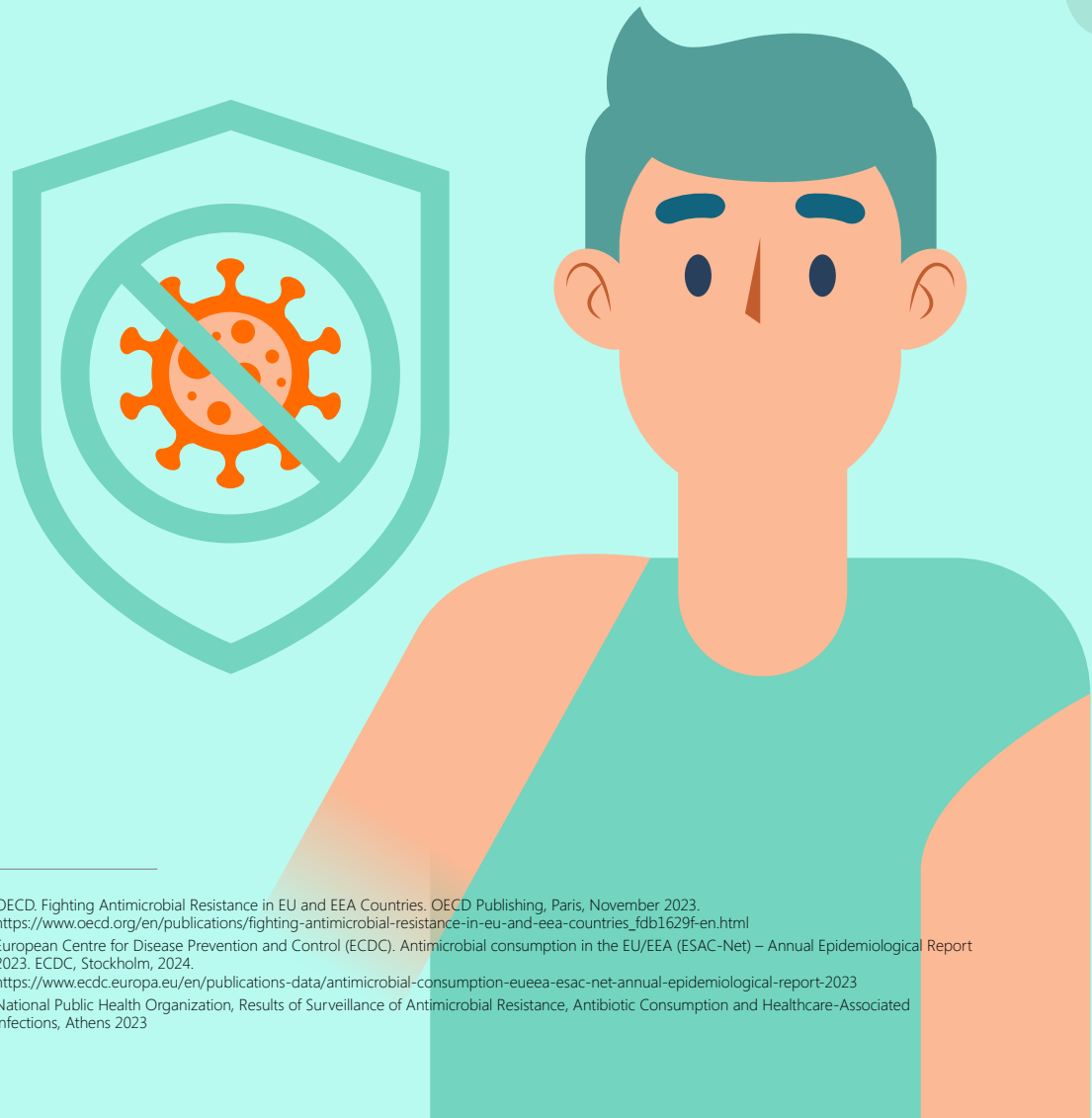
Vaccination also plays a key role in addressing the global challenge of **antimicrobial resistance (AMR)**, as its use directly or indirectly prevents bacterial and viral infections. According to the World Health Organization, more than 1,300,000 deaths in 2019 were directly attributed to resistant infections<sup>7,8</sup>, while by 2050, infections caused by resistant microbes are expected to become the leading cause of death worldwide<sup>9,10</sup>.



