

Association Between Service Agreements and Frequency of Primary Care Visits in a Chinese Community Health Service Center

Jing Ding, BM, MS, Wen-Jan Tuan, DHA, MS, MPH, Xueping Du, BM, and Kenneth Kushner, PhD, MS

Background: To increase the utilization of Community Health Service (CHS) centers for primary care, the Central Government of China has promoted the use of contracts—known as “service agreements” (SAs)—between patients and primary care physicians. This study sought to identify factors that predict who signed SAs and the association between SAs and frequency of primary care visits in a CHS center in Beijing.

Methods: Four years of electronic health record (EHR) data (2015 to 2018) were analyzed. Multivariate logistic regression analysis was performed to examine the tendency of patients to establish a SA. The pattern of the primary care visits between the SA and the non-SA groups was compared using Gamma regression models, controlling for demographic and comorbidity conditions. Contrast analysis was performed to assess the odds ratios of signing SAs among levels of a specific patient characteristic.

Results: Data from 32,682 adult CHS patients were collected. Of those, 66.4% had signed a SA. Patients who were female, older, more educated, married, employed, insured, or had comorbid conditions were more likely to sign SAs. Overall, having a SA was associated with a higher frequency of primary care visits for women and older patients, but not for the young and educated patients.

Conclusions: The evidence provides an important consideration for reducing gaps in the use of primary care services during the nationwide transition from the fee-for-service specialty care system to the patient-centered primary care-driven medical home model. (J Am Board Fam Med 2021;34:1045–1054.)

Keywords: China, Community Health Services, Continuity of Patient Care, Logistic Models, Patient-Centered Care, Primary Care Physicians, Primary Care Visit, Primary Health Care, Service Agreement

Introduction

The Community Health Services (CHS) were created between 1999¹ and 2006² by the Central Government of the Peoples’ Republic of China. CHS centers, which combine primary care medical services with community and public health activities,

were established to decrease the reliance of the populace on tertiary and secondary hospitals for routine medical and preventive care.³ Subsequent government initiatives have attempted to strengthen the role of the CHS and of the general practitioners (GPs), who provide the major part of primary care services in these community clinics.^{4–7}

Despite the emphasis and resources that the government has put into the CHS, there is evidence that the service is underutilized. Even though services rendered in the community-based clinics are less expensive and more convenient for the patient than those provided in the hospitals,^{8,9} many patients still opt to go to the latter.¹⁰ Because hospital-based clinics tend to be episodic (by patient choice), continuity of care suffers.¹¹

This article was externally peer reviewed.

Submitted 1 December 2020; revised 21 April 2021; accepted 29 April 2021.

From the Yuetan Community Health Service Center of Fu Xing Hospital, Capital Medical University, Beijing, China (JD); Department of Family and Community Health, Penn State College of Medicine (WT); Yuetan Community Health Service Center of Fu Xing Hospital, Capital Medical University, Beijing, China (XD); Department of Family Medicine and Community Health, University of Wisconsin School of Medicine and Public Health, Madison, WI (KK).

Funding: This project was partially funded through a Visiting Scholar Award from the University of Wisconsin-Madison Global Health Institute (P-1-00105).

Conflict of interest: None.

Corresponding author: Jing Ding, BM, MS, Building #7, Zhen Wu Temple Liuli, Xicheng District Beijing People’s

Republic of China, 100045, Phone: +86 10 18618238619 (E-mail: xiaoxiaodingj@ccmu.edu.cn).

To attract more patients to the CHS centers, to foster better continuity of care once they are there, and to allocate health care resources equitably, the Chinese government has instituted a policy of “service agreements” (SA) between patients and general practitioners (GPs)—including their health care teams—working in the community health centers.⁷ In essence, the SA promotes the concept of the primary care physician (PCP)/patient relationship for patients within the CHS. The feasibility of the SA was piloted in 2011 in Beijing,¹² and by 2016, SAs were being utilized in 200 cities and regions. In 2017, the coverage rate of SAs was over 30%, and in key population areas were over 60%. The government’s goal was to expand SAs to the entire population of the country by 2020.^{13,14}

