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ORIGINAL RESEARCH

Facilitate Signing with the Family Doctor: A Study of the Practice in Shanghai, China

Huimin Dai[1]
Lan Tang[1]
Zhaoxin Wang[2]
Xiaoming Sun[3]
Fang Zhang[1]
Min Zhu[1]
Qian Huang[1]
Bing Hu[1]
Linqiang Wang[1]
Xianqin Fu[1]
Li Luo[3]
Jianwei Shi[2,4]

[1]Shanghai Pudong Weifang Community Health Center, Shanghai, 200120, People's Republic of China; [2]School of Public Health, Shanghai Jiaotong University School of Medicine, Shanghai, 200025, People's Republic of China; [3]School of Public Health, Fu Dan University School of Medicine, Shanghai, 200433, People's Republic of China; [4]Department of General Practice, Yangpu Hospital, Tongji University School of Medicine, Shanghai, 200090, People's Republic of China

Background: In the time since primary care was implemented in China in 2009, programs of promoting residents signing with family doctor services have been key. However, there has been a lack of effective evaluation of its implementation.

Methods: We used mixed methods for evaluating existing measures of facilitating signing with family doctors in Shanghai. Based on the Donabedian model, qualitative informant interviews were conducted to obtain experts' evaluations in aspects of team construction (structure) and innovative solutions for promoting and supervising signings (process). Quantitative data were used to analyse the utilization situation (outcome) from "Shanghai Family Doctor Signing Data Platform".

Results: Measures of signing with family doctors in Shanghai have functioned well, but there is still a lack of sufficient family doctors and specialists, including paediatricians and gynaecologists. Although proportions of the key population (average=62.59%) and the elderly population (>65 years) (average=78.10%) who had signed with family doctors were relatively high, the proportion of the permanent resident population (average=29.36%) who had signed with family doctors was low from 2017 to 2020 in Shanghai. The proportions of residents seeking medical advice in signed community health centres in outskirts (71.08%) were higher than those in suburbs (63.51%) and urban areas (53.49%), whereas the proportion of those seeking medical advice from recommended multiple medical institutions were similarly low in urban areas, outskirts and suburbs.

Conclusion: The practice of facilitate signing with family doctors in Shanghai has increased. However, we showed that numbers of family doctors were relatively low, and there remains a need for more experienced gynaecology and paediatrics professionals, compared with Western countries. Additionally, efforts should be made to increase proportions of residents who utilize the program, especially in urban areas, and seek medical services in contracted group hospitals and community health centres.

Keywords: primary care, family doctor service, evaluation, practice

Introduction

Primary medical service systems centred on a family doctor system have been implemented in more than 50 developed countries and regions around the world, and some achievements have been made. The UK, which attaches great importance to primary health care, has one of the lowest costs of primary health care.[1] For instance, in the UK, 90% of patients receive their initial diagnoses in the GP clinic, and 80% of chronic diseases are solved in the community health centres, with the use of approximately only 30% of the NHS budget.[1] The number of family doctors in the United States accounts for approximately 60% of clinicians.[1] Under normal circumstances, 80–90% of health problems of community residents can be properly solved in family doctors' clinics,

Correspondence: Lan Tang; Jianwei Shi
Email tangl199@aliyun.com; shijianwei_amy@126.com

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and only 6.3% of patients need to be referred by family doctors to specialists for further treatment. In Australia, more than 80% of residents seek family doctor services each year.[2–4] Commonly, family doctors play the role of "health gate-keepers", and patients rely heavily on them.

However, the development of primary health care in China was relatively late. From the early days of the founding of the People's Republic of China to the days before the reform and opening up (1950–1979), "barefoot doctors" were vigorously promoted, and these doctors played a role similar to that of family doctors in Western countries. However, after the reform and opening, as well as due to the lack of national health funds, the government began to reduce the financial budget for hospitals and encouraged hospitals to operate independently which greatly increased the competition between secondary or tertiary hospitals and primary care centres, and gradually weakened the ability of primary care centres.[2] It was not until China's new round of healthcare reform in 2009 that the Chinese government placed more emphases on improving primary care services.[3–6] A series of policy documents (Figure 1) was issued to promote GPs as

