

Adolescent vaccination schedule in national immunization programs in Latin America and the Caribbean

Background

- In Latin America and the Caribbean (LAC) region, adolescents represent 16% of the total population¹
- The health future of the current and next generations will depend on investments in promoting well-being and improving adolescent health today, as highlighted by the 2022 World Health Organization (WHO) report^{2,3}
 - Immunization reaches more people than any other health or social service, being considered one of the most cost-effective health care interventions^{4,5}
 - Immunizations are a crucial component of the global strategy for adolescent health to reduce the risk of vaccine-preventable diseases²
- Setting national priorities to address adolescent health needs is critical in all LAC countries^{2,3}
- An assessment of current adolescent vaccination schedules in LAC may provide useful information on universal immunization coverage and identify potential areas of opportunity for strengthening adolescent health platform^{2,3}

Objective

- To characterize the current adolescent immunization schedule in national immunization programs (NIP) in 34 countries of LAC

Methods

- From September to December 2021, systematic search strategies were applied on:
 - Immunization country profiles of Pan American Health Organization (PAHO)⁶
 - World Health Organization (WHO)⁷⁻¹⁰
 - National health ministry websites
- The searches were supplemented by consultation with country experts and Google search engine via customized searches in native languages of LAC countries (Portuguese, Spanish, Dutch, and French) using free-text terms (“adolescent,” “preteens,” “teens,” “vaccination,” “immunization schedule,” “vaccine”)
- The PICOTT question framework and main definitions used in this review can be seen in Tables 1 and 2, respectively

Table 1. PICOTT question framework

Population	Adolescents aged 9-19 years living in Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Brazil, Bolivia, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Saint Lucia, Saint Vincent & Grenadines, Saint Kitts & Nevis, Suriname, Trinidad & Tobago, Uruguay, and Venezuela
Intervention	Vaccines included/recommended in national immunization programs in LAC for adolescents aged 9-19 years
Comparison	No comparator
Outcome	Vaccine type, vaccination strategy (routine or campaign), target age, vaccination coverage rate (VCR), funding
Time	From 31 January 2010 to 31 January 2022
Type of document	<ul style="list-style-type: none"> Official country health ministry records WHO, PAHO, and other international organizations' records

Table 2. Definitions used in this review

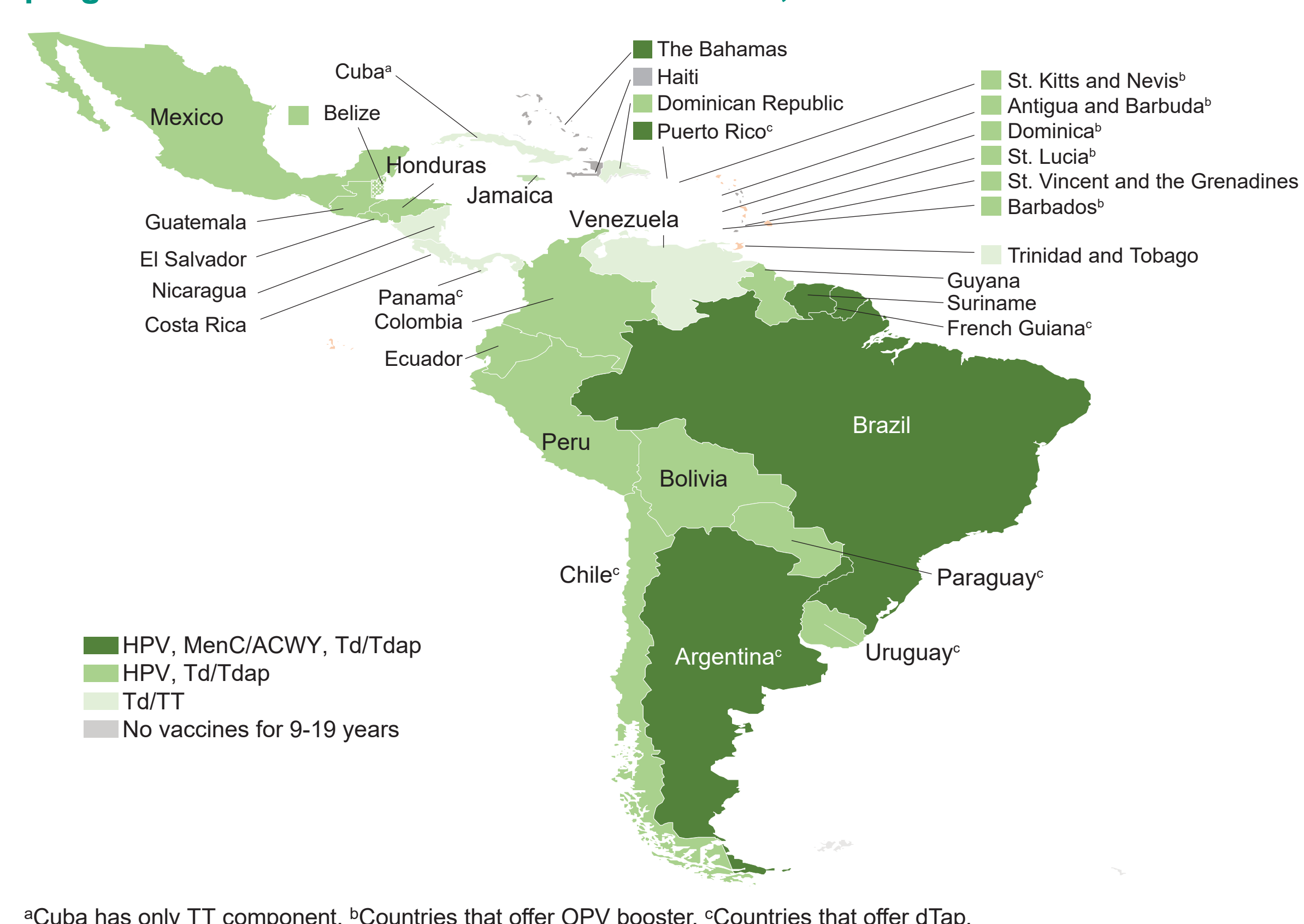
Routine vaccination	It encompasses the vaccines included in the official vaccination schedule, including approaches similar to campaigns with the objective of accelerating improvements to routine immunization coverage ¹¹
Vaccination campaign	It encompasses vaccines not included in the official vaccination schedule such as intermittent campaigns for accelerated disease control or based on epidemiology of a particular disease (eg, COVID-19 and yellow fever) ¹¹
WHO HPV VCR by age 15	HPV coverage measure provided for first and completed dose schedule based on cumulative cohort method to track trends, making possible comparisons between countries through an indicator of coverage by 15 years of age (prevalence) ^{11,12}
WHO HPV final dose, official	HPV coverage measure provided for first and completed dose schedule to assess the coverage by schedule in a calendar year (incidence) ^{11,12}

