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Leaving no one behind: Defining and implementing an integrated life course approach to vaccination across the next decade as part of the immunization Agenda 2030☆

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Abstract

Strategic Priority 4 (SP4) of the Immunization Agenda 2030 aims to ensure that all people benefit from recommended immunizations throughout the life-course, integrated with essential health services. Therefore, it is necessary for immunization programs to have coordination and collaboration across all health programs. Although there has been progress, immunization platforms in the second year of life and beyond need continued strengthening, including booster doses and catch-up vaccination, for all ages, and recommended vaccines for older age groups.

We note gaps in current vaccination programs policies and achieved coverage, in the second year of life and beyond. In 2021, the second dose of measles-containing vaccine (MCV2), given in the second year of life, achieved 71% global coverage vs 81% for MCV1. For adolescents, 60% of all countries have adopted human papillomavirus vaccines in their vaccination schedule with a global coverage rate of only 12 percent in 2021. Approximately 65% of the countries recommend influenza vaccines for older adults, high-risk adults and pregnant women, and only 25% recommended pneumococcal vaccines for older adults.

To achieve an integrated life course approach to vaccination, we reviewed the evidence, gaps, and strategies in four focus areas: generating evidence for disease burden and potential vaccine impact

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Declaration of Competing Interest

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in older age groups; building awareness and shifting policy beyond early childhood; building integrated delivery approaches throughout the life course; and identifying missed opportunities for vaccination, implementing catch-up strategies, and monitoring vaccination throughout the life course. We identified needs, such as tailoring strategies to the local context, conducting research and advocacy to mobilize resources and build political will. Mustering sufficient financial support and demand for an integrated life course approach to vaccination, particularly in times of COVID-19, is both a challenge and an opportunity.

Keywords

IA2030; Immunization; Life course; Adult vaccination

1. Introduction

Strategic Priority 4 (SP4) of the Immunization Agenda 2030 (IA2030) aims to ensure that all people benefit from recommended immunizations throughout the life course, integrated with essential health services. Although there has been progress in many countries to expand immunization services beyond early childhood and ensure immunizations are integrated with other health interventions, there is still much work needed to roll out vaccination platforms for older age groups and priority populations and maximize the benefits of integration. The goals and objectives laid out under SP4 of the IA2030 provide a framework for addressing the current gaps and barriers impeding the progress of an *integrated life course approach to vaccination* across all countries [1]. As more vaccines are being introduced and with COVID-19 vaccine leading the way as an example of countries quickly needing to provide a vaccine to all age groups, a life course approach to vaccination has become an essential part of the future of every national immunization program. Additionally, integrating vaccinations with other health services builds on the IA2030 vision of a people-centred approach to immunization delivery by providing a package of essential health interventions to every eligible individual at every health service contact, thereby increasing health service delivery efficiencies and reducing the risk of both vaccine-preventable disease morbidity and mortality as well as risk of morbidity and mortality from other non-vaccine preventable diseases that target the same age groups as immunization services.

1.1. Rationale for an integrated life course approach to vaccination

While the Global Vaccine Action Plan 2011–2020 (GVAP) saw progress in extending vaccination beyond infancy, several countries have yet to expand to included all childhood vaccinations as recommended by the World Health Organization (WHO), including the Hepatitis B vaccine birth dose, second dose of measles containing vaccine (MCV2), or booster doses of Diphtheria, Tetanus, Pertussis-containing (DTP) vaccine [2]. Children who have passed the 1st year of life may have failed to receive all recommended vaccines in the first year of life but still be at risk of infection, thus providing catch-up vaccination opportunities at older ages to reduce this risk is necessary. Adolescents and adults with immunity gaps can be sources of transmission [3] and may require catch-up vaccination to protect themselves as well as reduce risk of transmission to younger children who have yet to be vaccinated. Similarly, maternal immunization can protect both the mother during her

pregnancy and her newborn in *the* first weeks of life when the newborn's immune system is too young to mount an adequate immune response [4].

For some diseases, older children and adults are the target population for available and WHO-recommended vaccinations. Vaccination against human papillomavirus (HPV) is ideally timed in early adolescence prior to potential exposure [5]. This also applies if the disease disproportionately targets a particular group, such as those with comorbidities or older adults, as with herpes zoster (shingles) [6] and pneumococcal disease, where different serotypes may be prevalent in certain age groups. Preventing disease at all ages also reduces the burden on the health system and allows it to address other challenges, including non-communicable diseases and emerging infectious disease threats, such as COVID-19. Leaving adults unprotected against vaccine-preventable diseases (VPDs) may have consequences beyond the individual disease because their underlying health status will impact not only susceptibility to severe disease but also may result in an increased risk of downstream consequences, such as heart attack or stroke [7-9].

