Bridging the Gaps Between Patients and Primary Care in China: A Nationwide Representative Survey

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ABSTRACT

PURPOSE China introduced a national policy of developing primary care in 2009, establishing 8,669 community health centers (CHCs) by 2014 that employed more than 300,000 staff. These facilities have been underused, however, because of public mistrust of physicians and overreliance on specialist care.

METHODS We selected a stratified random sample of CHCs throughout China based on geographic distribution and urban-suburban ratios between September and December 2015. Two questionnaires, 1 for lead clinicians and 1 for primary care practitioners (PCPs), asked about the demographics of the clinic and its clinical and educational activities. Responses were obtained from 158 lead clinicians in CHCs and 3,580 PCPs (response rates of 84% and 86%, respectively).

RESULTS CHCs employed a median of 8 physicians and 13 nurses, but only one-half of physicians were registered as PCPs, and few nurses had training specifically for primary care. Although virtually all clinics were equipped with stethoscopes (98%) and sphygmomanometers (97%), only 43% had ophthalmoscopes and 64% had facilities for gynecologic examination. Clinical care was selectively skewed toward certain chronic diseases. Physicians saw a median of 12.5 patients per day. Multivariate analysis showed that more patients were seen daily by physicians in CHCs organized by private hospitals and those having pharmacists and nurses.

CONCLUSIONS Our survey confirms China's success in establishing a large, mostly young primary care workforce and providing ongoing professional training. Facilities are basic, however, with few clinics providing the comprehensive primary care required for a wide range of common physical and mental conditions. Use of CHCs by patients remains low.

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INTRODUCTION

The importance of a strong primary care system providing first contact access, an emphasis on prevention, and person-focused comprehensive care with continuity and coordination is widely accepted.[1-5] The World Health Report and World Health Organization (WHO) have highlighted additional key components underlying primary health care, including an emphasis on universal coverage,[6,7] community-oriented perspectives, and governance supported by national health policies. Nonetheless, many countries have yet to develop effective and robust primary care since the Alma Ata Declaration in 1978 calling for increased national and international commitment to primary care.[8] Primary care today is often still characterized by inadequately resourced facilities; lack of appropriate training; inequalities in delivery of care, itself variable in quality; and fragmented care, which may be unsafe and often has little focus on prevention.[6]

In China, these problems have been compounded by a deterioration in physician-patient relationships resulting from economic and health systems reforms.[9] Since the economic reforms in the late 1980s involving fiscal decentralization, commercialization of medical services, and underfunding of the public health care sector, community health workers

have turned to more profitable drugs and high-tech diagnostics.[10,11] Tying physicians' compensation to their revenue-generating ability has led to overprescribing of highly priced and often unnecessary medical tests.[12] In addition to ever-rising health care costs for patients, these factors have built unrealistic patient expectations focused on specialist diagnostic aids and procedures rather than cost-efficient primary care that would better suit the nation's health needs.[13] Patients' perceptions of unfair treatment or financial exploitation have also led to reports of mistrust of and increasing violence toward health care professionals.[10,14]

In 2009, the Chinese government recognized these fundamental problems and committed itself to reestablishing primary health care.[15] By 2014, it had established 8,669 community health centers (CHCs) employing more than 300,000 health professionals; however, the persistent negative image of "barefoot doctors" who had worked in rural regions since the 1950s, patients' criticism of the health care system, and unfavorable publicity by the media[11] have led to a lack of trust even in the newly revamped primary care system. These problems seem particularly severe in cities, where patients have more choices and easier access to hospitals. The CHCs appear underused, primary care practitioners (PCPs) are sometimes poorly trained, and resources are unequally distributed even within primary care. This study aimed to evaluate the current quality of CHCs in China, including their organization and infrastructure, as well as their use by patients and training of their health care professionals in primary care.

METHODS

We conducted a nationwide representative survey using a stratified randomized sample among CHC medical professionals between September and December 2015. A local ethics board (HKU/HAW IRB: UW15-350) and the WHO Regional Office for the Western Pacific (2016.4.CHN.1.HSI) approved the study.