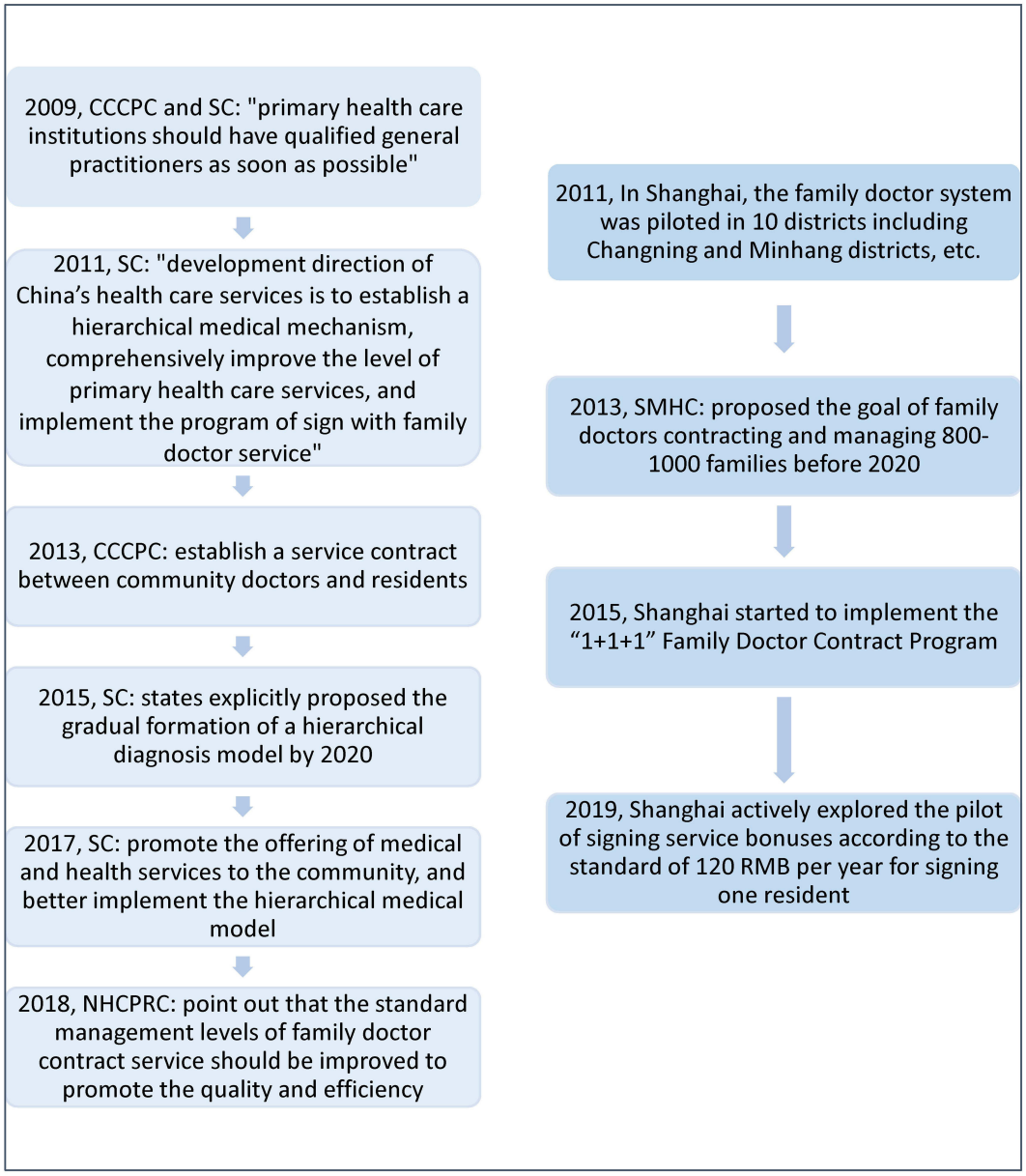

Figure 1 Policies of family doctor contract services in China between 2009 and 2019.
Abbreviations: CCCPC, Central Committee of the Communist Party of China; SC, State Council; NHCPRC: National Health Commission of the People's Republic of China; SMHC, Shanghai Municipal Health Commission.

"health gatekeepers". However, the GPs in China only initially provided the service of treating patients in health institutions, which was not fully realized as being the function of GPs in the developed countries. In 2011, the State Council noted the need to comprehensively improve the level of primary healthcare services and to implement the program of signing with a family doctor, in order to improve the function of GPs; additionally, these GPs are needed to provide health services in both the health institutions and in the home.[7] These GPs were specifically known as family doctors in China. As a result, in 2013, the Central Committee of the Communist Party of China proposed the program of health service contracts between family doctors and residents.[7,8] In 2018, "Guiding Opinions on Regulating the Management of Family Doctor Contract Services" pointed out that the standard management levels of family doctor contract services should be improved to promote their quality and efficiency.[9] Among all of the cities in China, Shanghai has prioritized the introduction and development of community healthcare services. A pilot family doctor system was launched in Shanghai in 2011, and information on their accumulated experience has been discussed.[10,11] The residents were encouraged to use family doctor services, such as priority referral appointments, convenient medications, targeted health management, medical insurance management and other supporting services, in order to gradually establish a hierarchical medical system and to fully realize the gatekeeper role of family doctors.[12–14]