1. Plotkin, S. A. (2005). Vaccines: past, present and future. *Nature medicine*, 11(Suppl 4), S5–S11.
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The economic burden is also substantial, with the Organisation for Economic Co-operation and Development estimating that the additional cost to European healthcare systems from resistant infections amounts to €6.6 billion annually<sup>11</sup>.

In Greece, antibiotic consumption remains exceptionally high, both in the community and in hospitals, at 28.5 daily doses per 1,000 inhabitants, compared to a European average of 20<sup>12</sup>. Similarly, the threat of AMR is highlighted by a major study conducted in 2023 by the National Public Health Organization in ten large public hospitals across the country. Specifically, it is reported that Greece ranks first among European countries in the prevalence of healthcare-associated infections (HAIs), while also recording one of the highest rates of antimicrobial resistance (AMR) in Europe for specific microbial strains. AMR rates in Greece have increased compared to the pre-COVID-19 pandemic period<sup>13</sup>.



## VACCINATION: AN INVESTMENT IN PUBLIC HEALTH

### HEALTH SYSTEM



Reduces morbidity and mortality from infectious diseases that are prevented through vaccination



A powerful tool in controlling antimicrobial resistance



Contributes to reducing the demand for health resources/ services

### SOCIETY



Improves quality of life



Provides protection to groups that cannot be vaccinated through herd immunity

### ECONOMY



Contributes to increased productivity



Offers savings in resources/ healthcare services



Promotes the well-being of society

11. OECD. Fighting Antimicrobial Resistance in EU and EEA Countries. OECD Publishing, Paris, November 2023.

[https://www.oecd.org/en/publications/fighting-antimicrobial-resistance-in-eu-and-eea-countries\\_fdb1629f-en.html](https://www.oecd.org/en/publications/fighting-antimicrobial-resistance-in-eu-and-eea-countries_fdb1629f-en.html)

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13. National Public Health Organization, Results of Surveillance of Antimicrobial Resistance, Antibiotic Consumption and Healthcare-Associated Infections, Athens 2023

## 2. DEVELOPMENTS IN THE FIELD OF PREVENTION THROUGH VACCINATION

The field of research and development of vaccines and immunization agents globally and in Europe is evolving, aiming to address new disease-related and technological challenges by leveraging technological advances, shifting epidemiological priorities, and a strong pipeline of candidate products in advanced stages of development.

Today, there are more than 90 candidate vaccines and monoclonal antibodies in clinical development by member companies, covering a wide range of infectious diseases and utilizing multiple technological platforms. This breadth reflects both scientific progress and a strategic shift toward viewing vaccination as the most effective public health intervention across all age groups of the population. It is worth noting that more than 80% of candidate vaccines target the adult population<sup>14</sup>.

Technological innovation is a key characteristic of developments in vaccine research and development. Next-generation technological platforms, such as mRNA, recombinant proteins, and viral vectors, are complemented by emerging approaches such as DNA vaccines and monoclonal antibodies for prophylaxis. Advances in technology have led, within the framework of the revision of the European Pharmaceutical Strategy—which is set to come into force in 2026—to define vaccines as **“any medicinal product intended to induce an immune response for prevention, including post-exposure prophylaxis, and for the treatment of diseases caused by an infectious agent.”**<sup>15,16</sup>. In this direction is the inclusion of the monoclonal antibody (nirsevimab) in vaccination programs, as it significantly contributes to reducing hospitalizations and confirmed cases caused by the RSV virus.