CHC Sample

We divided China into 3 administrative regions: central, eastern, and western. Two provinces were randomly selected from each region; within each region, we selected the capital city and randomly selected 2 district-level cities. In addition, 2 of the 4 municipalities (Beijing, Shanghai, Chongqing, and Tianjin) were also randomly selected and included in the sampling. In total, 20 cities were chosen from the province and municipalities combined, and from each city, 9 CHCs were randomly selected (with an urban-to-suburban ratio of 2:1), giving a total of 180 CHCs. We invited the lead clinicians and all PCPs (including physicians and nurses) with direct patient contact from these selected CHCs to participate in our survey.

We contacted the local chairpersons of the General Practitioner Association of the 6 selected provinces and 2 selected municipalities, who in turn contacted the randomly selected CHCs. Training on how to distribute and complete the survey questionnaire was arranged for the coordinators of each province or municipality before the study to ensure survey quality. Designated individuals were responsible for sending out the questionnaires by mail and delivering them in person, and for collecting them at a later time. We contacted lead clinicians by telephone if no response was obtained within 2 weeks of questionnaire delivery. Collected data were entered and cleaned using EpiData 3.1 (EpiData Association). A data entry team was responsible for data input, and appointed personnel were responsible for auditing and quality control.

Questionnaires

Our survey used 2 questionnaires: 1 for only the lead clinician and 1 for all PCPs. The lead clinician questionnaire (Supplemental Appendix 1, available at http://www.annfammed.org/content/15/3/237/suppl/DC1) covered the CHC's current clinical setup, range of services and manpower, community characteristics, and patient demographics, as well as its continuous professional development (CPD) and secondary care support. This questionnaire also asked the lead clinician to use his or her own records to estimate the median population size of the catchment area and the number of patient contacts in the past year.

The questionnaire for all PCPs asked about their working conditions, participation in CPD, and willingness to provide certain medical tests. Both nurses and physicians were surveyed because they are the core service clinicians at CHCs in China.

Both questionnaires were pilot-tested twice at 3 CHCs and among 25 PCPs, and modified accordingly.

Analyses

We performed descriptive analyses, calculating percentages and frequencies of key parameters. Confidence intervals for the sample proportions were calculated using the adjusted Wald method. Statistical modeling focused on (1) daily number of patients seen by each physician, (2) number of physicians, and (3) number of patients as a proxy measure of the match between human resources (ie, number of physicians working per day) and CHC use (ie, number of patients visiting the center per day). These values were also adjusted for region and population catchment area.

We used multivariate linear regression analysis to identify factors—among various measures of CHC

structure, staff composition, number of services, and on-site testing—independently associated with the number of patients seen daily by each physician. The assumptions of the regression model—normality of residuals, homoscedasticity, and multicollinearity—were checked by scatterplot of residuals vs predicted (fitted) values (quantile-quantile plots), Breusch-Pagan/Cook-Weisberg tests, and a variance inflation factor, respectively. We used the R^2 value to assess the model's goodness of fit. All significance tests were 2-tailed, and those with a P value <.05 were considered statistically significant.

Finally, multivariate logistic regression analysis was conducted to examine factors associated with the characteristics of CHCs having above-median employment of physicians. We analyzed data with Stata software, release 13 (StataCorp LP).

RESULTS

Of the 189 CHCs contacted, 158 provided data on their facility (84% response rate). Figure 1 shows the distribution of CHCs surveyed. Of the 4,146 PCPs invited to participate, 1,734 physicians and 1,846 nurses completed questionnaires, giving a response rate of 86%.

Table 1 shows the general characteristics of the CHCs. The median population size of the catchment area of each CHC was 50,000 people (interquartile range [IQR], 30,000-96,000) with a migrant population of 11,100 (IQR, 5,000-30,000). The median number of patient contacts per year was 41,100 (IQR, 12,000-163,600). The majority of CHCs had been converted from a Class B hospital (58%) or Class C hospital (13%). Three-quarters of them (77%; 95% CI, 70%-83%) were open 7 days a week. Slightly less than two-thirds (62%; 95% CI, 54%-70%) operated through an appointment system. Physicians saw a median of 12.5 patients a day (IQR, 5.0-25.8).