Due to the lack of qualitative systematic summaries and quantitative evaluations in the existing studies, this study aimed to summarize the experience of the promotion of the scheme of signings with family doctors in Shanghai and to evaluate its effectiveness. When regarding the promotion of family doctor services in China, Shanghai is far ahead of other cities in China; however, the circumstances commonly involve the idea that patients can freely choose the type of primary care and specialist without strict restrictions. Therefore, this study has an important reference value for the promotion of signing with family doctors and the reform of primary healthcare services in other regions of China and in other developing countries.

Method

Analytic Framework

This study used both qualitative and quantitative methods to evaluate family physician contract measures. The Donabedian model[15] provides a framework to evaluate the characteristics of the Family Doctor Contract Service Program schemes in three categories: structure, process and outcomes. Based on Donabedian's framework, the qualitative component of the study systematically summarized current common Family Doctor Contract Service Program schemes by interviewing 12 directors of community health services who were responsible for these programs, when regarding the structure and process of the programs. Questions designed for experts were related to the design of the program (structure), its implementation (process). The main discussion questions for the evaluation were as follows: 1) biographical information and experience (eg, age, gender, professional title); 2) awareness of the experiences of the family physician contract policy; 3) description of schemes of sign with a family doctor, including its design, execution/implementation, and effectiveness in China. The interview questions were open-ended. Furthermore, from the quantitative perspective, and to support the evaluation (particularly, the "outcome" section of the framework), we assessed the utilization rate of the scheme of signing with the family doctor from 2015 in the leading community healthcare centre in Shanghai.

Data Source

Qualitative Data

To evaluate the current common scheme of signing with a family doctor, we chose 15 experts who were directors of community health centres, officials in the Health Commission who were responsible for elementary health affairs and related scholars in Shanghai. They were given a detailed introduction of the significance, purpose, methods and content of this study. In-depth face-to-face interviews were conducted from May 6, 2020, to July 1, 2020. To obtain detailed and reliable data, each interview lasted approximately one hour and was audio recorded. The audio recordings were returned to the respondents for confirmation after each interview. We recorded the respondents' gender, age, title, education, and occupation.

Quantitative Data

In 2015, to monitor the proportion of the population signing contracts in each community healthcare centre in Shanghai, the Family Doctor Signing Data Platform was established. The platform performs real-time monitoring of signing data, including the proportions of permanent residents, key populations among permanent residents (elderly individuals up to 60 years old; pregnant women; children; disabled individuals; family members who

require special family planning; and patients with hypertension, diabetes, tuberculosis, and serious mental disorders[16]) and the elderly population up to 65 years old among permanent residents who have signed contracts. In addition, the platform tracks the proportions of residents seeking medical advice from multiple given types of medical institutions, which were measured as the sum of the number of consultations at community health centres, regional secondary hospitals and tertiary hospitals contracted with residents, divided by the total number of consultations at community health centres contracted with residents. Finally, the platform records the proportion of community health service centre consultations, measured as the number of consultations at community health centres divided by the total number of consultations of contracted residents. We collected data starting in 2017, the year in which the online system was launched and the programme began its two-year implementation period. The uploaded data provided a comprehensive status of the programme in Shanghai.

Data Analysis

Regarding the qualitative portion of the study, two trained researchers analysed the qualitative data using NVivo 10 to sort the interview answers. The Donabedian model was used as an a priori organizational framework. Using a hierarchical coding structure, the researchers deductively identified all themes and then coded and analysed the transcripts that were relevant. The transcripts were double coded (ie, coded independently by the two researchers), and the results were compared and discussed until consensus was reached.

A descriptive analysis was conducted for the utilization situation, including the proportion of permanent residents in Shanghai who signed contracts, the proportion of people over 65-years-old who signed contracts, the rate of first diagnosis in community healthcare centres and the rate of diagnosis in recommended multiple medical institutions. The descriptive statistics included the number, mean, standard deviation, and proportion of these variables from 2017 to 2020.

