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## Chapter

# Vaccination Barriers in Mexico

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## Abstract

Immunization is a simple, effective, and low-cost way to protect the child population against infectious diseases. However, various barriers interrupt compliance with the necessary vaccination schedule. For example, anti-vaccine groups that encourage fear and misinform—in this scenario, social networks are an unreliable source of information with high diffusion. Health personnel must help generate trust in patients, provide truthful information and reduce vaccination hesitancy among the population. The main objective of the universal vaccination program is to obtain the greatest possible coverage of vaccines in the entire population, so as to prevent the development of certain pathologies.

**Keywords:** vaccines, vaccination programme, barriers, vaccine hesitancy, infants, parents

## 1. Introduction

In 1900, life expectancy at birth in Latin America and the Caribbean was around 29 years, currently being approximately 74 years. This advance in life expectancy is related to the medical progress that occurred over the years, thanks to economic development, the application of hygiene measures, the discovery of antibiotics, and the creation of vaccination programs [1].

The first scientific breakthrough occurred in 1796, with Edward Jenner, who used the smallpox virus as a vaccine to protect against the disease caused by the human virus. Approximately 100 years later, Louis Pasteur succeeded in attenuating human pathogens allowing them to be applied as vaccines [1].

The rapid biotechnology development has facilitated the creation of new vaccines. The use of recombinant DNA techniques, nanotechnology, and the incorporation of more powerful adjuvants allow the design and production of new vaccines, thus providing the possibility of creating vaccines directed at new targets [1].

Immunization is considered a simple and effective form of protection for the child population to reduce severe infectious diseases. Comprehensive vaccination programs are the cornerstone for prevention and are a cost-effective public health intervention [2, 3].

In 1991, the Universal Vaccination Program was created in Mexico, where an approximately 6 billion Mexican pesos (MXN) budget is directed to purchase 16 different immunogens. Lately, the Basic Vaccine Scheme has increased up to three times, so there is higher pressure on first-level care systems to guarantee continuous and adequate supply [4].

However, despite the medical progress made over the years, several barriers intervene in achieving full coverage of vaccines in the general population. Among these are religious and philosophical beliefs, vaccination policies, socioeconomic environment, health beliefs, risk perception, and previous vaccination experiences—including the mode of administration and adverse effects [5].

The main objective of the universal vaccination program is to obtain the greatest possible coverage of vaccines in the entire population, so as to prevent the development of certain pathologies, which has led to certain strategies, to contribute to the reasons, beliefs, and situations that prevent it from being fulfilled as expected, as is the case of the problem of poor accessibility to health services in marginalized communities [6].

## **2. Vaccination**

A vaccine is a suspension of attenuated live or inactivated microorganisms or parts thereof [7]. It is applied to produce an infection like the natural one—without danger to the person who receives it. Hence, the objective is to boost an immune response that generates protection against any subsequent exposure to the microorganism in question. When this protection reaches people not vaccinated, it is known as herd immunity [8].

### **2.1 Types of vaccines**

There are three main methods for the design of a vaccine. A distinction is made between using whole viruses or bacteria; using only fragments of the pathogenic agent that induce the immune system response; or treating only the genetic material, containing the instructions to manufacture specific proteins and not the whole virus [9, 10].

Each vaccine is designed to make the immune system respond to different germs and fight off the diseases they cause [11, 12].

In **Table 1**, we summarize the types of vaccines developed so far (**Figure 1**).

### **2.2 Universal vaccination program**

It started in 1991 as a national commitment aiming to improve child survival, promoting, protecting, and caring for the health of the country's children through vaccination [13].

Their objectives were:

- Complete the Basic Vaccination Scheme for children under five years of age.
- To eradicate neonatal poliomyelitis, diphtheria, measles, and tetanus, and control whooping cough and severe forms of tuberculosis.
- Strengthen epidemiological surveillance through specific systems for identification, notification, and immediate control of cases and outbreaks.

Inactivated or killed vaccines	To inactivate the pathogen by chemical, heat, or radiation. This type mainly induces the humoral response. They maintain their epitope on the antigens, generating the immune response [9, 10]. These are whole or fractional cells, produced with only a part of a cell as a polysaccharide or protein. Examples are anti-choleric—oral and parenteral—and whole-cell anti-pertussis [9, 10]
Attenuated vaccines	Pathogens, remaining active, with the capacity to replicate, but weakened, losing pathogenicity. It induces a humoral and cellular response. It is not recommended in immunocompromised or pregnant people because they can revert to their virulent form. Examples would be anti-measles, anti-rubella, anti-varicella, anti-polio, BCG [9, 10]
Subunit vaccines	They use specific fragments called antigenic subunits of the virus or bacterium, which are indispensable for recognition. They do not contain the entire pathogen. The subunits are usually proteins or carbohydrates. Examples, most of which are included in the childhood vaccination schedule, such as pertussis, tetanus, and meningococcal meningitis [9, 10]
Nucleic acids	A sequence of genetic material is used that provides the instructions to manufacture a specific protein. They start from modified RNA or DNA to generate an immunogenic protein. Example: mRNA against COVID-19 [9, 10]
Vaccines based on viral vectors	It uses a harmless virus to carry specific fragments of “proteins” of the pathogenic agent, in order to induce an immune response without causing disease, so that the harmless virus serves as a vector to introduce the protein into the organism. Example: Ebola vaccine [9, 10]

