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Review

# Strengthening global vaccine access for adolescents and adults

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ABSTRACT

Global immunization efforts to date have heavily focused on infants and children, with noted success on public health. Healthy adolescents and adults contribute to the economic growth and development of countries but efforts to ensure vaccine coverage for these groups receive inadequate global attention and resources. Emerging epidemics for a number of infectious diseases including Ebola, Zika, dengue, malaria and the continuing epidemics of tuberculosis and several sexually transmitted infections, including HIV, HPV and Hepatitis B, have high incidence and prevalence in adolescents and adults. New vaccines under development for these diseases and under-used vaccines such as for human papilloma virus will have the greatest health and economic impact in these populations.

Global consensus, political will, policies, global and country infrastructure, and financing mechanisms are needed to accelerate access for the billions of adolescents and adults living under the threat of devastating infectious disease outbreaks and epidemics, especially in lower income countries. The global health community and countries cannot afford to delay planning for implementation of adolescent and adult vaccine programs that will potentially save millions of lives and strengthen global and national economies. The article examines this next challenge and suggests a research agenda and a framework for action to galvanize global and national policy decision-makers to begin preparations for future immunization challenges.



**Contents**



## 1. Introduction

Global immunization efforts to date have focused heavily on infants and children. The major stakeholders responsible for this surge – namely, the United Nations Children's Fund (UNICEF), Gavi, the Vaccine Alliance (Gavi), The Bill and Melinda Gates Foundation, the World Health Organization (WHO), and bilateral donors and

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national governments – have directed most of their resources to routine infant immunizations implemented through the Expanded Program on Immunization (EPI). The EPI, launched by WHO in 1974, has increased basic childhood vaccine coverage to over 80% worldwide and represents one of the most successful public health programs for infants and children [1,2]. EPI-led improvements in vaccination coverage and resulting reduction in infant mortality largely focused on lower-income countries (LICs) and lower middle-income countries (LMICs) – countries with high burdens of infectious disease.[1]

In contrast to the global success of childhood immunization, the limited access and uptake of vaccines for adolescents (defined as persons ages 10–19) and adults have rarely been discussed as global health issues of importance. Immunization efforts for adults and adolescents have been hindered by a dearth of targeted research and implementation programs, the absence of the data to drive evidence-based decisions on vaccine delivery and access, and low coverage, resulting in high burdens of preventable diseases for these groups. Adolescent and adult populations still suffer from transmission of yellow fever, flu, meningococcal A, hepatitis A and B, and cervical cancer due to human papillomavirus (HPV) even though effective vaccines are available. Recent outbreaks of dengue, Ebola and Zika and the continued high prevalence of tuberculosis (TB) and HIV and other sexually transmitted infections (STIs) have amplified the need for new vaccines against these diseases and programs to quickly scale up coverage in adolescents and adults when such vaccines become available. Vaccines for sexually transmitted infections (STIs) such as gonorrhea and herpes are under development, and would also benefit from a framework for implementation in adolescent and adult populations [3].

Given that new and innovative public health programs can take decades to implement [4] and the challenges surrounding adolescent and adult vaccination are complex, now is the time to plan and create strategies for efficient vaccination of these groups in countries where the poorest populations reside. The opportunity exists to use the lessons from the EPI as well as from the recent introduction of the human papillomavirus (HPV) vaccine to accelerate adolescent and adult access strategies.

The EPI has identified the characteristics of successful immunization programs as: recognition of the issues, global consensus, clear and concise supportive data, political will, financing, and strategic and operational access plans [5]. In this paper the authors propose a high level research agenda and framework to support global and national policy decision-makers as well as future program implementers and communities in planning for accelerated and more effective immunization of adolescents and adults in LICs and LMICs.

## 2. Infectious diseases in adult and adolescent populations

Every year millions of adolescents and adults, primarily in LICs and LMICs, sicken or die from infectious diseases, disrupting the health, social and economic advancement of countries [6]. The impact of infectious diseases can be especially profound in regions with weak health systems that lack infrastructure and have limited ability to effectively prevent, diagnose, and treat sick patients, a problem highlighted in the recent Ebola outbreak [7].