Results

Qualitative Evaluation of Schemes of Signing with Family Doctors in Shanghai

Evaluation of Contract Service Team Construction

At present, the signing of contracts by residents with family doctors in Shanghai is assisted by the residents' committees (in China, the residents' committee plays an important role in assisting the sub-district offices in handling social and public affairs). A team of family doctors (one GP + one assistant + N (public health doctors, residents committee cadres, volunteers, etc.)) is formed, with a team leader at the core. The GP is responsible for the organization, leadership and quality control of the team's work, as well as for performing specific diagnoses and treatment services, including outpatient diagnoses and treatments and medicine management services for contracted patients. The assistant assists the GP in completing the contract signing, arranging appointments, establishing and updating health records, following up on chronic diseases, providing health information, performing physical examinations of elderly patients and screening for chronic diseases related to public health. Public health doctors are responsible for public health-related service consultation, chronic disease management and follow-up. The cadres and volunteers of the neighbourhood committee assist the GP in establishing connections and contact with residents.

Specifically, in terms of medical service provisions, to better attract patients, community health centres generally set up a family doctor service team with a complete set of professionals. Specifically, for a certain kind of disease, the team usually cooperates with a counterpart specialist from a tertiary hospital in the region and establishes a full specialist team. For example, for diabetes care, when considering type 2 diabetes as the starting point, a community in Pudong New Area cooperated with a tertiary hospital in its area to set up a "Renji - Weifang" (Renji is a tertiary hospital and Weifang is a community healthcare institution) diabetes disease facility in the community, which was composed of 1 specialist, 4 GPs and 1 diabetes specialist nurse. Usually, half a day each week was dedicated to outpatients, focusing on appointments for patients with nonideal glycosylated haemoglobin (hbA1c) levels that have previously agreed to the "1+1+1" contract, with 15–20 patients being seen each half day. The nurses completed routine physical examinations, such as height, weight, waist circumference, and blood pressure. At the same time, we provided a rotation service between Renji Hospital and the "Renji - Wei fang" diabetes disease facility according to the agreed-upon grading diagnosis treatment standards and the actual situations of patients.

Currently, among the 246 community health centres in Shanghai, 175 centres can offer paediatric diagnoses and treatment services. However, all of the centres are already in service to provide outpatient appointments, preventions

related to health care between the ages of 0–6 years, health records and other common services for infants. Interestingly, many GPs and their teams have expanded to sign up entire families after originally signing up only children.

When regarding the composition of the contract service team in Shanghai, as required by the government, each team should equip at least one family doctor, one nurse, one public health physician (can be part-time) and one rehabilitation therapist, with the family doctors representing the core individual in the team. This condition was well met by all of the community health centres in Shanghai. However, the number of family doctors was not sufficient compared to their considerable work load, especially regarding door-to-door services. When considering this scenario, the Shanghai government has implemented various measures, including service bonuses of 120 RMB for the team if they are able to successfully sign one resident. Another problem is that, in certain community health centres, the family team does not include gynaecology or paediatric professionals, and some of these individuals are unable to diagnose via chest radiographs or electrocardiograms.

Evaluation of Various Innovative Solutions to Promote and Supervise the Schemes of Signings with Family Doctors

Regular Door-to-Door and Community Canvassing to Promote Contract Signing

In terms of publicity, community health centres usually organize family doctors, assistants, neighbourhood community cadres and public health personnel to participate in publicity and the provision of services for residents in the neighbourhood, communities and outpatient departments. Family doctors perform consultations with individuals from the entire neighbourhood and publicize signings among residents. Assistants conduct telephone follow-up and ensure that everyone has been appropriately informed according to the household registration. While the canvassing of the area continues, family doctor groups are arranged to give informative speeches in the community related to the family doctor policy. Relevant leaflets are distributed in corridors and public spaces, among other settings, where posters with information and pictures of family doctors are also placed. These efforts are taken to further strengthen public awareness and support.

Information Support

From the time of 2018, the method of signing has changed from the original paper-based registration form to online contract signing. Family doctors can provide face-to-face contract signing for residents using mobile phones. Residents can also query family doctors from community health centres through the use of the health platform of each district (such as the Pudong Health Information Platform). On the platform, they can select and apply for family doctors according to their needs.

Many community health centres have developed computer systems to assist in the identification of medical insurance card information and the establishment of a general outpatient-oriented triage system. With the help of medical insurance card information recognition, patients can be divided into two categories: signed and not signed. Before registration, patients who have signed must go to the triage nurse table The triage nurse informs the family doctor of the clinic and guides the patient to the corresponding family doctor's clinic. Doctors can lead contracted patients through to the correct room by using the computer and the intercoms placed in waiting areas to announce they are ready to see them; this is done to promote continuous and consistent services to patients who have signed contracts. This approach has solved problems such as the presence of patients who have signed contracts but not booked appointments to meet their doctors and who see the appointment as a mere formality.

In addition, the health cloud platform and the family doctor management application (app) have been popularized in Shanghai. Family doctors can query the medical treatment situations of community residents in the whole city, including their hospital information, diagnoses, test results, examinations, medications and medical insurance expenses. In addition, they can follow the health status of residents in a timely manner. By telephone or chat, they can immediately follow up about the disease and provide community health guidance, and they can inform residents that they can provide medicines from higher-level hospitals through extended prescriptions to reduce unnecessary visits to higher-level hospitals.

Quality Control System for the Scheme

In the process of signing a contract, most communities pay attention to the service quality assessment. The first part of the assessment involves the identification of the number of patients who have signed a contract with

a doctor and the demographics of that group, which are used as the basis for workload statistics and incentive allocation (mentioned by all 12 interviewed communities). The second is a post-signing weekly/monthly/quarterly forum among the GP signing teams to synchronize and discuss the current contract signing progress, signing skills, and problems encountered in the process of signing; 50–100 people are randomly selected for telephone follow-ups every month to understand the satisfaction rate and listen to the feedback. In addition, a third party is entrusted to make a follow-up call every six months to understand the awareness and satisfaction of the contracted party with the family doctor service, communicate in a timely manner and provide feedback, and track and verify the problems that are found. Third, the incentive payment for signing is gradually being linked to the quality of service. The contract service fee is a system that has been implemented since 2019; signing up a resident with a GP team can lead to a bonus payment for the signing team member, and the initial payment is measured only based on the number of residents contracted. However, an increasing number of community health centres are proposing establishing a team distribution system that takes into account both the signing process and the results into the assessment, which would ensure a fair payment of service fees and better motivate team members.

Quantitative Evaluation of Schemes on Signings with Family Doctors in Shanghai

As seen in Table 1, at the end of 2020, Shanghai had 22,467,089 permanent residents (6,621,629 [29.47%] living in urban areas, 10,817,532 [48.15%] living in the outskirts and 5,027,928 [22.38%] living in the suburbs) and 5.839 million key populations. Among these populations, the number of 65-year-old individuals increased year by year, accounting for 15.78% (3,544,991/22,467,089) of the total population in 2020. However, although the number of GPs increased from 2019 to 2020, there were only 3.62 GPs (8128/22,399,358) for every 10,000 residents in 2019 and 3.91 GPs (8782/22,467,089) for every 10,000 residents in 2020.

As shown in Table 2, in general, the signing rate of permanent residents and key populations increased from 2017 to 2020. The average proportion of key populations and seniors aged 65 and above in Shanghai who signed contracts was significantly higher in the outskirts (key population: 71.08%; aged >65 years: 93.14%) than in urban areas (key population: 53.49%; aged >65 years: 61.00%) or the suburbs (key population: 62.59%; aged >65 years: 78.10%). In addition, we found that in some districts in the outskirts (the districts of Minhang, Jiading and Baoshan), the proportion of seniors aged 65 and above who signed contracts was already 100% in 2020.

When comparing the actual behaviour of residents seeking medical advice, it was found that the overall average proportions of consultations at multiple medical institutions and contracted community health centres were 71.58% and 48.61%, respectively. The proportions of residents seeking medical advice at multiple medical institutions were similar in urban areas, the outskirts and the suburbs. However, the proportion of residents seeking medical advice in contracted community health centres in the outskirts (71.08%) was higher than those in the suburbs (63.51%) and urban areas (53.49%) (Table 3).

Discussion

As shown in this study, Shanghai has prioritized the introduction and development of promoting the schemes of signing with the family doctor. However, although the team met the basic requirements of the government, in the study, we showed that there was a considerable shortage of family doctors, which may largely influence the efficiency of the signing work, due to the fact that family doctors in China not only exhibit responsibilities of providing health services, but also practice public health duties, including disease screening, vaccination and health status follow-ups, among other services.[17] Actually, when regarding Shanghai GPs in 2020, there were 3.91 GPs for every 10,000 residents in Shanghai, whereas there were 8–10 GPs for every 10,000 residents in developed countries.[18,19] This considerable shortage, to a great extent, makes the contract services of family doctors difficult to implement. In addition, compared with western countries, in terms of salary levels, the salary of family doctors is much higher than that of other vocations, whereas the income level of family doctors in China is relatively low. For instance, the average annual income of family doctors in the UK is 2.5 times the average in China, while that in the US is 2–7 times that in China.[20,21]

In terms of the multiple roles of GP teams, contracted family doctor teams in Shanghai are also constantly improving. In the past, some community health centres with only GPs and nurses have developed multiple-member teams with GPs, nurses, and assistants, similar to health follow-

Table 1 The Populations of Each District in Shanghai (2017–2020)

	Districts	2017 (N)				2018 (N)				2019 (N)				2020 (N)			
		Permanent Residents (N)	Key Population (N)	Population >65 Years (N)	GP (N)	Permanent Residents (N)	Key Population (N)	Population> 65 Years (N)	GP(N)	Permanent Residents (N)	Key Population (N)	Population> 65 Years (N)	GP(N)	Permanent Residents (N)	Key Population (N)	Population> 65 Years (N)	GP(N)
Urban	Huangpu	578,750	/	/	/	653,363	306,043	196,390	/	643,203	312,555	205,291	216	644,736	304,495	233,427	300
	Xuhui	1,082,844	/	/	/	1,046,693	343,873	204,606	/	1,080,509	365,100	216,856	287	1,097,249	335,193	237,004	532
	Changning	682,708	/	/	/	691,745	237,103	140,844	/	690,363	246,067	147,516	213	666,388	229,713	164,043	305
	Jingan	895,522	/	/	/	830,353	369,930	229,226	/	998,008	386,477	239,981	356	931,196	388,067	272,210	427
	Hongkou	742,142	/	/	/	694,379	282,132	182,846	/	766,621	282,990	184,708	221	773,828	270,661	207,167	316
	Putuo	1,204,434	/	/	/	1,227,245	346,233	199,461	/	1,212,478	366,619	212,940	341	1,212,478	349,121	245,312	383
	Yangpu	1,244,071	/	/	/	1,244,071	415,622	252,566	/	1,295,754	442,094	269,755	370	1,295,754	419,912	306,697	441
	Total for the urban districts	6,430,471	/	/	/	6,387,849	2,300,936	1,405,939	/	6,686,936	2,401,902	1,477,047	2004	6,621,629	2,297,162	1,665,860	2704
Outskirts	Pudong	4,998,280	/	/	/	4,952,726	1,246,223	551,986	/	4,966,292	1,378,329	606,705	1690	5,040,802	1,152,860	628,524	1933
	Jiading	1,446,729	/	/	/	1,377,605	324,597	135,325	/	1,505,928	374,933	148,646	350	1,454,046	276,469	147,324	670
	Minhang	2,330,080	/	/	/	2,469,721	478,871	202,350	/	2,420,674	552,838	226,845	613	2,439,551	416,552	227,258	919
	Baoshan	1,930,603	/	/	/	1,874,838	417,606	189,195	/	1,858,873	467,022	209,192	414	1,883,133	371,598	219,124	574
	Total for the outskirts districts	10,705,692	/	/	/	10,674,890	2,467,297	1,078,856	/	10,751,767	2,773,122	1,191,388	3067	10,817,532	2,217,479	1,222,230	4096
Suburbs	Jinshan	681,234	/	/	/	777,192	233,860	110,714	/	814,699	249,382	117,647	234	804,803	217,693	128,284	321
	Fengxian	1,092,877	/	/	/	1,066,810	245,361	103,390	/	1,023,353	265,958	111,738	276	1,011,271	217,662	119,057	423
	Songjiang	1,387,684	/	/	/	1,401,454	322,843	119,945	/	1,416,691	371,615	137,054	352	1,504,948	268,559	128,045	529
	Qingpu	1,131,450	/	/	/	1,036,161	229,573	91,450	/	1,075,740	253,596	102,626	287	1,071,012	198,736	104,429	399
	Chongming	694,917	/	/	/	696,836	272,586	152,769	/	630,172	274,769	155,963	218	635,894	271,261	177,086	310
	Total for the suburban districts	4,988,162	/	/	/	4,978,453	1,304,223	578,268	/	4,960,655	1,415,320	625,028	1367	5,027,928	1,173,911	656,901	1982
	Total	22,124,325	/	/	/	22,041,192	6,072,456	3,063,063	/	22,399,358	6,590,344	3,293,463	8128	22,467,089	5,688,552	3,544,991	8782

Note: /Indicates that these data could not be obtained from the data platform.

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Table 2 The Proportions of Different Populations Who Signed a Contract in Each District in Shanghai (2017–2020)