Throughout the life course, integration of immunizations and essential health services can expand access to illness management and provide opportunities for preventive and promotive healthcare [10]. Integrated packages of essential interventions can more comprehensively address population health needs, make efficient use of resources, and improve collaboration among programs, leading to fewer missed opportunities for vaccination (MOV) and reductions in mortality and morbidity [1]. Many diseases targeted by vaccines, such as pneumonia and diarrhea, require a comprehensive set of disease prevention and control strategies to reduce their overall burden. Examples include screening and treatment for cervical cancer, and the multi-sectoral collaboration with water, sanitation, and hygiene (WASH) needed for preventing diarrheal diseases and other communicable diseases. COVID-19 also provides another recent, clear example where the combination of mask use, social distancing, sanitation, air filtration and vaccination to reduce disease burden was an integrated strategy promoted and used across countries. Improving the integration of immunization services with curative care and other preventative care services is a key rationale due to the potential for increasing coverage and improving health delivery efficiencies. One example is addressing missed opportunities for vaccination (MOV), which occur when individuals eligible for vaccination visit a health facility, and do not receive the recommended, age-appropriate vaccinations. Recent MOV assessments suggest that children who present for curative care and non-vaccination preventative visits are often never screened on vaccination status and experience an MOV because they are eligible for vaccination [11-15]. Globally, an estimated one in three children and one in two women of reproductive age may experience a MOV [16,17].

1.2. Goal for 2030: Integrated life course approach to vaccination

IA2030 defines life course and integration as one of its seven strategic priorities [18], with the aim that "all people benefit from recommended immunizations throughout the life course, effectively integrated with other essential health services". The objectives of this goal are focused on the life course approach and an integrated delivery approach; ultimately,

these two objectives are heavily dependent on one another for the overall success of this IA2030 *strategic* priority goal [18].

The key objective of life course vaccination is achieving high, equitable coverage, including the provision of vaccines through routine and catch-up vaccination, throughout the life course. The vision for 2030 is that countries have robust delivery platforms beyond infancy that provide both recommended and catch-up vaccination opportunities. This vision includes new contact points for young children beyond infancy, adolescents, and those needing vaccines against emerging infectious diseases, e.g. severe acute respiratory syndrome coronavirus 2 (SARS CoV-2), HIV and dengue fever. An urgent imperative is to establish or further strengthen vaccination platforms for priority adult populations to be able to deliver routinely deliver vaccines such as COVID-19 and influenza [19]. Example priority populations include healthcare workers, individuals with underlying conditions, older adults, and pregnant women. For pregnant women, vaccine delivery will need to extend beyond tetanus and diphtheria in preparation for new maternal immunizations targeting neonatal infants, such as vaccines against the respiratory syncytial virus or Group B Streptococcus.

The IA2030 objective for an integrated immunization program is to connect to the broader health system to more comprehensively address population health needs as they change through the life course. The vision of integration is to have essential health services be co-delivered where appropriate, and to screen and refer or provide services to individuals eligible for additional health services when they come for any health visit.

2. Status of the integrated life course approach to vaccination

The status of life course and integration varies widely among countries. Some countries, particularly in the Americas and Europe, have vaccination schedules that span the life course. Many other countries have added new vaccines into their national immunization programs, however, they have yet to go beyond an infant and maternal vaccination schedule, although global guidance is available (Table 1). A key contributor to progress has been the growth in National Immunization Technical Advisory Groups (NITAGs) that review and endorse the evidence for new vaccine introductions across the life course. As of 2019, more than 80 % of all countries reported having a NITAG.

2.1. Status of infant vaccinations

Although the first year of life has been most strongly served by infant vaccinations, many countries still have not introduced all WHO-recommended infant vaccinations [20]. Main gaps in the national vaccination schedules as of 2021 included the following: 61 % of the countries included rotavirus vaccination, 57 % a birth dose of Hepatitis-B vaccine, 79 % pneumococcal vaccination, 89 % rubella vaccination, and 98 % Hepatitis-B vaccination. In addition, coverage among vaccines varies greatly. While long-standing vaccines in the infant schedule (such as the first dose of measles-containing vaccine) have the highest global coverage at or near 81 %, several newer vaccines (such as pneumococcal conjugate and rotavirus vaccines) have global coverage at roughly 50 % mainly because several countries still need *to* introduce these vaccines [21].

