Epidemiology & Health Data Insights
(eISSN 3080-8111)

Original Article

Understanding the Rising Trend of Medical Exemptions in Childhood Vaccination: A Qualitative Study of Healthcare Providers' Perspectives in Kazakhstan

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Received: June 10, 2025
Accepted: July 10, 2025

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Abstract:

Background: Vaccination is one of the most effective public health interventions yet increasing numbers of unjustified medical exemptions in Kazakhstan threaten both herd immunity and public trust. In 2020 alone, over 208,000 temporary and 2,600 permanent exemptions were issued—often based on questionable clinical criteria. This study aims to explore the drivers behind the rising number of medical exemptions in Kazakhstan, with a particular focus on the perspectives and attitudes of healthcare professionals.

Methods: A qualitative approach was employed, combining a desk review of national immunization policies and statistical reports with 27 in-depth interviews conducted in 2021–2022. Participants included healthcare providers and public health experts across urban and rural regions of Kazakhstan. Thematic analysis was used to identify key patterns in the data. Relevant national regulations were also reviewed and compared with international standards.

Results: Thematic analysis revealed four major areas of concern: (1) inconsistencies in pre-vaccination monitoring practices, (2) variability in post-vaccination follow-up procedures, (3) divergent roles and responsibilities among stakeholders in granting medical exemptions, and (4) limitations in surveillance and data systems for tracking and verifying exemptions. Findings suggest that physician over-cautiousness, legal insecurity, parental pressure, and inconsistent training are key drivers of unnecessary exemptions. The over-diagnosis of precautionary conditions—particularly by specialists such as neurologists—further contributes to false contraindications. These practices erode vaccine confidence and create barriers to timely immunization.

Conclusion: Addressing the growing problem of unwarranted medical exemptions requires policy reform, clearer clinical guidelines, enhanced physician training, and improved digital monitoring systems. Strengthening these areas is essential for restoring public trust, reducing unjustified exemptions, and ensuring high vaccination coverage in Kazakhstan.

Keywords: Kazakhstan; vaccination; medical exemptions; vaccine hesitancy; immunization policy; health systems

Introduction

Vaccination is one of the most effective public health interventions, preventing millions of deaths annually from vaccine-preventable diseases (VPDs). According to the World Health Organization (WHO), global immunization coverage has contributed significantly to reductions in childhood morbidity and mortality (1). Kazakhstan has maintained high routine vaccination coverage, with over 95% of children receiving vaccines in accordance with the National Immunization Schedule (2). Despite these efforts, there are certain difficulties in the attitude of both parents and health care providers towards the process of vaccination of children. Despite this strong coverage, outbreaks of diseases such as measles in 2005 and 2019 suggest that reported coverage may not reflect the actual population immunity. In 2019 alone, more than 13,000 measles cases were recorded, with a substantial proportion among unvaccinated children (3). These gaps are partly attributed to increasing numbers of medical exemptions from vaccination, many of which may be clinically unjustified.

While valid medical exemptions are essential for protecting vulnerable individuals, unjustified or excessive exemptions undermine herd immunity. International evidence suggests that such exemptions often reflect provider hesitancy, legal fears, or misinterpretation of contraindications rather than actual medical need. For instance, after the removal of non-medical exemptions in California, the number of medical exemptions increased disproportionately, contributing to new Vaccine-preventable disease (VPD) outbreaks (4). Similarly, there was an increase in the number of medical exclusions (MIs) following the cancelling of non-medical exclusions (NMIs) in Australia (5).

In Kazakhstan, data from the Ministry of Health (MoH) indicate a concerning trend: 208,932 temporary and 2,642 permanent medical exemptions were issued in 2020. Yet international guidelines suggest true contraindications affect fewer than 1% of children (6). Studies in similar settings have found that healthcare providers may issue exemptions out of caution, under parental pressure, or due to knowledge gaps (7, 8).

As global data shows, vaccine hesitancy may contribute to low vaccine acceptance (9). The growing role of healthcare providers in facilitating exemptions requires urgent attention, particularly in the context of vaccine hesitancy. Nowadays, the issue of vaccine hesitancy is widely recognized and has been detected in more than 90% of the countries globally (10). The WHO has identified vaccine hesitancy as one of the top ten threats to global health (11, 12). About 22,291 children in Kazakhstan have missed vaccinations in 2020 due to parental refusals (13). Nevertheless, anti-vaccination attitudes among parents are not the main reason for incomplete vaccination coverage. UNICEF emphasizes that health workers are key influencers of parents' vaccination decisions (14). Their beliefs and practices can both encourage and discourage vaccination. Lack of awareness among health workers about contraindications to vaccination and the impact of misinformation can lead to unjustified medical exemptions or false vaccine contraindications (FVC) (15, 16). Since healthcare professionals' (HCPs) knowledge and attitudes have a significant impact on patients' decisions to vaccinate, enhancing their confidence in vaccination through targeted education and reliable information plays a crucial role (17).

Globally, countries have implemented standardized systems to monitor and respond to adverse events following immunization (AEFIs), including digital registries and dual-reporting mechanisms involving both healthcare providers and recipients. Prompt identification and reporting of adverse drug and vaccine reactions are essential to successful case investigation (18). In contrast, Kazakhstan's reporting remains fragmented, with data collected manually and lacking detail on exemption duration or justification. Study conducted by Hodel et al. (2024) emphasizes that underreporting of adverse events is a significant challenge in pharmacovigilance, with studies estimating that over 90% of adverse events go unreported by healthcare professionals (19).

While research in Kazakhstan has largely focused on parental vaccine refusal and hesitancy, limited qualitative work has been conducted on healthcare provider perspectives. Understanding provider decision-making, knowledge gaps, and perceived systemic barriers is critical to formulating effective policy interventions. This study aims to explore the drivers behind the rising number of medical exemptions in Kazakhstan and assess the robustness of the AEFI monitoring system. By capturing the perspectives of healthcare professionals and examining existing processes, the study seeks to identify gaps in policy, practice, and data infrastructure that affect immunization coverage.

Methods

The study used a qualitative design combining desk research. The desk review covered Kazakhstan's national immunization policies, regulations, and health system data regarding vaccination process and AEFI monitoring. The qualitative component examined healthcare providers' lived experiences with issuing medical exemptions and monitoring AEFIs.

