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ADULT VACCINATION: PRACTICAL STRATEGIES TO PROMOTE ADHERENCE

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Abstract

Vaccination is recognized as one of the most impactful public health interventions, providing significant benefits in terms of disease eradication, prevention of infectious diseases, herd immunity, antimicrobial resistance, years of life gained, morbidity and mortality reduction, and cost- effectiveness. In recent years, vaccination coverage rates have decreased due to multiple factors. The aim of this article is to provide updated information on the benefits of vaccination at both the individual and public health levels, to identify the barriers to vaccination, and to present evidence- based global and in-office strategies for implementation in daily medical practice for adults, with the goal of improving vaccination coverage rates.

Key words: public health, vaccination, vaccination, adults, vaccination strategies

Resumen

Vacunación en adultos: estrategias prácticas para promover la adherencia

La vacunación es reconocida como una de las intervenciones de mayor impacto en salud pública, con gran beneficio en términos de erradicación de enfermedades, prevención de enfermedades infecciosas, inmunidad colectiva, resistencia antimicrobiana, años de vida ganados, disminución de morbilidad y mortalidad y costo-efectividad. En los últimos años las tasas de cobertura de vacunación han disminuido como consecuencia de múltiples factores. Este artículo tiene como objetivo ofrecer información actualizada sobre los beneficios de la vacunación, tanto a nivel individual como de salud pública, presentar cuáles son las barreras a la vacunación y cuáles son las estrategias globales y en consultorio basadas en la evidencia, para implementar en la práctica diaria en la consulta médica en adultos, a fin de mejorar las tasas de cobertura vacunal.

Palabras clave: salud pública, vacunación, adultos, estrategias de vacunación

KEY POINTS
Current knowledge

- Vaccination is essential to reduce infectious diseases and their complications, particularly in those with chronic conditions. It

is also the cornerstone of herd immunity, decreasing community transmission. Health professionals, as trusted sources, should be trained to communicate the benefits and risks, combating misinformation.

Contribution of the article

- This article offers practical tools and evidence-based strategies to overcome barriers to vaccination, improving coverage and public health impact. It also enhances the training of health professionals, strengthening them as communicators to promote confidence in vaccines and reduce misinformation in the community.

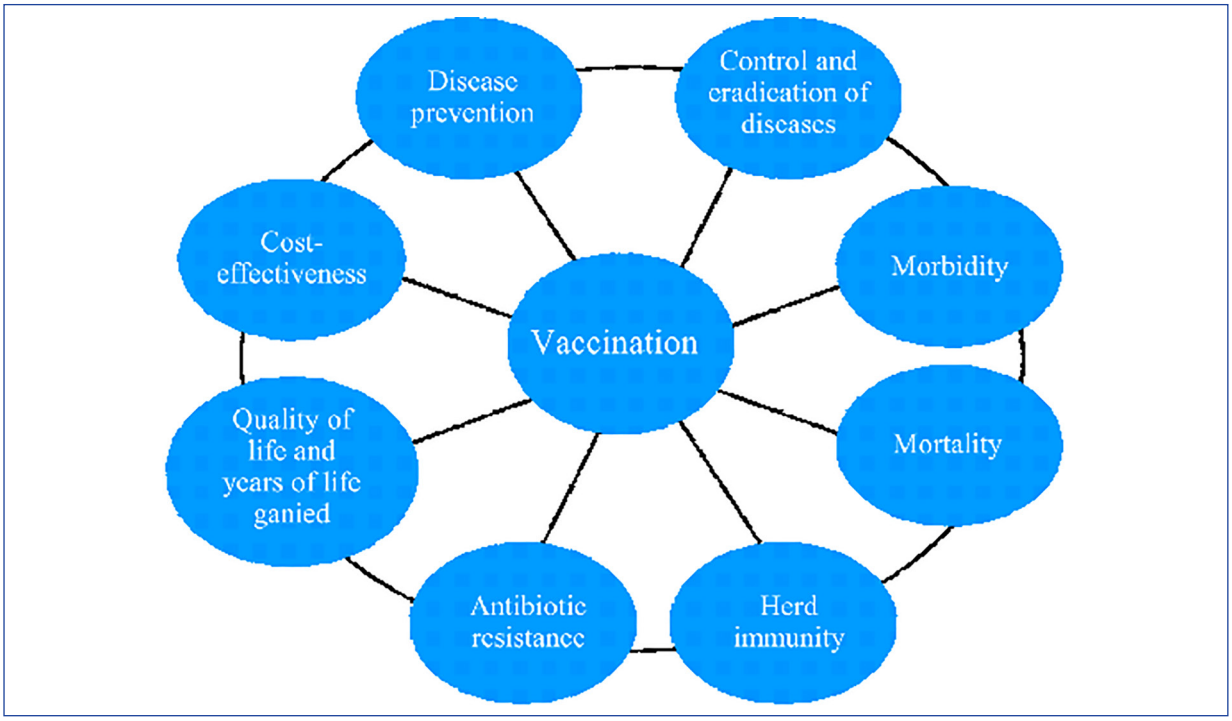
In 1796, Edward Jenner developed the first smallpox vaccine using pustular material obtained from lesions in cows affected by cowpox, a disease caused by the bovine smallpox virus, which confers cross- protection against human smallpox[1]. This procedure, known as vaccination, replaced variolation, an older technique that involved inoculation of human smallpox material and carried a higher risk of disease transmission[2]. Jenner's introduction of vaccination marked the beginning of routine immunization against infectious diseases, and his work was quickly adopted in Europe and other parts of the world[3].

