REPORT

Which Doctor For Primary Health Care?

An Assessment Of Primary Health Care Providers In Chhattisgarh, India

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An Assessment Of Primary Health Care Providers In Chhattisgarh, India

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Recently, in an article in a leading national daily[3], India's former central health minster articulated several popular criticisms against a rural cadre: introducing this cadre would be an act of "discrimination against rural folk, who are taken for second-grade citizens deserving medical care by a brigade of 'qualified quacks'." Further, it will dissuade physicians from serving in rural areas. Other clinical care providers like AYUSH doctors and nurse-practitioners were mooted as being better alternatives to a rural cadre of clinical care providers with shorter training. Finally, it was also argued that, producing more physicians coupled with compulsory rural service or recruitment of students from rural areas will eliminate the rural physician shortage.

The debate on the ability of non-physician clinicians is, unfortunately, not based on any empirical assessment of their performance. This study attempts to fill this important gap by taking advantage of a "natural" experiment in the state of Chhattisgarh where, because the public sector could not adequately staff PHCs with Medical Officers, non-physician clinicians like AYUSH doctors and RMAs provide clinical services. Quite frequently paramedical staff (e.g. nurses, medical assistants, pharmacists), with little or no clinical training, provide clinical services at PHCs because no one else was available. The functioning, either by design or circumstance, of non-physician clinicians and paramedical staff (pharmacists and nurses) as the main providers of clinical services at PHCs represents a set of alternatives to Medical Officers. Yet, there is little known about how well they perform the duties expected of Medical Officers at PHCs.

Study objectives

This study provides a comparative assessment of the performance of different types of clinical care providers working at the primary care level – Medical Officers and non-physician clinicians i.e. RMAs, AYUSH physicians and paramedical staff (nurses and pharmacists) – in their capacity as the main providers of clinical services at PHCs. Their performance is examined on several dimensions. First, provider competence ('how much they know') to manage the following conditions: malaria, diarrhea, pneumonia, TB, preeclampsia

[3] Ramadoos A. The Wrong Way For Rural Doctors. The Hindu. 27th February, 2010. Downloaded on March 31, 2010 from www.editorialjunction.com/?p=4061

and diabetes.[4] Second, how patients and the communities they work in view them in terms of satisfaction with services and perceptions about the quality of care received. Third, how much the PHCs they work in are used by ill community members. Finally, it examines their attitudes towards rural service and levels of job satisfaction. Assessing the performance of these different types of clinical care providers on a variety of dimensions enables a comprehensive understanding of their suitability as primary health care providers. The study was conducted in the state of Chhattisgarh in central India between July and September 2009.

Provider competence[5]

Findings from this study suggest that Medical Officers and RMAs are equally competent to manage conditions commonly seen in primary care settings. AYUSH Medical Officers are less competent than Medical Officers (and RMAs) and Paramedicals[6] are the least competent. This was observed for infectious, chronic and maternal health conditions and for a range of patient types – infants, children and adult men and women. Further, these results hold even after controlling for various individual, facility and location characteristics. This relative performance is consistently found in all aspects of the outpatient clinical care - history taking, examinations, investigation, diagnosis, prescription and home recommendations. An important implication of this is that, in terms of clinical competence for primary health care, clinical care providers with short duration of training appear to be a viable alternative to physicians.

Most states in India have been posting AYUSH doctors to fill vacancies of Medical Officers at PHCs and to mainstream Indian systems of medicine. This study casts doubt on the appropriateness of this practice when it results in the AYUSH doctor becoming the primary clinical care provider in the PHC. The overall competence of AYUSH doctors and their performance on the different aspects of the consultation (except for prescriptions) is below

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[4] For the TB and preeclampsia case, clinical care providers were not evaluated on their prescription practices because PHCs are expected to refer such cases.

[5] The term 'competence' is used because in this study provider knowledge ('what they know') is measured and not practice ('what they do'). However, the two are related since the competence measure can be thought of as the maximum attainable performance in practice. Further, studies have shown that measures of competence and practice are correlated.

[6] Paramedicals in this study – pharmacists and nurses – are not trained nor are they expected to diagnose and treat sick people. However, in PHCs where no other clinical care provider is present, Paramedicals perform these functions.

that of Medical Officers and RMAs. Without additional clinical training, particularly in primary health care, AYUSH doctors, at current levels of training, do not seem to be the best alternative to Medical Officers at PHCs. However, they certainly are a better alternative to having paramedical staff provide clinical care. Moreover, their competence with additional allopathic training can be quite different and it is important to explore the potential of this.