The study was conducted across various regions of Kazakhstan, including urban and rural healthcare facilities which provide childhood immunization services. Participants were recruited from primary healthcare centers, pediatric clinics, and immunization units throughout different regions of the country to reflect geographic and institutional diversity. A purposive and snowball sampling strategies had been employed to include participants with direct experience in vaccination decision-making: (a) medical practitioners, (b) health management representatives, (c) public health experts. Inclusion criteria for participants encompassed healthcare professionals directly involved in the organization or delivery of childhood immunization services, such as pediatricians, general practitioners, nurses responsible for administering vaccines in polyclinics, and immunization program coordinators at the facility or regional level. The selection of these groups of professionals was guided by the objective to gain a comprehensive and multi-level understanding of the practices related to unjustified medical exemptions and the registration of AEFI within the childhood vaccination system in Kazakhstan.

Semi-structured, in-depth interviews were conducted to collect the data. Interviews had been conducted both face-to-face and via online video calls when in-person meetings were not feasible. The interview guide was developed by the research team based on a comprehensive review of the relevant literature. Key topics included: (a) healthcare providers' decision-making processes regarding medical exemptions, (b) perceived barriers and challenges in vaccination policy implementation, (c) the role of AEFI monitoring systems in vaccine coverage analysis. The interview questions covered procedures ad reasons for granting medical exemptions, use of clinical guidelines, communication with parents, challenges in data systems and suggestions for improving current practices. Interview guides are available in the supplementary materials for reference. Audio recordings of the interviews were transcribed. Each interview lasted about 60 minutes on average. Interviews were conducted in Kazakh and Russian, and translated into English for analysis.

Thematic analysis approach was applied using open coding to identify emerging patterns and categories (20). Comparative review of Kazakhstan's policies with international best practices (WHO, CDC) was applied. Two researchers independently reviewed the transcripts, and discrepancies were resolved through consensus. Coding was conducted manually. An analysis of business processes at medical organizations was conducted to assess gaps in the registration and monitoring system. Verbal informed consent was obtained from all participants before the interviews. Confidentiality of the data and anonymity of the identity of the participants were ensured. Participants were given the option to withdraw from the study at any stage. This study was reviewed by the Research Center "Paperlab" and was deemed exempt from full ethical review (N43-21).

Results

During the period from November 2021 to February 2022, we interviewed 27 participants from nine regions of Kazakhstan, including (a) medical practitioners, (b) health management representatives, (c) public health experts (Table 1).

The data analysis is structured by categorizing the vaccination process and the recording of medically ineligible persons and AEFI around four key thematic areas: (1) Inconsistencies in Pre-vaccination monitoring practices; (2) Variability in post-vaccination monitoring; (3) Divergent roles and responsibilities among stakeholders in granting medical exemptions; and (4) Surveillance and data systems limitations in monitoring medical exemptions.

Inconsistencies in Pre-vaccination monitoring Practices in Kazakhstan

This step involves the patient and physician interacting before the patient is admitted for vaccination. Before the medical examination, the doctor should talk to the parent about the principles of risk-benefit weighing when deciding whether to vaccinate. If the parent is ready to vaccinate their child, an informed consent is filled out in the form specified in the Sanitary Rules "Sanitary and Epidemiological Requirements for Prophylactic Vaccination of the Population".

Table 1. Study sampling of 27 participants by city and participant groups

Characteristics	
Study participants, by city and professional role (n=27)	
Astana city	9
Public health experts	5
Health management representatives	2
Medical practitioners	2
Almaty city	4
Public health experts	2
Health management representatives	1
Medical practitioners	1
Shymkent city	1
Medical practitioners	1
Almaty region	4
Health management representatives	1
Medical practitioners	3
Karagandy region	4
Health management representatives	1
Medical practitioners	2
Pavlodar region	2
Medical practitioners	2
Atyrau region	1
Health management representatives	1
Zhambyl region	1
Medical practitioners	1
Kyzylorda region	1
Health management representatives	1
Participant groups, by professional role	
Public health experts (n=7)	
Health management representatives (n=7)	
Medical practitioners (n=13)	
Pediatric neurologist	5
Pediatrician	2
General practitioner	1
Vaccination nurse	3
Immunization doctor	1
Infectious disease specialist	1

Informants had different accounts of the order of examination and informed consent. Some interviewees said that the informed consent is signed before the examination (as the content of the document implies), while others said that the examination is conducted first, and then they are told about the vaccination and asked to sign the consent. It is likely that in the second case the respondent was describing the combination of admission to vaccination and age-appropriate preventive examinations. Scheduled vaccination is included in the process of child health monitoring and is predominantly carried out on the days of preventive examinations (or on the nearest vaccination day after them).

The subject of professional training of doctors on vaccination is beyond the scope of this study, but it should be noted that the curricula of pre-graduate, postgraduate and additional medical education do not ensure the continuity of transfer and accumulation of advanced knowledge on immunization by medical workers. Thus, standard professional curricula for medical and pharmaceutical specialties define a list of the most common diseases and conditions to be diagnosed and treated. At the same time, according to the modules of curricula for medical specialties of residency, mandatory study of vaccination is required only for the following specialties: family medicine, neurology, pediatrics, and infection.

In terms of theoretical knowledge of Kazakhstani medical students, the situation is not the best: the degree of their awareness of vaccination is assessed as below average, and students have an inherent belief in vaccination myths (21). It is also important that the modules of training programs do not provide requirements for mastering certain practical skills, manipulations, procedures of work on immunization, including the appointment of medical exemptions and AEFI.

Hence, the study indicates significant variability in how pre-vaccination screening is conducted. Some physicians require parents to sign informed consent before screening, while others conduct medical examinations first. A common issue is a lack of standardized communication about vaccine safety, which fosters parental concerns. Healthcare providers in Kazakhstan conduct pre-vaccination assessments, but variability exists in the application of medical exemption criteria. Physicians are often cautious due to fear of legal consequences if an adverse event occurs, parental pressure to issue exemptions, and lack of standardized training on vaccine contraindications.