Additionally, research into new delivery methods—such as intranasal and oral vaccines—aims to improve access and acceptance<sup>16</sup>. These developments contribute to more flexible and faster vaccine development processes, strengthening countries’ preparedness against future public health threats.

From a disease perspective, the technologies under development reflect a dual focus on established (ongoing or persistent) public health challenges and emerging risks. Notably, around 40% of candidate vaccines target diseases for which no vaccine is currently available, such as HIV, Lyme disease, and the Epstein–Barr virus, highlighting a shift toward addressing unmet medical needs.

14. Vaccines Europe, Pipeline Report 2025; C.E.PI., 2026

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# 3. VACCINATION CONCERNS ALL AGE GROUPS

For the optimal implementation of vaccination programs, it is important to highlight the benefits of vaccination throughout the entire life course in order to fully leverage the potential of immunization across all ages.

A milestone in assessing the value of vaccines is a comprehensive study published in *The Lancet* (2024), which concludes that vaccination has saved at least 154 million lives over the past 50 years (1974–2024). The study highlights that vaccination accounts for 40% of the global reduction in infant mortality and that, for each life saved, an average of 66 years of full health are gained.<sup>17</sup> Additionally, according to data from the Centers for Disease Control and Prevention (CDC), between 1994 and 2023, childhood vaccination prevented approximately 508 million cases of illness, 32 million hospitalizations, and over 1 million deaths, saving \$540 billion in direct medical costs and \$2.7 trillion in total societal costs—yielding about \$11 in return for every \$1 invested in childhood vaccination.<sup>18</sup>

In Greece, the assessment of the value of investment in vaccination, and its multiplicative return, is presented in a recent study<sup>19</sup>, according to this study, the proper implementation of recommendations for nine (9) routine vaccinations for children aged 2 months to 11 years—targeting 14 vaccine-preventable diseases (diphtheria, hepatitis A, hepatitis B, Haemophilus influenzae type b, measles, meningococcal disease, mumps, pertussis, pneumococcal disease, poliomyelitis, rotavirus, rubella, tetanus, and varicella)—prevents 447,221 disease cases, 242 deaths, and the loss of 6,682 life-years in the 2022 cohort (82,700 children).

In addition, the existence of the pediatric National Immunization Program was associated with savings of nearly €201.4 million. Taking into account the cost of the vaccination program, reduced treatment expenses, decreased productivity losses, improved quality of life, and fewer deaths, every €1 invested in vaccination is estimated to generate €8.5 in societal cost savings in our country. Furthermore, recent data show that infant immunization in Greece with a monoclonal antibody could prevent 2,716 hospitalizations annually and lead to savings exceeding €20 million<sup>20</sup>.

Regarding the multiplicative benefits of vaccination in the adult population, a report by the Office of Health Economics (2024) concludes that adult vaccination programs can deliver socioeconomic benefits comparable to those achieved by childhood immunization programs.

Specifically, the study assessed the benefits of vaccines against influenza, pneumococcal disease, RSV, and herpes zoster across ten countries, concluding that such programs can generate socioeconomic benefits of up to 19 times the initial investment, with a net societal benefit of up to \$4,637 per vaccination course<sup>21</sup>. The above-mentioned data highlight adult vaccination as an investment with efficiency comparable to childhood programs and as a powerful tool for addressing the challenges of population aging and antimicrobial resistance.

Similarly, the use of enhanced vaccines against seasonal influenza in individuals aged ≥65 years in Greece is estimated to result in net cost savings of over €13 million, with a favorable ICER of approximately €10,000 per QALY, primarily through the prevention of hospitalizations<sup>22</sup>. Furthermore, Greek data indicate that vaccination reduces the risk of hospitalization by 30–45% and productivity loss by 50%, confirming its overall value<sup>23,24</sup>.