The government has established incentive policies to encourage adopting the community-based primary care delivery model by establishing SAs between GPs and patients. Financial incentives can be offered to GPs and care teams based on the number of their patients with SAs. The contribution of funding often comes from the government, insurance companies, and fees from patients. Typically, 70% of the incentive amount is awarded to GPs and care team members, while 30% is given to other supporting staff at the clinic. Yet, the availability and allocation of the incentive differ by city or region due to local government regulations and budget constraints.¹⁵ Whether patients signing SAs require to pay a monthly or an annual fee also depends on local health policy and budget. Large cities (eg, Beijing and Shanghai) often waive SA annual fees for patients. In general, patients with SAs have access to expedited appointment scheduling, follow-up consultations, health alerts, and health education materials from their care teams via telephone calls, text messaging, or patient portals.¹⁶ Patients signing SAs also receive an annual physical assessment at no cost. The government provides financial incentives to GPs and their care team.

Although the signing rate of SAs in China has been increasing, there still lie wide gaps in signing coverage across different regions. Reported signing rates include 46% for the Desheng District of Beijing,¹⁷ 30.2% for patients of 5 CHS centers in Shanghai,¹⁸ 70.1% of CHS patients in the Pudong District of Shanghai,¹⁹ 42.3% of patients of 40 CHS centers in Shenzhen,²⁰ 56.7% of urban older patients in Zhejiang,²¹ 32.3% of residents from 1 district in Shanghai,⁴ 46.9% of residents in 5

communities in Hubei,⁷ and 58% of CHS patients in Chongqing.²² The fact that these studies were undertaken at different points in time makes it difficult to determine how much the variations among them reflect regional differences versus the times the data were collected. Two studies suggest rapid increases in signing rates. Jing et al¹⁹ found that the signing percentages had increased from 59.2% in 2011 to 80.8% in 2012. Similarly, Huang et al⁴ reported 21.5% in 2013 and 32.53% in 2016. Different methodologies, whether community-dwelling residents versus CHS center patients were sampled, also make these comparisons difficult. A number of the studies cited above identified patient factors associated with the likelihood of signing SAs. These include age,^{4,18} gender,¹⁹ health status,^{4,18,20} educational level,^{4,7,19} marital status,^{4,7} insurance status,⁷ awareness of governmental policies regarding general practitioners,⁷ and satisfaction with general practitioners.⁷

Central to the concept of the SA is that patients who sign them should be more likely to receive primary care by their PCP or the PCP’s health care team. A study of patients in CHS waiting rooms in Guangdong found that approximately 9% reported that they use a family physician for usual care. However, it is unclear from their report what percentage of those patients had signed service agreements.¹⁶ Zheng et al,¹⁴ using retrospective patient surveys, found higher utilization of CHS services among CHS patients who signed SAs than those who had not contracted with a PCP. However, to date, no study using objective, rather than survey, methodology has examined whether patients who sign SAs are in fact more likely to seek primary care from their PCP or the PCP’s health care team.

This study was undertaken to gain insight into characteristics frequently associated with patients in a large CHS system in Beijing who signed a SA and to determine whether or not signing a SA influences the likelihood of their having primary care visits in their PCP’s office as determined by objective measures.

Methods

Study Design and Setting

This retrospective study examined primary care practices at 10 community health clinics in a large academic health care center from January 2015 to December 2018, which serves more than 38,000

patients in Beijing, China. Providers consisted of GPs serving as a PCP in the study period. To be included in the analysis, patients must be adults (≥ 18 years) and had 2 or more visits with clinicians at their PCP's clinic in the study period. This structure allowed the study population to reflect actively managed patients. Patients who died or lived outside of Beijing municipality were excluded from the analysis. Encounter and patient data for the study was extracted from an enterprise electronic health record (EHR) database. This study was determined to be exempt by the health system's Institutional Review Boards.