Variability in post-vaccination monitoring

For the next three days after inactivated vaccine administration and on days 5-6 and 10-11 after live vaccine administration, the district nurse provides post-vaccination follow-up at home. As health workers explained, most often they communicate with the parent

of the vaccinated child via telephone or online messengers; if this is not possible, they make home visits.

"The nurse calls or goes home and asks if there was a fever the next day, if there was any reaction, rash or what, how the child behaved. This asset is documented in Damumed" – [district pediatrician, Almaty Oblast].

Citing high workload, some of the interviewees reported that they do not call their patients but carefully instruct them in which cases they should definitely seek medical help (red flags).

In practice, not all the steps are followed, and adherence to the procedures depends on the management of the primary healthcare organization (PHC) and the workload of health workers. For example, nurses may not provide post-vaccination follow-up, sending the child and parents home immediately after vaccination. Also, health care workers may not always provide home-based follow-up, expecting patients to be able to make contact if they develop distressing symptoms.

Divergent roles and responsibilities among stakeholders in granting medical withdrawals

The provision of medical withdrawals is regulated by the Order of the Ministry of Health of the Republic of Kazakhstan from October 21, 2020, №RK DSM-146/2020 "On approval of the list of medical contraindications to prophylactic vaccinations". The order defines general permanent and temporary contraindications, as well as permanent and temporary contraindications to live vaccines and certain types of vaccines.

According to the existing regulations in Kazakhstan, a district pediatrician or general practitioner cannot independently grant a child a medical exemption of more than one month. For granting a permanent medical excuse, the conclusion of the Medical Advisory Committee at PHC organization is required. However, with regard to long-term temporary medical exemption, in some PHC organizations, the opinion of a specialist with a recommendation to postpone immunization is sufficient, while in others, the medical exemption requires the opinion of the Medical advisory committee. This leads to differences between health care organizations in the number of medical appointments and children's delay in the immunization calendar.

Interviews show that the practice of medical withdrawal is widespread. One of the nurses interviewed reported that at her site, every second child aged 1-2 months is recommended by a neurologist to be medically withdrawn for 2-4 months. At the same time, one of the interviewed neurologists reported a similar view.

"Almost always, in 99.9%, there are no contraindications on the part of the nervous system, and the vaccine that we use in Kazakhstan, even if there is some neurological condition, can be administered" – [pediatric neurologist, Astana].

Physicians themselves find it difficult to give an accurate assessment of the commonness of medical exemptions without valid justification. Thus, when asked about the possible share of unfounded medical exemptions, the answers of respondents varied from 20 to 50% of temporary medical exemptions. One of the neurologists interviewed admits that 90% of medical exemptions are false.

"If a child came for an appointment at the polyclinic, it is a child who can be vaccinated if his/her somatic status allows it, i.e. no fever, no diarrhoea, clearly compensated condition, because he/she is at home and not in intensive care" – [pediatric neurologist, Astana].

When discussing the reasons for medical exemptions, based on false contraindications, most respondents noted that doctors prescribe medical exemptions in order not to take responsibility for possible negative consequences of vaccination. Informants attributed the lack of confidence in the safety of vaccinations to the insufficient level of qualification of doctors and their legal insecurity:

"We have such legislation in our country, such an attitude towards doctors, when they are always looking for a scapegoat if something goes wrong after vaccination" – [pediatric neurologist, Shymkent].

As reported by the participant, this is especially true for neurologists who do not allow children to be vaccinated, citing *"delayed psychomotor development"*, *"perinatal encephalopathy"* and *"intracranial hypertension"*. Postponing vaccination due to false contraindications is also an option when dealing with parents who doubt the safety of vaccinations. More often parents ask to postpone the start of vaccination for 1-2 months, such behavior is attributed by interviewees to lack of confidence in the safety of vaccinations.

Pediatricians report that every fifth parent asks for a medical excuse, and one neurologist reported that up to 50% of his patients ask for a medical excuse. Thus, a significant proportion of temporary medical exemptions may mask refusals to vaccinate, as refusals are subject to special oversight by regulatory agencies.

The assumption that unjustified medical exemptions might be linked to vaccine supply challenges was not supported by participant accounts. Respondents consistently reported no observed shortages of vaccines in their practice.

"We already have everything calculated, we have all the vaccines, we have everything, and everyone has enough. [We just have to] have the patient show up at the polyclinic and have the patient examined" – [general practitioner, Almaty].

The interviews revealed a wide range of diagnoses that are used by doctors to prescribe not only temporary but also permanent medical withdrawals. Thus, medical exemptions are granted to patients with atopic dermatitis (even in remission), bronchial asthma, arthritis, chronic bronchitis, autism and Down syndrome. Despite the clear list of reasons for medical exemptions, in practice, their granting is largely subjective, and neurologists may differ in their assessment of the risks of vaccination for certain conditions. For example, one of the interviewed neurologists named epilepsy and seizures as grounds for permanent medical withdrawal. According to two other neurologists, medical withdrawals are not necessary for epilepsy, cerebral palsy, seizure syndrome successfully controlled by medications.

"Before getting a vaccination, he does not have to go to a neurologist, it is our pediatricians who send him, and so he only needs a somatic status, the neurological status has no effect on whether he needs to be vaccinated or not. I don't quite understand why they send them to see a neurologist" – [pediatric neurologist, Astana].

The study displayed that PHC organizations can effectively tackle the practice of unjustified medical refusals at their level. The tools include both peer decision-making in doubtful cases (CDC) and direct management control. The motivation for such action is the commitment of those in charge to immunization.

"[...] And so she was an anti-vaxxer. [...] If, for example, a child's mother said she didn't want to receive the vaccine, the doctor would agree and write a medical exemption. I decided for myself that I would no longer work with her, because this system of work does not correspond to my principles. It turns out that eight out of ten patients left with a medical excuse. This is a drawback for my institution and contradicts my principles" – [health management representative, Almaty Oblast].

Since it is the pediatrician or general practitioner who determines admission to vaccination, specialists can recommend medical withdrawal, but the final decision rests with the district GP. However, as informants noted, even if the pediatrician understands that he or she has encountered overdiagnosis, the district doctor will not go against the conclusion of the specialist.