2.2. Status of older childhood and adolescent vaccinations

As MCV2 was introduced globally during the last decade, commonly given in the second year of life, it stimulated immunization programs in many low- and lower-middle-income countries (LLMICs) to consider vaccinations beyond the first year of life for the first time. By 2021, 94 % of countries included MCV2 in their recommended vaccination schedule (Fig. 1), and global coverage had reached 71 %[21]. In comparison, MCV1 coverage in that same year reached 81 %[21]. Another major new non-infant vaccine that many LLMICs considered was the HPV vaccine, recommended for girls aged 9–14 years. By 2021, 60 % of the countries had introduced HPV (Fig. 2), *primarily* in the Americas and Europe, but global coverage in 2021 was still only 12 percent. Additionally, 136 countries (70 %) have introduced at least one of the three recommended DTP booster doses for older children [21,22] (Fig. 2).

Implementation challenges persist in delivering new vaccines to children beyond infancy (e.g. second year of life and adolescence) [23]. These include suboptimal health worker orientation to new age *targets* and modes of delivery (e.g., at schools, daycares, and pharmacies), insufficient demand generated for these vaccines, and inadequate information systems for tracking doses and boosters. With the availability of new vaccines (e.g., HPV) and increased attention to provide booster doses of routine vaccines to older children (e.g., DTP, MCV2), there is a growing interest in using schools as a platform for immunization services to reach these older children. A 2018 global survey collected through the WHO/UNICEF Joint Reporting Form (JRF) found that that 70 % (n = 135) of WHO Member States reported vaccination screening checks occurred in at least one level of the education system. Countries that already had a strong school-based health program were often more easily able to introduce HPV [24], and numerous guidance documents addressed the challenges of implementation and integration of other services [23,25,26].

2.3. Status of adult vaccinations

Apart from covid-19 vaccine and influenza vaccine [27,28], there is a lack of adult-age global recommendations for available vaccines such as pneumococcal and herpes zoster vaccines [19]. As of 2021, 128 countries (65 % of the WHO member states) included influenza vaccination for older adults and high-risk populations, such as health workers or pregnant women. Forty-eight (25 %) countries, mainly in the Americas and Europe, included the pneumococcal polysaccharide vaccine for older adults in their schedule, although 23 of these countries only include it for their high-risk populations [21]. In contrast, as of April 2021, only four months after the first country introduced COVID-19 vaccination, 180 of 194 countries (93 %) were providing an opportunity to expand and improve adult and health care worker vaccination programs through delivery of this vaccine. By October 2022, 179 of 194 countries (92 %) had vaccinated at least 10 % of their population with at least 1 dose of COVID-19 vaccine [29]. However, a noted hurdle to reaching adults as identified in the COVID-19 vaccine rollout is how the absence of strong health systems for adult vaccinations has appeared to place an important barrier in reaching high levels of COVID-19 vaccination coverage among adults [30].

2.4. Status of integrated service delivery

Findings from MOV assessments have demonstrated the potential for improving coordination, collaboration, and integration among all health interventions given at health facilities [31-33]. These assessments in multiple African and Asian countries have shown that upwards of 40 % of individuals attending health facilities have experienced a MOV, indicating how better integration among health programs could lead to increased multi-health intervention coverage and better vaccination completion and timeliness [31-33].

Measuring the global status of the integrated delivery of other health interventions with immunization poses a challenge. However, a series of metrics are used to track integrated delivery. The Composite Coverage Index (CCI) is a weighted average of eight preventive and curative interventions related to family planning, maternal and newborn health, immunization, and management of sick children for selected countries that was used as an integration monitoring indicator for GVAP. The 2018 analysis of progress for GVAP showed marked differences in coverage levels across these eight interventions, with immunization consistently ranking among the interventions with the highest coverage, even among countries with relatively high CCI overall. Furthermore, countries with at least two rounds of data since 2010 demonstrate continued coverage differences among the eight interventions, highlighting the suboptimal level of integration in these countries (Fig. 3) [34].

Experiences over the last 20 years have demonstrated the potential gains for other services when integrated with infant immunization platforms, including those for HIV, malaria, or family planning [35-39]. However mixed outcomes have been documented in certain cases, for both immunization and the linked service, emphasizing that the details of implementation are critical to its success [40,41]. In late 2018, the WHO published a “Resource Guide for Planning and Strengthening Immunization Services Throughout the Life Course”[1]. (Fig. 4).

2.5. Status of health system tools for integrated services

Monitoring progress across the life course relies heavily on the availability of appropriate health information tools. Key tools for healthcare providers and clients include home-based records (HBRs), name-based registries, facility-based aggregated recording and reporting tools (e.g. tally sheets, monthly summary reports), and health management information systems (HMIS) [42]. HBRs are critical to integrated service uptake throughout the life course. WHO’s 2018 guidelines recommended HBRs as a complement to facility-based records for the care of pregnant women, mothers, newborns, and children. However, their development revealed numerous research gaps, such as insufficient evidence to recommend one format of HBR over another, how electronic HBRs may complement paper-based records, and the potential use of HBRs for adolescents [43]. Additionally, although HBRs are used in over 160 WHO member states, access remains a major challenge in several high-priority countries, with less than 50 % of children in 24 countries missing an HBR, either because they were lost or never been received [44]. Research has shown that individuals without an HBR have increased MOV, in addition to limiting the use of the HBR as a facilitator for service integration [31,42].