Population Characteristics

Demographic data included patient sex, age, marital status, educational attainment, employment status, insurance status, and overall health complexity. Binary variables were constructed for patients' marital status, employment status, and insurance status to indicate whether patients are married, employed, and insured. The analysis also collected patients' chronic conditions based on the Elixhauser comorbidity measure. The number of comorbidities of each patient served as an indicator reflecting the individual's overall health status.²³

Service Agreement and Primary Care Visit

Outcomes of interest included a binary indicator representing whether a patient had signed a SA with their PCP. Essentially, the purpose and benefit of PCP-patient affiliation were presented and explained to patients during their visits to community health clinics (see Appendix). A SA between a patient and a doctor was signed after the patient selected a doctor as their PCP. The patient's participation in the SA was voluntary in China and could be terminated by patients at any time. Primary care visits were defined as in-person care activities rendered by PCPs and measured by the aggregated visits for each patient during the study period. Clinical encounters with specialists (eg, traditional Chinese medicine, public health, rehabilitation, and mental health) in the community health services center were excluded.

Statistical Analysis

Descriptive statistics were computed to compare between the groups with and without a SA using χ^2 tests for categorical variables and *t*-test (normally distributed) or Mann-Whitney U/Wilcoxon test for

continuous variables. Multivariate logistic regression analysis was further performed to examine the tendency of patients to establish a SA with their PCP.

Analysis for primary care visits by SA group was compared using Gamma-distributed generalized linear log-linked multivariable regression models, controlling for demographic characteristics and comorbidity conditions. Using a Gamma-distributed generalized linear model with a log-transformed link function has been shown to be a good method to estimate health care utilization distributions that are generally right-skewed, especially when the log-transformed-dependent variables do not have heavy tails or excessive heteroscedasticity.²⁴ Variables were removed from the final models if they had little to no predictive/confounding effect and no influence on model fit (Akaike information criteria) or primary estimate. Contrast analysis also was performed to calculate odds ratios (OR) and 95% confidence intervals (CI) of the primary care rate to compare the likelihood of signing service agreements among levels of a specific characteristic. All statistical analyses were performed using SAS version 9.3 software (SAS Institute Inc., Cary, NC).

Results

A total of 32,682 adult patients met the study's inclusion criteria between 2015 and 2018, including 1,041,342 primary care visits to 45 GPs at the community health service center. The top 33.5% of patients with the most visits accounted for more than 70% of the total visits. Of those patients in the study, 66.4% ($n = 21,699$) had signed a SA with their PCP. Table 1 shows the results of the univariate analysis that compared individuals with SAs to individuals without service agreements (non-SA). The percentage of female patients (60.4%) in the SA group was slightly higher than the percentage of female patients (59.7%) in the non-SA group; however, the difference between the 2 groups was not statistically significant. The average age of the SA patients was 63.4 years, compared with 60.1 years for non-SA patients. The percentage of the age group also differed between SA patients and non-SA patients.

The education distribution of the patient varied between the SA and the non-SA groups. Patients with a bachelor's degree made up 38% of the study population in the non-SA group, compared with

Table 1. Characteristics of the Patient Population (n = 32,682)

Characteristics*	Patients with Service Agreement (N = 21,699)	Patients without Service Agreement (N = 10,983)	P Value
	n (%)	n (%)	
Female	13,097 (60.4)	6,553 (59.7)	.23
Age group			<.01 ^f
18 to 39 years	1,109 (5.1)	1,172 (10.7)	
40 to 59 years	7,386 (34.0)	4,343 (39.5)	
60 to 79 years	10,261 (47.3)	3,988 (36.3)	
80 years and older	2,943 (13.6)	1,480 (13.5)	
Education level			<.01 ^f
< High school	5,295 (24.4)	2,451 (22.3)	
High school and some college	9,038 (41.7)	4,354 (39.6)	
Bachelor's degree and higher	7,366 (33.9)	4,178 (38.0)	
Married	19,382 (89.3)	9,665 (88.0)	<.01 ^f
Employed	10,427 (48.1)	5,146 (46.9)	.04 [‡]
Insured	18,725 (86.3)	8,391 (76.4)	<.01 ^f
Comorbidity, mean ± SE	2.6 ± 1.7	1.4 ± 1.5	<.01 ^f
Primary care visits, mean ± SE	10 ± 8.2	4.2 ± 5.0	<.01 ^f

SE, standard error.