The question of the impact of medical exemptions on parental trust in vaccination remains unresolved. On the one hand, parents can interpret the appointment of a temporary medical excuse as an individual approach to the child's health. This will increase trust in the doctor and in immunoprevention, as the parent will be sure that the doctor is attentive to the child's condition. On the other hand, frequent medical exemptions may be seen as a signal that immunization is unsafe, especially when medical exemptions are given to healthy children.

One of the immunization specialists interviewed said that in his practice, half of the parents of children with long medical withdrawals refuse immunizations after the medical withdrawal is lifted:

"She already thinks that if she has a medical excuse, 'I will wait until the child is three years old,' and then they will wait until the child is six years old, until the child goes to school, and then they start to have this busy time, they come, like this year, we have a lot of six-year-olds coming" – [immunization doctor, Pavlodar Oblast].

From the interviews conducted, reasons for FME were mentioned by participants: (1) Fear of legal repercussions for adverse effects following immunization (AEFI); (2) Lack of physician confidence in vaccine safety, (3) Overdiagnosis of conditions like "perinatal encephalopathy" and "intracranial hypertension"; (4) Pressure from vaccine-hesitant parents requesting exemptions.

Surveillance and data systems limitations in monitoring medical exemptions

The number of medical refusals is reflected in site reports on the implementation of the vaccination program, where temporary and permanent medical refusals are considered separately, but their timing and reasons are not noted (Form No. 4 "Report on Preventive Immunization Coverage"). Reports from the districts are manually summarized by department or by the PHC organization as a whole and sent to the regional epidemiologists of the Department of the Sanitary-Epidemiological Control Committee (DSECC) for collection, processing and analysis.

"We have five district departments, they submit the third and fourth forms to the immunologist and infectious disease specialist, and the latter enter them into a pile in the computer" – [general practitioner, Astana].

All data on the qualitative characteristics of the prescribed medical exemptions remain at the PHC organization level, and monitoring is done by the district service.

"In Damu KMIS [...] it is personalized for each child" – [health management representative, Astana].

The existing approaches to recording medical withdrawals, when no information is collected on timing and diagnoses, do not allow DSECC to conduct any analysis other than estimating their number. Statistics do not even reflect the share of children who have received medical appointments, as each medical appointment is recorded as a separate fact, and a child may receive several medical appointments for different reasons and for different periods during the year. The content of Form No. 4 is not verified by data from information systems (KMIS), which creates opportunities for manipulation of statistics. It is possible to verify the reliability of data on medical refusals only when working with preventive vaccination cards and outpatient records of patients:

"Whether they have vaccinated all the planned children, this is what our epidemiologists check in the places. If a child has not been vaccinated for one reason or another, I mean, if it is a medical exemption, then we look at the journal, if they recorded it, then the child has not left the field of attention, they are aware that the child should be vaccinated but has not been vaccinated for certain reasons" – [health management representative, Kyzylorda Oblast].

At the same time, data on medical exclusions are collected in KMIS, but they are used only at the level of PHC organizations. There is no external verification of the data collected on the reasons for medical withdrawals.

"There is no analysis, no request for data on these children, for what reasons the medical withdrawal was issued, we do not provide this information to anyone" – [health management representative, Astana].

Since data collection is not automated, DSECC staff continue to manually summarize data from reporting form No. 4, and the lack of information on the reasons for and duration of medical appointments does not allow for analysis and managing this process.

"I don't know what diagnoses there are, whether they are really permanent, who is involved there - we don't see either. It can be children under a year old, for example, or children who have been registered for a long time, it can be cumulative, in these 400 [permanent medical exemptions] there are children up to 16 years old who are on dispensary registration as a permanent medical exemption" – [public health experts, Astana].

Analysis of the reasons for medical refusals can currently be carried out only at the level of Health Departments, but such work requires significant labor input.

"As a rule, each Health Department has out-of-department pediatricians, immunologists. They already do, well, at least they should do - in the regions I do not know how much and how this work is done - analyze these medical withdrawals and look at the validity of these medical withdrawals and already work directly with district pediatricians, neurologists, etc." – [public health experts, Almaty).

During the interview, the opinion was expressed that data on the reasons for medical withdrawals should not be sent somewhere else from the medical organization that needs it to ensure immunization coverage.

"To be sent, for what purpose? Just to understand what medical withdrawals? I understand if that medical refusal was further discussed, but that's not there. [...] But I think this data should not go somewhere, I think it is the responsibility of each organization, each district GP, if he has such an indicator, if he is interested in this" – [health management representative, Astana].

The participants responded that DSECC's access to preventive vaccination card data and outpatient records will enable the development and management of an automated system to monitor and control the administration of medical withdrawals from routine immunizations to reduce the number of unwarranted medical withdrawals and vaccination schedule backlogs.

"I can see improvements for myself only when the system will work. Because we would like to see not only dry fig-

ures on medical refusals, there are 5 thousand medical refusals somewhere in the region, but what kind of medical refusals they are. [...] For 7-8 years we have been trying to create such an information system" – [public health experts, Astana].

Health workers' doubts about the safety of immunization are also related to the realization that AEFI are not properly recorded, and the quality of vaccines cannot be controlled. In the current context, most serious AEFI are isolated, and regulators lack information to systematically analyze the safety of vaccination.

There was also reported a conflict of interest where only health workers can report AEFI. An exception is the reporting of adverse events after BCG vaccination. Due to the unfavorable epidemiological situation of tuberculosis in the country, possible AEFI are perceived as an inevitable evil, tolerance to them is higher. The procedure for responding to AEFI after BCG is different, in particular, emergency notification to the Sanitary-Epidemiological Control Committee (SECC) is required only when group cases are detected. Single reactions are registered, the child receives important observation and treatment, but there is no intervention of regulatory authorities.

It was clear that although PHC organizations monitor exempted children at the local level, the absence of standardized data integration with regional health authorities (DSECC) prevents effective oversight and strategic planning. Manual data processing further complicates efforts to track trends and assess the validity of exemptions, leaving room for inconsistencies and potential manipulation. Without an automated system for monitoring exemptions, public health experts emphasize that improving immunization coverage and reducing unwarranted exemptions remains a significant challenge. Developing a comprehensive, centralized database could enhance the management of medical withdrawals, facilitate data verification, and ultimately strengthen Kazakhstan's vaccination program

Discussion

This study highlights the role of unjustified medical exemptions in increasing immunization rates in Kazakhstan, i.e. it can reduce vaccine coverage and contributes to preventable outbreaks which aligns with other studies (15, 16). The procedures and order of medical exemption appointment differs between individual PHC organizations. The application of the norms of the regulatory documents on medical exemption in practice depends on the management in a particular medical organization, human resources and their qualifications. Thus, the current regulations set only a general framework for the appointment and registration of medical withdrawals in Kazakhstan.