2.6. Status of the policies supporting life course and integration

Key immunization policies need to be in place to support life course and integration goals. A relevant policy gap relates to catch-up vaccination, recommending the vaccination of individuals who have not received timely vaccinations for which they are eligible. For many countries that have historically only vaccinated infants or pregnant women, the expansion of catch-up vaccination to older age groups may be entirely new for both the policy-makers and health workers, which will require a shift in both attitude and practices. WHO has published tables with recommendations for interrupted or delayed immunization, summarizing the recommendations from WHO vaccine position papers. These summary tables are intended to aid and guide policy- and decision-makers [45].

Policies for vaccines at later stages of the life course also vary across the globe, with only a limited number of countries have a whole-of-life immunization schedule, extending into older adulthood as of 2021. A recent analysis of high- and middle-income countries with established adult vaccines showed that 65 % of the countries did not have a published national immunization strategy including adult vaccines [46]. Only a few LLMICs recommend vaccines for older adults and a minority of NITAGs have adult vaccine working groups or include experts on older adults amongst their core members [46].

3. Key focus areas for implementing an integrated life course approach to vaccination

Scaling up the implementation of an integrated life course approach to vaccination within a national immunization program will require new strategies in four key focus areas which address the barriers and gaps described earlier when reviewing the status of the integrated life course approach to vaccination.

Firstly, is the need to generate the local and global evidence in support of vaccine development that targets diseases for all ages. Secondly, the evidence is used to support efforts to increase awareness of the benefits of vaccination across all age ranges to build demand, stakeholder support, and healthcare provider understanding of the integrated life course approach. Thirdly, an integrated approach to vaccination should be emphasized to make better use of existing contact points, while identifying new delivery platforms, such as schools and workplaces. Finally, is the need to strategically address MOV, formalize catch-up vaccination strategies, and expand the objectives of country health information systems to ensure they have the capability to record vaccination history throughout one’s life.

3.1. Generate evidence on the disease burden among older age groups, the potential of vaccines to decrease it, socio-economic benefits, determinants of uptake, and the programmatic implications for introducing the vaccines

To assist countries in making the case for introducing vaccines across the life course, new evidence is needed on vaccine-preventable public health threats for all ages. This includes well-recognized diseases, such as malaria, HIV, or tuberculosis; new infectious diseases, such as COVID-19; and seasonal diseases such as influenza [47]. Evidence for country-

level decision-making is reliant on burden of disease data to identify the broader health, economic, and social impact of a vaccine. Strengthened infectious disease surveillance will need to be extended to older age groups, particularly in the LMICs, to better understand the epidemiology and burden of disease across the life course. These data can help countries better understand their morbidity patterns and can also indicate market interest to the manufacturers. Further modeling of potential impacts and costs of a vaccine could be used to inform policy-makers about the cost-effectiveness of vaccines targeted at older age groups.

Additional focus should be placed on understanding the factors influencing demand for vaccines throughout the life course. Research to date has largely been focused on childhood vaccines, but vaccines for older children and adults may be influenced by different motivations. Identifying the barriers across a variety of countries can facilitate both decision-making and implementation of life course vaccination and provide valuable lessons learned that can be leveraged in countries with similar priorities and programs [19,46]. The lessons from strategies designed to generate demand for COVID-19 vaccine for adults as well as influenza vaccine which has been available to adults for many years in several countries should be both documented and reviewed to identify the strengths and weaknesses of these various behavior change strategies. Through such work, guidance can be provided on how to better generate demand for vaccines among adults who have not typically been targeted through national immunization programs. Even among pregnant women, who have long had vaccinations available for delivery of tetanus toxoid containing vaccines, lessons can be learned about the role of vaccine hesitancy and refusal among adults [48].

3.2. Raise awareness for the benefits of life course vaccination and shift national immunization policy beyond early childhood

Mobilizing political support for the life course approach to vaccination will depend on a clear understanding of the full value of immunization at different stages of life. The societal value of indirect protection, the economic impact of increased productivity, and the impact on equity should be emphasized when raising awareness of the benefits of the life course approach [49]. Although WHO provides recommendations for immunization across all ages [20], country-level evidence should be generated to help mobilize political support for life course vaccination. For *example*, a recent analysis of the costs of nine pediatric illnesses in LMICs found that treatment for an illness represented 1–75 % of an average household's monthly income or 10–83 % of its average monthly expenses [50]. In addition to deaths averted and the associated economic costs of expanding vaccine access beyond infancy, data on wider impacts on families, communities, and society, as well as the benefits from reduced morbidity will be necessary for advocacy [51].