*Source: Made by the authors based on the WHO and PVU [9, 10].*

**Table 1.**  
*Types of vaccines.*

- Promotion, education for health, and community participation as support in the prevention of diseases that cannot be avoided with vaccination [13].

In **Figure 2**, we can see the complete vaccination schedule.

### 2.3 Vaccine Hesitancy

The term “Vaccine Hesitancy” refers to the hesitant attitudes that the population has toward vaccination, delaying or denying the application of vaccines in health centers [14].

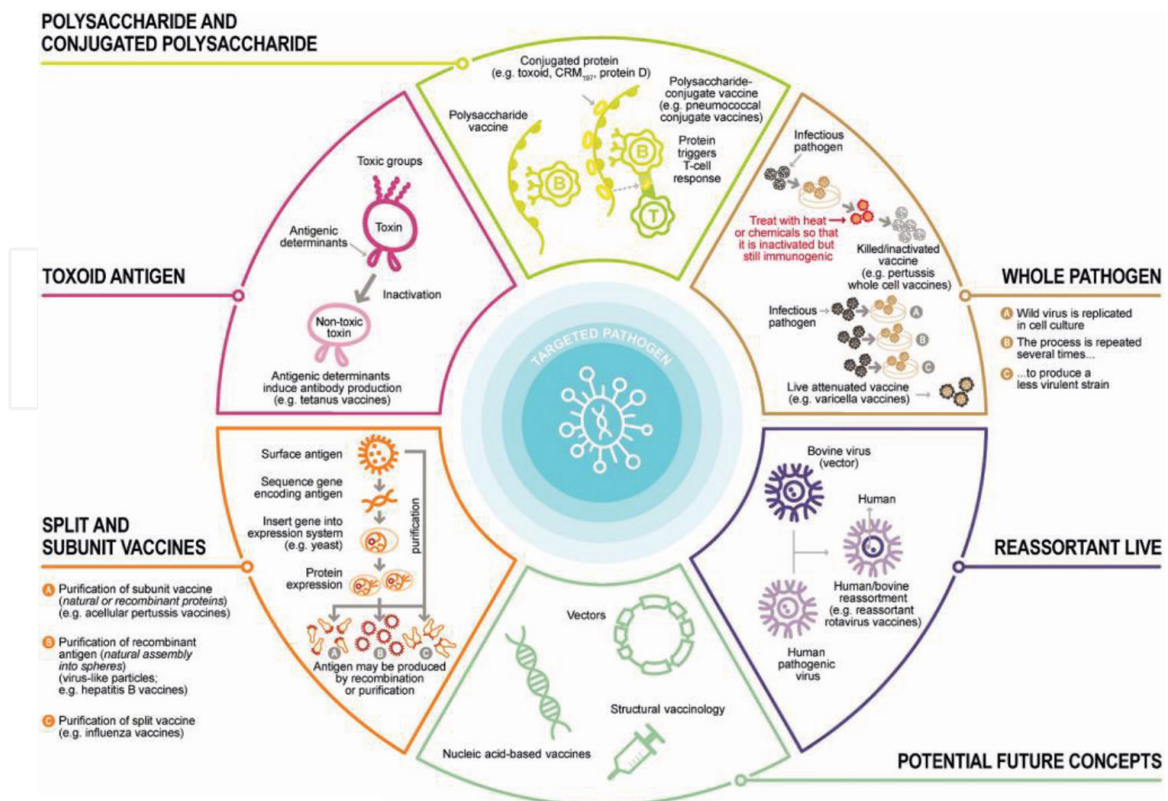
The definition by the Group of Experts in Strategic Advice (SAGE) Working Group in “Vaccine Hesitancy” (VH) is translated as “the delay, either in the acceptance or rejection of vaccination despite being available in vaccination health services” [15].

Wavering attitudes to vaccination are common and may have increased since the 2009 influenza pandemic [14].

In this context, Hesitation is doubt, distress, or concern about the value or safety of vaccination [14].

Regarding the hesitancy about a specific vaccine, a study was carried out to determine the indecision about the anti-influenza vaccine, during the hospitalization of a minor, by the parents [16, 17], making minimal modifications to the PACV [17].

