

Study on the Characteristics of Outpatient Visits among Minors at Urban Community Health Service Institutions Based on Real-World Big Data

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Abstract

Background Strengthening health management services for key populations, including older adults and children, is an important task for primary healthcare institutions. However, the service content currently provided by primary healthcare institutions and their institutional characteristics have not yet been analyzed systematically in large samples. **Objective** To gain insights into the reception of primary healthcare services for minors using real-world data, and to accurately plan the direction of capacity building for primary healthcare services for minors by comparing actual needs. **Methods** Desensitized outpatient data of the population aged 0~17 years (based on age at the date of visit) from 12 community health service institutions in Wuhou District, Chengdu from January to December 2025 were collected, including age, sex, visit time, visiting institution, department visited, attending physician, and diagnosis at the visit. Data analysis was conducted according to the hierarchical classification rules of the International Classification of Diseases, 10th Revision (ICD-10). The population was also divided by age into five subgroups: 0~2 years (206351 cases), 3~5 years (87172 cases), 6~11 years (109474 cases), 12~14 years (27512 cases), and 15~17 years (16149 cases), and data were statistically analyzed using EXCEL function tools. Diagnoses with a triggering diagnosis proportion >0.1% were included for ranking and characteristic analysis. **Results** A total of 469602 original visit records were included, of which 446658 had diagnostic records, involving 124777 individuals. Overall visit needs were relatively simple, with 1~2 diagnoses per visit accounting for 92.37% (412562/446658). In terms of temporal and spatial characteristics of visits, November had the highest volume (58093 visits, 12.4%), and institutions outside the Second and Third Ring Roads accounted for a relatively high proportion of visits (360230 visits in total, accounting for 80.65%). In terms of age characteristics, the 0~2-year age group (206351 visits, accounting for 46.20%) was the main population seeking primary healthcare, while visits after the age of 12 were fewer (43683 visits in total, accounting for 9.78%). In terms of departments visited, the Department of Preventive Healthcare (248791 visits, 55.70%) and general practice outpatient clinics (162944 visits, 36.48%) had the highest volumes. In terms of diagnostic distribution, the common diagnoses (top 5) were vaccination (173693 visits, 38.89%), acute respiratory infection (77565 visits, 17.37%), general medical examination/screening/medical certificate (76357 visits, 17.10%), traditional Chinese medicine diagnosis (22603 visits, 5.06%), and vitamin or nutrient deficiency (24059 visits, 5.39%). Other issues, such as consultation, symptom records, digestive system diseases, conjunctivitis, dermatitis and eczema, and problems requiring follow-up, ran throughout the entire growth and development cycle of minors. The visit rankings and characteristic health problems differed across age subgroups. **Conclusion** At present, the problems or health needs of minors actually seen in primary healthcare settings are relatively simple, leaving considerable room for expansion of health services, with an upgrade from “capacity compliance” to “experience optimization” on the basis of meeting capacity standards. For primary healthcare service resources for minors, it is recommended

to optimize resource allocation according to the principle of “increased allocation in autumn and winter and preferential support for peripheral urban areas.” In terms of primary healthcare service capacity, attention should be paid to cultivating clinical diagnosis and treatment capabilities that run throughout the entire growth and development cycle of minors, as well as comprehensive health management capabilities for maintaining healthy development, thereby improving the quality and efficiency of diagnosis and treatment and parents’ caregiving capacity, and comprehensively promoting and maintaining developmental health and the management of disease-related problems throughout the full growth cycle of minors.

Full Text

Article

Study on the Characteristics of Outpatient Visits among Minors at Urban Community Health Service Institutions Based on Real-World Big Data

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[Abstract]Background Strengthening health management services for key populations such as “the elderly and the young” is an important task for primary healthcare institutions. However, there has not yet been any large-sample and systematic analysis of the service contents and institutional characteristics currently provided by primary healthcare institutions. **Objective** To gain insight, through real-world data, into the reception of health services for minors at the primary level, and to accurately plan the direction of capacity building for primary-level services for minors by comparing actual needs. **Methods** Desensitized outpatient data of people aged 0-17 years (age calculated by the date of visit) from 12 community health service institutions in Wuhou District, Chengdu, from January to December 2025 were collected, including age, sex, time of visit, institution visited, department visited, attending physician, and diagnosis at that visit. Data were analyzed according to the hierarchical classification rules of the 10th Revision of the International Classification of Diseases (ICD-10). At the same time, participants were divided by age into five subgroups: 0-2 years old (206 351 cases), 3-5 years old (87 172 cases), 6-11 years old (109 474 cases), 12-14 years old (27 512 cases), and 15-17 years old (16 149 cases). Data statistics were performed using EXCEL function tools. Diagnoses accounting for >0.1% of triggered diagnoses were ranked and analyzed for their characteristics. **Results** A total of 469 602 original visit records were in-

cluded in this study, of which 446 658 had diagnostic records, involving 124 777 patients. Overall, the demand for visits was relatively simple: 1-2 diagnoses per visit accounted for 92.37% (412 562/446 658). In terms of temporal and spatial characteristics of visits, November had the highest number of visits (58 093 person-times, 12.4%), and institutions outside the Second and Third Ring Roads accounted for a relatively high proportion of visits (360 230 person-times in total, 80.65%). In terms of age characteristics, the 0-2-year age group (206 351 person-times, 46.20%) was the main population seeking primary-level care, while visits after the age of 12 were fewer (43 683 person-times in total, 9.78%). In terms of departments visited, the departments with the highest numbers were the Preventive Health Care Department (248 791 person-times, 55.70%) and the General Practice Outpatient Department (162 944 person-times, 36.48%). In terms of diagnostic distribution, the common diagnoses (top 5 by rank) were vaccination (173 693 person-times, 38.89%), acute respiratory infection (77 565 person-times, 17.37%), general medical examination/screening/medical certification (76 357 person-times, 17.10%), traditional Chinese medicine diagnosis (22 603 person-times, 5.06%), and vitamin or nutrient deficiency (24 059 person-times, 5.39%). Other items, such as consultation, symptom records, digestive system diseases, conjunctivitis, dermatitis and eczema, and problems requiring follow-up, ran throughout the entire growth and development cycle of minors; the ranking of visits and characteristic health problems differed among age subgroups. **Conclusion** At present, the problems or health needs of minors who actually seek primary-level care are relatively simple, indicating considerable room for expansion of health services and for upgrading from “capacity compliance” to “experience optimization.” In terms of primary-level health service resources for minors, it is recommended that resources be optimized according to the principle of “increasing allocation in autumn and winter and tilting toward peripheral urban areas.” In terms of primary-level health service capacity, attention should be paid to cultivating clinical diagnosis and treatment capacity throughout the entire growth and development cycle of minors, as well as overall health management capacity for maintaining healthy development, thereby comprehensively promoting and maintaining developmental health and the management of disease problems throughout the full growth cycle of minors by improving the quality and efficiency of diagnosis and treatment and the caregiving ability of parents.

【Keywords】 minors; children; urban community health services; outpatient visits

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Study on the Characteristics of Aged 0 to 17 Outpatient Services in Urban Community Health Centers Based on Real World Data

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[Abstract] **Background** Strengthening health management services for key populations such as the elderly and children is a critical responsibility of primary healthcare institutions. However, there has been no large-scale or systematic analysis of the current service offerings and institutional characteristics at these facilities. **Objective** Gain insights into real-

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...world pediatric healthcare utilization in primary care settings by analyzing actual service data, thereby enabling precise planning for capacity development based on genuine needs. **Methods** De-identified outpatient data from 12 community health service centers in Wuhou District, Chengdu, covering individuals aged 0 to 17 years (based on age at the visit date) from January to December 2025, were collected. Data included age, gender, visit time, facility, department, physician, and diagnosis. Analysis was conducted according to ICD-10 (International Classification of Diseases, Tenth Revision) classification rules. Patients were divided into five age subgroups: 0 to 2 years (206 351 cases), 3 to 5 years (87 172 cases), 6 to 11 years (109 474 cases), 12 to 14 years (27 512 cases), and 15 to 17 years (16 149 cases). Statistical analyses were performed using Excel functions. Diagnoses accounting for more than 0.1% of total visits were ranked and analyzed for patterns. **Results** A total of 469 602 original visits were included, with 446 658 diagnosed cases involving 124 777 patients. Overall

healthcare demands were relatively simple, with 92.37% (412 562/446 658) of visits involving one or two diagnoses per encounter. In terms of timing and location, November had the highest number of visits (58 093, 12.4%), and institutions located outside the second and third urban rings accounted for the majority (360 230 visits, 80.65%). By age, children aged 0 to 2 years constituted the largest group (206 351 visits, 46.20%), while those aged 12 years and above represented only 9.78% (43 683 visits). The most frequently visited departments were Preventive Medicine and Health Care (248 791 visits, 55.70%) and General Outpatient Clinics (162 944 visits, 36.48%). The top five diagnoses were vaccinations (173 693 visits, 38.89%), acute respiratory infections (77 565 visits, 17.37%), general medical examinations/screenings/medical certifications (76 357 visits, 17.10%), traditional Chinese medicine diagnoses (22 603 visits, 5.06%), and vitamin or nutritional deficiencies (24 059 visits, 5.39%). Other issues, such as consultations, symptom documentation, digestive disorders, conjunctivitis, dermatitis, eczema, and follow-up concerns, spanned the entire developmental period of minors. The ranking and characteristics of health issues varied across age subgroups. **Conclusion** Current pediatric healthcare needs observed in primary care settings appear relatively straightforward, indicating substantial room for service expansion. Beyond achieving baseline capability standards, efforts should shift toward optimizing patient experience. Regarding resource allocation, it is recommended to adopt a strategy of “increased staffing during autumn and winter” and “prioritizing outer urban areas.” In terms of capacity building, emphasis should be placed on developing clinical capabilities that address conditions throughout minors’ growth and development cycle, along with comprehensive health management skills. By improving diagnostic quality and efficiency, as well as parental caregiving abilities, we can comprehensively promote and maintain healthy development and effective disease management across the entire lifespan of minors.

[Key words] Minors; Children; Urban community health services; Outpatient services

Primary medical institutions constitute the “network foundation” of China’s health service system and serve as the frontline for health services and protection for minors. They undertake basic work including growth and developmental care, health monitoring, psychological counseling, prevention of common diseases, health education, and screening for high-risk conditions. Strengthening health management for minors in primary medical institutions can implement the health-work principle of prioritizing prevention and shifting the gateway upstream, enabling precise intervention for highly prevalent problems among minors such as myopia, obesity, psychological anxiety, and abnormal growth and development, thereby safeguarding minors’ physical and mental health from the source. At the same time, as the first point of contact in tiered diagnosis and treatment, primary care can divert children with common diseases, relieve pressure on large hospitals, build an integrated service chain of prevention, screening, diagnosis, treatment, and rehabilitation, consolidate the foundation of Healthy China, and protect children’s healthy growth. However, in recent years, domes-

tic studies on minors' visits to primary medical institutions have mainly focused on qualitative consultation needs and clinical disease diagnosis and treatment capacity; relatively few studies have examined the structure and changing characteristics of clinical and preventive services provided by primary care across the complete growth and development cycle of minors. A study of pediatric outpatient clinics in community health centers in Shenzhen found that the top five categories of visits among minors aged 0–18 years were respiratory diseases, calcium and vitamin supplementation, physical examinations and healthcare for minors, trauma and postoperative dressing changes, and skin diseases (together accounting for 67.92%). However, that study lacked overall data on patients' visits to other departments within primary medical institutions and behavioral data such as interactions with medical institutions [1]. This study conducted a real-world data analysis of the utilization of outpatient services delivered to minors by urban community health service institutions, with the aim of helping primary medical institutions coordinate outpatient resources, better deepen and expand outpatient services needed by minors at different stages, and meet the needs of residents within their jurisdictions.

1 Materials and Methods

1.1 Data Sources

De-identified outpatient data for minors were collected from 12 community health service institutions in Wuhou District, Chengdu, from January to December 2025, including their affiliated community health service stations. The data included a unique scrambled ID, visit institution, visit date, all diagnoses for the visit (using ICD-10 six-character codes or traditional Chinese medicine diagnostic codes), attending physician, attending department, gender, and age. Inclusion criteria: all outpatient records for patients aged 0–17 years at the time of the visit. Exclusion criteria: diagnostic information that was incomplete or not recorded according to ICD-10 coding.

1.2 Methods

ICD-10 (International Classification of Diseases, Tenth Revision) [2] diagnostic classification codes refine diseases and health-related problems using six-character codes; among them, three-character codes can effectively identify the main categories of diseases and health-related problems. This study used three-character codes for classification and aggregation. By age, cases were divided into 0–2 years (206 351 cases), 3–5 years (87 172 cases), and 6–11 years (109 474 cases),

12–14 years (27 512 cases), and 15–17 years (16 149 cases), largely corresponding to the home-care, kindergarten, primary-school, junior-high-school, and senior-high-school stages. For each subgroup, the characteristics of receiving departments and diagnostic rankings were analyzed. The spatiotemporal characteristics of care-seeking demand were analyzed by visit time and receiving institution;

statutory working days in 2025 were calculated as 248 days. The complexity of care-seeking demand was analyzed according to the number of diagnoses triggered during the visit.

1.3 Statistical Methods

Data were summarized using EXCEL functions. Count data are presented as composition ratios, and means, medians, and structural ratios were calculated. After extraction of the desensitized original data, sampling verification was performed to confirm the correctness of the extraction results. Noise data such as blanks and clinically abnormal values were identified through data-distribution descriptions and cleaned. Diagnostic data accounting for more than 0.1% of triggered diagnoses were analyzed by rank and characteristics.

2 Results

2.1 Basic Characteristics

A total of 469 602 original visit records were included. After retaining records with diagnostic information, 446 658 records remained, involving 124 777 patients. The highest annual number of visits for a single individual was 92. Records with 1-2 diagnoses per person per visit accounted for 92.37% (412 562/446 658). The top 3 months of the year were November (12.4%), September (9.6%), and December (9.1%). The visit loads differed among community health service institutions; the maximum average daily outpatient volume was 243.2 person-times, and the top 6 institutions were all outside Ring 2, as shown in Table 1.

2.2 Visit Characteristics by Age Subgroup

2.2.1 Number of Visits As shown in Table 2, the 0-2-year age group was the main population for primary-level visits, accounting for 46.20% (206 351/446 658). After age 12 (the middle-school stage), the number of primary-level visits was relatively low, consistent with the age groups of key minors specified in the national basic public health services. With increasing age, the maximum number of primary-level visits among minors, as well as the group mean and median numbers of visits, all gradually decreased.

2.2.2 Receiving Department As shown in Table 3, the Department of Child Preventive Health Care (including Child Health Care and Planned Immunization) and the general outpatient clinic together undertook 92.18% (411 735/446 658) of visits. With increasing age, preventive health-care services gradually decreased: 80.48% (166081/206351) in the 0-2-year group and 44.20% (38 527/87 172) in the 3-5-year group, while all other age groups were 24-30%, suggesting that preventive health care

Table 1 The frequency of patient visits is determined by the number and structure of diagnoses made on each occasion, the month, and the number and structure of geographical segments.

Single-visit diagnoses: Number of diseases (types)	Single-visit diagnoses: Triggering visits [person-times (%)]	Monthly visit frequency: Month	Monthly visit frequency: Visits [person-times (%)]	Visit load by branch institution: Institution and region	Visit load by branch institution: Annual visits [person-times (%)]	Visit load by branch institution: Average daily visits [person-times]
1	343 937 (77.0)	January	33 541 (7.1)	Institution 01 (within Ring 1)	40 329 (9.03)	162.62
2	68 625 (15.4)	February	33 736 (7.2)	Institution 02 (within Ring 1)	9 185 (2.06)	37.04
3	25 084 (5.6)	March	39 290 (8.4)	Institution 03 (within Ring 1)	13 082 (2.93)	52.75
4	7 003 (1.6)	April	37 915 (8.1)	Institution 04 (Rings 1-2)	23 795 (5.33)	95.95
5	1 550 (0.3)	May	33 699 (7.2)	Institution 05 (Rings 2-3)	47 881 (10.72)	193.07
6	364 (<0.1)	June	34 225 (7.3)	Institution 06 (Rings 2-3)	43 346 (9.70)	174.78
7	72 (<0.1)	July	33 392 (7.1)	Institution 07 (Rings 2-3)	27 121 (6.07)	109.36

Single-visit diagnoses: Number of diseases (types)	Single-visit diagnoses: Triggering visits [person-times (%)]	Monthly visit frequency: Month	Monthly visit frequency: Visits [person-times (%)]	Visit load by branch institution: Institution and region	Visit load by branch institution: Annual visits [person-times (%)]	Visit load by branch institution: Average daily visits [person-times]
8	13 (<0.1)	August	39 494 (8.4)	Institution 08 (out-side Ring 3)	42 721 (9.56)	172.26
9	5 (<0.1)	September	44 980 (9.6)	Institution 09 (out-side Ring 3)	62 190 (13.92)	250.77
10	4 (<0.1)	October	38 700 (8.2)	Institution 10 (out-side Ring 3)	56 005 (12.54)	225.83
11	1 (<0.1)	November	58 093 (12.4)	Institution 11 (out-side Ring 3)	17 974 (4.02)	72.48
>11	0 (0)	December	42 537 (9.1)	Institution 12 (out-side Ring 3)	63 029 (14.11)	254.15
Total	446 658 (100)	Total	446 658 (100)	Total	446 658 (100)	1 801.04

Note: Institutions 01-12 represent the 12 community health service centers in the trial district, including their affiliated community health service stations; Rings 1-3 are divided according to Chengdu' s standard ring roads.

Table 2 Characteristics of the number of visits by different age groups

Group	Number of people [persons (%)]	Total visits [person-times (%)]	Individual maximum number of visits [times/year]	Median individual number of visits [$M(P_{25}, P_{75})$, times]
0-2 years	29 735 (23.83)	206 351 (46.20)	92	5 (2, 10)
3-5 years	24 689 (19.79)	87 172 (19.52)	55	2 (1, 4)
6-11 years	46 485 (37.25)	109 474 (24.51)	82	1 (1, 3)
12-14 years	14 645 (11.74)	27 512 (6.16)	32	1 (1, 2)
15-17 years	9 223 (7.39)	16 149 (3.62)	23	1 (1, 2)
0-17 years	124 777 (100.00)	446 658 (100.00)	95	2 (1, 4)

The service population of health-related consultation departments was concentrated among those aged 0 ~ 6 years. In terms of clinical diagnosis and treatment services, general practice ranked first (36.48%, 162 944/446 658); except for the 0 ~ 2-year group, the proportion in all other subgroups was above 45%. Traditional Chinese medicine/rehabilitation ranked second (3.57%, 15 937/446 658), and pediatrics ranked third (3.21%, 14 344/446 658). The remaining visits were scattered across stomatology/ENT, surgery/dermatology, women's health care, and psychological counseling.

2.3 Characteristics of Disease-Diagnosis Rankings

First-diagnosis data from single visits were extracted, and samples with diagnostic counts > 0.1% in each age subgroup were retained for classification. The top 10 ranked disease categories and the corresponding three-character ICD-10 codes involved were analyzed; the results are shown in Table 4.

Overall, the top five disease diagnoses were: vaccination [173 693 visits (38.89%)], acute respiratory tract infection [77 565 visits (17.37%)], general medical examination/screening/medical certificate [76 357 visits (17.10%)], traditional Chinese medicine diagnosis [22 603 visits (5.06%)], and vitamin or nutritional-element deficiency [24 059 visits (5.39%)]. In addition, consultation, problems recorded only by symptoms, digestive-system diseases, conjunctivitis, dermatitis and eczema, and problems requiring follow-up were present throughout the entire growth and developmental period of minors.

Among the unique diagnoses in each age group, the 0 ~ 2-year group included neonatal jaundice, with 4 576 visits (2.2%), and iron-deficiency anemia, with 322 visits (0.2%). In the 3 ~ 5-year group, skin and mucosal viral infectious diseases represented by hand-foot-and-mouth disease and herpangina began to appear,

ranking 11th with 700 visits (0.8%), as did problems requiring follow-up, ranking 14th with 98 visits (0.1%). In the 6 ~ 11-year group, animal bites, scratches, and trauma began to appear, ranking 13th with 261 visits (0.2%). Compared with the 6 ~ 11-year group, the 12 ~ 14-year group had no characteristic diagnoses specific to this subgroup. In the 15 ~ 17-year group, dysmenorrhea/irregular menstruation began to appear, ranking 15th with 47 visits (0.3%), and knee-joint pain/low back pain ranked 16th with 37 visits (0.2%); even two health problems commonly seen in adults appeared, namely hyperuricemia, ranking 17th with 33 visits (0.2%), and sleep disorders, ranking 19th with 21 visits (0.1%).

3 Discussion

3.1 Concordance between the Core Population of Minors Receiving Primary-Care Visits and Service Positioning

Using real-world big data, this study further clarified the structure and changing trends of primary-care services for minors. The 0 ~ 2-year age group was the core population received in primary care (47.35%), which is highly consistent with the key population of “children aged 0 ~ 6 years” in the national basic public health services. A white paper on insights into medical-seeking behavior among child internet users, released by an enterprise[3], indicated that infectious diseases (27.76%), neonatal diseases (19.66%), and growth and development/health care/nutrition-related problems (18.28%) ranked as the top three reasons for children’s visits. This is consistent with the visit rankings in the present study, confirming that primary medical institutions in this district can undertake the main medical and health-care needs of minors, especially children. On the other hand, however, studies have found that the willingness of minors aged 0 ~ 14 years to seek care at the primary-care level still has considerable room for improvement[4-5]. This study also found that as age increased, visit frequency gradually decreased; among adolescents aged 12 years and above, the proportion of primary-care visits was less than 10%. Although this is related to the relatively hidden nature of health problems in this age group and their low willingness to seek care independently, it also reflects an insufficient supply of primary-care services.

3.2 Directions for Optimizing Resource Allocation in Primary-Care Outpatient Services

3.2.1 Matching Spatiotemporal Resources with Service Load This study found that the number of primary-care visits by minors increased month by month from July onward, reaching a peak in November (12.4%). This is directly related to the epidemiological characteristics of the high incidence of respiratory tract infections in autumn and winter. The service load of two-ring primary-care institutions located relatively farther from the city center and from abundant tertiary-hospital resources was significantly higher than that of

institutions within the two rings. The average daily outpatient visits of different institutions ranged from 37.04 to 254.15 visits, suggesting that minors in the peripheral urban areas depend more strongly on primary medical care. It is recommended that resources be optimized according to the principle of “increasing allocation in autumn and winter, and tilting resources toward peripheral areas”: in autumn and winter, increase staffing in general practice and preventive health care, and extend consultation hours; for institutions outside the two rings, priority should be given to supplementing pediatric diagnostic and treatment equipment and drug reserves.

3.2.2 Service Supply and Capacity Expansion In clinical diagnosis and treatment, although some studies, based on the great potential demand for community pediatric services, have recommended that community health service centers establish pediatric specialty outpatient clinics[4,6], this study showed that visits to standalone pediatric outpatient clinics accounted for only 1.07% ~ 4.87% across different age subgroups. That is, in this district, cultivating pediatric subspecialty expertise among general practitioners in 12 community health service institutions could satisfy the vast majority of...

Table 3 Characteristics of consultation departments in different age groups [visits (%)]

	0-2		3-5		6-11		12-14		15-17		
	years		years		years		years		years		
	(n=206)	Visits	(n=87)	Visits	(n=109)	Visits	(n=27)	Visits	(n=16)	Visits	Total
	Rank	(%)	Rank	(%)	Rank	(%)	Rank	(%)	Rank	(%)	(n=446)
Preventive health care	166	2	38	2	32	2	8	2	3	248	
	081		527		205		084		894	791	
	(80.48)		(44.20)		(29.42)		(29.38)		(24.11)	(55.70)	
General practice	30	1	40	1	64	1	16	1	10	162	
	808		062		943		637		494	944	
	(14.93)		(45.96)		(59.32)		(60.47)		(64.98)	(36.48)	
Traditional Chinese medicine/rehabilitation	4	3	4	4	4	3	1	3	1	15	
	644		250		859		136		048	937	
	(2.25)		(4.88)		(4.44)		(4.13)		(6.49)	(3.57)	
Pediatric	4	4	3	3	5	4	1	5	173	14	
	208		472		334		157		(1.07)	344	
	(2.04)		(3.98)		(4.87)		(4.21)			(3.21)	

	0-2	3-5	6-11	12-14	15-17	
	years	years	years	years	years	
	(n=206)	(n=87)	(n=109)	(n=27)	(n=16)	
Consultation	351	172	474	512	149	Total
de-part-ment	(n=206)	(n=87)	(n=109)	(n=27)	(n=16)	(n=446)
Rank	Rank	Rank	Rank	Rank	Rank	Rank
	(%)	(%)	(%)	(%)	(%)	(%)
Stomatology/ENT	5	767	5	1	290	4
	(0.16)	(0.88)		829	(1.05)	(1.72)
				(1.67)		488
Women's health care	6	251	7	19	6	212
	(0.12)		(<0.1)	(0.19)		7
				(0.41)		114
Surgery/Dermatology	6	73	7	81	6	74
	(<0.1)	(<0.1)		(<0.1)		(0.27)
						(0.27)
Psychological	8	2	8	11	8	20
coun-sel-ing		(<0.1)		(<0.1)		(<0.1)
						(0.37)
						(<0.1)

Note: / indicates no data.

Table 4 Characteristics of disease ranking by different age groups [visits (%)]

	0-2	3-5	6-11	
	years	years	years	
	(n = 0-2	(n = 3-5	(n = 6-11	
	206 351)	87 172)	109 474)	
	— (n =	— (n =	— (n =	
	Cat- 206 351)	Cat- 87 172)	Cat- 109 474)	
	e- —	e- —	e- —	
Rank	gory	Code*	Visits	gory
1	Vaccination	Z23-	100	Vaccination
	Z29		419	Z23-
			(48.66)	Z29
				(32.46)
				and
				spe-
				cial
				screen-
				ing

Rank	0-2 years (n = 206 351) — Cat- e- —			3-5 years (n = 87 172) — Cat- e- —			6-11 years (n = 109 474) — Cat- e- —		
	gory	Code*	Visits	gory	Code*	Visits	gory	Code*	Visits
2	General medical examination	Z00, Z01	52 197 (25.30)	Acute upper respiratory tract infection	J00-J06	13 048 (14.97)	Acute upper respiratory tract infection	J00-J06, J10	25 371 (23.18)
3	Vitamin or nutrient deficiency	E55-E61	12 909 (6.26)	General medical examination and medical certificate	Z00, Z02	10 054 (11.53)	Traditional Chinese medicine diagnosis	ICM code	8 557 (7.82)

Rank	0-2 years (n = 206 351)			3-5 years (n = 87 172)			6-11 years (n = 109 474)		
	Cat- e- gory	Code*	Visits	Cat- e- gory	Code*	Visits	Cat- e- gory	Code*	Visits
4	Acute up- per res- pira- tory tract in- fec- tion	J00- J06	8 202 (3.97)	Acute lower res- pira- tory tract in- fec- tion	J20, J21; J18; J40	8 587 (9.85)	General med- ical ex- ami- na- tion, med- ical cer- tifi- cate, and screen- ing	Z00- Z13	8 639 (7.89)
5	Neonatal jaun- dice	R59	4 576 (2.22)	Tradition- al Chi- nese medicine diag- no- sis	R61 code	6 706 (7.69)	Acute lower res- pira- tory tract in- fec- tion	J20, J21; J40	6 943 (6.34)
6	Tradition- al Chi- nese medicine diag- no- sis	R61 code	4 449 (2.16)	Vitamin or nu- tri- ent defi- ciency	E50- E61	6 202 (7.11)	Symptoms and signs	R55- R50	4 901 (4.48)

Rank	0-2 years (n = 206 351) — Cat- e- —			3-5 years (n = 87 172) — Cat- e- —			6-11 years (n = 109 474) — Cat- e- —		
	gory	Code*	Visits	gory	Code*	Visits	gory	Code*	Visits
7	Acute lower respiratory tract infection	J20, J21; J40	4 319 (2.09)	Symptoms and signs	R05- R63	2 797 (3.21)	Vitamin or nutrient deficiency	E50- E58	4 184 (3.82)
8	Consultation	Z71bn	4 295 (2.08)	Digestive system diseases (gastrointestinal, oral cavity)	K30- 92, A09; K12	1 872 (2.15)	Digestive system diseases (gastrointestinal, oral cavity)	K00- 92; A09	3 908 (3.57)
9	Digestive system diseases (gastrointestinal)	K30- 92	2 666 (1.29)	Consultation	Z71bn	1 869 (2.14)	Consultation	Z71bn	3 079 (2.81)
10	Symptoms and signs	R21- R50	1 608 (0.78)	Rhinitis	J30, J31	1 294 (1.48)	Rhinitis	J30, J32	1 972 (1.80)
Total	/	/	195640 (94.81)	/	/	80724 (92.60)	/	/	99627 (91.01)

Rank	12-14 years (n = 27 512) –Cate- gory			15-17 years (n = 16 149) –Cate- gory		
	12-14 years (n = 27 512) –Code	12-14 years (n = 27 512) –Code	12-14 years (n = 27 512) –Visits	15-17 years (n = 16 149) –Code	15-17 years (n = 16 149) –Code	15-17 years (n = 16 149) –Visits
1	Vaccination and special screen- ing	Z24- Z29	8 701 (31.63)	Vaccination and special screen- ing	Z23- Z29	4 205 (26.04)
2	Acute upper respira- tory tract in- fection	J00- J06, J10	6 491 (23.59)	Acute upper respira- tory tract in- fection	J00- J06, J10	3 301 (20.44)
3	Traditional Chinese medicine diagno- sis	ICM code	1 711 (6.22)	General medical exami- nation, certifi- cates, screen- ing, etc.	Z00- Z13	2 613 (16.18)
4	General medical exami- nation	Z00- Z11	2 854 (10.37)	Traditional Chinese medicine diagno- sis	ICM code	1 180 (7.31)
5	Symptoms and signs	R05- R51	1 237 (4.50)	Digestive system diseases (gas- troin- testi- nal)	K29-92; A09	717 (4.44)
6	Digestive system diseases (gas- troin- testi- nal)	K00-92; A09	932 (3.39)	Symptoms and signs	R00- R51	517 (3.20)

Rank	12-14 years (n = 27 512) –Cate- gory			15-17 years (n = 16 149) –Cate- gory		
	12-14 years (n = 27 512) –Code	12-14 years (n = 27 512) –Code	12-14 years (n = 27 512) Visits	15-17 years (n = 16 149) –Code	15-17 years (n = 16 149) –Code	15-17 years (n = 16 149) Visits
7	Acute lower respiratory tract infection	J20, J21; J40	864 (3.14)	Consultation	W71	515 (3.19)
8	Consultation	W71	737 (2.68)	Acute lower respiratory tract infection	J20, J40	439 (2.72)
9	Vitamin (D)/calcium deficiency	E55, E58	568 (2.06)	Vitamin (D)/calcium deficiency	E55, E58	196 (1.21)
10	Rhinitis	J30-J31	305 (1.11)	Animal bite or scratch / trauma / sprain	W55, T14, S93	125 (0.77)
Total	/	/	24400 (88.69)	/	/	13808 (85.50)

Note: For descriptions of the disease types corresponding to the codes, see the *International Statistical Classification of Diseases and Related Health Problems (Tenth Revision)* issued by the World Health Organization [2].

Meeting the needs for diagnosis and treatment of common diseases, and satisfying more complex diagnostic and treatment needs through a smooth referral mechanism within the jurisdiction, is a concrete manifestation of fulfilling the gatekeeper responsibility for health and medical resources. Meanwhile, this study found that traditional Chinese medicine/rehabilitation departments accounted for a stable proportion in all age subgroups (2.3%–6.5%), reaching 6.5% in the 15–17-year-old group, reflecting a relatively high level of parental recognition of traditional Chinese medicine for regulating minors' health problems. This phenomenon is related to the unique advantages of traditional Chinese medicine in regulating the spleen and stomach in minors, improving allergic constitution,

and providing rehabilitation and health care; it is recommended that primary care institutions further leverage the strengths of traditional Chinese medicine. In addition to providers' ability to manage health problems, some studies have found [7–8] that primary care is constrained by the dosage forms and specifications of centrally procured drugs, as well as by the understanding of such drugs among children's family members; as a result, rational medication-use plans cannot be formed in primary care practice, affecting parents' trust in and use of primary care. It is recommended that, while addressing core diagnostic and treatment capacity, medication-supply support should also be strengthened. Differences in the capacity for clinical diagnosis, treatment, and management of specific diseases are discussed together in Section 3.3.

In terms of health management, a survey of 8 469 practicing (assistant) primary care physicians in primary medical and health institutions in eastern, central, and western China showed that, with respect to child health management capacity, 83.82% and 83.46% of primary care physicians had the ability to provide child nutrition guidance and physical examinations, respectively [9]. On the basis of services that can generally be provided, primary care can further incorporate the *Action Plan for Promoting the “Five Healths” of Children and Adolescents (2026–2030)* jointly issued by the National Health Commission, the Cyberspace Administration of China, the Ministry of Education, and other departments [10], and actively attach importance to developing health services for minors and adolescents in areas such as weight, vision, mental health, bones, and oral health. In addition, studies have demonstrated that timely and standardized health management and behavioral interventions carried out at the primary care level have significant intervention effects on delayed growth and development in children [11], asthma [12–14], and developmental language disorder [15], making these service directions worthy of expansion. In light of the trend toward integration of commercial insurance and health management, primary care institutions may explore cooperation with commercial insurance companies to provide insured minors with value-added services such as personalized health management, health behavior maintenance, and guidance on family caregiving capacity, thereby improving service accessibility, the effectiveness of health maintenance, and parents' caregiving capacity, and exploring the establishment of a multi-level health management payment mechanism. At the same

At the same time, as urban parents' expectations for service experience increase and their sensitivity to costs decreases^[3], primary healthcare institutions in urban areas need to upgrade from “meeting capability standards” to “optimizing the patient experience.” This includes new-stage needs such as making the care environment more child- and family-friendly—for example, improving the waiting experience and shortening waiting times^[5]—rather than relying excessively on price strategies such as reductions or waivers of medical fees. Studies have found that the family-doctor contract-signing rate is also an influencing factor for pediatric visit volume^[5,16], indicating that enhancing the appeal of family-doctor health-management services can also promote the use of clinical diagnosis and treatment services; therefore, greater attention should be paid to

the development of health-management services.

3.3 Response strategies for health problems across age groups

3.3.1 Routine management of common health problems This study found that acute upper and lower respiratory tract infections, vitamin or nutrient deficiencies, digestive system diseases, conjunctivitis, dermatitis and eczema, and problems requiring follow-up run through the entire growth and developmental period of minors. These constitute core health-problem management needs in primary care. Drawing on the classified diagnosis-and-treatment catalogue method proposed in previous research^[17], for diseases included in Primary Care Core Diagnosis and Treatment Catalogue A (core diagnosis and treatment), it is recommended to establish “standardized diagnosis and treatment pathways for common diseases among children and adolescents.” Through measures such as unifying diagnostic and treatment standards, optimizing the drug catalogue (e.g., stocking pediatric-specific dosage forms), and providing health education for parents (e.g., home care for respiratory infections and guidance on scientific feeding), diagnostic efficiency and parents’ self-care capacity can be improved. For Core Diagnosis and Treatment Catalogue B (capacity enhancement), locally demand-based health-management service packages may be established; meanwhile, primary care institutions can be encouraged to expand their capacities and provide corresponding services through mechanisms such as capability-level certification for institutions and service providers. It is recommended that artificial intelligence technologies be fully utilized to rapidly improve primary healthcare workers’ capacity for early recognition, diagnosis, and management of specific diseases^[18-19].

3.3.2 Precise responses to specific problems in different age subgroups

Resources should be allocated in a targeted manner according to the characteristic health problems of each age subgroup:

For the 0–2-year-old group, neonatal jaundice and iron-deficiency anemia require linkage and follow-up mechanisms between primary care institutions, obstetrics departments, and maternal and child health hospitals, so as to ensure early detection and early referral of complex conditions. For the 3–11-year-old group, hand-foot-and-mouth disease, herpangina, and animal bites require additional services in communities surrounding kindergartens and primary schools, including publicity on scientific pet keeping, prevention and control of infectious diseases, and emergency management of trauma, as well as reserves of specialized vaccines and debridement equipment. For the 15–17-year-old group, dysmenorrhea, joint pain, hyperuricemia, and sleep disorders require attention. The *2024 Survey Report on Pain Points in the Treatment and Rehabilitation of Depression among Children and Adolescents*^[20] shows that the average age at first diagnosis of adolescent depression is only 13.41 years; more than 30% have comorbidities, and delayed consultation is widespread. On the one hand, primary care institutions should work with schools to hold adolescent health lectures,

and introduce specialists in endocrinology, orthopedics, psychology, and other fields to provide regular on-site consultations or remote consultations, thereby addressing both the physiological and psychological needs of adolescents during growth and development. On the other hand, health problems that manifest at older ages may potentially be identified by primary care providers and referred in a timely manner during the early stages of growth and development—for example, issues related to language development and autism. Therefore, in addition to clinical diagnosis and treatment capacity, general practitioners should be trained in early identification and regular screening of growth and developmental problems, and mechanisms should be established for coordinated family-school-community attention with the family as the main actor.

4 Limitations

This study focused only on the consultation characteristics of minors in primary care. If combined with analyses of pediatric outpatient departments in maternal and child health hospitals and general hospitals, it would be possible to present a more complete picture of minors' consultation needs and the distribution of regional medical-service resources for minors. In addition, this study did not include data such as consultation costs or parental medical decision-making factors (e.g., specific motivations for choosing primary care and satisfaction with services). Future studies could supplement questionnaire surveys to further analyze the mechanisms influencing healthcare-seeking behavior. Meanwhile, the study sample was limited to one district in Chengdu, and its regional representativeness is limited. Subsequent multicenter studies could be conducted to provide more generalizable references for optimizing primary medical services for minors in urban areas nationwide.

5 Conclusion

Primary healthcare institutions in this district can basically meet the main medical and healthcare needs of minors in the district, especially children, but there is insufficient service supply for populations over 6 years of age. It is recommended that health-service resources in this district be optimized according to the principle of “increasing allocation in autumn and winter and tilting resources toward peripheral areas,” further leveraging the advantages of traditional Chinese medicine and focusing on developing health-management services with good experience and high value for early intervention. Acute upper and lower respiratory tract infections, vitamin or nutrient deficiencies, digestive system diseases, conjunctivitis, dermatitis and eczema, and problems requiring follow-up run through the entire growth and developmental cycle of minors; these are the core health-problem management needs of primary care. For growth and developmental issues and major disease problems at different ages, clinical diagnosis and treatment capacity should be strengthened in a targeted manner, and corresponding family-doctor contract services should be designed from the perspectives of the whole life course, dual physical and mental health, and

improving parents' caregiving capacity.

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References

[1] Yin Chaoxia, Mao Lidong, Zhang Baoshuang, et al. Study on the disease spectrum of community outpatient visits among children contracted with family doctors in Shenzhen and its implications for standardized training of general-practice residents [J]. *Chinese General Practice*, 2023, 26(33): 4218-4224. DOI: 10.12114/j.issn.1007-9572.2023.0047.

[2] Translated by Dong Jingwu. *International Statistical Classification of Diseases and Related Health Problems—Volume 1: Tabular List* [M]. 2nd ed. Compiled and translated by the WHO Family of International Classifications Collaborating Centre, Peking Union Medical College Hospital. Beijing: People's Medical Publishing House, 2008.

[3] Taikang Online. White paper on insights into children's healthcare-seeking behavior among Internet users [EB/OL]. https://www.360kuai.com/pc/92905a13c3c1537f9?cota=3&kuai_so=

[4] Zhang Xiaojuan, Liu Yang, Peng Bo, et al. Study on pediatric construction and service provision in primary healthcare institutions [J]. *Chinese General Practice*, 2025, 28(10): 1228-1235. DOI: 10.12114/j.issn.1007-9572.2023.0301.

[5] Xu Bixia, Lin Xiaodan, Yao Weiguang. Study on children's willingness to seek care at primary care institutions and influencing factors based on the Andersen model [J]. *Chinese General Practice*, 2022, 25(22): 2766-2772. DOI: 10.12114/j.issn.1007-9572.2022.0174.

[6] Liu Tao, Wu Qiong, Wang Yan, et al. Investigation of willingness to seek pediatric care in the community and analysis of reasons among residents of a suburban street in Shanghai [J]. *Chinese Journal of Clinical Medicine*, 2023, 30(4): 709-713.

[7] Song Fei, Chen Hao, Wang Chenzhou, et al. Analysis of the impact of national centralized drug procurement on the supply guarantee of pediatric medications [J]. *Health Economics Research*, 2024, 41(10): 10-14, 19.

[8] Li Man, Wu Min, Ni Mingming, et al. Analysis of pediatric drug shortages in primary healthcare institutions within pediatric medical alliances and improvement measures [J]. *Pharmaceutical and Clinical Research*, 2022(002): 030.

[9] Li Yahui, Xie Kun, Lian Lu, et al. Health management of children's health status analysis of the current status of management service capacity [J]. *Chinese Journal of Public Health*, 2025, 41(5): 574-579. DOI: 10.11847/zgggws1144932

- [10] National Health Commission, Cyberspace Administration of China, Ministry of Education. Notice on issuing the Action Plan for Promoting the “Five Healths” among Children and Adolescents (2026–2030) [EB/OL]. <https://www.nhc.gov.cn/fys/c100078/202512/9c3da4badfb34026b5fabbf5853105ee.shtml>
- [11] You Lin. Evaluation of the effects of primary-level interventions for growth and developmental retardation in children and analysis of influencing factors [J]. *Smart Healthcare*, 2025, 11(17): 35–38.
- [12] Geng Liting. Analysis of the effects of implementing standardized primary-level diagnosis and treatment for pediatric respiratory asthma [J]. *Smart Healthcare*, 2025, 11(16): 49–52.
- [13] Luo Dan. Evaluation of the effectiveness of a family health management and counseling program for childhood asthma under the guidance of implementation science [D]. Wuhan: Wuhan University, 2021.
- [14] Yang Qiao, Liu Yulin, Wang Chongjie, et al. Evaluation of childhood bronchial asthma prevention and treatment services provided by primary-level general practitioners in Chongqing [J]. *Chinese General Practice*, 2024, 27(22): 2780–2788. DOI: 10.12114/j.issn.1007-9572.2023.0758.
- [15] Gong Yanhui, Guo Lingling, Che Chao, et al. Analysis of parent-child interaction characteristics and influencing factors in children with developmental language disorder [J]. *Chinese Journal of Child Health Care*, 2022, 30(3): 259–263. DOI: 10.11852/zgetbjzz2021-0902.
- [16] Dong Xiaoyang. Study on the correlation between medical services and basic public health services in primary medical and health institutions in Chengdu and its influencing factors [D]. Chengdu: Sichuan University, 2021.
- [17] Lü Caipeng. Study on associated factors and prediction of medical service demand among residents in Ningxia [D]. Ningxia: Ningxia Medical University, 2025.
- [18] Zou Qingxiang, Yong Yayun, Li Xuejun, et al. Health management of “preventive treatment of disease” in traditional Chinese medicine pediatrics based on artificial intelligence technology: PEST-SWOT analysis and countermeasure study [J]. *Guangxi Medical Journal*, 2025, 47(8): 1099–1105. DOI: 10.11675/j.issn.0253-4304.2025.08.05.
- [19] Li Jinyu, Zhao Dahong. Research progress and application prospects of speech recognition technology in the diagnosis of autism spectrum disorder [J]. *Journal of Nanjing Medical University: Natural Sciences*, 2025, 45(4): 574–579, 587. DOI: 10.7655/NYDXBNSN241209.
- [20] Institute of Psychology, Chinese Academy of Sciences. 2024 Survey Report on Pain Points in the Treatment and Rehabilitation of Depression among Children and Adolescents [EB/OL]. <https://www.rmzxw.com.cn/c/2024-05-30/3554671.shtml>

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