To generate demand for vaccinations among adults, new strategies must be developed. Healthcare providers should have their capacity developed, through interpersonal communications and motivational interviewing techniques, to know how to communicate about the benefits of older age vaccination to populations that do not typically receive routine vaccines. The rollout of COVID-19 vaccines to older age groups provides an excellent opportunity to document the lessons learned in reaching these atypical groups. Global and regional partners can also assist by documenting examples of program successes

and challenges in getting public support and by supporting local efforts to communicate the broader value of protecting populations that are not traditionally vaccinated.

3.3. Build on integrated delivery approaches throughout the life course

Strengthening the delivery of immunization through integration with other health and development services has been part of previous global immunization strategies [7] and program implementation guidance [52,53]. The integrated delivery approach has focused on how immunization programs can benefit other health and development programs, given the typically higher coverage levels achieved for vaccination throughout infancy [53]. However, recent research demonstrates the need for immunization to be incorporated into other services, especially in age groups beyond infancy where many immunization programs do not have an already established reach.

Public healthcare services that are well-connected to other government and non-governmental services, both within and outside the health sector (e.g. WASH, education, and private healthcare providers), can create opportunities for multi-sectoral collaboration to establish or strengthen delivery platforms (e.g. school-based vaccination), screen for vaccination status, and provide referrals between non-healthcare services and healthcare services. Incorporating information on immunization into other health programs can lead to increased awareness and empowerment regarding information and rights to health. For example, in Canada, schools have included immunization as part of health and civic studies [54]. Interagency Coordinating Committees, global and national technical advisory groups, and others should work to increase coordination within the Ministries of Health and with other sectors (e.g. WASH, education) to create policies that support Primary Health Care (PHC). Countries should create or strengthen multi-sectoral disease control strategies (e.g., cholera control plans) to ensure integration and coordination, thereby making optimal use of limited healthcare resources. Even ensuring that within immunization services that vaccines are bundled together (such as COVID-19 and influenza vaccine) appropriately is another aspect of the integration approach which simultaneously addresses reducing MOV, another key SP4 focus area [55].

3.4. Address missed opportunities for vaccination, implement formal catch-up immunization strategies, and facilitate vaccination monitoring throughout the life course

A key component of the integrated life course approach to vaccination is scaling up proven strategies that address those who have previously missed vaccinations. These include ensuring implementation of formal catch-up policies and initiatives, reducing MOV, and improving tracking of vaccination status throughout the life course.

Timely vaccination is key to maintaining population immunity against VPDs. However, scheduled vaccinations may be missed because of several context-specific reasons. In 2020 and 2021, the COVID-19 pandemic disrupted immunization programs world-wide and left an urgent need to reach and offer vaccines to missed children [56]. A catch-up vaccination strategy that includes a clearly defined catch-up vaccination policy and a catch-up schedule is an essential part of a well-functioning immunization program [57]. Identifying where and how to implement catch-up vaccination opportunities is also critical. Implementing

school-based vaccination checks whereby children are screened on vaccination status to identify those who have missed earlier vaccinations and providing these children with needed vaccines should be considered by all countries. In developing a routine catch-up vaccination strategy, countries must address the topic of maximum age ranges for provision of a catch-up vaccination dose. WHO provides guidance on the maximum age ranges by vaccine, although generally, many LLMICs have maximum age ranges that are currently too low and should be aligned to WHO recommendations to allow for a successful catchup vaccination strategy. Providing tailored support to countries to understand their barriers to implementing a successful catchup vaccination strategy is necessary. Another vaccination catch-up strategy which countries should implement ties closely with the MOV topic: screening an individual on vaccination status to identify vaccination eligibility, even when they come to the clinic for a non-vaccination visit or are accompanying someone else to the clinic.

Comprehensively addressing MOV starts with countries identifying the underlying causes of MOV, either by using existing data, such as surveys or program assessments, or carrying out a MOV country assessment [31-33]. Through this process, countries should be able to identify opportunities to improve service delivery and promote synergy among programs by further integrating immunization into other PHC planning, health registers, and other record-keeping systems [31-33]. The key is ensuring that every health contact is used as an opportunity to check for eligibility and provide missed vaccines and other essential health interventions [31,57]. To ensure that vaccination screening within any setting (health facility, school etc.) is successful, health workers must inform caregivers and individuals about the importance of safeguarding the HBR, bringing it to every health contact, and ensuring the HBR is kept beyond the first year of life. More consistent use of HBRs will improve the health service encounters more broadly, as well as reinforcing the value of vaccination and other health interventions [31,43,57]. Other proven approaches to both reduce MOV and improve catch-up vaccination policy implementation include ensuring that health workers are trained on the correct contraindications for vaccinations, the minimum and maximum ages for each vaccination, and the need to screen for vaccination status at each and *every* health contact [31,57].