The results showed the presence of VH. Approximately 53% of the parents declined the influenza vaccine during hospitalization, 24% of the respondents



**Figure 1.** Vaccines can be produced using different processes. Vaccines may contain live attenuated pathogens, inactivated whole pathogens, toxoids, or parts of the pathogens (e.g., natural or recombinant proteins, polysaccharides, conjugated polysaccharides or virus-like particles) [12]. Source: Taken from [12].

obtained a high hesitancy score > 50, and parents with high scores refused vaccination compared to those with slightly lower scores [17].

The PACV was applied to future mothers [18], finding that 1 in 12 (8%) pregnant women present VH [17].

Some reasons may be related to a lack of awareness or misinformation.

The World Health Organization (WHO) recognizes the global importance of hesitant attitudes. Hence, it recommends the intervention of immunization managers (IMs) to understand the factors that determine the indecisiveness of the population [14].

Vaccines are acknowledged by health authorities and the medical community as a tool to eradicate several pathologies and be part of public health successes [14].

Nevertheless, for many people, this is not a sufficient reason to trust vaccination, as they question its necessity [14].

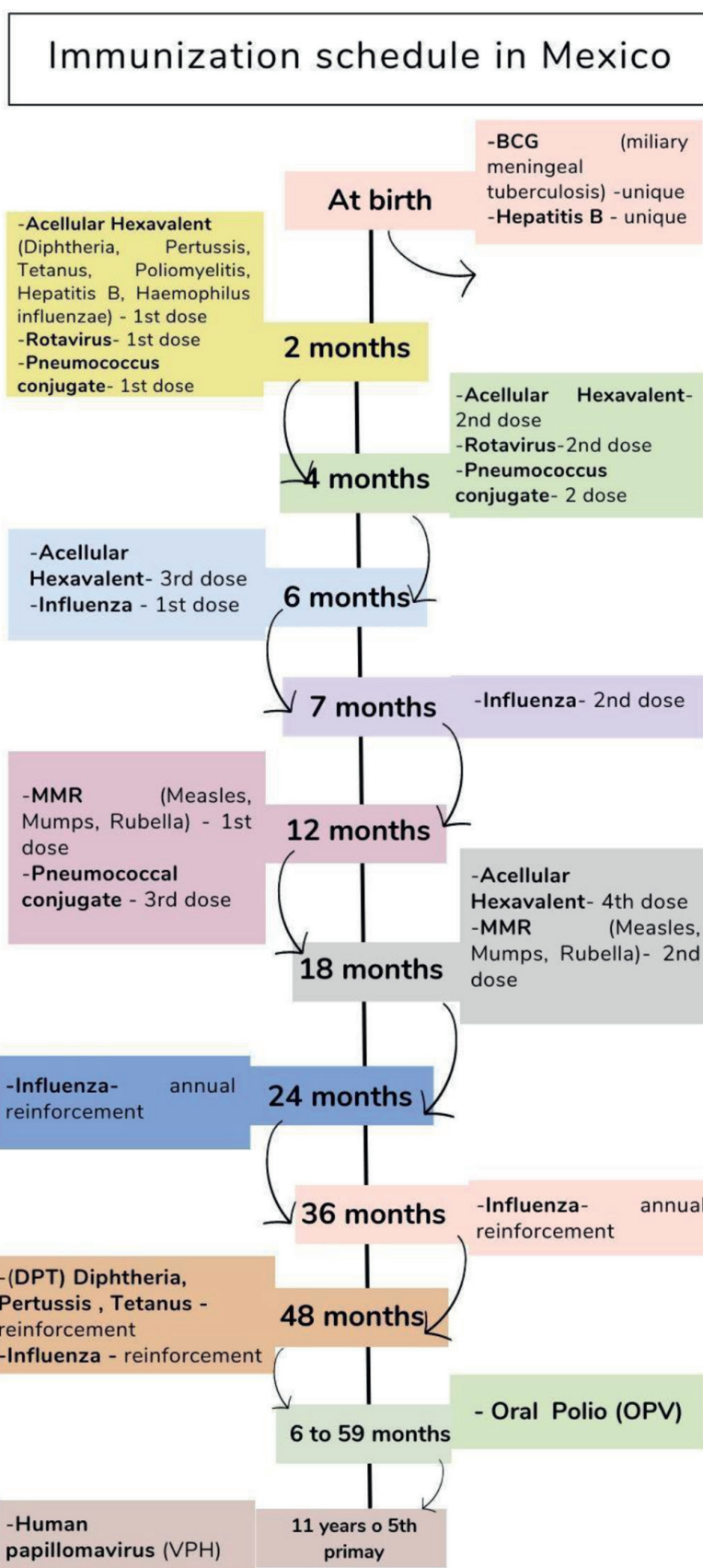
It is crucial to understand that a hesitant attitude differs from a vaccine refusal attitude [14].