HPV, human papillomavirus; VCR, vaccination coverage rate; WHO, World Health Organization.

Results

- A total of 178 reports were included in this review
- As of January 2022, among 34 LAC countries/territories, 33 had at least one vaccine in adolescent immunization schedule (**Figure 1**)
 - The vaccines included in routine vaccination were diphtheria/tetanus (dT) without or with acellular pertussis (dTdap) (33 countries/territories), HPV, meningococcal C/ACWY vaccines (5), oral polio vaccine booster (7), and catch up on missed childhood vaccines
 - Vaccination campaigns have been offered for adolescents to mitigate outbreaks of COVID-19, measles, and yellow fever
 - COVID-19 vaccines were offered for children/adolescents in all LAC countries, except for Haiti, as part of vaccination campaigns
- NIPs were primarily publicly funded in LAC countries/territories
- Online open access to adolescents' VCR data were limited:
 - Few countries had online data on the performance of current vaccines included in the NIP: Argentina (HPV and dTap vaccines), Chile (HPV and dTap), Paraguay (HPV), Brazil (HPV), and Peru (HPV)
 - WHO immunization dashboard provided a yearly estimate of national HPV vaccination coverage, derived from the annual WHO/UNICEF Joint Reporting Form on Immunization using official and by age 15 indicators:
 - In 2020, it was reported an HPV VCR of 40% and 61% for official and by age 15 indicators in the Americas region. No specific data for LAC was available (**Table 3**)
 - The comparison of official HPV VCR estimates between 2019 and 2020 showed, in general, a substantial reduction in coverage rates in 2020
 - HPV VCR by age 15, as expected, was not affected much due to this methodological approach

Figure 1. Adolescent routine immunization schedule in national immunization programs in Latin America and the Caribbean, 2021



^aCuba has only TT component, ^bCountries that offer OPV booster, ^cCountries that offer dTap.

HPV vaccine

- Out of 30 countries, 29 had quadrivalent HPV vaccine, and one had nine-valent HPV vaccine (Puerto Rico)
- A 2-dose schedule with 6-month interval was used in all countries, except for Chile, which adopted a 12-month interval between doses
- 16 countries had gender-neutral vaccination (males/females) and 14 female-only vaccination, delivered by school or facility-based strategy (**Table 3**)

Table 3. Vaccination coverage rate in Latin America and the Caribbean using official and by age 15 indicators, WHO Immunization Data Portal, 2019-2020