The low competence of paramedics is both expected and disturbing. They do not receive any formal training in clinical care nor are they meant to perform such activities. Yet, because there is no physician or competent alternative, these paramedics continue to treat patients in numerous PHCs across Chhattisgarh and in the rest of the country. Their functioning as clinical providers is clearly a danger to their patients and undermines trust in the public health system. However, in other countries paramedical staff like nurses, have been found to be as effective as physicians in providing primary health services. Paramedics in the study sample are, however, dominated by pharmacists. Nevertheless, the potential of paramedical staff with appropriate training to serve in PHCs is an important area of future research.

Prescription practices

In every clinical care provider group there was a substantial proportion of prescriptions that were ineffective in treating the patient. The majority of prescriptions written by Medical Officers and RMAs were effective in treating the presented condition. Notably, almost half the prescriptions written by AYUSH Medical Officers and the majority written by Paramedicals were ineffective. In terms of rational drug use, Medical Officers wrote the most rational prescriptions followed by AYUSH Medical Officers, RMAs and Paramedicals.

All clinical care providers did better at prescribing effective treatments for the malaria and diabetes cases. However, they did poorly in treating diarrhea and pneumonia - all diseases contributing substantially to the burden of disease and to mortality. Malaria is the focus of an established national disease control program and the ability of clinical care providers to prescribe effectively reflects the success this vertical program has had on frontline health workers.

Patient and community satisfaction and quality perceptions

Patients were equally satisfied with Medical Officers, AYUSH Medical Officers and RMAs. However, patients of Paramedicals were less satisfied with their visit. The 'medical advice' and 'physician behavior' dimensions of patient perceived quality directly refer to the clinical care provider in the local PHC. Medical Officers and RMAs received the highest scores followed by AYUSH Medical Officers on both these dimensions; however, there was no significant difference between their average scores. This suggests that patients perceive the medical advice and behavior of Medical Officer, AYUSH Medical Officers and RMAs similarly. Paramedicals consistently received the lowest scores and these were generally significantly lower than the other clinical care provider categories.

Community satisfaction with PHC services was moderately high for all provider types, except Paramedicals. Households were equally satisfied with local PHCs where the clinical care provider was a Medical Officer, AYUSH Medical Officer or RMA. Household perceptions of the technical skills of the clinical care provider at the local PHC indicate that they saw no difference in the ability of Medical Officers, AYUSH Medical Officers and RMAs to treat common illnesses. However, Paramedicals were perceived as having significantly lower ability to treat common conditions. In contrast, for the treatment of serious conditions, all the other clinical care providers were perceived to have significantly lower ability compared to Medical Officers. If we assume that the household definition of 'common' or 'serious' conditions is similar across groups, then there is a clear vote that Medical Officers, AYUSH Medical Officers and RMAs are equally able to treat common conditions but are less able than Medical Officers to manage serious illnesses. There is little ambiguity that communities view Paramedicals as having little ability to treat either common or serious conditions. The discerning ability of the community, in what different providers can or cannot do, was interesting and matches with both the study findings and theoretical expectations.

Service utilization and equity

Perceptions of service quality are important drivers of where people choose to go for treatment. PHCs headed by AYUSH Medical Officers received the largest share (60%) of total visits, followed by RMAs (35%), Medical Officers (29%) and Paramedicals (20%).

Where there is no qualified clinical care provider, as in the Paramedicals case, the local PHC is hardly used for treatment. Indeed, the share of visits to private providers is largest for this group. The pattern of visits to the local PHC suggest that, all else being the same, there is at least as much public trust in AYUSH Medical Officers and RMAs as there is in Medical Officers.

The majority of visits by households located in the vicinity of a PHC were not to the local PHC – the most assessable government provided care - but to private providers irrespective of the type of clinical care provider present in the local PHC. The only exception to this case was areas where AYUSH providers headed PHCs, but this appears to be due to their exclusively tribal area location where there are few alternatives to the local PHC. Importantly, the presence of Medical Officers, a rarity in rural India, did not seem to influence this pattern.

Poorer people depend more on the local PHC compared to those who are better-off. When no qualified clinical care provider present (i.e. Paramedical PHCs), use of the local PHC is low, even by the poor, because people seek care elsewhere. When private alternatives are not available, as in the AYUSH Medical Officer case because of their tribal area location, the local PHC becomes very important and is heavily used. This highlights the importance of investing in primary health services. However, the continued use of private fee-for-service providers, often unqualified, even by the poorest and even when qualified clinical care providers are present at PHCs, indicates the need to look beyond the package of services available and examine issues of access and the nature of social relationships in primary care settings.