At present, vaccination is recognized worldwide as the pharmacological intervention with the greatest impact on public health in terms of disease eradication, infectious disease prevention, herd immunity, antimicrobial resistance, life years gained, morbidity and mortality reduction and cost-effectiveness (Fig. 1).

The World Health Organization's (WHO) Expanded Programme on Immunization (EPI) was designed to make life-saving vaccines available worldwide. Since its inception in 1974, vaccination has prevented 154 million deaths, including 146 million deaths in children under 5 years of age, of which 101 million were infants under 1 year of age. By 2024, an increased probability of survival was observed, even into adulthood[4].

Vaccination has been the tool to eradicate diseases such as smallpox and in the significant reduction of others such as measles and poliomyelitis, which in some regions of the planet have been eradicated. Other diseases like Diphtheria, Pertusssis, Tetanus, Rubella, decreased

Figura 1 | Impact of vaccination on different areas of health interest



their incidence with the global increase in vaccination coverage[5]. Recently, vaccination played a crucial role in the SARS-CoV-2 pandemic. Studies showed that vaccines significantly reduced the incidence of COVID-19-related cases, hospitalizations and deaths. It has been estimated that vaccines prevented approximately 14.4 million COVID-19 deaths in 185 countries and territories during the first year of vaccination, increasing to 19.8 million deaths averted when excess deaths are considered as a more accurate estimate of the impact of the pandemic[6]. In the U.S., it was estimated that vaccination reduced the infection rate from 9.0% to 4.6% and hospitalizations and deaths by 63.5% and 69.3%, respectively, over a 300-day period[7]. Another study in the U.S. estimated that, during the first six months of vaccine availability, more than 8 million confirmed cases, 120 000 deaths and 700 000 hospitalizations were prevented[8].

However, vaccination not only provides individual protection, but also community or herd protection. This means that by vaccinating a significant part of the population, the disease transmission is interrupted, protecting unvaccinated or partially or incompletely vaccinated individuals. This indirect effect is crucial to prevent outbreaks and protect vulnerable populations[9].

The relationship between vaccination and antimicrobial resistance is an area of growing interest in public health. Vaccines can play a crucial role in decreasing antibiotic use by directly preventing bacterial and viral infections, which in turn reduces the selective pressure that favors the emergence of resistant strains. For example, pneumococcal conjugate vaccines and rotavirus vaccines have been shown to significantly reduce antibiotic use in children, especially in low- and middle-income countries[10,11]. On the other hand, vaccines can have a direct effect by reducing the prevalence of organisms carrying specific resistance genes, and an indirect effect by reducing febrile illnesses that often lead to antibiotic use, for example, influenza vaccination has been shown to reduce antibiotic use by 13-50% in vaccinated individuals[12].

In economic terms, vaccination has proven to be a cost-effective intervention. In the U.S., the Vaccines for Children program prevented millions of cases of illness, hospitalizations and deaths, resulting in significant savings in both direct and community costs[13]. Globally, it was estimated that vaccination prevented millions of deaths and disability-adjusted life years (DALYs), especially in low- and middle-income countries[14].