Table 2 shows human and material resources of the CHCs. They had a fairly high ratio of nurses to physicians, at 1.7 (IQR, 1.0-2.8), but less commonly employed administrative and allied health staff. Basic primary care equipment, including stethoscopes, sphygmomanometers, and thermometers, were

Figure 1. Distribution of community health centers surveyed across China.

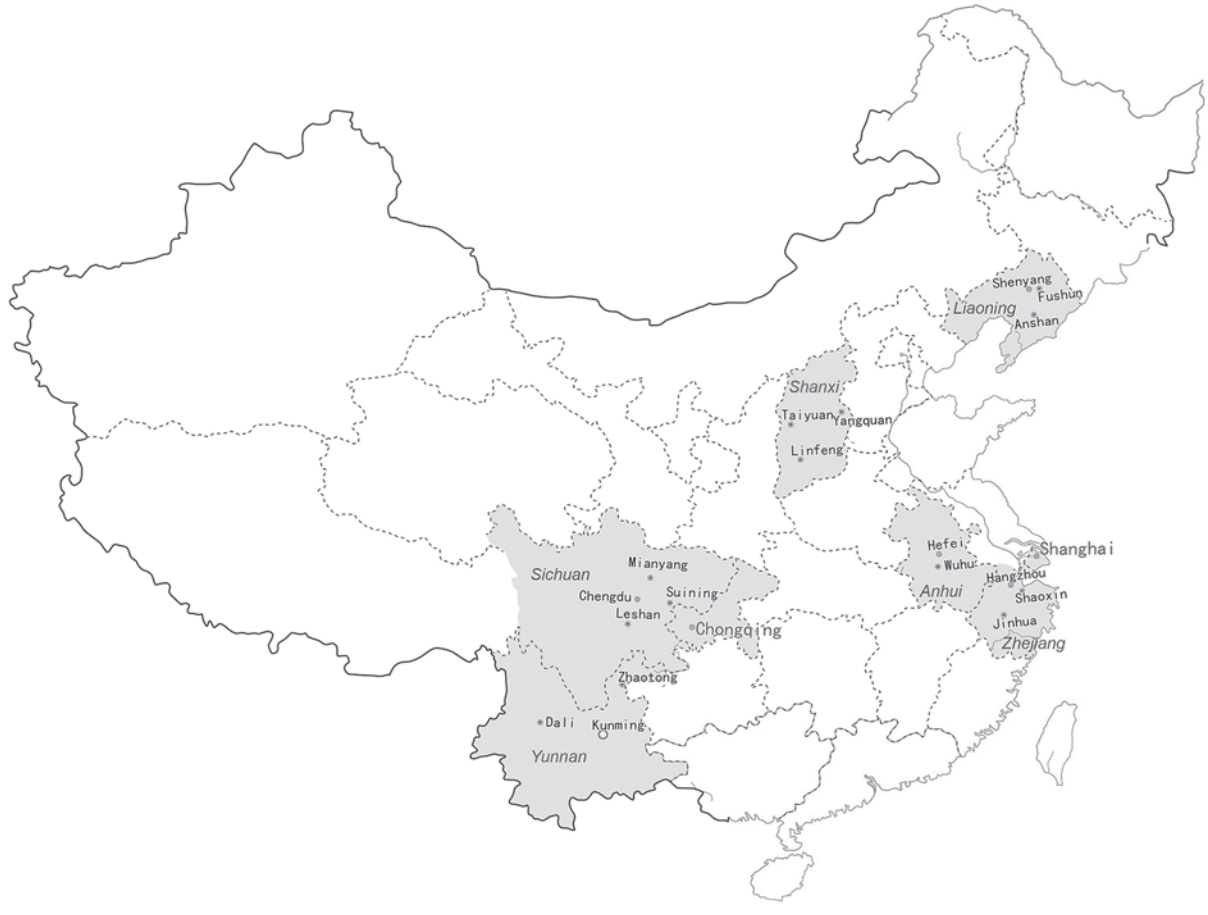

Table 1. General Characteristics of the CHCs (N = 149)