Our participants described barriers to the public perception of the safety of immunization. The study revealed the problem of uninformed and poorly trained physicians themselves in immunization, echoing broader concerns about health literacy and institutional readiness in Kazakhstan's health system (22). The overuse of unjustified medical exemptions is often driven by physicians' misconceptions about vaccine safety and overestimation of parental concerns in regard to immunization (8, 23). Physicians' reluctance to take responsibility for vaccine reactions also contributes to unnecessary medical exemptions. According to the interviewees, many specialists tend to overestimate the risks of vaccination, prescribing excessive laboratory tests or prophylactic use of antihistamines and immunomodulators. Such excessive caution on the part of health care providers does not help to increase confidence in vaccinations (24). For example, one of the neurologists interviewed strictly recommends that parents "get tested before vaccinations" to avoid negative consequences of vaccination (in this case, cerebral palsy). Such statements increase parents' already strong concerns about the development of neurological pathologies after vaccination, such as autism, cerebral palsy, epilepsy, and other conditions (25). Thus, vaccination itself turns out to be a risky medical intervention, rather than a routine procedure.

Even though the regulation defines a clear list of grounds for medical exemptions, there is room for subjective interpretation of these grounds by medical personnel. In practice, the grounds for medical withdrawal turn out to be not the diagnosis and treatment of a specific disease, but long-term (months or years) observation of the child's development in case of suspected disorders. The experts interviewed, based on their personal experience, assumed that 20-50% of medical suspensions may be unjustified, and in one case a doctor suggested that inappropriate medical exemptions may be up to 90%.

Temporary medical exemptions increase the delay in the immunization calendar because parents do not show up for appointments by the end of the exemption period, nurses do not invite them, and the child continues vaccination at intervals of several months instead of one (15). One of the respondents criticized the

need to wait 2-4 weeks after acute respiratory viral infection, as in his opinion, only severe acute respiratory infection is a valid contraindication. As follows from the Order of the Ministry of Health, ARVI is "a temporary contraindication common to all types of vaccines". Consequently, there is a widespread issue of precautionary conditions being misinterpreted or overdiagnosed as absolute contraindications to vaccination.

In general, it can be stated that there is no consensus in the Kazakhstani medical community regarding the safety of immunization. Health care workers tend to overestimate the risks of AEFI after vaccination, sometimes forgetting the risks associated with the spread of vaccine-preventable infections. The same is true for parents who rely on collective immunity and prefer to delay vaccination until the child is six months, two years of age or older.

The solution to the problem may be to build and improve the system of knowledge and skills exchange, where the main tools should be systematic lectures (seminars) within the framework of professional development courses and practical trainings, business games with the involvement of recognized experts with practical experience in the field of vaccination (26). Given the role of health care workers in spreading distrust of immunization, advanced training on immunization is an effective tool to reduce the number of unwarranted refusals (27). Such training should cover a wide range of health workers who communicate with the population on vaccination issues to proactively address patient concerns, leading to increased vaccine uptake (11). Training of health workers in the procedure, criteria and practice of immunization in non-standard cases (missed vaccines in children, immunization of immunocompromised persons, pregnant women), differential diagnosis of anaphylaxis and (vasovagal) syncope, dosage and method of administration of adrenaline can also contribute to reducing the number of medical withdrawals due to lack of confidence in the health worker's ability to manage the situation (28).

Parents should be educated about the difference between a vaccine-related reaction and an adverse event that may have other causes. In addition, studies show that people are more willing to be vaccinated when vaccination rates in the population are high, indicating the role of social influence (29). In general, information about immunizations should be given well in advance of the vaccination. This gives parents time to absorb the information and ask questions that concern them and ultimately mitigates the possible desire to avoid vaccination through unwarranted medical exemptions.

At the same time, there is no possibility to analyze diagnoses for medical refusals, as qualitative data on medical refusals (diagnoses, duration) are contained only in primary medical documentation. External systemic stimulus to the adequacy of medical withdrawals should be the control of children's immunization coverage. But as interviews have shown, there are opportunities for manipulation of statistical indicators in the direction of their overestimation. As a result, the problem of medical exemptions, with many lacking adherences to evidence-based standards, remains out of the focus of attention of both the management of PHC organizations and regulatory bodies. Improvement of vaccination records depends directly on the completion of digitalization of immunization (30). This will help not only to reduce the burden on the staff of primary health care organizations, but also to establish automated monitoring and control of immunization (31). In the absence of a system of verification of PHC organizations' reporting, which would motivate the organization's management to strengthen control over medical exemptions, it is difficult to rely solely on the professionalism and initiative of health workers.

As interviewees report, not all polyclinics have implemented KMIS, and even if they have, they continue to duplicate paper-based records. At the same time, the interface of the information system requires further development, as now, when registering the fact of vaccination, manual selection of procedure parameters is required. It is important to consider that in rural areas the issue of access to the Internet has not yet been resolved, i.e. there are objective limitations to the digitalization of healthcare.

Therefore, Kazakhstan's system for tracking of exemptions and vaccine reactions lacks integration across health institutions, meaning there is no real-time integration of patient data between clinics and national databases. As a result, manual data entry leads to underreporting and discrepancies in national statistics, a problem that has also been observed in other areas of public health data in Kazakhstan, such as chronic disease surveillance (32). A significant proportion of medical refusals are already recorded by health care providers in KMIS, and this data can be collected and analyzed. This data can be used to automatically adjust vaccination schedules, automatically send reminder invitations to parents, and monitor attendance after the medical withdrawal is lifted.