In 1978, the first Argentine National Vaccination Calendar (CNV) rolled up, for the prevention of prevalent diseases: Diphtheria, Pertussis, Tetanus, Poliomyelitis, Measles and severe forms of Tuberculosis (meningitis, miliary dissemination). The CNV is characterized by being mandatory and free of charge, guaranteeing equitable access to vaccination services for all stages of life, as established by law. Despite these guarantees, vaccination coverage is suboptimal and showed a steady decline in the last five years[15]. In the context of maternal vaccination, Argentina prioritized vaccination against influenza and pertussis as part of a comprehensive care strategy for pregnant and lactating women. Since 2011, influenza vaccination was included in the national schedule to reduce complications and deaths from influenza in the at-risk population, achieving coverage of over 95% in the following years. In 2012, Argentina was among first in Latin America by implementing a universal pertussis vaccination strategy for pregnant women, using the Tdap vaccine from 20 weeks of gestation. In addition, in 2005, Argentina introduced universal vaccination against hepatitis A in one-year-old children, using a single-dose strategy that proved effective in reducing cases and associated medical costs[16,17]. In 2017, routine vaccination against meningococcal disease was introduced in infants and adolescents, using MenACWY and 4CMenB vaccines to address the changing epidemiological trends of the disease[18].

Influenza vaccines and COVID-19 have been shown to significantly reduce disease incidence and mortality. In Argentina, the introduction of quadrivalent influenza vaccine instead of trivalent influenza vaccine could prevent thousands of influenza cases, consults, hospitalizations, increased quality-adjusted life years (QALYs) and deaths, especially in adults older than 65 years[1,9]. As for COVID-19 vaccines, a significant reduction in disease burden, infections and mortality was also observed in people over 60 years of age

in Argentina, with high effectiveness after two doses[20-22].

Currently, vaccination coverage in Argentina, according to the CNV, has experienced a decline during and after the SARS-CoV-2 pandemic. An analysis of national administrative databases and a systematic literature review of vaccination coverage in Latin America, including Argentina, revealed that vaccination rates for several childhood vaccines, such as rotavirus, pentavalent/hexavalent, measles, BCG, and pneumococcal conjugate vaccine, showed a downward trend before and during the pandemic. The decrease in coverage ranged from 2.5% to 18.5%, depending on the specific vaccine[22].

In addition, a study on the prescription of influenza and pneumococcal vaccines in adults during the first wave of COVID-19 in Argentina indicated that vaccination rates for these vaccines were also suboptimal. The influenza vaccination rate was 37.7%, while the pneumococcal vaccination rate was 24.7%[23]. These data suggest that the pandemic may have negatively affected vaccination coverage in both children and adults in Argentina.

Vaccination in adults is an essential measure to prevent serious diseases, reduce complications and reduce the burden on health systems. Clinicians, being in direct contact with patients, have a fundamental role as educational agents and health promoters. From their position, they can address myths, reinforce confidence in vaccines and ensure adherence to recommended schedules. This document aims to highlight the importance of physician participation in the recommendation of vaccination schedules in adults, based on scientific evidence and adapted to the individual needs of patients to reduce health costs, morbidity and mortality associated with vaccine-preventable diseases.

Vaccination in adults: general framework

In a context of an aging population and increasing prevalence of chronic diseases, vaccination is a key preventive tool to reduce the incidence of infectious diseases, serious complications and mortality in the adult population. Many governmental and non-governmental organizations (NGOs) worldwide issue vaccination recommendations for adults, which are updated annually, including the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC) in the USA, and these guidelines are followed by many countries due to their scientific validity[24]

Vaccines for adults and the elderly are also crucial in reducing the incidence of serious diseases and complications, especially those with chronic conditions, such as diabetes, chronic cardiovascular disease, chronic lung disease, solid or hematologic cancers, AIDS/HIV or immunosuppression. Vaccines not only protect the vaccinated individual, but also contribute to herd immunity, reducing disease transmission in the community. This is particularly important for diseases such as measles, rubella, pertussis, influenza, COVID, where adult vaccination can prevent outbreaks[25-27].

Immunity acquired in childhood may decrease over time, necessitating boosters in adulthood, such as tetanus and diphtheria vaccines. In addition, new vaccines targeting adults have emerged, such as the human papillomavirus (HPV) vaccine, which is recommended up to age 26 years and can be considered in previously unvaccinated older adults[25-28]. Influenza and pneumococcal vaccines have been shown to be particularly cost-effective in terms of cost per quality-adjusted life year (QALY)[29].

Recommended vaccines in Argentina

Vaccination recommendations are determined according to the age of the individuals, the presence of comorbidities and/or some other condition. Worldwide we have vaccines that are included in the NVC of each country and others that are not included in the NVC, but are recommended by governmental agencies, NGOs, scientific societies or medical entities[30-37] (Table 1).

Vaccines of the National Vaccination Calendar

All CNV vaccines are compulsory, free, universal and are administered in vaccine clinics, health centers and public hospitals in the country. It includes vaccines for all stages of life, special situations and specific groups, with the aim of controlling and eradicating preventable infectious diseases, guaranteeing equity and social justice. CNV vaccines comply with strict quality

Table 1 | Recommended vaccines in Argentina

Vaccines within the Argentine National Vaccination Calendar by stages of life[30]	
Life stage	**CNV vaccines**
Pregnancy	- Anti-flu (in any trimester of pregnancy) - Triple Bacterial Acellular (from 20 weeks of gestation) - Respiratory syncytial virus (between 32 and 36 weeks)
Newborns	- Hepatitis B (within the first 12 hours of life) - BCG (before leaving the maternity ward)
Up to one year of life	- Rotavirus (2 and 4 months) - Pentavalent (2, 4 and 6 months) - IPV (2, 4 and 6 months) - Pneumococcal conjugate (2, 4 and 12 months) - Meningococcal -(3 and 5 months) - Anti-flu (from 6 months old) -MMR (12 months) - Hepatitis A (12 months)
Up to 2 years old	- Meningococcal (15 months) - Chickenpox (15 months) - Influenza (up to 24 months) - Pentavalent (15-18 months) - Yellow fever (18 months. Residents in risk areas)
5 years	- IPV - Chickenpox - MMR - DTP
11 years	- dTpa - HPV - Yellow fever (residents in at-risk areas)
15-64 years	- DT (every 10 years) - Argentine hemorrhagic fever (from 15 years of age for residents in at-risk zones)
65 years and over	- Influenza (annual) - Pneumococcal conjugate - DT (every 10 years)
Vaccines not included in the Argentine National Vaccination Calendar[32-37]	
COVID	- 2 annual doses (every 6 months)
Respiratory syncytial virus	- 1 dose (the need for booster not yet defined)
Varicella-zoster virus	- 2 doses (0 and 2 to 6 months)
Dengue virus	- 2 doses (0-3 months)

IPV: inactivated polio vaccine; HPV: human papillomavirus; CNV: National Immunization Schedule; HPV: human papillomavirus: MMR; vaccine against measles, mumps, and rubella: DT: diphtheria and tetanus vaccine

and safety controls at national level, guaranteed by the National Administration of Medicines, Food and Medical Technology (ANMAT) and internationally, the World Health Organization (WHO).

Vaccines outside the National Calendar, according to individual risk

These are vaccines recommended by NGOs, scientific societies or medical entities, not included in the CNV of Argentina, and which present characteristics that respond to specific needs of population groups. These vaccines are usually suggested as a complement to the CNV to cover protection gaps or provide additional immunization in specific situations. In Argentina, vaccines against SARS-CoV-2 and dengue are recommended by the Ministry of Health, the former universally and according to the risk categorization of the individual, and the latter according to age and in areas of high virus transmission, but neither is included in the CNV. The RSV vaccine is recommended for those over 50 years of age and/or with comorbidities. The dTpa vaccine is an acellular triple bacterial vaccine that protects against diphtheria, tetanus and pertussis. The dT vaccine, against tetanus and diphtheria, is administered to children 7 years of age and older, adolescents and adults. It should be administered every 10 years. Some of its doses can be replaced by the dTpa vaccine, in case vaccination with acellular pertussis vaccine has not been performed, especially in patients with COPD.

Regarding the degree of coverage in the adult population, the National Survey of Risk Factors conducted by the National Ministry of Health in 2013 included a vaccination module and 32 365 persons >18 years were surveyed on the use of four vaccines included in the CNV: hepatitis B, tetanus, influenza and pneumococcus. The entire surveyed population was considered for tetanus and hepatitis B and certain at-risk groups for influenza and pneumococcus, according to recommendations. The vaccination coverage varied according to the vaccines analyzed: tetanus 49.8%, hepatitis B 21.7%, influenza 51.6% and pneumococcus 16.2%[31]. In the study by Matta et al. on vaccination coverage in individuals over 18 years of age in Argentina, for influenza and pneumococcal vaccines during the COVID-19 pandemic, it is described that in the year 2020 the vaccination rate against influenza was 37.7%, while vaccination against pneumococcus was 24.7% in adults in three regions of Argentina. Furthermore, in the subgroup of patients with indications for both vaccines, 71.7% received the influenza vaccine and 59% received the pneumococcal vaccine[38].

In patients older than 18 years, the main causes of death include noncommunicable diseases such as cardiovascular disease, cancer and respiratory diseases, both globally and in Argentina. A study in South America revealed that cardiovascular disease causes 31.1% of deaths, cancer 30.6%, and respiratory diseases 8.6%, much of the latter group preventable with vaccines[39-41].

The Bunge y Born Foundation presented in February 2024 the results of the Index of Confidence and Access to Vaccines (ICAV) corresponding to the year 2023, marking the fifth consecutive year of this study in Argentina. Among the most relevant findings, they highlight that the vaccine confidence

index stood at 85.2 points, representing a decrease of 0.8% with respect to 2022 and a 9.1% drop compared to 2019, before pandemics. Eighty four point nine percent of respondents considered vaccines to be effective and 90.1% perceived them to be safe. But people over 65 are among the groups with the least confidence in vaccines and with lower levels of access, as opposed to 87.7% who considered them important for children, even with the notable difference in the number of vaccines given in children relative to older people. Another relevant finding is the booster against SARS-CoV-2: 46% of participants indicated that they did not plan to get the booster dose, and 37% were unaware of health recommendations on the need for an annual booster[42,43]. These findings underscore the need to strengthen communication, access and education strategies on the importance of vaccines.

In summary, public health vaccination not only protects individuals, but also reduces community transmission, generating collective immunity, reducing the incidence of outbreaks, hospitalizations and mortality associated with preventable diseases. In addition, it translates into a significant reduction of costs for the

health system, by avoiding expenses in medical consultations, treatments, requests for complementary studies, hospitalizations and long-term complications in adults. Investing in adult vaccination is a cost-effective strategy that strengthens public health and improves the quality of life of the population[24,26,29]. The challenge ahead is to improve vaccination coverage rates, mainly in the elderly and/or those with comorbidities.

Barriers to vaccination in adults

The concept of "barrier to vaccination" refers to any obstacle or factor that hinders or prevents people from accessing vaccination. Barriers to vaccination are multifactorial and can be classified as structural and nonstructural. Non-structural barriers include factors such as lack of adequate information or advice about vaccines, concerns about the safety and efficacy of vaccines, and trust in the health care system, lack of understanding about personal risk of vaccine-preventable diseases, and perceived low risk, which can lead to complacency and thus lower motivation to vaccinate[43,44]. Structural barriers include problems of access and availability. Lack of vaccines and difficulty in accessing vaccination centers represent significant barriers to immunization[14,45]. This may be due to

logistical problems, such as vaccine shortages and limited hours of operation of health centers, which make it difficult for people to get vaccinated at convenient times[45,46]. Ensuring adequate quantity and quality of vaccines, with sufficient access and availability, is essential to achieve optimal coverage and avoid gaps in the protection of the population.

The difficulty in achieving the expected[30,38] and necessary objectives in vaccination coverage continues to be a complex multifactorial phenomenon that must be addressed at all levels: individual in the clinic, population, government, communication, social and cultural.

In addition, we can add other behavioral and social factors and practical aspects, which, in sum, make patients and various communities, such as LGBTQIA+ or indigenous population, not approach or access the health system to receive the necessary immunizations[47]. Some specific barriers faced by these vulnerable communities may be, for example, lack of translated or culturally appropriate materials, discrimination and lack of communication skills of health personnel[48].

Personal or family experiences, contact with pro- or anti-vaccine groups, self knowledge about a particular vaccine, religious or cultural factors, and information disseminated in the media and social networks[49], are some of the determinants that influence each individual's decision to be vaccinated and can act as barriers[50].

In some countries, religious and cultural barriers limit women's participation in the health care system and there are security issues that impede access to health care. In the LGBTQIA+ community, discrimination by health care providers and violence are major barriers[51, 52].

As for health personnel, the increased workload, limited resources, and even lack of knowledge to respond to patients' questions and demands, may act as limitations when prescribing vaccines[53]. A survey on trust and access to vaccines carried out by the Bunge y Born Foundation[42], showed that in those patients who received the recommendation not to be vaccinated, the rate of trust in vaccination was lower, this shows that the indication and recommendation by the health personnel is a fundamental part of the vaccination process. Finally, the availability, cost and distribution of vaccines also act as barriers to vaccination. As shown in the previously cited survey, access to vaccines (based on 8 dimensions of analysis proposed by WHO) fell by 2.2% in 2023 and showed a decrease compared to previous years among those with lower and higher levels of education. Barriers and constraints to achieving vaccination goals are multifactorial, are located at each level of health care, and differ by region and community. Therefore, in order to develop appropriate vaccination strategies, it is necessary to analyze in each region and community why the vaccination rate is low and to develop the appropriate strategies.

Role of the physician as a leader in vaccination

Physicians, as members of health teams, play a key role in improving vaccination coverage, and have many tools as education, effective communication, community engagement and

specific strategies. The literature highlights that their influence is essential to counteract misinformation and promote confidence in vaccination[54, 55].

They can act as leaders in vaccination campaigns, particularly by addressing existing barriers through education, effective communication, community engagement, and management of vaccine hesitancy. By educating, the physician can provide accurate, evidence-based information to patients in the face of common concerns and myths that contribute to hesitancy. It is desirable for physicians to be part of representative groups that participate in policy decisions along with health authorities and ministries of health[54, 55].

Is insufficient to only give accurate health information about vaccines to the community and expect substantial increases in vaccination rates. Such information must be conveyed by reliable sources, accompanied by open participation and dialogue, with messages to build trust[56]. Therefore, another key element is effective communication, which should be persuasive and include appropriate framing of the message, including vaccine safety and benefits (personal and community) and allow a safe space for discussion in the context of shared decisions[57]. The ASPIRE tool, which means ***assuming*** people want to be vaccinated and being prepared for questions, ***sharing*** key facts and sources of information to counter misinformation, ***presenting*** strong recommendations to vaccinate and stories about vaccination experiences, proactively ***initiating*** discussion or addressing questions about adverse effects and sharing credible sources of information, ***answering*** questions and actively listening, and ***empathizing***, understanding concerns, can facilitate community discussion to improve vaccination adherence[56].

Multicomponent interventions encompassing the following strategies could be more effective: (i) targeting specific groups, such as unvaccinated or under-vaccinated groups and health care workers,

(ii) increasing knowledge and awareness of vaccines, (iii) improving access to and appropriateness of vaccination, (iv) mandating vaccination or implementing sanctions against non-vaccination, (v) engaging religious and community leaders, (vi) incorporating new knowledge and evidence about vaccines into routine health practices and procedures, and (vii) addressing mistrust and improving trust in health care providers and institutions through genuine engagement and dialogue[55].

At the individual level, the physician can be a strong motivator for the patient to be vaccinated, through trust building, personal example, effective communication and the use of motivational interviewing techniques. Trust in the physician can increase the patient's willingness to accept vaccination recommendations, and clear and empathetic communication can strengthen this trust and motivate the patient to follow his or her advice[58]. The fact that physicians are vaccinated is a strong predictor of recommending vaccination to their patients[59]. Proper framing of the message containing information about benefits (personal and social) is effective as a motivator[57]. The use of motivational interviewing techniques can help address patient hesitancy by allowing them to express their concerns and receive personalized information that reinforces their motivation and confidence in the decision to vaccinate[60].

During COVID pandemic, a new practical 4-step framework[60] designed to support health care professionals arose in their dialogue with patients reluctant to vaccinate: (a) Engage in establishing a trusting and safe relationship to freely express opinions, beliefs, and knowledge gaps; (b) Understand what matters most to the individual; (c) Offer information to co-construct accurate knowledge in order to guide the individual toward the intention to vaccinate; .(d) Clarify and agree to validate an individual's decision-making autonomy. Other studies show the importance of motivational interviewing as an effective strategy to address vaccine indeterminacy[61,62].

Healthcare professionals should receive continuing education in vaccination that covers aspects such as vaccine knowledge, communication skills, and managing vaccine insecurity (providing tools and skills to counteract misinformation and patient concerns) [63]. Other strategies to improve vaccination rates, knowledge, attitudes and confidence include educational interventions[64].

The participation of the professional in the elaboration of documents with scientific societies, within or without the orbit of the Ministry of Health, can help to correct erroneous perceptions and increase the acceptance of the vaccine in the population by reducing the perception of medical controversy[65], being a low-cost intervention with lasting positive impacts on health.

The results of the intervention of physicians recommending vaccination have a great effect in improving vaccination rates. Three different scenarios can be presented in the consultation: when both the professional and the patient have a positive attitude, the probability that the patient will be vaccinated is 90%; when both the patient and the physician have a negative attitude to vaccination, only 7% of patients will be vaccinated; and when the patient has a negative attitude, but the physician has a positive attitude to vaccination, the probability that the patient will be vaccinated is 87%[66-69].

Effective strategies to strengthen vaccination: from evidence to practice

The role of health professionals is critical: medical recommendations and *in situ* vaccination are proven strategies to improve vaccine uptake[70]. In lower-income countries, interventions such as improved access, financial incentives, awareness programs, media campaigns and automated messages have addressed knowledge and attitudinal barriers to vaccination[71].

A systematic review conducted in the United Kingdom identified that the provision of clear and understandable information, together with personalized reminder systems (messages or letters), were the most documented and effective interventions to increase public demand for vaccination. In addition, organizational strategies aimed at improving access to vaccines, such as provision at alternative locations or times, were noted to be highly effective[72]. An analysis of adult coverage identified that the most successful strategies are those that integrate cognitive, emotional and social aspects, together with practical educational components. Among them, measures such as the use of reminders at the point of care and the authorization of non-medical personnel of the health team to administer vaccines stand out, which facilitates access and improves adherence to immunization[73,74]. In the case of vaccination against COVID-19, a study showed that financial incentives and vaccination requirements for certain activities or jobs significantly increased the intention to be vaccinated[75]. On the other hand, in older adults, the combination of health education, centralized reminders and *in situ* vaccination was shown to significantly improve vaccination rates against influenza and pneumonia[76]. For adult vaccination in general, the use of standing orders and electronic reminders have been highlighted as key methods, especially for influenza vaccination[77].

In vulnerable groups, strategies such as home visits, personalized communications, and the implementation of community pharmacies have proven to be highly effective[78]. A prominent example in Boston illustrates how community-based strategies, including vaccination sites in churches and community centers, mobile vaccination events, and communication campaigns led by trusted messengers, have contributed to the success of programs such as VaxUpPhilly-Families, This program engages parents and caregivers as promoters of vaccination through culturally tailored, trust-based messages[79,80], similar programs have been carried out in our country during the COVID-19 pandemic.

These evidences are the indicated ways to achieve better coverage in vaccination rates. Some strategies that can be implemented for the general adult population are (Table 2):

- Reminders are powerful tools to encourage vaccination. They can be done through phone calls, text messages or even home visits[81].

- The association of referents or *champions*[82], strongly identified with the different communities, can help to build the necessary bridges to increase trust and adherence[83].

This concept applies to sporting examples, show business figures or even referents, such as managers within an organization or high-ranking officers in the military.

- Identifying the population to whom we want to communicate is also a priority, and this is even more evident if we use social media. The correct choice of the message to be communicated and its recipients is key: emphasizing the final intended effect of the vaccine (for example,

Table 2 | Global vaccination strategies for the adult population

Strategy	Resources
Vaccination reminders	Phone calls, text messages or home visits
Champions	Association of referents identified with the communities
Identify the population	Personalized message and media to recipients
Seizing opportunities	Vaccinate without a vaccination record or co-administering vaccines at the same time
Locations	Vaccinate at the site where the person is located. Vaccinate at the first visit without taking into account serostatus or previously administered vaccinations Use shortened schemes
Economic	Economic incentives for certain groups

reducing the probability of severe disease, reducing hospitalizations and mechanical ventilation in cases of COVID or influenza vaccine), is an important strategy. Videos or social media messages can serve to increase public awareness and can have both a positive and negative impact on attitudes and behavior regarding a given vaccine[84].

- Other strategies such as avoiding missed opportunities by vaccinating patients, even if they do not have their vaccination log book or history with them, or by co-administering vaccines that do not present contraindications to be administered at the same time[85].

- In homeless people, living on the street or in transitory centers, other strategies have been used, such as vaccinating where they are, vaccinating at the first visit without considering serological status or previously administered vaccines, and using shortened vaccination schemes[86]. The use of economic incentives may also be considered for certain groups[87].

In recent years, debates have arisen where individual freedoms collide with the social need for vaccination. This has been at its peak with COVID vaccines and some childhood vaccines. When discussing vaccination, it is very important to detach from biases by creating a safe space, listening empathetically, without judgment and validating personal feelings but challenging misinformation. Open-ended questions and even personal examples of why you recommend vaccination, and your own vaccination status can be used. The information we share should be reliable and warranted to counteract the misinformation people receive daily through unreliable sources[88]. The physician's office is an important place to discuss vaccines, prescribe and even administer. Any opportunity for patient contact should be used.

The direct recommendation of a health professional to be vaccinated is a decisive factor in the acceptance of vaccination[89]. Among the strategies that can be implemented in the office we can add (Table 3):

- In all contacts with different professionals in the office (nurses, technicians, etc.) as well as with administrative staff, share clear messages such as: how long has it been since you received a flu shot? or have you reviewed with your clinician the recommended vaccinations? Using all points of contact reinforces the importance of vaccination and prepares the conversation.

- Make vaccine resources readily available. Share evidence-based, easy-to-read information on the benefits of vaccination in general and vaccines in particular. Use your professional website or social media, as well as in-office brochures and materials with free access to patients and their companions.

- Provide the adult immunization schedule at the first visit with the mandatory and recommended vaccines, review it, spend time answering questions and discussing benefits.

- Record vaccination status and actions taken in the medical record. Leave reminders for the next visit, such as asking if the vaccine was administered and how the experience was.

Table 3 | Vaccination strategies for the office

Strategy	Shares
Direct messages to the patient by the professional and administrative health care team	How long has it been since you've had a flu shot? Did you review the recommended vaccinations with the clinician?
Information resources	Evidence-based, easy-to-read information
Vaccination schedule	Provide the CNV at the first visit with the mandatory and recommended vaccines.
Registration of vaccination status	Record vaccination status in medical records. Record vaccinations in digital systems
Vaccination clinics Seizing opportunities	Give clear directions and working hours. Inpatient: Consider inpatient immunization strategies Emergencies: prescribing priority vaccines

CNV: National Immunization Schedule

- Generate contacts to facilitate administration after the indication. Provide a list of vaccination clinics with updated working hours and means of contact and share it with the interested person.

- It is important that vaccines are recorded in the digital systems intended for this purpose (e.g. Nomivac in Argentina) so that they are accessible to all professionals attending the patient.

- In addition to the office, consider inpatient strategies that allow you to identify vaccination status and create the conditions to complete priority vaccination schedules quickly during hospitalization or at discharge[90].

- Emergency departments are sites where some vaccines are routinely prescribed (anti-tetanus in wounds, hepatitis B in post-exposure), so emergency room visits are an important and possible point to work with priority vaccines (e.g., COVID, influenza) in adults, since

emergency rooms are often the first and only contact with the health system, especially in vulnerable populations[91].

Another point to highlight in daily practice is the co-administration of vaccines. We know from experience that during infancy multiple doses of vaccines are received simultaneously with proven efficacy and safety. In adults, the effective and safe co-administration of vaccines with 2 doses has also been demonstrated, and in recent years there have been studies of co-administration with 3 doses: the inactivated vaccine against SARS-CoV-2, the quadrivalent inactivated vaccine against influenza and the 23-valent pneumococcal polysaccharide vaccine in adults over 60 years of age[92].

In recent years it has become clear that it is necessary to prioritize adult vaccination as it is done in childhood, health professionals in general and the clinician in particular should be trained to answer questions and facilitate the process including not only medical but also operational aspects.

Conclusions

Although vaccines are extremely effective tools with a positive impact as a public health strategy, vaccine refusal has increased in several countries around the world, leading to outbreaks of diseases that were considered eradicated, such as measles. Health professionals play a crucial role in people's decision making when it comes to vaccination. It is not only nec-

essary that they know the recommendations for each vaccine according to age group and specific health condition, but also that they respectfully consider people's concerns and discuss the risks of not vaccinating. Refusal to vaccinate not only increases the individual risk of disease, but also the risk to the whole community. Beyond other intervening factors, the individual role of the health professional is fundamental in the fight against misinformation that influences public perceptions about vaccines, installing or increasing unfounded concerns and thus contributing to doubt or reject the indication for vaccination. The positive influence of the health professional on people is manifested in several ways:

1. The health professional should be a main source of information. To this end, it is essential to be up to date and follow the recommendations of international and local organizations.

2. The health professional must convey trust and credibility when recommending vaccines. People who trust their primary care providers are more likely to consider vaccines as safe and effective.

3. The health professional should educate and advise, not just prescribe. The "information" should be transformed into a "recommendation", credible and feasible, taking the necessary time to introduce the discussion of its risks and benefits in each case.

4. The health professional should be a positive influence. People who receive adequate information and advice are more likely to consider vaccines safe than those who do not receive such influence.

5. The health professional should be an ally, listening to and respecting people's insecurities and concerns about the indication for vaccination and not discontinuing the relationship with those who refuse vaccines.

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