Characteristic	Value
Population size, median (IQR)	
Catchment area	50,000 (30,000-96,000)
Migrant population	11,100 (5,000-30,000)
Days open per week, median (IQR)	7 (7-7)
Patient visits in 2014, median No. (IQR)	41,100 (12,000-16,360)
Age of patients, mean (SD), y	49.9 (11.1)
Male-female ratio of patients, median (IQR)	1 (0.7-1.3)
Patients seen each day, median No. (IQR)	70 (28-200)
Patients seen each day by physicians, mean No. (%)	
<10	61 (44.5)
10-19.9	27 (19.7)
20-39.9	30 (21.9)
≥40	19 (13.9)
Physicians available each day, median No. (IQR)	
All physicians	7 (4-12)
Trained in western medicine	5 (2-10)
Trained in traditional Chinese medicine	2 (1-4)
Specialists	2 (1-4)
Appointments can be made in advance, % (95% CI)	62 (54-70)
Origin of CHC, % (95% CI)	
Converted from Class B or C hospital	58 (50-65)
Organized under Class B or C hospital	13 (8-18)
Organized under company, social group, or individuals (private enterprise)	31 (23-38)

CHC = community health center; IQR = interquartile range.

available, but sizable shares of CHCs did not have spotlights for gynecologic examination (36%), ophthalmoscopes (57%), or otoscopes (17%). The great majority of consultation rooms had access to computerized medical records (88%) including Internet access (81%). Nearly all CHCs had on-site capacity for further tests (biochemistry/hematology) (95%) and ultrasound (91%). Most had inpatient beds for their patients (87%); however, only 38% had microbiology support and only 53% offered Papanicolaou (Pap) screening. Although virtually all CHCs provided management of common ailments, chronic diseases, hypertension, and diabetes, as well as traditional Chinese medicine, maternal and infant health care, and vaccinations, large proportions did not provide management for other common conditions such as dyslipidemia (38%), mental illness (66%), sexually transmitted infections (66%), and chronic obstructive pulmonary disease (70%).

Table 3 provides an overview of the responses from PCPs. On average, the physicians and nurses surveyed were 39.7 and 33.1 years old, respectively. About one-half (54%) of the physicians had a graduate degree or more education, but only 46% reported that general practice was their primary registration. In terms of ongoing professional development, two-thirds of CHCs provided CPD to improve patient care on a monthly or more frequent basis. Virtually all these meetings involved physicians, nurses, and mangers, but few involved other health care staff or receptionists. These meetings covered organization and service management (97%), policy implementation (100%), team performance (95%), organization of work processes and services (96%), disease updates (84%), case discussions (83%), and further medical education courses (96%).

Table 4 details differences in CHC characteristics according the 3 regions. CHCs in the eastern region appeared to be better developed and used than those in the western and central regions in that they had significantly higher population catchment area ($P = .03$), and person-time visits ($P < .01$). The mean age of CHC staff in the eastern region was older ($P = .02$) and there were more physicians registered as general practitioners ($P < .01$), and more managers/administrators ($P = .01$), pharmacists ($P < .01$), and laboratory technicians ($P < .01$). There were no statistical differences among the 3 regions with respect to the number of receptionists ($P = .70$), computers for keeping medical records ($P = .47$), appointment systems ($P = .99$), or being open 7 days a week ($P = .07$). They also did not differ in terms of certain staff, such as number of receptionists ($P = .70$); facilities, such as drug-dispensing facilities ($P = .59$), treatment rooms ($P = .76$), access to inpatient beds ($P = .12$), designated parking facilities ($P = .55$); or Internet access for staff ($P = .38$). Across regions, CHCs were also statistically indistinguishable with respect to their range of services, for example, offering chronic disease management ($P = .26$), family planning and reproductive health ($P = .91$), maternity and infant health ($P = .90$), vaccinations ($P = .16$), mental health care ($P = .36$), on-site blood testing ($P = .49$), and on-site radiography ($P = .59$).