Digitalization is important so that monitoring of not only vaccine coverage, but also AEFI does not depend on the special efforts of health workers but is car-

ried out in the background without diverting human resources (33). Vaccination procedures are standardized, but inconsistent post-vaccine monitoring may reduce the effectiveness of adverse event detection (34, 35). Many clinics do not systematically follow up with patients' post-vaccination. Reports of severe adverse events are rare, raising concerns about underreporting. Many parents perceive vaccine adverse event monitoring as unreliable, leading to mistrust. Moreover, physicians sometimes avoid documenting adverse events for fear of administrative scrutiny (36). Some facilities in Kazakhstan continue using paper-based records, leading to duplication and errors in digital reporting.

In comparison with international practices, in India, the online software IDSurv is used to report infectious diseases and AEFIs (37). Similarly, in many OECD and European Union countries, both the health care provider and the vaccine recipient or their representative can report an AEFI online. In Canada, incentives for timely reporting of AEFIs are provided through the inclusion of 12 major tertiary pediatric hospitals in the surveillance system Immunization Monitoring Program ACTive (IMPACT) (38). In addition to passive surveillance, international practice has used a Large Linked Databases tool to monitor vaccine and immunization safety (e.g. the Vaccine Safety Datalink project between CDC and eight health insurers). This tool offers a cost-effective and rapid means to conduct post-licensing investigations of drug and vaccine safety and allows testing of vaccine safety hypotheses.

The lack of open and comprehensive data on the status of immunization in the country generates distrust in official statistics on AEFI and vaccination coverage (39). Consequently, increasing the transparency of the immunization system and improving data collection and processing methods has the potential to increase public and medical community confidence in vaccination (40).

From the point of view of motivation to adequately prescribe medical refusals and to register AEFI, the vast majority of countries have introduced mechanisms to insure or guarantee the professional liability of health workers, including coverage of possible consequences of immunization. One example of international practice to combat the problem of inadequate interpretation of precautions is reflected in the CDC's General Recommendations for Immunization Best Practices: Guidance from the Advisory Committee on Immunization Best Practices. The document provides principles for distinguishing between contraindications and precautions. Similar documents are available in most countries, for example, in Russia there are Methodological Guidelines of the Ministry of Health of the Russian Federation MU 3.3.1.1095-02 'Medical Contraindications to Prophylactic Vaccination with National Vaccination Calendar Preparations'; in Germany, the Standing Committee on Vaccination at the Robert Koch Institute provides a list of conditions that are mistaken for contraindications to vaccination (Epidemiological Bulletin No. 34).

In Kazakhstan, to date, there are no similar bylaws, mechanisms and funds. When developing mechanisms to guarantee the professional liability of health workers, special consideration should be given to the need for legal and financial protection of health workers in case of adverse vaccine effects. However, given the status of AEFI registration in Kazakhstan, the recommendation to participate in such regional activities seems premature. Analyzing all data collected, the problem of the rising number of inappropriate medical withdrawals is caused by a whole set of reasons, which can be grouped into three broad categories: (1) legal insecurity of health care workers, (2) low qualifications of physicians, and (3) inadequate statistical recording of vaccination coverage, which leads to chronic overestimation of its indicators. Currently, any serious AEFI in Kazakhstan, even one not causally linked to vaccination, is grounds for scrupulous investigation, search and punishment of the perpetrator.

The punitive nature of AEFI monitoring results in (1) doctors over-insuring and falsely withholding immunization for any questionable case (down to "squinting eyes" in a child with epicanthus), and (2) health care providers not reporting suspected AEFI except for serious consequences that cannot be concealed. The quality of medical statistics affects the effectiveness of immunization at several levels: (1) hesitant parents overestimate collective immunity, (2) specialist doctors develop a 'tunnel vision' of the risks of vaccination for specific patients, and (3) supervisory and governing bodies (SECC, Health Departments and MoH) do not have clear and reliable data to monitor the work of PHC, analyze the epidemiological situation and identify target groups for communication work.

Policy Implications

To reduce inappropriate medical exemptions and restore confidence in vaccination, Kazakhstan's immunization system requires multi-level reform:

1. Clearer clinical guidelines: develop and disseminate evidence-based national protocols for contraindications and precautions, modeled after CDC or STIKO recommendations.

2. Targeted professional training: expand training modules for both undergraduate and in-service medical personnel to include immunization practice, AEFI response, and communication with hesitant parents.

3. Legal and institutional protection: introduce regulatory protections and no-fault compensation schemes for providers who adhere to clinical guidelines but experience adverse outcomes.

4. Strengthened digital infrastructure: complete the integration of KMIS across all PHC facilities and develop automated dashboards for exemption tracking, AEFI trends, and delayed immunization alerts.

5. Transparent communication: publicize anonymized AEFI statistics and exemption trends to foster public trust and ensure accountability within healthcare institutions.

If implemented, these interventions could improve timely vaccine uptake, reduce data manipulation, and support a culture of evidence-based decision-making.

Strength and Limitations

This study provides one of the first qualitative explorations of healthcare provider perspectives on medical exemptions in Kazakhstan. The multi-regional scope and inclusion of both clinical and administrative stakeholders provide a nuanced understanding of the structural and behavioral dynamics at play. The study has the following limitations. First, it relies on self-reported data, which may introduce bias and underrepresent the extent of unwarranted exemptions. Second, it did not involve a systematic review of individual medical records, which could have allowed for validation of clinical appropriateness. Limited availability of centralized data on unjustified medical exemptions and AEFI restricts analysis. Third, interviews were conducted during a specific period and may not reflect recent changes in practice or regulation. Finally, the findings may not be generalizable beyond Kazakhstan, although similar dynamics are likely present in other post-Soviet or LMIC contexts.

Conclusion

Kazakhstan's immunization program faces significant challenges due to the prevalence of unjustified medical exemptions and systemic inadequacies in AEFI monitoring. A persistent lack of consensus within the medical community regarding vaccine safety contributes to an environment in which healthcare providers—particularly specialized physicians such as neurologists—tend to overestimate the risks of vaccination. This often results in the overdiagnosis of precautionary conditions and the misclassification of such cases as absolute contraindications.

This leads to the problem of unjustified medical exemptions (false vaccine contraindications), especially for children. These practices undermine public trust in immunization by reinforcing parental fears, inflating the perceived risks of vaccines, and diminishing awareness of the real threats posed by vaccine-preventable diseases. As a result, vaccination is increasingly viewed not as a standard preventive measure but as a high-risk intervention that necessitates expensive pre-screening and cautious clinical oversight.