Many countries have moved to electronic immunization registers (EIRs) or integrated HMIS; however, many LMICs are still in the process of moving toward EIRs. An important advantage of these systems is that they can facilitate active data searches, support monthly vaccination planning and monitoring of those who missed vaccinations [58], and be expanded more quickly and easily to cover individuals receiving health services throughout the life course as compared to paper-based records. Chile, for instance, has demonstrated that their EIR can also be used for adolescent vaccination [59]. To facilitate the life course approach to vaccination, countries may wish to consider modifying or establishing EIRs to more easily facilitate identifying individuals who need to be caught up on missed vaccinations, and allow for expansion of immunization registries into older age groups [46].

4. Conclusions and next steps

Although life course vaccination and integration are strategic priorities for IA2030, there is a wide spectrum of country implementation of these approaches. These priorities must be tailored to address local challenges, available resources, and the existing decision-making capacity to advance the key focus areas outlined in this document. Regardless of the variety of country contexts, protecting health throughout the life course must be valued as a pathway to ensuring equitable access to health for all and healthy-aging [60,61].

The major challenge is to muster enough financial support for the introduction of new vaccines. These investments must be viewed as a critical contribution to the well-being of the population [62], whose health is impacted by the healthcare decisions made early in life. This will require adequate internal funding from the national government budget and other sources. In preparation for new vaccine introductions, countries may need to develop new vaccination strategies and establish strong service delivery platforms for reaching all individuals that are targeted to receive vaccines. Other strategies within the life course approach theoretically require fewer financial resources to implement, such as reducing MOV, implementing a catch-up vaccination policy, and establishing and strengthening NITAGs to review evidence for the introduction of vaccines across the life course. Strengthening such low-cost strategies may more easily facilitate other efforts for an integrated life course approach.

To achieve the vision of an integrated life course approach by 2030, support will be needed at all levels, local to global, through both implementation and advocacy roles. We put forth a call to action for all global partners and countries to come together in a coordinated fashion to support this strategic priority, particularly as it forms the cornerstone of universal healthcare (UHC), which in its core, ensures that all people have access to needed health services of sufficient quality. Achievement of the UHC goal means ensuring vaccination services are accessible and offered at any healthcare interaction and that all recommended vaccinations across the life course are made available to their intended populations. The IA2030 offers a platform for continued technical alignment on priority topics through the planned governance model called the Partnership Council, which will be key over the next decade to ensure that for the good health and well-being of all, that we leave no one behind for vaccinations, from infancy to old age.

Data availability

Data will be made available on request.

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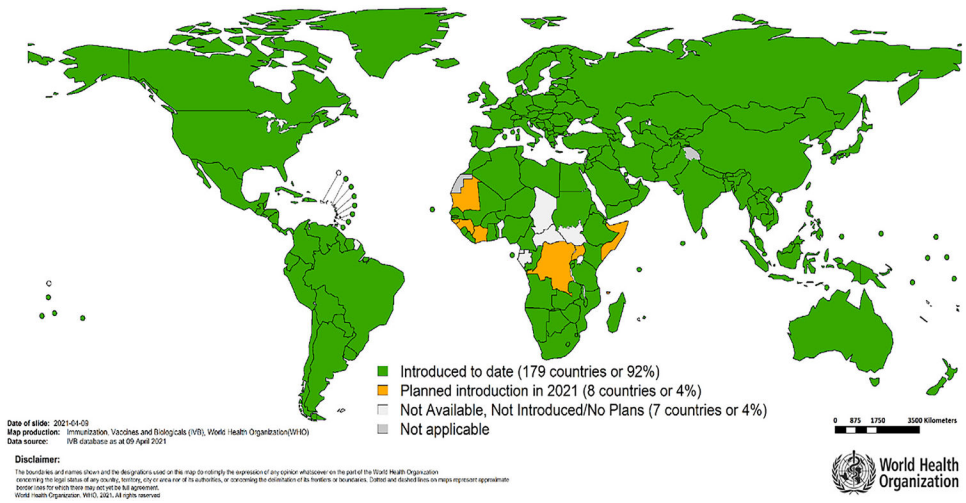

Fig. 1.

Countries with Measles Second Dose vaccine in the national immunization program.