Table 5 summarizes the multivariate analysis of CHC characteristics associated with a higher mean number of patients seen daily by each physician. Physicians saw more patients daily in CHCs that had been converted from private hospitals and those having more pharmacists and nurses; in contrast, physicians saw fewer patients daily in CHCs that offered more services or were open more days per week. Table 6 shows the analysis of factors associated with CHC employment of more than the median number of 7 physicians per day. CHCs were less likely to have above-median physician employment if they originated

from a private enterprise, and more likely to do so if they employed more specialists and nurses, and if they offered more services.

DISCUSSION

This is the first nationally representative survey of the structure and organization of the Chinese primary health care system, involving 158 CHCs and more than 3,500 PCPs. We found the surveyed CHCs to be generally well equipped, but some physicians were neither trained to use nor used otoscopes or ophthalmoscopes in their clinical examination. The lack of some simple equipment may reflect the selected service provided in primary care, for example, the relative lack of spotlights for gynecologic examination likely reflects the lack of availability of Pap testing in this setting. Other countries have also noted lack of basic services in their primary health care, such as a shortfall of mental health screening in Canada and Australia.[16,17] On one hand, these young PCPs were actively engaged in professional development and quality improvement of their clinics. On the other hand, use of services by patients remained poor at each CHC: despite serving 50,000 people, the centers had an average of only 41,000 patient contacts a year, and each physician saw a median of just 12.5 patients per day. Staffing varied considerably across regions, with the eastern CHCs employing more staff and types of staff, but equipment, facilities, and services offered varied little.

China has recently been implementing strategies to strengthen its primary health care system to prepare for and improve universal coverage. According to the Health & Family Planning Commission, expenditure on primary care reached ¥110 billion (1USD = ¥6.20) in 2014.[18] In fewer than 10 years, the Chinese government has succeeded in establishing a primary medical care service infrastructure composed mainly of rural township centers, village clinics, and CHCs in cities. In 2011, social insurance was passed to provide for equal access to basic public health services for both urban and rural residents.[19] Historically, a variety of colleges, vocational training schools, and universities have offered medical courses ranging from 2 to 8 years of training. Graduates of these courses would have to pass board examinations to be registered for their chosen specialties. The young discipline of general practice in China was reflected by the relatively young age and junior titles reported by our survey respondents, clinicians

Table 2. CHC Staff, Equipment, Facilities, Services, and Testing

Characteristic	Value
Staff, median No. (IQR)	
Full-time general practitioners	8 (4-14)
Part-time general practitioners	0 (0-2)
Dentists	1 (0-2)
Nurses	13 (8-21)
Managers/administrators	2 (1-3)
Front desk administrators/receptionists	1 (0-1)
Pharmacists	2 (1-5)
Physiotherapists	1 (0-2)
Psychologists	0 (0-0)
Social workers	0 (0-1)
Laboratory technicians	2 (1-3)
Radiographers	1 (1-2)
Equipment in consultation rooms, % (95% CI)	
Stethoscope	98 (96-100)
Sphygmomanometer	97 (95-100)
Thermometer	96 (93-99)
Computer for keeping medical records	88 (83-93)
Otoscope	83 (73-93)
Spotlight for gynecologic examination	64 (56-71)
Ophthalmoscope	43 (35-52)
Facilities available, % (95% CI)	
Observation/intravenous drug room	100 (97-100)
Treatment/wound dressing room	93 (89-97)
Inpatient beds	87 (81-92)
Drug dispensing	84 (78-90)
Internet access for staff	81 (75-88)
Designated parking facilities	78 (72-85)
Wheelchair access	77 (70-84)
Clinical services for various conditions, % (95% CI)	
Common ailments (cold, diarrhea)	100 (97-100)
Chronic disease management (hypertension, diabetes)	99 (96-100)
Traditional Chinese medicine	96 (93-99)
Maternity and infant health care	93 (89-97)
Vaccinations	93 (89-97)
Family planning/reproductive health	79 (72-86)
Dyslipidemia management	62 (55-70)
Sexually transmitted infection diagnosis and management	34 (26-42)
Mental health care	34 (26-41)
Chronic obstructive pulmonary disease management	30 (23-38)
Testing available, % (95% CI)	
Blood tests (biochemistry, hematology)	95 (91-98)
Doppler/ultrasound	91 (86-95)
Rapid pregnancy test	87 (81-92)
Radiographs	75 (68-82)
Papanicolaou test	53 (45-61)
Microbiology	38 (30-46)