The majority of LICs and LMICs lack comprehensive vaccination schedules for adolescents or adults. To date, adult immunizations, and in most cases adolescent immunizations in LICs and LMICs are implemented through mass vaccination campaigns for specific endemic disease outbreaks or severe public health threats.

Gavi, the Vaccine Alliance (Gavi), is the driving influence for increasing access to new and under-utilized vaccines in LICs and has carried on the EPI's focus on infants and young children. However, Gavi has taken initial steps to broaden its programs to include vaccination against the sexually transmitted HPV, a major driver of cervical cancer in LICs and LMICs, where over 85% of cervical cancer deaths occur [8]. The first HPV vaccine became available in 2006, and Gavi has since expanded eligibility for HPV vaccines through its programs to 54 countries [9]. Globally, over 100 countries have introduced the vaccine [10]. However, even with Gavi financial support and the WHO recommendation that routine HPV vaccination should be included in national immunization programs for 9–13 year-old girls, key barriers – including a lack of routine preventive health services targeting adolescent girls, inadequate immunization infrastructure, and cultural concerns about discussing sexually transmitted infections – have slowed vaccine introduction and uptake, leading to low vaccine coverage rates [11,12].

Prevention through new, effective vaccines for HIV and TB is becoming increasingly important, stressing the need to begin access planning now. The Bacillus Calmette–Guérin (BCG) vaccine against TB provides important protection for young children but has been insufficient to control the epidemic and new, more effective vaccines remain in development [13]. TB remains the world's leading cause of death due to a single pathogen, and adolescents and adults represent the largest number of TB cases (prevalence) [14]. The global incidence of TB has remained relatively flat in recent years, and in some high burden countries incidence has even increased despite widespread delivery of BCG to infants. For example, South Africa saw an approximate 200% increase from 2000 to 2015 [15]. Throughout the world, multidrug-resistant (MDR) and extensively-drug resistant (XDR) TB threaten the progress made against the disease, especially in high burden LICs, LMICs and BRICS nations – Brazil, Russia, India, China and South Africa [16]. HIV vaccine candidates have been developed but as yet none has been licensed [17]. The great majority of HIV transmission occurs via sexual contact, making a vaccine's likely target cohort similar to that of HPV vaccines (namely, young women and men). HIV/AIDS disproportionally affects young women and girls in sub-Saharan Africa, with rates of new infections among young women aged 15–24 substantially higher that of men in the same age ranges (e.g. in South Africa four times as high) [18].

Emerging infectious threats such as Ebola and Zika virus, for which vaccine development efforts have been fast-tracked, highlight the need to immunize full populations regardless of age group as soon as vaccines are licensed. The Ebola epidemic crippled the economies of Liberia, Sierra Leone, and Guinea and created the need for economic recovery and development support in all three countries [19]. The Zika epidemic is having a major public health impact, and the economic burden for countries where Zika is endemic is estimated to be US$7–18 billion from 2015 to 2017 [20]. A routine vaccination strategy to control Zika infections will be needed because mosquito-borne infections tend to recur in waves, waxing and waning as the virus strikes new populations of susceptible people [21]. Adolescents and adults are especially at risk through life activities such as work, school, and travel which directly impact economies.

Additionally, infectious diseases that cause long-term morbidity for adolescents and adults have a profound socio-economic impact. Modeling of the global health and economic impact of new TB and HIV vaccines demonstrates that targeting these age groups will have the maximum effect in the shortest period of time on the TB and HIV epidemics. Modelling of TB vaccination indicates that a 60% efficacious vaccine given to only 20% of adolescents and adults could potentially prevent 25–35 million new cases of active TB in its first 20 years of use [22,23]. A 70% efficacious HIV vaccine

[1] LIC and LMIC are categories as per World Bank Country and Lending Groups, 2017, https://datahelpdesk.worldbank.org/knowledgebase/articles/906519.

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