*Values are number of subjects (weighted proportion) for categorical variables or weighted means (SE) for continuous variables.

[†]P values were calculated from χ^2 analysis or *t*-test (normally distributed) or Mann-Whitney U/Wilcoxon test (abnormally distributed) for continuous variables.

[‡]P < .05; ^fP < .01.

33.9% in the SA group. Most SA patients completed some college, or high school or less. A greater percentage of the SA patients were married (89.3%), employed (48.1%), and insured (86.3%). Patients in the SA group also had more chronic conditions (mean, 2.6) and primary care visits per year (mean, 10.0) than their counterparts (mean, 1.4 for chronic conditions and 4.2 for primary care visits).

Characteristics Associated with Service Agreement Participation

Table 2 summarizes the results of the logistic regression analysis on characteristics affecting the likelihood of patients to sign PCP SAs. The likelihood of having SA was 14.7% higher for female patients than for their male counterparts (OR, 1.147; *P* < .01). Older patients were more likely to sign SA than younger patients. Essentially, compared with patients aged 18 to 39 years, individuals aged 40 to 59 years were 1.2 times as likely to establish SA with their PCP. Patients older than 60 years old were about 1.8 to 2.1 times as likely as patients aged 18 to 39 years to have SA.

Level of education varied the likelihood of patients signing SA. Individuals who completed

high school or some college had 17.6% more likely to have SA than patients who did not complete high school (OR, 1.176; *P* < .01). The likelihood of signing a SA was 1.2 times as high for individuals with a bachelor's degree than for people without graduating from high school (OR, 1.216; *P* < .01). Married patients were 9% more likely to have SA than unmarried patients. Individuals who were employed were approximately 1.6 times as likely to establish SA than the unemployed. The likelihood of having SA for insured patients was almost 2-fold greater than the uninsured. The number of comorbidity conditions also showed a strong impact on the tendency of having SA. The likelihood of signing SA increased approximately 56.1% as the number of the patient's comorbidity conditions increased by 1 unit (OR, 1.561; *P* < .01).

Primary Care Visits

The results of the Gamma regression model for the demographic and comorbidity effects on primary care visits are provided in Table 3. The overall goodness of fit showed that the Gamma model fit well with both the deviance and Pearson goodness-of-fit statistics under a value of 1 (deviance, 0.57; Pearson $\chi^2=0.60$). The individual's

Table 2. Multivariate Logistic Regression for Prediction of Patients Signing Service Agreements

Characteristics	Estimate	SE	OR*	95% CI
Female	0.137	0.026	1.147 [‡]	(1.090, 1.207)
Age group (Reference: 18 to 39 years)				
40 to 59 years	0.197	0.060	1.218 [‡]	(1.082, 1.370)
60 to 79 years	0.720	0.061	2.055 [‡]	(1.822, 2.318)
80 years and older	0.615	0.066	1.849 [‡]	(1.624, 2.107)
Education (Reference: No High school)				
High school and some college	0.162	0.034	1.176 [‡]	(1.099, 1.257)
Bachelor's degree and higher	0.195	0.036	1.216 [‡]	(1.133, 1.304)
Married	0.087	0.041	1.091 [†]	(1.006, 1.183)
Employed	0.464	0.029	1.590 [‡]	(1.502, 1.683)
Insured	0.605	0.033	1.832 ^{**}	(1.717, 1.954)
Comorbidity	0.445	0.009	1.561 ^{**}	(1.534, 1.589)

SE, standard error; OR, odds ratio; CI, confidence interval.

**P* values were estimated from the logistic regression analysis.

[†]*P* < .05; [‡]*P* < .01.

Table 3. Effect of Gamma Regression on Primary Care Visits

Characteristics	DF	Chi square statistic*
Service agreement (SA)	1	87.3 [‡]
Female	1	4.7
Female × SA	1	4.3 [†]
Age group	3	104.3 [‡]
Age group × SA	3	64.1 [‡]
Education	2	34.5 [‡]
Employed	1	30.2 [‡]
Insured	1	1128.9 [‡]
Comorbidity	1	13690.4 [‡]

DF, degree of freedom; SA, service agreement.