Country*	Strategy	Eligible cohorts		Official VCR		By age 15 VCR	
		Primary	Catch-up	2019 ^a	2020 ^a	2019	2020
AMRO ^b	Female	—	—	56%	40%	58%	61%
Argentina	Female	11	12-22	59%	46%	56%	69%
	Male	11	12-16	48%	39%	—	—
Antigua & Barbuda	Female	9-13	14-26	—	—	—	—
	Male	9-13	14-26	—	—	—	—
Bahamas	Female	9-12	—	4%	9%	7%	10%
	Male	9-12	—	—	—	—	—
Barbados	Female	10-11	—	30%	7%	30%	16%
	Male	—	—	27%	7%	—	—
Belize	Female	9-14	—	69%	16%	—	—
	Male	9-14 ^c	—	49%	26%	—	—
Bolivia	Female	10-12	—	31%	23%	—	70%
Brazil	Female	9-14	—	47%	47%	66%	66%
	Male	11-14	—	19%	36%	—	—
Chile	Female	9-13	—	86%	73%	—	72%
	Male	9-13	—	—	65%	—	—
Colombia	Female	9-17	—	10%	9%	57%	33%
Costa Rica	Female	10	—	39%	77%	—	—
Dominica	Female	11-12	—	—	82%	—	—
	Male	11-12	—	—	85%	—	—
Dom. Republic	Female	9-14	—	7%	7%	—	—
Ecuador	Female	9	10	67%	34%	82%	78%
Guatemala	Female	9-14	15-26	42%	17%	—	—
	Male	11-14	15-19	—	—	—	—
French Guiana	Female	11-14	15-19	—	—	—	—
	Male	11-14	15-19	—	—	—	—
Guyana	Female	9-16	—	55%	46%	—	13%
	Male	9-16	—	62%	60%	—	—
Honduras	Female	11	—	61%	48%	—	53%
	Male	11	—	—	—	—	—
S. Kitts & Nevis	Female	11	—	—	—	—	—
	Male	11	—	—	—	—	—
Jamaica	Female	11-12	—	32%	4%	1%	5%
	Male	11-12	—	—	—	—	—
Mexico ^d	Female	9-11	—	97%	11%	99%	99%
	Male	10	—	75%	46%	80%	57%
Panama	Female	10	—	64%	38%	—	—
	Male	—	—	—	—	—	—
Paraguay	Female	9-10	—	50%	30%	67%	65%
	Male	9-10	—	—	—	—	—
Peru	Female	9-13	—	91%	20%	70%	76%
	Male	11-12	13-18	—	—	—	—
Puerto Rico	Female	11-12	13-18	—	—	—	—
	Male	11-12	13-18	—	—	—	—
Saint Lucia	Female	11-12	—	53%	38%	—	—
	Male	11-12	—	48%	35%	—	—
S. Vincent & Grenadines	Female	11-12	—	—	1%	—	—
Suriname	Female	12-13	—	42%	24%	40%	40%
Trinidad & Tobago	Female	11-15	—	20%	—	6%	6%
	Male	11-15	—	—	—	—	—
Uruguay	Female	11	—	61%	33%	48%	49%
	Male	11-12	—	—	13%	—	—

HPV, Human papillomavirus; WHO, World Health Organization. *HPV vaccine has not been introduced yet in Cuba, Haiti, Nicaragua, and Venezuela

^aNumbers are rounded down if the decimal portion is less than 0.5 and round up if decimals is more than 0.5; ^bAMRO, Americas region (encompasses the United States and their territories, Canada, and Latin American countries and territories); ^cAdministered to males only on request of parent and availability of vaccine; ^dProgram resumed in 2022 after HPV vaccine supply problems from 2019-2021.

Meningococcal C or ACWY vaccines

- Five countries had meningococcal vaccine in the NIP targeting adolescents: French Guiana used meningococcal C (age 1-24 years), and meningococcal ACWY was available in Argentina (age 11 years), Brazil (age 11-12 years), Puerto Rico (age 11-12 years and booster dose at age 16 years), and Suriname (age 14 years)

Discussion/Limitations

- Introducing new vaccines or expanding for other cohorts or males (eg, HPV) may create opportunities to reach underserved populations or age groups with other immunizations and health interventions that they would not otherwise receive^{2,3}
- The production of comparable VCR statistics for adolescents has been complex due to the lack of VCR data and differences in age at vaccination (targeting of multiple and different cohorts), program delivery strategy, multiple variations in timing and/or schedule^{8,9}
- Although disease surveillance would be the best indicator for adolescent health programs, VCR can be used as the primary outcome measure due to the difficulties in establishing comprehensive systems capable of detecting all vaccine-preventable diseases or long-term required to prevent disease in low- and middle-income countries, such as HPV-related cancers^{11,12}
- Reliable and timely immunization data at national and subnational level is fundamental to set national priorities to address adolescent health needs. These data can be used to work closely with communities, civil society, young people, within the public and private sector, as part of an integrated approach to maximize efforts in adolescent health promotion^{2,3}
- Based on the available information, mainly for HPV vaccine, 2020 adolescent vaccination programs were affected worldwide by the COVID-19 pandemic and related disruptions. The lack of availability of 2020 HPV VCR for males reflects the recent introduction of a male indicator in the WHO/UNICEF Joint Report in 2019^{11,12}

Conclusions

- Most LAC NIP had routine (HPV/dT/dTap) and campaign vaccination programs targeting adolescent population
- There were limited or absent VCR data for adolescent vaccines which may limit timely actions where and when needed
- HPV vaccine coverage was impacted by the COVID-19 pandemic in 2020; despite limited data, probably the same trend occurred for other vaccines included in the adolescent schedule. Fast VCR recovery is needed to ensure a healthy future for this adolescent generation
- While vaccine presents exciting opportunities for adolescent public health, continued global, regional, and country efforts should be carried out to address barriers to universal immunization coverage for adolescents

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Notes: This review is part of a broader systematic review with mixed methods registered in Prospero (CRD42021272518). These results are related to the first question of the review.

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