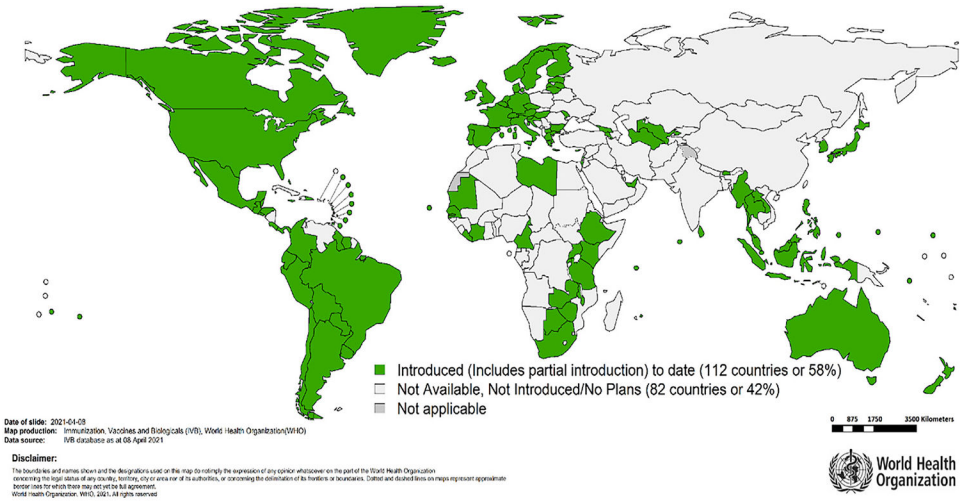

Fig. 2.
Countries with HPV vaccine in the national immunization program.

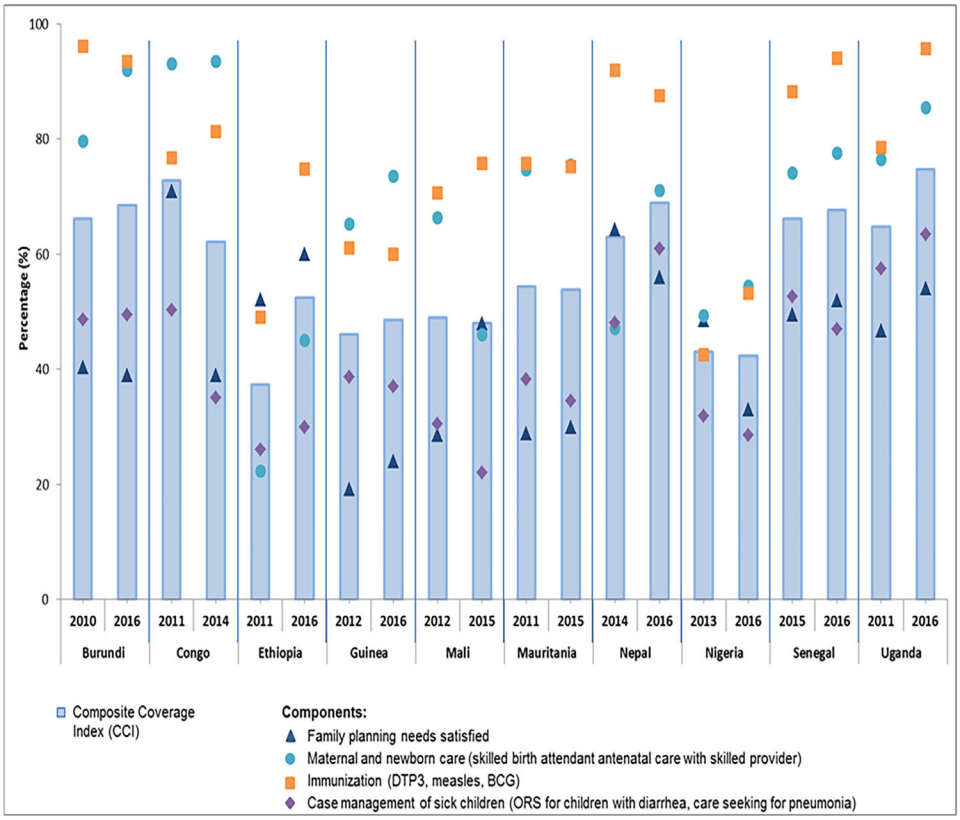

Fig. 3.

Comparison in Composite Coverage Index (CCI) and coverage for four CCI components in ten countries with two rounds of survey data since 2010. Caption: Figure adapted from the Global Vaccine Action Plan Monitoring, Evaluation & Accountability Secretariat Annual Report 2018.