CHC = community health center.

who were often originally trained as specialists but were tasked with setting up these CHCs. Indeed, one-half of the physicians in our study kept their previous specialist registration despite the fact that all were now working in primary care. In light of this situation, there is concern that these professionals may not feel allegiance to their new roles and identities in an interprofessional rivalry, resulting in lack of alignment with the community's needs or health system functioning. One example is that the services seen were skewed on management of certain chronic diseases, and on performance of some unappealing public health tasks, such as setting up detailed chronic disease computer records, which is paid for by the government.

Basic primary care teams in China are made up of physicians, including traditional Chinese medicine practitioners, as well as nurses, with very few physiotherapists, clinical psychologists, or social workers. The CHC workforce is determined to some degree by a combination of the local health bureau requirements to fulfill basic manpower needs, but largely by the hospital with which the center is affiliated. These CHCs provide selected primary care services for common ailments, chronic diseases, and preventive care, such as vaccinations. The lack of a diverse multidisciplinary primary care team that allows roles to be defined in a functional response to the needs of the community is evident in this study. As many CHCs had been converted from smaller township (Class B and C) hospitals, a broader range of facilities (including inpatient beds or radiograph/ultrasound capability) were offered. Our findings contrast with the general public's perception of CHCs as "poorly equipped and of low quality."[20] We found underuse of CHCs; in fact, those offering more services and open longer hours were not more acceptable and used to greater extent by patients in our study. These findings suggest that patients are not supportive of community health work-

Table 3. Characteristics of the CHCs' Primary Care Practitioners and Continuing Education

Characteristic	Lead Clinicians	Physicians	Nurses
Sociodemographics			
Age, mean (SD), y	–	39.7 (10.6)	33.1 (8.9)
Male, % (95% CI)	–	39 (37-41)	1 (0-2)
Han Chinese, % (95% CI)	–	95 (94-96)	95 (94-96)
Highest qualification, % (95% CI)			
Less than associate degree	–	12 (10-13)	21 (19-23)
Associate degree	–	34 (31-36)	50 (48-52)
Graduate degree	–	49 (47-52)	26 (24-28)
Graduate degree with postgraduate qualifications	–	6 (5-7)	3 (2-4)
Primary specialty registration, % (95% CI)			
General practice	–	46 (44-48)	5 (4-6)
Integrative medicine	–	8 (7-10)	0
Other specialty	–	26 (24-28)	1 (1-2)
Years working, median (IQR)	–	14 (7-23)	9 (4-18)
Title, % (95% CI)			
Senior	–	10 (9-12)	2 (2-3)
Intermediate	–	41 (39-43)	26 (24-28)
Junior	–	40 (38-43)	64 (61-66)
None	–	9 (7-10)	8 (7-9)
Participation in continuing education, % (95% CI)	–	92 (91-93)	89 (88-91)
Frequency of CPD, % (95% CI)			
Yearly	12 (7-17)	–	–
Quarterly	18 (12-24)	–	–
Bimonthly	10 (5-15)	–	–
Monthly	52 (44-60)	–	–
Biweekly	11 (6-16)	–	–
Weekly	3 (0-5)	–	–
Professionals partaking in CPD, % (95% CI)			
Managers	95 (92-99)	–	–
Physicians	100 (97-100)	–	–
Nurses	100 (97-100)	–	–
Other health care staff	88 (82-93)	–	–
Receptionists	61 (52-69)	–	–
Content of CPD, % (95% CI)			
Studies/discussion on diagnostic standards	96 (93-99)	86 (85-88)	64 (62-67)
Disease updates	84 (78-90)	80 (78-82)	63 (60-65)
Case discussions	83 (77-89)	78 (76-80)	57 (55-60)
Further medical education courses	96 (93-99)	92 (91-93)	88 (86-89)
Content of management meetings, % (95% CI)			
Organizing and managing services	97 (94-100)	–	–
Conveying and implementing policies and documents	100 (97-100)	–	–
Appraising department and team performance	95 (91-98)	–	–