*Gamma regression model was used to calculate the *P* values.

[†]*P* < .05; [‡]*P* < .01.

sex, age, education attainment, insured status, and comorbidity condition showed strong effects on the utilization of the primary care visit at the community health center. The patient's marital status was removed from the final model because of a lack of an evident impact on primary care visits.

Essentially, the result of the contrast analysis in Table 4 showed that patients with a bachelor's or graduate degree were 6% less likely to visit primary care clinicians than individuals without graduating from high school. Patients who completed high school or some college were also less likely to have primary care visits than those

without a high school diploma. However, their differences were not statistically significant. Individuals who were employed were 5.0% less likely than the unemployed to visit their primary care clinicians. Patients with insurance were 1.5 times as likely to have primary care visits than their uninsured counterparts. The likelihood of visiting primary care clinicians increased approximately 1.4 times the number of patients' comorbidity conditions increased by 1 unit.

Multiple 2-way interactions were also found to be statistically significant between SA and sex and between SA and age groups. The contrast analysis showed that differences in the likelihood of having primary care visits between the SA and the non-SA groups varied by sex. In essence, the likelihood of having primary care visits for female patients in the SA group was 42% higher than female patients in the non-SA group. However, male patients were only 37% more likely to have primary care visits in the SA group than the non-SA group. Analysis by age group also showed that patients who signed SA were more likely to visit primary care clinics than their counterparts without SA, though the effect size varied by age group. For those aged 60 to 79 years, the likelihood of visiting primary care clinicians was 1.7 times as high in the SA group than those in the non-SA group. For individuals in the rest of the age groups, the odds of having primary care visits were 1.55 to 1.60 times as high for the SA patients than for the non-SA patients.

Table 4. Effects of the Service Agreement and Patient Characteristics on Primary Care Visits

Characteristics	Contrast	Estimate	SE	OR	95% CI
Sex					
Female	SA vs non-SA	0.349	0.045	1.417 [†]	(1.332, 1.508)
Male	SA vs non-SA	0.312	0.046	1.367 [†]	(1.280, 1.459)
Age group					
40 to 59 years	SA vs non-SA	0.436	0.028	1.547 [†]	(1.493, 1.602)
60 to 79 years	SA vs non-SA	0.550	0.030	1.734 [†]	(1.676, 1.794)
80 years and older	SA vs non-SA	0.467	0.041	1.595 [†]	(1.517, 1.677)
Education					
High school and some college	vs no-HS	-0.016	0.011	0.984	(0.963, 1.010)
Bachelor's degree and higher	vs no-HS	-0.061	0.011	0.941 [†]	(0.920, 0.960)
Employed	vs Unemployed	-0.050	0.009	0.951 [†]	(0.935, 0.970)
Insured	vs Uninsured	0.399	0.017	1.491 [†]	(1.458, 1.524)
Comorbidity		0.347	0.004	1.415 [†]	(1.407, 1.423)

CI, confidence interval; HS, high school; OR, odds ratio; SA, service agreement; SE, standard error.

**P* values were from multiple 2-way interactions between SA and sex, and between SA and age group.

[†]*P* < .01.

Discussion

The study identified several patient characteristics that influenced the signing of SAs: sex, age, medical comorbidity, educational level, marital status, employment status, and insurance status. Consistent with findings by Qian and Dai,¹⁸ we found that women were more likely to sign SAs than men. This finding may be explained by women having higher needs for regular physical examinations, more awareness, and interest in their health, or greater investment in the relational aspects of physician/patient interactions. Higher signing rates for older patients^{4,18} patients and those with chronic illness^{18,23} have also been reported in previous studies. They may reflect a greater sense of physical vulnerability resulting in stronger inclinations to pay attention to their own health and to seek health-related information. Our finding that patients with higher educational levels were more inclined to sign agreements than those with less educational attainment is at odds with previous research^{4,19} and may indicate regional differences.