20. Rigopoulos P, Stratopoulos A, Ghemouri M, Mortaki K, Kougioumtzoglou I. CO192 Projected public health benefits of nirsevimab for RSV prevention in infants in Greece. *Value Health*. 2025;28(12 Suppl):S80–S81.

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# 4 FACTORS DETERMINING THE DEVELOPMENT AND IMPLEMENTATION OF VACCINATION PROGRAMS

Greece has one of the most advanced vaccination programs, covering the pediatric, adolescent, and adult populations. However, emerging challenges highlight the need to adopt measures aimed at the broad implementation of these programs, so that the State can maximize the return on its investment. In this direction, the following factors are considered critical:

## 4.1 Establishment of distinct stages for recommendation and reimbursement

The establishment of distinct stages, along with clearly defined responsibilities and procedures for the bodies designated by the legislative framework as responsible for the development and reimbursement of vaccination programs, is considered crucial for the design and implementation of vaccination policies.

Transparency in the evaluation and decision-making processes of these bodies will contribute to increasing public trust in vaccination.

## 4.2 Establishment of vaccination targets

The establishment of vaccination targets reflects the commitment of health authorities to positioning vaccination as a key mechanism for promoting public health.

The Immunization Agenda 2030 of the World Health Organization sets a central target of  $\geq 90\%$  global coverage with the DTP3 vaccine<sup>25</sup>. Similarly, the European Immunization Agenda 2030, adopted by the 53 Member States of the WHO European Region, aims for the complete elimination of measles in all Member States—a goal that requires  $\geq 95\%$  coverage with both doses<sup>26</sup>.

For the pneumococcal vaccine (PCV) and hepatitis B, a target of  $\geq 90\%$  coverage is set. Overall, vaccination against hepatitis B and the human papillomavirus (HPV) could prevent 1.1 million cancer cases annually worldwide.

Indicatively, global vaccination coverage with the HPV vaccine—which protects against a viral infection that can cause cervical cancer in women, as well as other types of cancer and genital warts in both men and women—is estimated at 31% in 2024<sup>27</sup>. Furthermore, in our country, a recent publication<sup>28</sup> highlighted that full vaccination coverage among girls reaching the age of 15 increased from 47.7% in 2022 to nearly 52.5% in 2024, but remains far from the 90% target set by the World Health Organization, which should be achieved by 2030<sup>29</sup>.

25. WHO. Immunization Agenda 2030: A Global Strategy to Leave No One Behind. 2021. <https://www.immunizationagenda2030.org/>

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Although immunization programs save millions of lives, countries continue to face outbreaks due to insufficient vaccination coverage rates. In the long term, this downward trend may pose a significant threat to achieving herd immunity—and to maintaining low morbidity and mortality rates among younger populations—leading to the re-emergence of diseases that could have been prevented through vaccination (e.g., the measles outbreak in Europe and Greece in 2017).

Concerning findings are also presented in the latest global tuberculosis epidemiological surveillance report (2025) published by the World Health Organization, which shows a 10% increase in cases among children under 15 in Europe and Central Asia. This increase corresponds to 650 additional pediatric tuberculosis cases in 2023 compared to 2022<sup>30</sup>.

### 4.3 Development and Implementation of Recording and Monitoring Systems for Vaccination Coverage

The development and proper implementation of mechanisms for recording and monitoring vaccination coverage have multiple implications for society and the healthcare system.

In particular, they can help identify the population's health needs as well as vaccination gaps by geographic region, age group, and health status, and guide targeted interventions to safeguard public health by reducing the risk of disease and complications from vaccine-preventable illnesses.

Essentially, the collection and utilization of data enable the identification of priorities, provide evidence for assessing the benefits of vaccination programs, and mobilize health authorities, the scientific community, and the public to ensure proper adherence to the National Immunization Program.