CHC = community health center; CPD = continuous professional development; IQR = interquartile range.

Table 4. Differences in CHC Characteristics According to Region

Characteristic	East (n = 56)	West (n = 47)	Central (n = 46)	*P* Value
Provision of care				
Population of catchment area, median (IQR)	60,000 (37,000-100,000)	60,500 (31,500-100,000)	30,000 (21,000-72,000)	.03
Annual person-time visits, median No. (IQR)	125,000 (28,150-275,500)	44,500 (17,300-111,000)	11,250 (4,750-42,500)	<.01
Facilities, % (95% CI)				
Computers for keeping medical records	81 (71-91)	90 (82-98)	86 (77-96)	.47
Appointments can be made in advance	61 (48-74)	62 (49-76)	61 (48-75)	.99
Open 7 days a week	77 (66-87)	82 (72-93)	64 (51-77)	.07
Drug-dispensing facilities	80 (69-90)	82 (71-93)	86 (77-96)	.59
Treatment rooms	90 (82-98)	92 (85-100)	92 (84-100)	.76
Inpatient beds	81 (71-91)	92 (85-100)	81 (70-92)	.12
Designated parking	81 (72-91)	75 (63-87)	74 (61-86)	.55
Internet access for staff	84 (75-94)	80 (70-91)	74 (62-86)	.38
Staff composition, median (IQR)				
Age of staff, y	55 (47-60)	50 (42-54)	49 (41-55)	.02
Physicians registered as general practitioners, No.	5 (2-12)	2 (1-7)	2 (1-3)	<.01
Administrators/managers, No.	3 (1-5)	2 (1-3)	1 (1-2)	.01
Receptionists, No.	1 (0-1)	1 (0-2)	1 (0-1)	.70
Pharmacists, No.	5 (2-8)	2 (1-4)	2 (1-3)	<.01
Laboratory technicians, No.	3 (2-4)	2 (1-2)	2 (1-2)	<.01
Services available, % (95% CI)				
Chronic disease management	100 (93-100)	100 (92-100)	97 (87-100)	.26
Family planning and reproductive services	79 (68-90)	76 (64-88)	78 (66-89)	.92
Maternity and infant health	92 (85-99)	92 (85-100)	90 (82-98)	.90
Vaccinations	98 (90-100)	90 (82-98)	86 (76-96)	.16
Mental health care	39 (26-51)	37 (23-50)	27 (14-40)	.36
On-site blood tests	98 (90-100)	92 (85-100)	90 (82-98)	.49
On-site radiographs	72 (60-84)	78 (67-90)	70 (57-83)	.59

CHC = community health center; IQR = interquartile range.

ers even though these clinicians make services available in a primary care setting. Although CHCs converted from private hospitals saw more patients, their overall clinical expertise was poor compared with that of government-run or hospital-managed CHCs.[21] Arguably, setting up primary care services in big hospitals with the support of tests and procedures, and specialists could be an additional transition measure to introduce general practice and help patients gain trust in this "new" discipline.[22]

As primary care is a relatively new discipline to medical schools in China, very few of them have general practice departments; additionally, exposure to primary care at the undergraduate level is minimal, a situation further compounded by the low status of the discipline. Currently, full-time general practice vocational training requires 3 years, often with 2.5 years in hospital rotations and only 6 months working in the community. Despite these inherent disadvantages, the training programs suggested by the list of CPD activities we found in our sample appear to facilitate competencies required to address the local community's health needs and priorities, rather than replicating ideas and curriculum from resource-rich contexts.[23]

The main limitation of our study is that we collected only self-reported information on structure and use of care, and the survey did not include questions on primary care and health system reform from the perspective of China's leaders or patients. Nonetheless, this study is the first step in understanding the organization and delivery of primary care in China. The strengths are that the data were collected from a large sample of both physicians and nurses in CHCs throughout China, with good response rates at clinic and individual levels, and hence should be generalizable.