Attitudes towards rural service and job satisfaction

The majority of the sampled clinical care providers intended to transfer from their current PHC posting at some point. Medical Officers, RMAs, AYUSH Medical Officers were equally likely to seek a transfer. However, Paramedicals have a slightly lower inclination to transfer. Among those seeking an immediate transfer, the largest proportion was from Paramedicals, followed by Medical Officers, AYUSH Medical Officers and RMAs. No significant differences in the intention to transfer were found between groups.

The sampled clinical providers had moderate levels of job satisfaction. AYUSH Medical Officers reported the highest levels of job satisfaction, followed by Medical Officers and Paramedicals. RMAs had the lowest job satisfaction. Similar patterns are seen across the job satisfaction dimensions of 'Family life' 'Job performance' and 'Professional development'; AYUSH Medical Officers have the highest job satisfaction, followed either by Medical Officers or Paramedicals, and then RMAs.

Conclusions

The acute shortage of health workers in rural areas, particularly physicians, severely constrains the delivery of clinical services to rural communities. Findings from this study support the claim that in primary health care settings in India, clinical care providers with shorter duration of training are a competent alternative to physicians. This endorses the introduction of rural cadres like the RMAs of Chhattisgarh or the BRHC course by the health ministry. Indeed, limiting BRHC graduates to serve only at sub-centers, as is currently proposed, is under utilizing their potential in a rural environment of physician shortages.[5] AYUSH doctors and paramedical staff like nurses also, as demonstrated in other countries, have the potential to be competent primary care providers but would require substantial further training.

Introducing a rural cadre requires careful planning; there are many pitfalls on this road but much can be learnt from the experience of states like Chhattisgarh.[9,10] For one, it is important that the medical establishment supports the creation and sustenance of this cadre. In this regard, the government has done well to involve the Medical Council of India in developing BRHC program.[6,7] Secondly, local recruitment, as proposed for the BRHC program, can increase rural retention though it remains to be seen if quality candidates and instructors will be locally available everywhere. Third, a rural cadre needs a clear career path – where they can work, what title they can or cannot use, and what functions they can or cannot perform need to be clearly defined beforehand. Fourth, it is important that graduates be allowed, after some years of service, to become fully qualified medical graduates either through a 'bridge course' or through preferential admission to medical schools.[10] This will improve the prestige and status of the rural cadre, increase the legitimacy of program graduates among their superiors and colleagues, and provide avenues for professional advancement within the health system.

The finding that even PHCs with Medical Officers receive such few visits from people living in close proximity strongly suggests that improving primary health care in India requires efforts which go beyond simply placing a qualified clinician in a PHC.[11] The quality of care is important – this study found that the quality of clinical providers at PHCs was poor irrespective of who was providing clinical services. It is alarming that even after decades of emphasis, clinical providers find it difficult to correctly diagnose and treat conditions like diarrhea, pneumonia and preeclampsia. Clearly, there is an urgent need for improving standards. Further, planned action is needed on the organizational environment, adequacy of supplies, management at different levels, incentives, and even the social context of health care.

A related point is that successful primary health care is built on the trust and rapport between physician and the communities they serve. Clearly, as this study shows, the mere presence of a qualified clinical provider is not adequate to make a PHC 'successful'. The importance of community trust in the clinical provider cannot be over emphasized and can only be achieved through the provider's continued engagement with the community and by being part of them. This casts doubt on the effectiveness, from the perspective of successful primary health care, of human resource policies that involve placing clinical providers in PHCs for a short duration (e.g. compulsory rural service for a few years) or which allow providers to live away from the communities they serve.

In some ways, the debate over whether non-physician clinicians are a reasonable substitute for physicians misses the point because the correct comparator is not the physician but the situation where no physician is present. Non-physician clinicians offer a substantial improvement over the latter. Placing qualified clinical care providers in rural health facilities is an important first step in the process of expanding quality health services. However, it is presumptuous to believe that the simple act of placing a qualified provider in a PHC will automatically result in increased service utilization and better health. Successful primary health care results from the interplay of many factors; placing qualified providers is just one of many necessary, but by no means sufficient, conditions required for a 'successful' PHC.