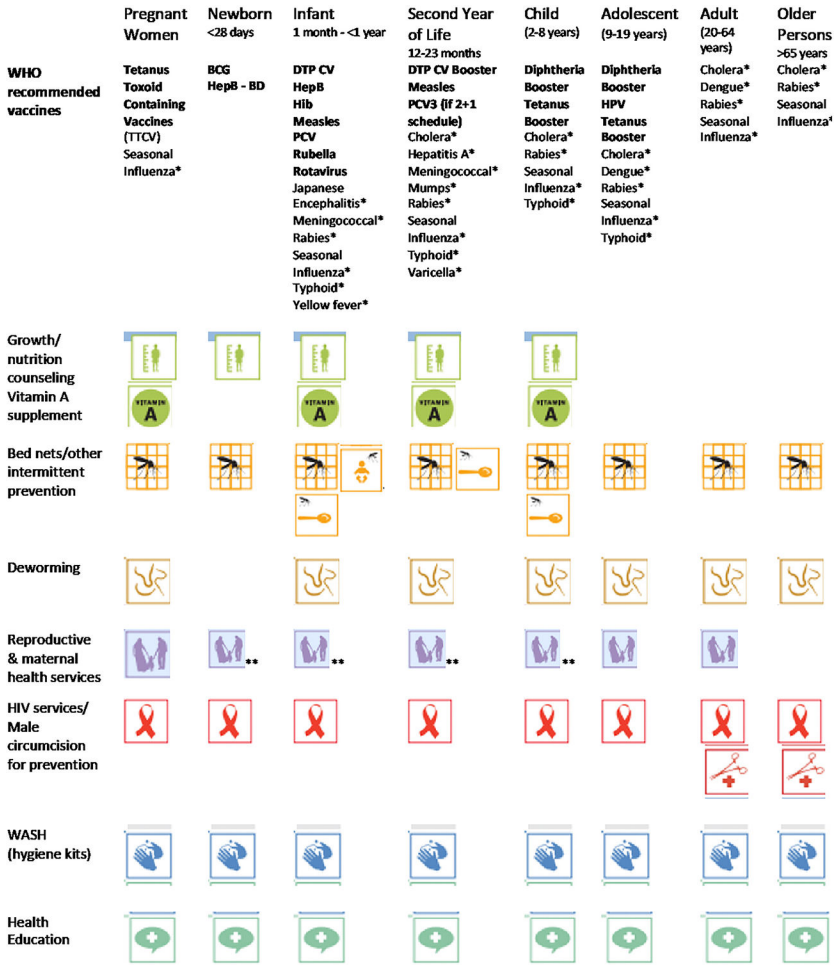

Fig. 4.

Immunization delivery platforms that can be used to deliver other health interventions across the life course. Caption: Figure adapted from the Working together: An integration resource guide for planning and strengthening immunization services throughout the life course. * Vaccines recommended by WHO for certain regions/high risk populations/immunization programs with certain characteristics. ** For caregiver.

Table 1

Select resources by focus area to assist with an integrated life course approach to vaccination.

Focus area	Resource title	Resource link
Mobilizing support	A life course approach to health: synergy with sustainable development goals.	https://doi.org/10.2471/BLT.17.198358.
Using evidence-based delivery practices	Working together: an integration resource guide for immunization services throughout the life course.	https://apps.who.int/iris/bitstream/handle/10665/276546/9789241514736-eng.pdf
Reducing missed opportunities	Planning guide to reduce missed opportunities for vaccination	https://apps.who.int/iris/bitstream/10665/259202/1/9789241512947-eng.pdf
	Methodology for the assessment of missed opportunities for vaccination	https://apps.who.int/iris/bitstream/10665/259201/1/9789241512954-eng.pdf?ua = 1
	Intervention guidebook for implementing and monitoring activities to reduce Missed Opportunities for Vaccination	https://apps.who.int/iris/bitstream/handle/10665/330101/9789241516310-eng.pdf
	Leave No One Behind: Guidance for Planning and Implementing Catchup Vaccination	https://www.who.int/immunization/programmes_systems/policies_strategies/WHO_Catch-up_guidance_working_draft_11.08.20.pdf
Cross-sectoral collaborations	Establishing and strengthening immunization in the second year of life: practices for vaccination beyond infancy	https://apps.who.int/iris/bitstream/handle/10665/260556/9789241513678-eng.pdf
	A handbook for planning, implementing, and strengthening vaccination into the Second Year of Life	https://apps.who.int/iris/bitstream/handle/10665/311642/9789241514194-eng.pdf?ua = 1
Policy environment	National Immunization Technical Advisory Groups (NITAGs): Guidance for their establishment and strengthening	https://doi.org/10.1016/j.vaccine.2010.02.027
	WHO Guidance Note: Engagement of private providers in immunization service delivery. Considerations for National Immunization Programs	https://apps.who.int/iris/bitstream/10665/258968/1/WHO-IVB-17.15-eng.pdf
Tracking vaccination status	WHO recommendations on home-based records for maternal, newborn and child health	https://apps.who.int/iris/bitstream/handle/10665/274277/9789241550352-eng.pdf
	Practical guide for the design, use and promotion of home-based records in immunization programs	https://apps.who.int/iris/bitstream/10665/175905/2/WHO_IVB_15.05_eng.pdf