The study identified four key thematic areas that reflect the complexity of these challenges: (1) Inconsistencies in pre-vaccination monitoring practices; (2) Variability in post-vaccination follow-up procedures; (3) Divergent roles and responsibilities among stakeholders in granting medical exemptions; and (4) Surveillance and data system limitations in tracking and verifying medical exemptions.

Addressing these issues requires a multifaceted approach that includes policy reform, standardized clinical guidance, enhanced physician training, and the implementation of integrated digital health systems to improve transparency and accountability. Strengthening these areas is essential for restoring confidence in immunization, reducing the incidence of unwarranted exemptions, and improving vaccination coverage nationwide.

Acknowledgments

Author Contributions: Conceptualization, MM, AN, SB, SA, AK; methodology, MM, AN, SB, KY; writing – original draft preparation, KY, MM, MG; writing – review and editing, KY, MM, MG, AN, SB, SA, AK. All authors have read and agreed to the published version of the manuscript.

Disclosures: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Clinical trials registry site and number: This research does not involve any clinical trials, and therefore there is no registry site or number to report.

Acknowledgments: The authors would like to thank the community members who participated in the study.

Funding: This project was supported by the UNICEF representative office in Kazakhstan.

Ethics approval: The study was reviewed by the Research Center "Paperlab" and was deemed exempt from full ethical review (N43-21).

References

1. World Health Organization. Vaccines and immunization [Internet]. Geneva: WHO; 2023 [cited 2025 Jun 8]. Available from: https://www.who.int/health-topics/vaccines-and-immunization
2. Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Coverage of children with preventive vaccinations [Internet]. [cited 2025 Jun 8]. Available from: https://bala.stat.gov.kz/ohvat-detej-profilakticheskimi-privivkami/
3. Ministry of Healthcare of the Republic of Kazakhstan. Measles in Kazakhstan: review of the healthcare system and root cause analysis of the 2019-2020 outbreak. Nur-Sultan: Ministry of Healthcare; 2020.
4. Gromis A, Liu KY. Spatial Clustering of Vaccine Exemptions on the Risk of a Measles Outbreak. Pediatrics. 2022;149(1). DOI: 10.1542/peds.2021-050971
5. Yap WK, Attwell K. Medical exemptions to mandatory vaccinations: The state of play in Australia and a pressure point to watch. Epidemiol Infect. 2024;152:e40. DOI: 10.1017/S0950268824000268
6. Ministry of Healthcare of the Russian Federation. Medical contraindications for preventive vaccinations under the national immunization schedule: Methodological guidelines (MU 3.3.1.1095-02). Moscow: Federal Center for State Sanitary and Epidemiological Surveillance; 2002.
7. Berry NJ, Henry A, Danchin M, Trevena L, Willaby HW, Leask J. When parents won't vaccinate their children: a qualitative investigation of australian primary care providers' experiences. BMC Pediatr. 2017;17:19. DOI: 10.1186/s12887-017-0783-2
8. Lin C, Mullen J, Smith D, Kotarba M, Kaplan SJ, Tu P. Healthcare Providers' Vaccine Perceptions, Hesitancy, and Recommendation to Patients: A Systematic Review. Vaccines (Basel). 2021;9(7):713. DOI: 10.3390/vaccines9070713
9. Tankwanchi AS, Jaca A, Larson HJ, Wiysonge CS, Vermund SH. Taking stock of vaccine hesitancy among migrants: a scoping review protocol. BMJ Open. 2020;10(5):e035225. DOI: 10.1136/bmjopen-2019-035225
10. The Lancet Child Adolescent Health. Vaccine hesitancy: a generation at risk. Lancet Child Adolesc Health. 2019;3(5):281. DOI: 10.1016/S2352-4642(19)30092-6
11. World Health Organization. New WHO study shows health workers feel more confident to recommend COVID-19 vaccination following a training on patient communication [Internet]. Copenhagen: WHO Europe; 2023 [cited 2025 Jun 8]. Available from: https://www.who.int/europe/news/item/24-05-2023-new-who-study-shows-health-workers-feel-more-confident-to-recommend-covid-19-vaccination-following-a-training-on-patient-communication
12. MacDonald NE; SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: definition, scope and determinants. Vaccine. 2015;33(34):4161-4. DOI: 10.1016/j.vaccine.2015.04.036
13. UNICEF Kazakhstan, USAID, BRIF Research Group. Behavior insights research on drivers influencing immunization-related behaviours in Kazakhstan. Astana: UNICEF; 2023. 174 p.
14. UNICEF. Knowledge, attitudes, and practices (KAP) survey on childhood immunization in Ka-

zakhstan. Nur-Sultan: The United Nations Children's Fund (UNICEF) in the Republic of Kazakhstan; 2021.