Our findings are consistent with a previous study in Hubei Province that married patients are more likely to sign SAs⁷ and in contrast to another study that found single people to be more likely to sign.⁴ These, too, may indicate regional differences. Haung et al⁴ found that retired patients were more likely to sign SAs than employed. Conversely, in our study, employed patients were more likely to

sign SAs. This discrepancy may be that the CHS of the study is surrounded by companies, schools, factories, and shopping malls, making it convenient for their employees to receive medical care at the center.

In addition to the frequency of signing SAs, we also analyzed how signing such an agreement might relate to patients' utilization of primary care services at the community health center. Overall, we found that patients who signed SAs were more likely to have primary care visits than those without SAs. Contrast analyses revealed further complexities in the relationship between SAs and primary care visits. Women who signed SAs had more frequent primary care visits than women without SAs, suggesting that signing a SA may reflect stronger commitment to ongoing primary health care. Age also interacted with SA status. Signing a SA predicted greater primary care utilization for all but the youngest age group (18 to 39 years). This finding might result from the relative health or lack of a sense of vulnerability of that youngest cohort.

Contrast analyses also found relationships between other patient factors and the frequency of primary care visits. Those at the lowest educational level (no high school diploma) were more likely to have primary care visits than at the highest level (university degree). This may reflect a predilection of those with more education to prefer specialty care over primary care. (It may also indicate that older people in China had fewer educational

opportunities than younger cohorts. And, as we have seen, older community residents were more likely to use primary care services).

Further, those with the most education likely have greater financial resources to afford specialty, as opposed to primary care. Perhaps unsurprisingly, insured patients were more likely to use primary care services. Presumably, reducing out-of-pocket costs resulting from having basic medical insurance made seeking primary care services less of a financial burden. Greater medical comorbidity was also related to higher primary care utilization. This conclusion also may reflect greater health concern and motivation for health care among patients with comorbidities.

An implication of the results relating SA status to primary care utilization indicates that additional patient information campaigns directed at patients who have already signed SAs may help boost their primary care utilization. Further, targeting patients who are male, younger, more highly educated, employed, and without comorbidity for such campaigns may be especially productive in boosting primary care utilization. This study is the first to investigate the relationship between patients signing SAs and the frequency of their visits with their primary care teams using objective EHR measures in contrast to subjective patient surveys. Our finding of interactions on clinic behavior between patient signing status and patient characteristics indicates that such contrast analysis should be included in future research in this area.

Study Limitations

This study has several limitations. First, all the data were collected at 1 CHS system in 1 major metropolitan area. Generalization of our results to other urban areas and, especially, to rural areas must be made cautiously. A second limitation is that we could not directly analyze continuity of care with a patient's PCP for those who have signed SAs (by definition, those who had not signed SAs would not have a designated PCP). Implicit in the concept of the SA is that the patient agrees to see their PCP when possible. While we did not have access to what primary care clinician a patient saw at a given encounter, we used the frequency of primary care visits at the center as a proxy for continuity with the PCP or their health care team. Thus, it is unclear whether patients were choosing to see their PCPs when possible. The relationship between SA status

and continuity with the PCP is an important area for future research. A third limitation of this study is that, because of the retrospective design of this study, we cannot determine from our data whether the act of signing a SA influences whether a patient is more likely to use primary care services. Instead, it is possible that our results showing greater primary care utilization for women and older patients who signed SAs reflects their greater concern about their health and investment in the principles of primary care. Such concern and investment may have prompted them to sign SAs, but there is no way of telling whether signing the SA changed their behavior. This, too, is an area for future research.

Conclusions

This study applied EHR data to examine factors affecting patients' intention to adopt SAs and use primary care services at the community health center in China. In general, female, older, married, employed, insured, and sicker patients were more likely to establish service agreements with their PCP. Individuals with SA were also more likely to use primary care services. The evidence provides an important consideration for reducing gaps in the use of primary care services in the midst of the nationwide transition from the fee-for-service specialty care system to the patient-centered primary care-driven medical home model.

To see this article online, please go to: <http://jabfm.org/content/34/5/1045.full>.