In a cohort study, a significant decrease was observed among the mothers with a hesitant attitude both at birth and at two years of age, with the proportion being 9.7% at the birth of the child compared to 5.9% at 24 months of age [19].

The above shows that Vaccine Hesitancy” (VH) can decrease over time, mainly due to the maternal experience acquired with vaccination [20].

It leads us to understand that first-time parents’ hesitancy attitude will decrease with their next delivery if they are properly oriented about the importance and benefits of a vaccine [20].





**Figure 2.** Flugogram of universal vaccination program. Source: Made by the authors based on the Universal Vaccination Program [13].

The Parental Attitudes About Childhood Vaccines Questionnaire (PACV) is one of the most used instruments among studies addressing vaccine hesitancy in parents in the United States. This instrument has proven validity and reliability. It has been modified for use in specific situations, such as the type of vaccine, parents of different statuses, or study countries [19].

In a study using a modified version of the PACV questionnaire for adolescent fathers [18], it was possible to find that 39% expressed concern about suffering from preventable diseases and 41% about side effects [21].

Among the factors related to reluctance to vaccination is personality. The conscientiousness trait is included. It describes how persistent, organized, and goal-oriented the person is. Individuals with low levels show a greater reluctance to get vaccinated. In second place is neuroticism, defined as the sensitivity presented to stress and negative emotional triggers [22].

The main complication is that indecision or hesitancy turns into rejection. Pearce et al., in a UK study of 14,578 children, found that three-quarters of parents whose children were not vaccinated consciously chose not to be vaccinated [23].

Two cornerstone concepts to promote an active demand are trust and legitimacy. The first is the ability to believe in statements made by another person about a situation. For example, when the medical doctor describes the preventive benefits of the hexavalent vaccine. Legitimacy refers to the foundations on which the political leaders come to make decisions. For instance, research is conducted about the application and benefits of a specific vaccine before applying it [23].

The problem lies when people fail to have trust bases, so they come to reinterpret the provided information. For example, statements that applying the hepatitis vaccine provokes Multiple Sclerosis or that a new disease originates from a specific vaccine [23].

Distrust increases by the lack of awareness, low perception of the seriousness of the disease, and distrust in government sources [23].

A Romanian study found that many mothers refused HPV vaccination because they believed the vaccination campaign was too experimental and that their daughters would be test subjects [23].

Among health professionals, approximately 63% had to deal with skeptics, 90% wanted better campaigns for patients, and 57% mentioned insufficient government support as a concerning issue [23].

According to the IMs, indecision has its roots in people who resist vaccination for various reasons, people who do not believe in the role of vaccines and that they are effective and therefore are not necessary, parents who do not allow them to their children are vaccinated especially against the presence of new vaccines [14].

Health professionals report challenges in building a more trusting relationship with the patient. First, the lack of time with the patient makes it difficult to recommend vaccination [23].

It is worth noting that the time a medical doctor shares with his patient is not extensive. However, it must be favorable to foster a bond of trust.

As healthcare professionals operate with increasing time constraints, there is a higher opportunity for “alternative” medical information and practices to play a more reliable role, particularly with social media [23].

The medical doctor needs to keep abreast of the most recent information on vaccines, that is, adverse effects, the latest on the subject, seeking to remain a constant part of the parents’ doubts, such as, for example, if a parent considers that your child is more likely to start smoking after getting HPV [23].

Generally, in first-time parents, there is a lot of mistrust and fear, especially in care regarding their newborn. It implies the part of their screening, vaccination, and pediatric consultations. Hence, a proper approach by the medical doctor is essential. By doing so, with the following children, it is easier for them to join the vaccination programs and everything related to their care during their development [23].

## 2.4 Beliefs and customs

Families that decide not to vaccinate their children have the conception that health goes beyond the absence or presence of a disease. Health is balance and physical, emotional, and spiritual well-being [23].

When any of these elements is affected is when the disease appears. They perceive protection as something individual, being of greater importance following a good diet and breastfeeding for as long as possible. In case of a disease, they opt to use alternative medicine, phytotherapy, homeopathy, acupuncture, and conventional medicine is used just when the severity of it is perceived. Having a mistrust in the medical field [23].

Throughout the last few years, movements of people have developed, especially parents, who reject or are undecided regarding the use of vaccines. It is generated by the lack of awareness of the risks and severity that may have vaccine-preventable diseases, as the influence of social networks, which announce false news about the safety and efficacy of vaccines. Investigations in European countries and North America have described a term to study this phenomenon: Vaccine Hesitance. The literature on this topic is scarce in Latin America [24].

A chief problem is the beliefs of people, the customs taken as the most appropriate when it represents obsolete behaviors. Examples would be “my grandmother saying that this is harmful and they are ways of infecting us” or “because of the vaccine the child became very serious” when they are talking about a lack of knowledge on the subject, mainly about the side effects that they generate [24].