15. Rivero I, Raguindin PF, Buttler R, Martinon-Torres F. False Vaccine Contraindications Among Healthcare Providers in Europe: A Short Survey Among Members of The European Society of Pediatric Infectious Diseases. Pediatr Infect Dis J. 2019;38(9):974-6. DOI: 10.1097/INF.0000000000002401
16. Centers for Disease Control and Prevention. Immunization strategies for healthcare practices and providers. In: Epidemiology and prevention of vaccine-preventable diseases. Washington (DC): U.S. Department of Health & Human Services; 2021.
17. Badur S, Ota M, Öztürk S, Adegbola R, Dutta A. Vaccine confidence: the keys to restoring trust. Hum Vaccin Immunother. 2020;16(5):1007-17. DOI: 10.1080/21645515.2020.1740559
18. Shah RR. Importance of Publishing Adverse Drug Reaction Case Reports: Promoting Public Health and Advancing Pharmacology and Therapeutics. Drug Saf Case Rep. 2017;4(1):11. DOI: 10.1007/s40800-017-0053-0
19. Hodel KVS, Fiuza BSD, Conceição RS, Aleluia ACM, Pitanga TN, Fonseca LMDS, et al. Pharmacovigilance in Vaccines: Importance, Main Aspects, Perspectives, and Challenges-A Narrative Review. Pharmaceuticals (Basel). 2024;17(6):807. DOI: 10.3390/ph17060807
20. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77-101. DOI: 10.1191/1478088706qp063oa
21. UNICEF. Preliminary analysis of vaccination curricula in medical educational institutions of the Republic of Kazakhstan. 2020.
22. Sarybay U, Kabibolla S, Adilmetova G, Nassyrov R, Meyerbekova A, Sarría-Santamera A, et al. Level of nutrition competencies among healthcare professionals and medical students in Kazakhstan. BMJ Nutr Prev Health. 2025. DOI: 10.1136/bmjnph-2024-000972
23. Zimmerman RK, Schlesselman JJ, Mieczkowski TA, Medsger AR, Raymund M. Physician concerns about vaccine adverse effects and potential litigation. Arch Pediatr Adolesc Med. 1998;152(1):12-9. DOI: 10.1001/archpedi.152.1.12
24. Healy CM, Montesinos DP, Middleman AB. Parent and provider perspectives on immunization: are providers overestimating parental concerns? Vaccine. 2014;32(5):579-84. DOI: 10.1016/j.vaccine.2013.11.076
25. Salmon DA, Pan WK, Omer SB, Navar AM, Orenstein W, Marcuse EK, et al. Vaccine knowledge and practices of primary care providers of exempt vs. vaccinated children. Hum Vaccin. 2008;4(4):286-91. DOI: 10.4161/hv.4.4.5752
26. Uttekar S, MacDonald N, Orenstein WA, Danchin M, Blaser V, Thomson A, et al. Empowering Health Workers to Build Public Trust in Vaccination: Experience from the International Pediatric Association's Online Vaccine Trust Course, 2020-2021. Vaccine. 2023;41(2):435-43. DOI: 10.1016/j.vaccine.2022.11.061
27. Wennekes MD, Almási T, Eilers R, Mezei F, Petykó ZI, Timen A, et al. Effectiveness of educational interventions for healthcare workers on vaccination dialogue with older adults: a systematic review. Arch Public Health. 2024;82(1):34. DOI: 10.1186/s13690-024-01260-1
28. Doucette EJ, Fullerton MM, Pateman M, Lip A, Houle SKD, Kellner JD, et al. Development and evaluation of virtual simulation games to increase the confidence and self-efficacy of healthcare learners in vaccine communication, advocacy, and promotion. BMC Med Educ. 2024;24(1):190. DOI: 10.1186/s12909-024-05169-9
29. Hoogink J, Verelst F, Kessels R, van Hoek AJ, Timen A, Willem L, et al. Preferential differences in vaccination decision-making for oneself or one's child in The Netherlands: a discrete choice experiment. BMC Public Health. 2020;20(1):828. DOI: 10.1186/s12889-020-08844-w

30. Secor AM, Mtenga H, Richard J, Bulula N, Ferriss E, Rathod M, et al. Added Value of Electronic Immunization Registries in Low- and Middle-Income Countries: Observational Case Study in Tanzania. JMIR Public Health Surveill. 2022;8(1):e32455. DOI: 10.2196/32455
31. Ministry of Health and Family Welfare, Government of India. National Adverse Events Following Immunisation (AEFI) Surveillance and Response Operational Guidelines - 2024 [Internet]. New Delhi: MoHFW; 2024 [cited 2025 Jun 8]. Available from: https://mohfw.gov.in/sites/default/files/National%20AEFI%20Surveillance%20and%20Response%20Operational%20Guidelines%202024.pdf
32. Zhakhina G, Mussina K, Yerdessov S, Gusmanov A, Sakko Y, Kim V, et al. Analysis of chronic kidney disease epidemiology in Kazakhstan using nationwide data for 2014-2020 and forecasting future trends of prevalence and mortality for 2030. Ren Fail. 2024;46(1):2326312. DOI: 10.1080/0886022X.2024.2326312
33. Public Health Agency of Canada. Reporting adverse events following immunization (AEFI) in Canada: user guide to completion and submission of the AEFI reports [Internet]. Ottawa (ON): Public Health Agency of Canada; 2025 Feb [cited 2025 Jun 8]. Available from: https://www.canada.ca/en/public-health/services/immunization/reporting-adverse-events-following-immunization/user-guide-completion-submission-aefi-reports.html
34. McGoldrick M, Gastineau T, Wilkinson D, Campa C, Clercq N, Mallia-Milanes A, et al. How to accelerate the supply of vaccines to all populations worldwide? Part I: Initial industry lessons learned and practical overarching proposals leveraging the COVID-19 situation. Vaccine. 2022;40(9):1215-22. DOI: 10.1016/j.vaccine.2021.11.098
35. Buttery JP, Clothier H. Information systems for vaccine safety surveillance. Hum Vaccin Immunother. 2022;18(6):2100173. DOI: 10.1080/21645515.2022.2100173
36. Shragai T, Adegoke OJ, Ikwe H, Sorungbe T, Haruna A, Williams I, et al. Implementation of data triangulation and dashboard development for COVID-19 vaccine adverse event following immunisation (AEFI) data in Nigeria. BMJ Glob Health. 2023;8(1):e011006. DOI: 10.1136/bmjgh-2022-011006
37. Sankar C, Meyer JC, Schönfeldt M, Gunter H, Dawood H, Sekiti V, et al. Vaccine safety surveillance in South Africa through COVID-19: A journey to systems strengthening. Vaccine. 2025;46:126535. DOI: 10.1016/j.vaccine.2024.126535
38. Lv H, Pan X, Wang Y, Liang H, Yu H. Barriers to healthcare workers reporting adverse events following immunization in Zhejiang province, China. Hum Vaccin Immunother. 2022;18(5):2083865. DOI: 10.1080/21645515.2022.2083865
39. Wegwarth O, Hertwig R, Giese H, Fineberg HV. The impact of nontransparent health communication during the COVID-19 pandemic on vaccine-hesitant people's perception of vaccines. Front Public Health. 2023;11:1256829. DOI: 10.3389/fpubh.2023.1256829
40. Petersen MB, Bor A, Jørgensen F, Lindholt MF. Transparent communication about negative features of COVID-19 vaccines decreases acceptance but increases trust. Proc Natl Acad Sci U S A. 2021;118(29). DOI: 10.1073/pnas.2024597118