In China, as elsewhere, policy and training are the keys to high-quality primary health care; however, because of historic and recent mishaps in the Chinese health care system, policymakers will have to reconceptualize and change the system in these 2 areas, and also convey clearly the process and outcomes of

Table 5. CHC Characteristics Associated With Number of Patients Each Physician Saw Per Day

Characteristic	Coefficient (95% CI)	*P* Value
Structure of CHC		
Size of catchment area (per 10,000-person increment)	−0.01 (−0.03 to 0.01)	.46
Origin of CHC		
Converted from Class B/C hospital	5.20 (−3.58 to 13.99)	.24
Private enterprise	11.05 (1.28 to 20.82)	.03[a]
Number of days open per week	−3.76 (−7.24 to −0.28)	.04[a]
Daily staff composition (per 1−staff member increment)		
Pharmacists	1.89 (0.72 to 3.06)	.002[a]
Specialists	−0.08 (−0.86 to 0.71)	.85
Dentists	0.52 (−2.23 to 3.26)	.70
Nurses	0.32 (0.12 to 0.52)	.002[a]
Managers	0.10 (−0.70 to 0.89)	.81
Services available		
Number of services[b]	−3.28 (−5.81 to −0.76)	.01[a]
On-site testing available		
Radiography	−1.03 (−8.22 to 6.16)	.78
Blood testing	4.18 (−13.57 to 21.92)	.64
Ultrasound	2.00 (−11.72 to 15.72)	.77
Hepatitis B serology	−5.16 (−14.36 to 4.04)	.27
Rapid HIV test	−5.21 (−11.84 to 1.42)	.12
Rapid pregnancy test	−2.30 (−12.22 to 7.63)	.65
Rapid syphilis test	4.42 (−1.64 to 10.48)	.15

CHC = community health center.

[a] $P < .05$ by multivariate linear regression analysis.

[b] Out of 7 possible services: traditional Chinese medicine, sexually transmitted infections diagnosis and management, drug dispensing, family planning/reproductive health, maternal and infant care services, vaccination services, and mental health care.

Table 6. CHC Characteristics Associated With Above-Median Employment of Physicians

Characteristic	Coefficient (95% CI)	*P* Value
Structure of CHC		
Size of catchment area (per 10,000-person increment)	0.00 (0.00 to 0.01)	.19
Origin of CHC		
Private enterprise	−1.84 (−3.60 to −0.08)	.04[a]
Daily staff composition (per 1−staff member increment)		
Specialists	0.51 (0.18 to 0.83)	.002[a]
Nurses	0.24 (0.11 to 0.37)	<.001[a]
Services available		
Number of services[b]	1.04 (0.25 to 1.83)	.01[a]

CHC = community health center.

Note: The median number of physicians the CHCs employed was 7.

[a] $P < .05$ by multivariate logistic regression analysis.

[b] Out of 7 possible services: traditional Chinese medicine, sexually transmitted infection diagnosis and management, drug dispensing, family planning/reproductive health, maternal and infant care services, vaccination services, and mental health care.

these changes to the public to alter their perception of primary care. There is a need to develop tools to evaluate primary care activities more clearly, integrate community-orientated thinking into primary care, and teach an integrated comprehensive approach (eg, formation of multidisciplinary teams), rather than selected care and a purely biomedical approach. Interprofessional education should engage the key primary care clinicians early on in a collaborative, complex, adaptive approach to forming functional teams that meet the community's needs.[24]

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Key words: structure of care; delivery of care; quality of care; primary care; health personnel; patient acceptance of health care; China

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