References

1. Bao Y, Gao X, Xu JC, et al. Trend and development of community health service research. *Chin Health Serv Manag* 2002;163:4-9.
2. State Council of the Peoples' Republic of China. Guiding Opinions of the State Council on the Development of Urban Community Health Services. Document. Available at: http://www.gov.cn/zhengce/content/2008-03/28/content_6229.htm. Published February 21, 2006. Accessed November 9, 2020.
3. Wang J, Kushner K, Frey JJ, Du XP, Qian N. Primary care reform in the Peoples' Republic of China: implications for training family physicians for the world's largest country. *Fam Med* 2007;39:639-43.
4. Huang JL, Liu SS, He RR, et al. Factors associated with residents' contract behavior with family doctors in community health service centers: a longitudinal survey from China. *PLoS ONE* 2018;13:e0208200-e0208216.

5. Shang X, Huang Y, Li B, et al. Residents' awareness of family doctor contract services, status of contract with a family doctor, and contract service needs in Zhejiang province, China: a cross-sectional study. *IJERPH* 2019;16:3312–4.
6. Liu GG, Vortherms SA, Hong X. China's health reform update. *Annu Rev Public Health* 2017;38:431–48.
7. Zhang XY, Zhang XN, Yang SY, Wang YX. Factors influencing residents' decision to sign with family doctors under the new health care reform in China. *Int J Health Plann Manag* 2019;34:e1800–e1809.
8. Tang C, Luo Z, Fang P, Zhang F. Do patients choose community health services (CHS) for first treatment in China? Results from a community health survey in urban areas. *J Community Health* 2013;38:864–72.
9. Luo ZN, Bai X, Min R, Tang CM, Fang PQ. Factors influencing the work passion of Chinese community health service workers: an investigation in five provinces. *BMC Fam Pract* 2014;15:77–85. doi:10.1186/1471-2296-15-77.
10. Wu D, Lam TP. Underuse of Primary Care in China: The Scale, Causes, and Solutions. *J Am Board Fam Med* 2016;29:240–7.
11. Liu CJ, Wu YQ, Chi XY. Relationship preferences and experience of primary care patients in continuity of care: a case study in Beijing, China. *BMC Health Serv Res* 2017;17:585–95.
12. Beijing Municipal Health Bureau. Work program of family doctor service in community health in Beijing. Document. Available at: <http://www.chab.org.cn/NewsDetail.asp?id=5858>. Published March 23, 2011. Accessed November 19, 2020.
13. State Council Healthcare Reform Office. Opinions on promoting contracted family doctor services. Document. Available at: <http://www.nhc.gov.cn/tigs/s3577/201606/e3e7d2670a8b4163b1fe8e409c7887af.shtml>. Published June 6, 2016. Accessed November 19, 2020.
14. Zheng JZ, Meng BY, Si YQ, Liu KH, Peng YG, Li H. Analysis on the implementation effect and influencing factors for family doctor contracted service in Shenzhen. *Chin J Hosp Admin* 2019;35:447–51.
15. Li L, Zhong C, Mei J, et al. Effect of family practice contract services on the quality of primary care in Guangzhou, China: a cross-sectional study using PCAT-AE. *BMJ Open* 2018;8:e021317. <https://doi.org/10.1136/bmjopen-2017-021317>.
16. Kuang L, Liang Y, Mei J, et al. Family practice and the quality of primary care: a study of Chinese patients in Guangdong province. *Fam Pract* 2015;32:3, 557–63.
17. Zhang YH, Zhang TH, Wang ZF. Status of signing on family doctor service for residents in Desheng area of Beijing and its influencing factors. *Chin Gen Pract* 2013;16:3715–8.
18. Qian W, Lin LP, Dai JM. Analysis of the relationship between patients' demography and the prevalence of contract with family physician among patients at communities in Shanghai. *Chin Prim Health Care* 2014;28:47–9.
19. Jing LM, Shu ZQ, Sun XM, Chiu JF, Lou JQ, Xie CY. Factors influencing patients' contract choice with general practitioners in Shanghai: A preliminary study. *Asia Pac J Public Health* 2015;27:77S–85S.
20. Yang Y, Zhang JH, Feng JJ, Li XS, Liu ZZ. Status of signing on family physician for residents in Shenzhen and its influencing factors. *Chin J Health Inform Manag* 2017;14:230–5.
21. Zhao YR, Lin JF, Qiu YW, et al. Demand and signing of general practitioner contract service among the urban elderly: a population-based analysis in Zhejiang Province, China. *IJERPH* 2017;14:356–65.
22. Liu WW, Hou Y, Feng J, Wang HZ, Hu B. Implementation status and residents' needs analysis of contracted family doctor services in Chongqing City. *Chin Gen Pract* 2019;22:777–82.
23. Farley JF, Harley CR, Devine JW. A comparison of comorbidity measurements to predict healthcare expenditures. *Am J Manag Care* 2006;12:110–7.
24. Manning WG, Basu A, Mullahy J. Generalized modeling approaches to risk adjustment of skewed outcomes data. *J Health Econ* 2005;24:465–88.