	Districts	Signing Proportion Among Permanent Residents (%)					Signing Proportion Among the Key Population (%)					Signing Proportion Among People > 65 Years (%)				
		2017	2018	2019	2020	Average	2017	2018	2019	2020	Average	2017	2018	2019	2020	Average
Urban	Huangpu	17.01	30.11	32.98	32.34	28.11	/	35.66	38.05	43.61	39.11	/	40.22	43.53	46.17	44.85
	Xuhui	20.95	30.82	34.19	34.3	30.07	/	56.53	54.79	68.08	59.80	/	66.72	64.88	72.49	68.69
	Changning	7.53	27.10	41.17	46.63	30.61	/	28.44	41.77	70.33	46.85	/	34.10	51.94	72.26	62.10
	Jingan	26.22	41.62	34.77	37.85	35.12	/	54.67	54.95	58.55	56.06	/	53.18	56.45	59.95	58.20
	Hongkou	24.30	36.76	33.56	33.14	31.94	/	54.57	55.03	61.93	57.18	/	57.72	58.85	63.93	61.39
	Putuo	20.16	33.50	37.55	36.69	31.98	/	57.87	61.74	72.21	63.94	/	67.19	70.12	75.25	72.69
	Yangpu	24.23	27.63	30.77	31.58	28.55	/	49.23	47.00	58.34	51.52	/	58.46	55.54	62.66	59.10
	Average for the urban districts	20.06	32.51	35.00	36.08	30.91		48.14	50.48	61.86	53.49		53.94	57.33	64.67	61.00
Outskirts	Pudong	7.41	32.48	36.11	37.30	28.33	/	59.15	63.28	85.76	69.40	/	80.15	81.86	98.86	90.36
	Jiading	14.40	23.18	31.39	33.48	25.61	/	56.09	52.92	85.97	64.99	/	85.33	83.08	100.00	91.54
	Minhang	11.69	30.65	33.29	34.03	27.42	/	53.80	63.05	91.88	69.58	/	79.13	88.92	100.00	94.46
	Baoshan	16.42	32.36	33.64	40.14	30.64	/	69.49	69.12	102.42	80.34	/	93.64	92.37	100.00	96.19
	Average for the outskirts districts	12.48	29.67	33.61	36.24	28.00		59.63	62.09	91.51	71.08		84.56	86.56	99.72	93.14
Suburbs	Jinshan	30.61	31.88	34.31	41.49	34.57	/	60.41	58.23	82.47	67.04	/	78.66	76.10	92.59	84.35
	Fengxian	17.59	29.01	31.17	33.11	27.72	/	57.56	58.06	80.32	65.31	/	85.18	86.05	100.00	93.03
	Songjiang	15.02	23.23	31.27	31.18	25.18	/	50.05	47.83	81.64	59.84	/	78.08	75.40	100.00	87.70
	Qingpu	10.01	17.57	22.46	31.78	20.46	/	41.57	43.21	83.41	56.06	/	71.85	72.62	100.00	86.31
	Chongming	29.26	35.04	40.25	42.98	36.88	/	65.46	64.97	77.44	69.29	/	80.97	81.51	88.35	84.93
	Average for the suburban districts	17.97	26.21	31.29	34.76	27.56		53.66	53.52	80.70	62.63		79.02	78.90	97.09	87.99
	Total	15.50	30.23	33.74	37.98	29.36	/	54.63	56.62	76.53	62.59	/	69.41	71.53	84.67	78.10

Note: /Indicates that these data could not be obtained from the data platform.

ups in Britain, collaborating with ophthalmologists, paediatricians, gynaecologists, pharmacists, and traditional medicine doctors. However, in certain community health centres, the family team does not include gynaecology or paediatrics, and some of them are unable to diagnose with chest radiographs or electrocardiograms. Therefore, the comprehensive diagnosis and treatment ability of these centres varies. There is still a need for improvement in terms of family doctors' contracts with service providers and service content.

In Shanghai, we witnessed innovative solutions for promoting and supervising the schemes of signings with family doctors; however, as shown in the results, although the proportion of the elderly population that has signed contracts is relatively high, the proportions of the population of permanent residents who have signed contracts, the proportion of consultations at contracted community health centres and the proportion of consultations at multiple medical institutions in Shanghai are far lower than those in developed

Table 3 The Proportions of Residents Seeking Medical Advice from Multiple Institutions and in the Contracted Community Health Centres of Each District in Shanghai (2017–2020)

	Districts	Seeking Medical Advice from Multiple Institutions (%)					Seeking Medical Advice from the Contracted Community Health Centres (%)				
		2017	2018	2019	2020	Average	2017	2018	2019	2020	Average
Urban	Huangpu	17.01	30.11	32.98	32.34	28.11	/	35.66	38.05	43.61	39.11
	Xuhui	20.95	30.82	34.19	34.30	30.07	/	56.53	54.79	68.08	59.80
	Changning	7.53	27.10	41.17	46.63	30.61	/	28.44	41.77	70.33	46.85
	Jingan	26.22	41.62	34.77	37.85	35.12	/	54.67	54.95	58.55	56.06
	Hongkou	24.30	36.76	33.56	33.14	31.94	/	54.57	55.03	61.93	57.18
	Putuo	20.16	33.50	37.55	36.69	31.98	/	57.87	61.74	72.21	63.94
	Yangpu	24.23	27.63	30.77	31.58	28.55	/	49.23	47.00	58.34	51.52
	Average for the urban districts	20.06	32.51	35.00	36.08	30.91		48.14	50.48	61.86	53.49
Outskirts	Pudong	7.41	32.48	36.11	37.30	28.33	/	59.15	63.28	85.76	69.40
	Jiading	14.40	23.18	31.39	33.48	25.61	/	56.09	52.92	85.97	64.99
	Minhang	11.69	30.65	33.29	34.03	27.42	/	53.80	63.05	91.88	69.58
	Baoshan	16.42	32.36	33.64	40.14	30.64	/	69.49	69.12	102.42	80.34
	Average for the outskirts districts	12.48	29.67	33.61	36.24	28.00		59.63	62.09	91.51	71.08
Suburbs	Jinshan	30.61	31.88	34.31	41.49	34.57	/	60.41	58.23	82.47	67.04
	Fengxian	17.59	29.01	31.17	33.11	27.72	/	57.56	58.06	80.32	65.31
	Songjiang	15.02	23.23	31.27	31.18	25.18	/	50.05	47.83	81.64	59.84
	Qingpu	10.01	17.57	22.46	31.78	20.46	/	41.57	43.21	83.41	56.06
	Chongming	29.26	35.04	40.25	42.98	36.88	/	65.46	64.97	77.44	69.29
	Average for the suburban districts	20.50	27.35	31.89	36.11	28.96		55.01	54.46	81.06	63.51
	Total	15.50	30.23	33.74	37.98	29.36	/	54.63	56.62	76.53	62.59

Note: /Indicates that these data could not be obtained from the data platform.

countries. For instance, in the UK, 90% of patients receive their initial diagnoses in the GP clinic, and 80% of chronic diseases are solved in community health centres.[21] The possible reasons for this result is that, specifically, the program of signing with family doctors in Shanghai and other regions in China is voluntary for residents; in other words, there is no compulsory restriction by laws or medical insurance policies. However, in foreign countries, there are laws, medical insurance policies and other mandatory elements. For example, in Britain, all of the citizens over the age of 16 and foreigners who are on visas longer than six months must register with a GP so that residents can only go to a specialist hospital with the consent of their GP; otherwise, surgery and treatment costs will not be reimbursed,[22] but acute patients can be directly sent to the hospital.[23] Additionally, although the proportion of reimbursed consultations has increased in community health centres, there has been no particularly strong effect on medical care conduct.[24] Similar to the UK, residents cannot go to specialized hospitals without permission. After specialist treatment, subsequent rehabilitation remains the responsibility of the GP; otherwise, it will not be reimbursed. Surgery and treatment costs can be reimbursed only if up-transfer requires surgery and is consented to by the GP.

Interestingly, in this study, we found that the utilization of schemes of signings with family doctors is higher in outskirts than in urban areas or the suburbs. Possible reasons for this effect is that the existing organization of medical resources is adequate in urban areas, and residents have been accustomed to seeing a doctor in secondary and tertiary hospitals, which leads to the proportions of the key population and seniors aged 65 years and above who have signed contracts being lower in urban areas.[25,26] This result indicated that, for those regions with abundant medical service from large hospitals, there should be more incentive measures for promoting the programs.

Limitations

First, the schemes of signings with family doctors have not been conducted for a long period of time, and its

effectiveness evaluation (including quality indicators such as satisfaction, disease incidence and health costs in the region) should be further measured and included in the analysis. Second, the study was conducted only in Shanghai, and data from other regions were difficult to collect. Further comparisons between different regions of China are required in the future.

Conclusion

The practice of facilitate signing with family doctors in Shanghai has accumulated considerable evidence. However, the evaluation showed that the number of family doctors was relatively low, as well as the fact that the team still requires more experienced gynaecology and paediatric professionals, compared with those in Western countries. In Shanghai, the innovative solutions for promoting and supervising the schemes of signings with family doctors can provide experiences for other regions or countries. However, the relatively low proportion of the permanent resident population who signed a contract, the proportion of individuals seeking medical services in community health centres, the proportion of individuals seeking medical services from multiple medical institutions and the proportions of individuals who signed contracts based on various indicators in urban areas suggest that the contract system for family doctors should be further improved in these aspects.

Abbreviations

GPs, general practitioners.

Ethical Approval and Consent

Ethical consideration was approved by the Ethics Committee of Fudan University (IRB00002408&FWA00002399). Participants gave informed consent prior to data collection. This study was conducted in accordance with the Declaration of Helsinki, the Belmont Report, CIOMS Guideline, and International Conference on Harmonization in Good Clinical Practice (ICH-GCP).

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Disclosure

The authors report no conflicts of interest in this work.

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