It is worth noting that our country has made significant progress in the development of databases (e.g., Immunization Registries, Electronic Health Records). However, their immediate activation and proper operation are crucial in order to contribute to the design of rational and effective vaccination policies. In this direction, expanding access to more groups within the medical community involved in the vaccination process could improve the accurate collection of data (e.g., pharmacists in adult vaccination).

At the same time, the implementation of public notification systems—such as those used during COVID-19 vaccination (e.g., informing citizens about the scheduling of doses by age group)—would be important, particularly for adolescents and adults, where vaccination coverage remains low.

### 4.4 Maintaining a sustainable budget

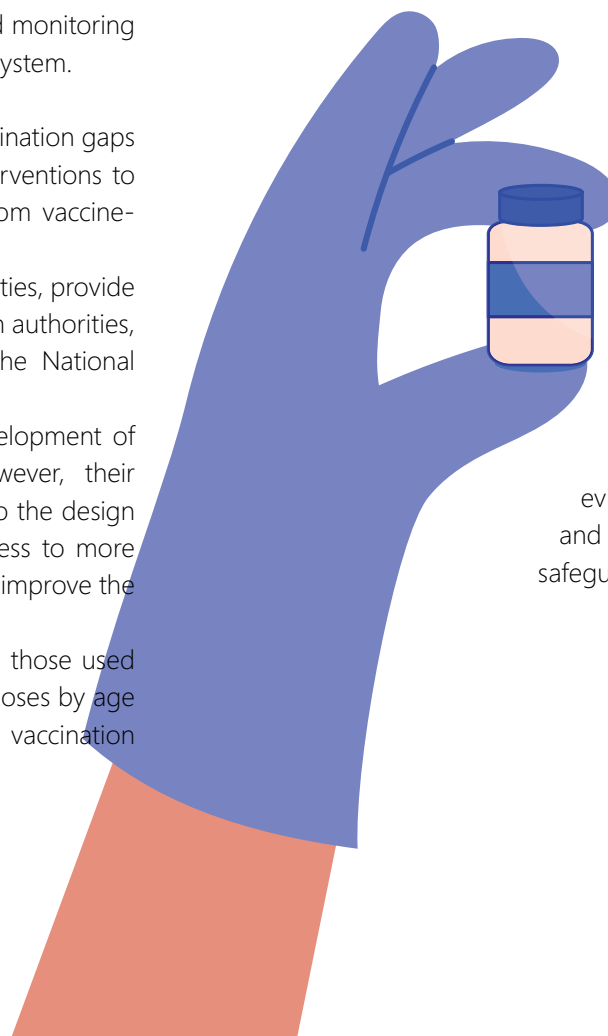
The design of a sustainable budget is a critical factor for the development and implementation of vaccination programs and should be treated as an investment in the growth, progress, and well-being of the state and society.

In this context, key parameters for determining the level of funding include health needs, demographic changes, developments in the field of vaccines, and vaccination targets. At the same time, data collected from Immunization Registries are an important component, as they can map trends and highlight vaccination gaps.

Additionally, the “horizon scanning” process—which provides essential information on developments in new technologies—can contribute to long-term planning and ensure the financial sustainability of vaccination programs.

### 4.5 Creation of a coalition of all stakeholders to highlight the value of vaccination

Achieving and maintaining high vaccination coverage requires collective effort and coordinated actions. The effective implementation of the National Immunization Program for Children, Adolescents, and Adults requires collaboration and communication among physicians of various specialties, pharmacists, health visitors, and all professionals involved in the provision of vaccination services. Continuous information and awareness of the public and healthcare professionals, at regular intervals, regarding the value and benefits of vaccination, strengthens public trust in vaccines and helps counteract any hesitancy that may arise. Effective communication requires coordination, consistent messaging, and the use of scientific evidence, and should form the core of prevention policies. Educating and raising public awareness about the value of vaccination contributes to safeguarding collective health.



30. <https://eody.gov.gr/el/nea/enimerotika-deltia/enemerotiko-deltio-eody-aprilios-2025.html>

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