Appendix: Patient-Primary Care Provider Service Agreement of Yuetan Community Health Service Center

Patient Information

Name: _____ Sex: _____ Date of Birth: _____
 Citizen ID #: _____
 Home Phone #: _____ Mobile Phone #: _____
 Home Address: _____
 Emergency Contact: _____ Phone of Emergency Contact: _____

Clinic Information

Yuetan Community Health Service Center in Xicheng District, Beijing, China
 Primary Care Provider (PCP) Name: _____
 PCP Phone Number: _____

Service Agreements

This agreement should be signed based on the principle of equality, voluntariness, honesty, and mutual benefit. The Center and the patient have reached the agreement as following:

Part 1: The Center shall offer the patient the following essential care or services.

No.	Item	Contents
1	Electronic health record	Create new and maintain current electronic health record of the patient, and keep the patient's electronic health records up-to-date.
2	Service agreement form	Provide a service agreement to the patient interested in entering a service agreement with her/his primary care provider.
3	Contact card or list	Provide the contact information of the PCP and the care team to the patient.
4	Clinic appointments	Provide the patient an expected time frame for appointments, and expedite the appointment privilege.
5	Referral	Provide referral services to the patient for treatments required specialized care or hospitalization.
6	Health monitoring and evaluation	Access to basic health counseling services at no cost, including blood pressure check, weight and height measurement, blood sugar check, and traditional Chinese medicine stamina assessment. Provide the physical check-up to the patient once a year, and assess the patient's health status to develop better health management strategies with the patient.
7	Health information service	Provide follow-up reminders, health education materials to the patient through messaging, emails, or online portal.

- Part 2. To optimize the patient's care process and well-being, the patient should:
- (1) Responsible for her/his own health and maintain a healthy lifestyle.
 - (2) Treat clinicians and clinical staff with respect.
 - (3) Ensure her/his personal information accurate and up-to-date. If the patient withholds medical history and other information or does not follow his/her treatment plans, the action may result in poor care quality and outcomes. The patient will bear the burden of her/his action.
 - (4) Adhere to medical advice and be forthcoming with their care teams if s/he has any question or concern.
 - (5) Disclose diagnostic or treatment events rendered at other healthcare facilities to her/his primary care clinicians.
 - (6) Promptly update changes in the home address, phone number, or contact information.
 - (7) Permit her/his primary care clinician to access and review medical and treatment information stored at other healthcare facilities for better care decisions.
- Part 3: The Center is required to ensure the confidentiality and privacy of the patient medical information. The information shall not be released to the third party without the patient's authorization.
- Part 4: The term of the service agreement is one year, effective from the date of signing. The agreement shall automatically renew at the end of each term unless the patient gives a notice of termination prior to the end the relevant term.
- Part 5: This agreement consists of two original copies. The Center and the patient shall hold one copy, respectively. All of which shall be equally valid and enforceable.
- Part 6: This agreement will become effective on the date when the patient signs and the Center affixes its official seal. The Center has the right to explanation in this agreement.

Patient (signature):

Institution (official seal):

Date:

Date: