

Preplanned Studies

Survey on Immunization Services for Children with Medical Conditions — China, 2022

Yong Huang^{1,2}; Yudan Song²; Junhong Li²; Yamin Wang²; Xiang Zeng^{2,3,4}; Chao Ma^{2,5}; Zundong Yin²

Summary

What is already known about this topic?

Children with medical conditions frequently experience under-immunization. Ensuring high-quality immunization services is crucial for enhancing vaccination coverage levels; nevertheless, the state of immunization service provision for children with medical conditions in China remains unclear.

What is added by this report?

Immunization support for children with medical conditions in China demonstrates considerable variability and may be inadequate. Primary obstacles to the provision of immunization services include an absence of comprehensive vaccination recommendations and assessment guidelines for specific medical conditions, as well as inconsistencies among vaccine recommendations, package inserts, and expert consensus statements pertaining to the vaccination of children with medical conditions.

What are the implications for public health practice?

The examination of provincial practices in providing immunization services for children with medical conditions, as well as understanding the barriers faced by National Immunization Program providers in administering vaccinations, can contribute to the improvement of immunization services for this population in China.

Children with medical conditions are defined as those possessing specific physiological or disease states that may increase their risk of infection or exacerbate the severity of vaccine-preventable diseases. Such conditions can also impact the safety and effectiveness of vaccinations, often necessitating evaluations prior to immunization (1). A strategic objective of Immunization Agenda 2030 (IA2030) is to extend immunization services to “zero dose” and under-immunized children, ensuring that all children receive full benefits from vaccines (2).

In China, vaccination rates for the National Immunization Program (NIP) vaccines have reached 99% among age-eligible children (3). However, delayed and missed vaccinations are common among children with medical conditions for various reasons. These factors include a lack of awareness of vaccine-preventable diseases, uncertainty surrounding vaccination safety, restrictions stated in vaccine package inserts, difficulties in assessing medical condition severity, misperceptions regarding contraindications and precautions, and barriers related to operations and systems (1).

Immunization services are critical for maintaining and enhancing high vaccination coverage levels. Nevertheless, the current state of immunization service support for children with medical conditions in China remains unclear. In order to address this knowledge gap and lay the groundwork for potential improvements in immunization services, we conducted a study examining immunization service patterns for children with medical conditions across 31 provincial-level administrative divisions (PLADs) in China.

Between August 3 and 16, 2022, we conducted a cross-sectional, questionnaire-based survey targeting provincial-level CDC immunization program departments responsible for implementing immunization services for children with medical conditions in China. Questionnaires were electronically disseminated and collected, including questions about relevant immunization policies, development of recommendations or expert consensus statements, utilization of vaccination evaluation clinics, the structure and processes of such clinics, and the availability of relevant training programs. Additionally, we inquired about perceived barriers to and urgent demands for the provision of immunization services. The question addressing urgent demands featured eight items ranked from zero to seven, with higher scores indicating higher demand. Definitions and meanings of each question were clarified through online face-to-face interviews.

The 31 PLADs surveyed were divided into 3 distinct socioeconomic regions in China: Eastern (Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan), Central (Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, and Hunan), and Western (Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang). Categorical variables are presented as frequencies and proportions. Analyses were conducted using R software (version 4.1.3, R Foundation for

Statistical Computing, Vienna, Austria).

All 31 PLADs completed the survey. Table 1 shows specific immunization services support for children with medical conditions by region. In general, supporting services were more numerous in eastern PLADs than in central and western PLADs, especially in the use of expert consensus statements and use of vaccination evaluation clinics for certain medical conditions. There were 74 vaccination evaluation clinics in pediatric hospitals nationwide, distributed in 16 PLADs.

TABLE 1. Support for immunization services among children with medical conditions by region, China, 2022.

Indicator	Eastern (11 PLADs)	Central (8 PLADs)	Western (12 PLADs)	Nationwide (31 PLADs)	P value**
Local vaccination recommendations*, n (%)	1 (9.1)	0 (0.0)	0 (0.0)	1 (3.2)	>0.999
Local expert consensus statements†, n (%)	5 (45.5)	1 (12.5)	0 (0.0)	6 (19.4)	0.009
Specialized training programs‡, n (%)	5 (45.5)	3 (37.5)	2 (16.7)	10 (32.3)	0.353
Presence of vaccination evaluation clinics¶, n (%)	9 (81.8)	2 (25.0)	5 (41.6)	16 (51.6)	0.036
Number of vaccination evaluation clinics, n	56	6	12	74	–
Defined structures and processes for evaluation clinics, n (%)	2 (18.2)	0 (0.0)	2 (16.7)	4 (12.9)	0.530

Abbreviation: PLADs=provincial-level administrative divisions; NIP=National Immunization Program.

* Local vaccination recommendations represent the official guidelines, which NIP providers must adhere to when vaccinating children with medical conditions.

† Local expert consensus statements, developed by expert teams, are not considered official standards. However, they serve as a foundation for NIP providers to enhance their scientific understanding of vaccination necessity, as well as to investigate the safety and efficacy of vaccinations in children with medical conditions.

‡ Specialized training programs aim to enhance the vaccination of children with medical conditions by offering education on fundamental knowledge, professional skills, and relevant case studies.

¶ Vaccination evaluation clinics have been established to provide counseling and assessment for children with medical conditions, addressing safety concerns and the necessity of vaccination.

** The comparison of indicator rates between regions was conducted using Fisher's exact test, as the small sample size of one cell (<5) necessitated this statistical approach.

“–” means data not available.

TABLE 2. Barriers to delivery of immunization services for children with medical conditions by region, China, 2022.

Barrier	Eastern (11 PLADs)	Central (8 PLADs)	Western (12 PLADs)	Nationwide (31 PLADs)	P value*
Lack of detailed vaccination recommendations for certain conditions, n (%)	9 (81.8)	7 (87.5)	7 (58.3)	23 (74.2)	0.339
Lack of standardized procedures for evaluation of specific conditions, n (%)	7 (63.6)	7 (87.5)	9 (75.0)	23 (74.2)	0.451
Inconsistency between official recommendations, vaccine package inserts, and expert consensus statements, n (%)	10 (90.9)	3 (37.5)	6 (50.0)	19 (61.3)	0.041
Insufficient authority of vaccination expert consensus statements, n (%)	6 (54.5)	4 (50.0)	7 (58.3)	17 (54.8)	>0.999
Insufficient official policy support, n (%)	3 (27.3)	3 (37.5)	3 (25.0)	9 (29.0)	0.887
Unwillingness to vaccinate children with medical conditions due to fear of adverse events, n (%)	2 (18.2)	2 (25.0)	6 (50.0)	10 (32.3)	0.239
Sustainability of services in vaccination evaluation clinics due to high operational costs, n (%)	4 (36.4)	2 (25.0)	4 (33.3)	10 (32.3)	0.897

* The rates for the barriers between regions were compared using Fisher's exact test, due to the small sample size of one cell (<5).

Table 2 shows barriers to immunization service provision as perceived by PLADs. More than half of the PLADs identified the following barriers: lack of comprehensive vaccination recommendations for specific medical conditions (74.2%); absence of standardized procedures to assess the appropriateness of vaccination in certain medical conditions (74.2%); inconsistencies between official recommendations, vaccine package inserts, and published expert consensus statements (61.3%); and limited authority of expert consensus statements (54.8%).

Table 3 shows scores and rankings of urgent demands for immunization services for children with medical conditions. All three regions indicated that the top priority is to develop detailed official vaccination recommendations for children with medical conditions.

DISCUSSION

This study revealed that the provision of immunization services varies throughout China and might not be adequate to guarantee that children with medical conditions receive the recommended vaccinations. Incomplete vaccination can increase the vulnerability of these children to vaccine-preventable diseases. While significant efforts are needed at a national level, some PLADs have already addressed this issue and have explored suitable immunization service models for children with medical conditions (4–5). To facilitate effective service provision, it is crucial to identify the barriers and unmet needs, as well as to implement measures that enhance vaccination coverage for children with medical conditions.

Immunization service support for children with medical conditions varies across regions, revealing inconsistencies in the development and

implementation of local recommendations, expert consensus statements, training programs, and vaccination evaluation clinics. Although progress has been observed in eastern PLADs, this is expected to enhance protection for children with medical conditions against vaccine-preventable diseases in the long run (6). Nonetheless, the limited-service support in central and western PLADs may indicate a lack of sufficient child health resources. Taking into account the practices and experiences from leading PLADs could potentially improve immunization service capacity in other regions.

This study discovered that the majority of provincial-level CDCs placed a higher importance on enhancing official vaccination recommendations for immunizing children with medical conditions. This preference outweighed the development of expert consensus statements, which would cover a broader range of conditions and operational details. The inclination towards official recommendations is primarily due to the fact that expert consensus statements are not recognized as official documents under the Vaccine Administration Law of the People's Republic of China. Consequently, these statements may vary depending on the expert teams involved, leading to a lack of confidence among healthcare workers (7).