Chapter 1

The Challenge of Placing Health Workers in Rural Areas

Health systems planning in India has always aspired to universal and affordable health care. Since Independence, considerable government effort and resources have been devoted to establishing a wide network of health facilities through which qualified health workers deliver affordable health services (Box 1.1). Yet, the aspirations of this massive undertaking have remained unfulfilled. As recent surveys show, substantial socioeconomic and geographic inequities in health outcomes and health service use mark the Indian landscape (NFHS, NSSO). Critically, many Indians, particularly those living in rural areas and the urban poor, do not receive health care from qualified providers.[12,13]

This chapter provides an overview of the human resource situation in India. It draws attention to the national and rural shortage in qualified physicians and other health workers. The challenges involved in addressing this rural scarcity are examined, particularly, the many state level experiments in recruiting and retaining health workers. The chapter concludes by exploring the feasibility of and experience with non-physician clinicians to deliver primary health care.

1.1 India's health workforce – a situation analysis

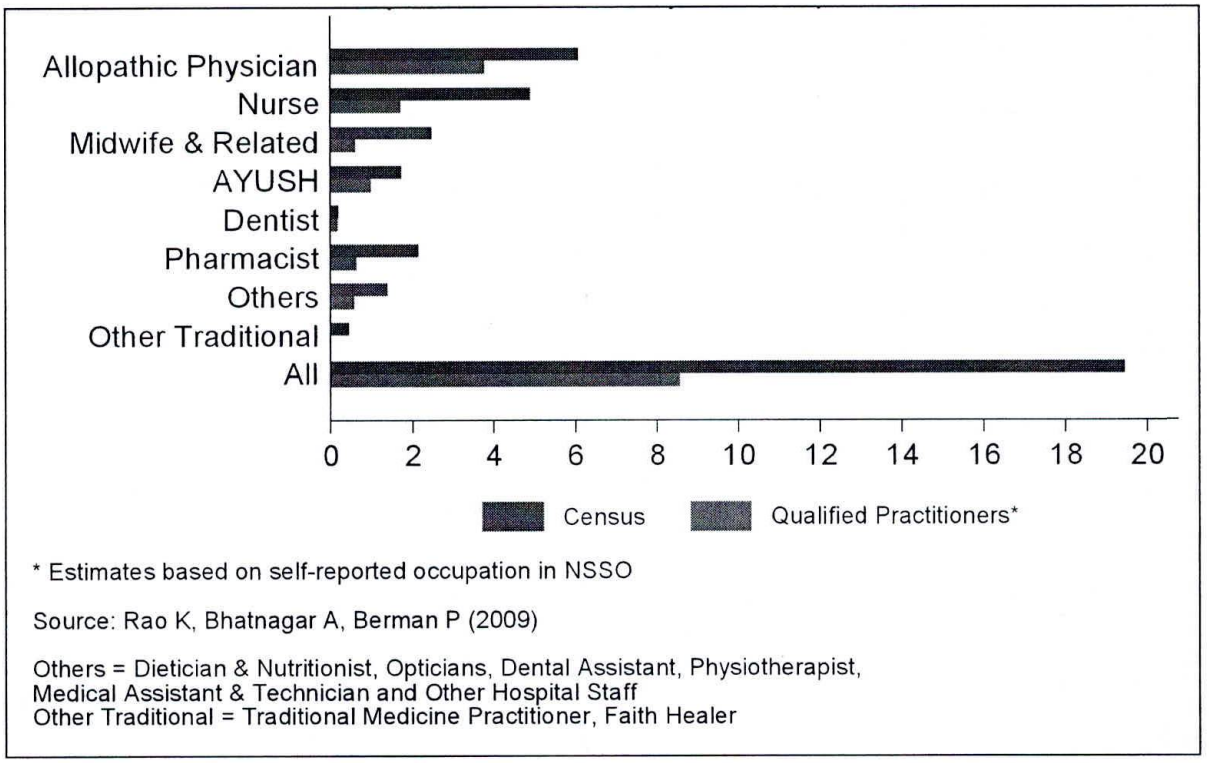
India's health workforce is characterized by a diversity of health workers offering health services in several systems of medicine. According to the National Occupation Classification (NOC) providers of allopathic health services broadly include doctors (general and specialists), dentists, nurses, midwives, pharmacists, technicians, optometrists, physiotherapists, nutritionists, sanitarians and a range of administrative and support staff. [14] Physicians and surgeons trained in Indian systems of medicine - Ayurveda, Yoga, Unani, Sidha - and Homeopathy, collectively known as AYUSH, are also important health care providers. In addition, there are community health workers and practitioners of traditional medicine and faith healers. Certain states have introduced state specific cadres. For example, the state of Chhattisgarh has deployed Rural Medical Assistant (RMA) at PHCs and female

RMAs in CHCs without lady doctors. RMAs receive three years of training in allopathic medicine followed by a year's internship before being certified.