The World Health Organization (WHO) report, global coverage stands at approximately 86%. Also, it establishes that nearly 19 million infants were not vaccinated against tetanus, diphtheria, and pertussis [17]. Prevention of these diseases during infancy is crucial since they could cause more severe conditions at older ages [25].

According to the 2019 report on Immunization in the Americas [17], in this region, there are outbreaks of measles and diphtheria caused by the low coverage of vaccines against measles, rubella, and mumps (SRP) 82% and diphtheria, tetanus, and pertussis (DPT) 88%. Other vaccines that had low coverage were hepatitis B in the newborn (80%), rotavirus (79%), and the oral polio vaccine (87%) [24].

Being in communication with society has become complicated by the lack of awareness of risks and the seriousness of Vaccine-Preventable Diseases (VPDs), mainly due to the dissemination of false news on the safety and efficacy of vaccines on social networks [24].

The parent's refusal to vaccinate their children is related to value factors, lack of information, deep distrust of health institutions, and ignorance regarding vaccines. It complicates making decisions and policies about the vaccination of children, generating the belief that vaccination is mandatory by the authorities, motivated by particular interests [26].

McDonald and his Group of Experts in Strategic Advice (SAGE) have worked, reviewed, and prepared research studies to generate a concept to study this situation, which resulted in “Vaccine Hesitancy” (VH) [15].



## **2.5 Issues specific to vaccines and vaccination**

The difficulty in accessing vaccines arises because they are unavailable due to insufficient production by the industry or for logistical reasons since receiving them takes time. The refusal of people to get new vaccines and professionals to prescribe them may be due to the little information they have [24].

## **2.6 3C model**

The WHO defined three basic determinants concerning the phenomenon of reluctance:

- **Trust:** The belief about the effectiveness and safety that the services, the health team, and those who make the decisions of the health system consider the needs [22].
- **Complacency:** When the risk implied by immuno-preventable diseases is not perceived. Therefore, actions are not considered necessary to prevent them [22].
- **Convenience:** It refers to the accessibility of vaccination centers with an adequate and friendly attitude, in addition to being able to afford the cost, including the vaccine, transportation, supplies, or application [22].

## **2.7 Imprecise coverage and poor follow-up of children who do not complete the scheme**

During the last 12 years, the vaccines included in the basic scheme have tripled, generating higher pressure on the primary care systems to guarantee a continuous and adequate supply of vaccines for the 2.2 million boys and girls born yearly in Mexico [27].

The national health authorities came to report very high vaccination coverage. The 5th Work Report of the Ministry of Health (SS) shows the coverage with a complete vaccination schedule in children under one year (92.8%) and one year (89.5%). measles, mumps, and rubella (MMR) coverage was 97.1% for one-year-olds [4]. In contrast, the vaccination coverage reported in different national and local surveys reveals a substantially lower amount [4].

What is relevant is that the differences described above are worrisome. The report of lower figures than the official ones make us suspect that the vaccination coverage in Mexico could be much lower than officially reported. This low coverage could be related to the increase in reported whooping cough cases in Mexico, which increased from 371 in 2010 to 1017 in 2015 and raises concern due to the resurgence of measles cases in the region [28].

## **2.8 Problem in children under 5 years**

Vaccination in children under five years is considered one of the most efficient and cost-effective interventions to reduce infant mortality worldwide. Approximately 2.5 million deaths might be avoided yearly due to compliance with a basic vaccination scheme for boys and girls [2, 29].

Approximately 20% of children born each year do not receive the benefits of vaccination, so they may be exposed to the risks of becoming ill and dying before they are five years old [2, 29].

It is crucial to continue advancing in understanding the factors or determinants that are involved or have prevented reaching the vaccination coverage goals, as well as the human, technical, and administrative resources in the problem of low coverage [29].

In Colombia, a study aimed to identify the reasons and barriers influencing non-compliance with vaccination schedules in boys and girls under five years of age [29].

This study tried vaccination as a social phenomenon, with meanings and subjectivities around it [30]. Individual interviews and focus groups were conducted, and strategies with which language was analyzed to approach the reality lived and felt by people. The aim was to design and apply a flexible interview guide with topics related to personal, demographic, and labor information, organization of the vaccination service in the municipality, strengths and weaknesses of the program, and reasons that prevent compliance with coverage [31].

Among the data obtained on the limitations are the following:

## **2.9 Regarding information, attitudes, and beliefs about vaccination**

For some, the main concern was the fear of the post-vaccination reaction, pain, and fever, being one of the reasons why they do not vaccinate children, expressing arguments such as that their child was sick after the vaccine application, or “my child got very sick with it, he got a fever and vomited” [29].

## **2.10 Socioeconomic and geographic conditions**

According to the vaccination staff, armed conflict, crime, and geographical distance have become barriers to accessing these services. Therefore, it leads people to choose not to vaccinate their children or not do it timely [29].