Vaccination recommendations for prevalent childhood medical conditions, including prematurity, low birth weight, allergic predisposition, immune system dysfunction, congenital diseases, and congenital infections, have been outlined in the 2021 version of China's national immunization schedule (8). As more data emerge from pertinent vaccine effectiveness and safety studies, national recommendations ought to encompass additional medical conditions. Providing training on these updated recommendations and

TABLE 3. Demands for immunization services support for children with medical conditions by region, China, 2022.

Demand	Eastern		Central		Western		Nationwide	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Detailed official vaccination recommendations	6.00	1	5.50	1	5.75	1	5.77	1
Technical guidelines for vaccination evaluation	4.73	2	4.00	3	4.42	2	4.42	2
Official policy support	4.00	3	4.50	2	3.25	3	3.84	3
Use of vaccination evaluation clinics for certain medical conditions	3.55	4	2.50	5	3.25	3	3.16	4
Developing Standard Operating Procedures for Counseling, Vaccination, and Managing Adverse Events	2.82	5	3.13	4	2.75	5	2.87	5
Establishing a multidisciplinary consultation team	2.73	6	1.63	7	2.08	6	2.19	6
Training with case studies for healthcare workers	1.27	7	1.75	6	2.00	7	1.68	7
Developing public education materials	0.64	8	0.63	8	0.67	8	0.65	8

technical guidelines is crucial for successful implementation.

Inconsistencies between vaccine package inserts and official recommendations have the potential to cause confusion among healthcare workers and concern parents. These inconsistencies were identified by provincial CDCs in our survey as significant barriers to vaccinating children with medical conditions. Similar discrepancies have been observed in other countries (9). Factors contributing to these discrepancies, which are important considerations for provincial CDCs, include varying disease burdens in children with medical conditions, differing risk and benefit estimates, vaccine characteristics, and parental and public acceptance (9). It is essential that all stakeholders collaborate to develop a well-coordinated immunization policy for potentially off-label vaccine recommendations.

This study discovered that 50% of PLADs have implemented vaccination evaluation clinics within pediatric hospitals to assess the appropriateness of vaccinations for children who have medical conditions that are challenging for NIP providers in community healthcare centers to evaluate. In other nations, children with medical conditions are typically assessed and vaccinated by NIP providers rather than specialist physicians, resulting in vaccination rates similar to those among healthy children (10). Variations in methodology may be related to a hesitancy among Chinese NIP providers to administer vaccinations to children with medical conditions (11), which may be influenced by unfamiliarity with certain medical conditions, insufficient knowledge regarding vaccine safety and efficacy in specific medical cases, and an absence of official, detailed guidelines for particular conditions (12). Although vaccination evaluation clinics positively impact the intentions of concerned parents to vaccinate their children (5), it is crucial to comprehend and overcome the barriers preventing NIP providers from recommending and administering vaccinations to children with medical conditions.

To address ongoing and emerging challenges in enhancing immunization services for children with medical conditions, several steps should be taken. These include monitoring vaccination coverage among children with medical conditions, expanding current national vaccination recommendations, developing evaluation procedure guidelines, addressing barriers experienced by immunization service providers, creating targeted educational tools for the public, and

advocating for changes in immunization policies to safeguard providers.

The current study presents several limitations. While the survey encompassed 31 PLADs in China, it may not adequately represent the perceptions of CDCs at the prefecture and county levels, nor the NIP providers and management operating within vaccination clinics. Additionally, the study did not incorporate the viewpoints of parents concerned about vaccinations. Future research should endeavor to assess the opinions and perspectives of these vital stakeholders in this field.

In conclusion, this study identified challenges related to the provision of immunization services for children with medical conditions. Furthermore, it highlighted potential opportunities to address these challenges, ultimately aiming to enhance vaccination coverage and protect children with medical conditions from vaccine-preventable diseases.

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* Corresponding author: Chao Ma, machao@chinacdc.cn.

¹ Guangzhou Municipal Center for Disease Control and Prevention, Guangzhou City, Guangdong Province, China; ² National Immunization Program, Chinese Center for Disease Control and Prevention, Beijing, China; ³ Chinese Field Epidemiology Training Program, Chinese Center for Disease Control and Prevention, Beijing, China; ⁴ Zhuhai Municipal Center for Disease Control and Prevention, Zhuhai City, Guangdong Province, China.

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