The issue of distance is a predominant problem, especially for people who live in communities far from their main health center, because even knowing that it is crucial to show up to vaccinate the child, they do not go for this reason [29].

## **2.11 Institutional conditions and health services**

Vaccination teams usually have low incomes, so they do not have adequate equipment to provide this service [29].

This cause is relevant. For example, in the hospital where they go for treatment or in their health center, vaccines are not available, provoking they are not applied promptly or in subsequent pregnancies. Currently, this issue is neglected [29].

## **2.12 Anti-vaccine groups**

Vaccines are one of the most effective preventive measures and contribute to the eradication of several diseases [32].

The existence of critics and opinions against vaccines is old, and it is a universal issue that has reached wide diffusion thanks to the media and the Internet [32].

When there is a higher concern for the disease and not for the vaccine, there is acceptance by the population. However, in the opposite case, when there is no concern

for the disease but for the vaccine side effects, it generates rejection. It is the basis for the critical groups on vaccines [32].

When adverse reactions increase quantitatively, even if they are constant and go unnoticed, individual or collective rejection, and a loss of confidence, appear. Hence, it generates lower vaccination coverage and the appearance of new disease cases. Therefore, correct information on what is happening on the increase in disease cases, outbreaks, susceptible people, and the decrease in coverage [32].

### 2.13 Fears and prejudices

Among the false concepts is the overestimation of the pain caused by the administration, the belief that immunity decreases, that the composition has toxic substances, or that the main interest is economic. Nevertheless, the one that has mostly come out is that vaccines can cause disease [8].

Anti-vaccine groups have created myths about the adverse effects of vaccines as (Table 2).

### 2.14 Children with egg allergy cannot be vaccinated against influenza and triple viral

The influenza vaccine is prepared in an allantoic fluid in chicken egg embryos and may contain small amounts of egg, mainly ovalbumin. However, the recombinant influenza vaccine does not have ovalbumin, so its application in these people is safe [30].

The inactivated trivalent or quadrivalent vaccine contains a low level of ovalbumin—less than 0.12 mcg/ml. Those vaccines can be administered safely in allergic patients [33].

In the case of the triple viral vaccine, it is prepared in chicken embryo fibroblast cultures. Therefore, it contains little ovalbumin, approximately 0.1 ng/mL, making its application safe [33].

Myths about the adverse effects of vaccines	
Autism and inflammatory bowel disease	It was related to the administration of the triple viral vaccine. The vaccine is unrelated to gastrointestinal symptoms or autism [8]
Guillain Barré Syndrome	It is based on causal associations between specific lots of flu vaccines and this syndrome [8]
Sudden infant death	Only five cases have been reported 24 h after the combined hexavalent vaccine application [8]
Atopic diseases, asthma	It is believed to be due to the lack of antigenic stimuli induced by not having suffered from infectious diseases in childhood. They are related to the triple viral, oral polio, Hepatitis B, and flu vaccines [8]
Immunization systems	Anti-vaccine groups argue that vaccines overload and impair immune systems. The body of a healthy infant can generate effective antibodies against 10,000 antigens [8]
Vaccinal transmission of the virus or viral particles	It has been proven that vaccines such as oral polio, MMR, or yellow fever cannot transmit viruses [8]

*Source: Made by the authors based on the Actualization of vaccines. Theory, realities, and myths (I) [8].*

**Table 2.**  
*Myths about of vaccines.*

Strategies must be directed at patients, healthcare providers, health systems manufacturers, and the media. In patients, it is necessary to take a pre-vaccination history, which explains the existence of contraindications, and allergies, if they previously suffered any negative experience, doubts, identification of adverse reactions, and the precautionary measures that must be taken [32].

In health professionals, the strategies are based on training and motivation, improvement of vaccination techniques, conservation of vaccines, management and information on side effects and vaccine reactions to parents and patients, and improvement in records for proper monitoring of the vaccine, from manufacture to inoculation [32].

### **2.15 Social networks**

Social networks are Internet-based applications that allow users to interact and share ideas. Users of these networks can obtain a large audience shortly [34].

Due to the social networks availability, misinformation and misreported experiences become the foundation in making their decisions. Decisions are added to the beliefs or personal experiences of people without much knowledge of the subject. Therefore, parents must be oriented about the adverse effects of vaccines [21].

The increasing Internet and social media access have changed people's attitudes toward vaccination, especially during disease outbreaks. Even though health professionals are considered the chief information source about health-related issues, many parents believe that the Internet is an easily accessible source of information related to health, including information on immunizations. Vaccine doubt groups are very active on these social networks, and most of the information found in these groups is about anti-vaccination, which can influence public opinion and raise doubts about vaccines [34].

## **3. Religious and philosophical conceptions**

The Amish community is one of the best-known examples. In 1991 the effect of reluctance to the rubella vaccine showed high numbers of congenital rubella in populations that refused vaccination, presenting a greater susceptibility to suffering the disease [35].

Belief in contraceptive effects of tetanus vaccine.

Between 1994 and 1995, members of the Pro-Life Organization and the Catholic Church in Mexico reported the presence of Chorionic Gonadotropin Hormone in tetanus toxoid. Due to this situation, the Mexican government, with the support of the Pan American Health Organization, verified that the tests used by these people were inappropriate and generated false positives [35].

It originated due to an experiment in India with a contraceptive product based on Chorionic Gonadotropin Hormone, which raised the use of tetanus toxoid in its preparation. The news was refuted, and the declarants were forced to give explanations to clarify the situation [35].

Escobar Díaz et al. managed to identify different factors that can influence non-compliance with vaccination schedules, which we have previously mentioned, such as fear of post-vaccination reaction, socioeconomic, geographic, and safety conditions of the population, adding the work conditions of vaccination personnel, administrative and economic problems and the precarious development of information systems [36].



On the other hand, Escobedo Collado and Portocarrero Ramos found that mainly sociocultural factors such as the mother's age, housing, and beliefs regarding the vaccine have a significant relationship with non-compliance with the vaccination schedule [37].

### **3.1 Geographical reasons**

The following are some reasons given for the vaccine rejection. They involve the lack of transportation for their transfer and the distance between the community and the health unit [38].

[Distance] "Sometimes there is no one: whoever moves you or you don't have to move. The date came and I had no one to move me or there was no one to take me, and sometimes for that reason, one lets the date pass" [38].

[Transportation] "Sometimes I couldn't because I didn't have anything to go or sometimes I couldn't because my partner or my mother-in-law didn't have time to take me because they were working" [38].

### **3.2 Economic reasons**

Factors related to family income decrease the possibility of carrying out the act of vaccination, such as the lack of monetary resources [38].

### **3.3 Institutional reasons**

It refers to the reasons related to the administrative, functional, and organizational parts that define each institution and that disadvantage the vaccination service. They include the absence of biological, insufficient hours, low availability of the service, and the lost opportunities for vaccination, which lead to children under five years of age not receiving all the necessary vaccinations (**Figure 3**) [38].

## **4. Recommendations or strategies to address vaccination barriers**

It is important to remember that vaccination policies vary widely, in their different processes and outcomes in each country [39].

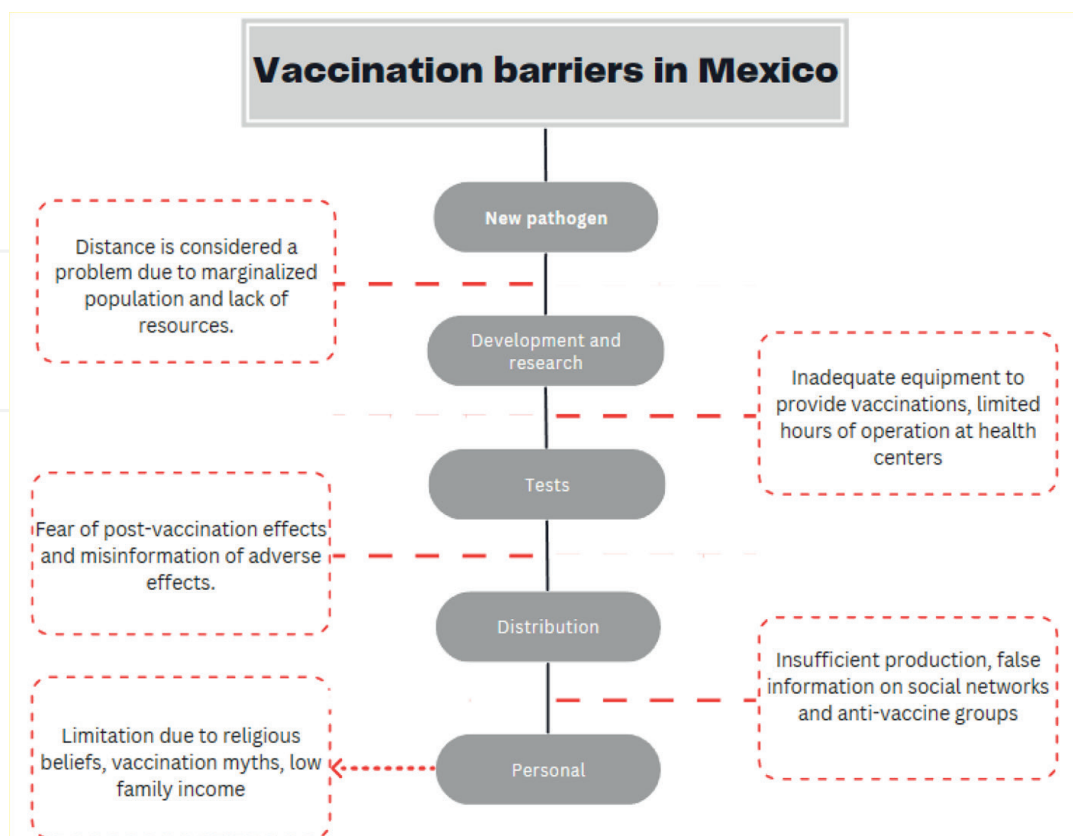
Some strategies that Europe implemented were the following:

In Italy, due to finding a decrease in registered vaccination coverages, according to the National Vaccination Plan, through a law n. 119/2017, approved by the parliament, it was decided to make ten vaccinations mandatory, imposing monetary fines on families of those not vaccinated [39].

Being one of the most reluctant countries, in France, the government added eight mandatory vaccines (*Haemophilus influenzae* type b, pertussis, hepatitis B, measles, mumps, rubella, meningococcus C, and *Streptococcus pneumoniae*) to the three that were already being required (diphtheria, tetanus, and polio) [39].

## **5. Strategies in México**

Because of the problems that have been detected in the performance of vaccination programs, it is necessary to build the capacity of health personnel to facilitate improvements in each component of the program [40].



**Figure 3.** Vaccination barriers in México. Source: Made by the authors based on the text.

Assessing the performance of immunization activities is a good opportunity to foster accountability to review progress and to determine factors of success or failure [40].

Effective vaccination coverage combines the measurement of vaccination coverage, demand for vaccination, and access to health services [40].

In primary care for the surveillance of adverse effects of vaccines it is necessary to comply with three basic functions [40]:

**Educational function:** the benefits of vaccination are explained to parents or guardians, the diseases that can be prevented and it is also important to warn about the possible side effects that may occur [41].

**Preventive function:** it is important to have adequate knowledge of the most frequent adverse reactions in order to identify and treat them correctly, to know the contraindications to avoid unnecessary postponement of vaccination, and to identify patients at high risk of adverse reactions [41].

**Active or passive surveillance function:** this is performed by identifying unexpected adverse events and reporting them through pharmacovigilance programs [41].

## 6. Approach to reluctance in the health team

Health professionals are crucial for providing information about preventable diseases and vaccines, especially to parents concerned about their safety and efficacy. For this reason, the European Center for Disease Prevention and Control created a guide of advice for the health team [42].

## **7. To improve communication and information**

By a willing attitude to listen and have a good dialog, it is possible to obtain information about the concerns that determine the reluctance. This communication must be in both directions [42].

Constantly monitor the media—especially blogs and websites—because they can give misinformation and generate rumors. It allows an immediate response [36].

It is important to understand the difference in risk perception for both healthcare personnel and patients; for physicians, they assess risks based on the most recent literature. In contrast, citizens assess and respond based on their emotions (cognitive biases) and the information available to the public at the time [43].

It is important to keep in mind that communication by authorities and health personnel should not discredit any public concern, even if it is based on beliefs or experiences and not on evidence [43].

Communication It must be simple, comprehensible, and in an appropriate language for the recipient [42]. Ensure that it is bidirectional, involving all stakeholders [43].

Many people believe that vaccination is risky and underestimate the risk of disease, so it is essential that information and interventions educate the recipient [42].

Risk communication in crises related to vaccine safety and vaccination is seen as a difficulty, but it becomes a great opportunity to improve communication [43].

Negative rumors can be disproved, and actions can be taken in order to implement good practices [43].

Presumptive communication assumes that people are ready to be vaccinated, while participatory communication asks people if they want to be vaccinated and seeks a point of view about vaccination. Greater vaccine uptake has been shown to occur when presumptive communication is used [44].

Communication is more successful if it is given as an indication, assuming that the patient will follow it, compared to if it is provided as a decision [42].

It is important to highlight individual protection and the responsibility to protect the group, not just themselves. Not being protected is much more dangerous than receiving the vaccine [42].

People who have doubts about vaccines should not be judged. The objective is to encourage them to go to health professionals in search of clarifying doubts [42].

## **8. Conclusions**

Immunization is a simple and effective protection for the child population to reduce infectious diseases. Some barriers intervene in compliance with the vaccination scheme in the child population, ranging from poor accessibility due to economic problems or long distances between communities and health centers to religious beliefs, fears, and prejudices about vaccines.

Other issues include the anti-vaccine groups that generate rumors and misinformation through social networks and the Internet, causing fear and attitudes of doubt about getting vaccinated. This problem gives rise to new cases of diseases previously controlled through vaccination.

The role of health personnel is of great importance, and they must be correctly trained and informed. It allows them to clarify their doubts and fears before the

vaccine application. There must be adequate communication between health personnel and the population, generating trust and using the same language to have a good understanding.

### **Conflict of interest**

The authors declare no conflict of interest.

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