A large number of informal medical practitioners, commonly called RMPs (Registered Medical Practitioners), constitute a substantial part of the health workforce.[15] RMPs are often the first point of contact for medical care for the rural population and the urban poor. They typically practice allopathic medicine, but have no formal qualification or license to do so. While it is difficult to estimate their numbers, one study estimates that 25% (42% in rural and 15% in urban) of the individuals classified as allopathic doctors reported no medical training.[4] Another study conducted in Udaipur district of Rajasthan in 2003 found that 41% of private practitioners who called themselves doctors had no medical degree, 18% had no medical training at all and 17% had not even graduated from high school. [12]

Estimates based on the 2001 Census suggest that there were close to 2.2 million health workers in 2005, which translates into a density of approximately 20 health workers per 10,000 population (Figure 1.1). The estimated density of allopathic doctors is 6.1, nurses & midwives is 5.8 and AYUSH practitioners is 1.8 per 10,000 population. Allopathic doctors comprise 31% of the workforce, followed by nurses & midwives (30%), pharmacists (11%), AYUSH practitioners (9%) and others.[4] Census and NSSO estimates are based on self-reported occupation which is susceptible to unqualified providers being counted as qualified ones. Census estimates adjusted for educational qualifications are revealing; the density of qualified health workers reduces to a little over 8, of allopathic physician to 3.8 and of nurse & nurse-midwives to 2.4 per 10,000 population.[4] Overall health workforce estimates do not include the substantial number of community health workers introduced under the National Rural Health Mission (NRHM) after 2005.

Figure 1.1 Health Worker Density (Per 10,000 population)– All India, 2005



* Estimates based on self-reported occupation in NSSO

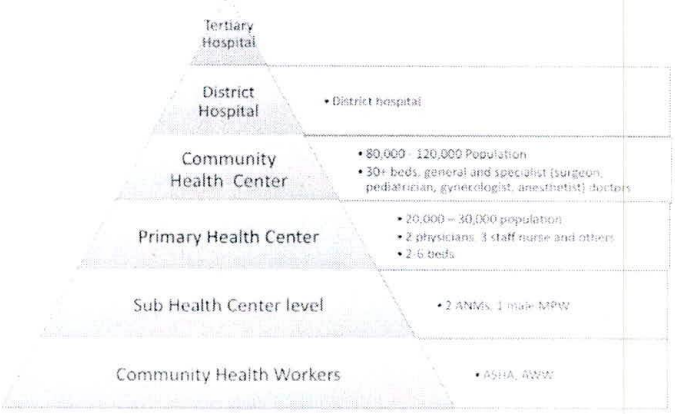
Source: Rao K, Bhatnagar A, Berman P (2009)

Others = Dietician & Nutritionist, Opticians, Dental Assistant, Physiotherapist, Medical Assistant & Technician and Other Hospital Staff
Other Traditional = Traditional Medicine Practitioner, Faith Healer

Estimates based on the Census suggest that the combined density of allopathic doctors, nurses and midwifes (11.9) is about half of the WHO benchmark of 25.4 workers in these categories per 10,000 population for achieving 80% attended deliveries by skilled personnel in cross-country comparisons.[16] When adjusted for qualification, the density falls to around one fourth of the WHO benchmark.[4] The Census estimates also indicate that India has a skewed mix of nurses and allopathic doctors. There is approximately one nurse and nurse-midwife per allopathic doctor and the qualification adjusted ratio falls to 0.6 nurses per doctor. Although there is no gold standard for a nurse–doctor ratio, a higher ratio is desirable because nurses can deliver basic clinical care and public health services at a lower cost than doctors. The only states in India which have two or more nurses per doctor are the north-eastern states, Kerala, and Orissa.[4]

Box 1.1 India's Health System: An Overview

India's health system is characterized by a large public and larger private sector. The public sector consists of a hierarchy of health facilities comprising of sub-centers, primary health centers (PHC), community health centers (CHC), district hospitals and specialty/research hospitals (see figure). The private sector is largely unregulated and heterogeneous; it comprises of super-specialist hospitals, nursing homes, clinics, unqualified allopathic practitioners, trained practitioners of indigenous systems of medicine and traditional health care providers.

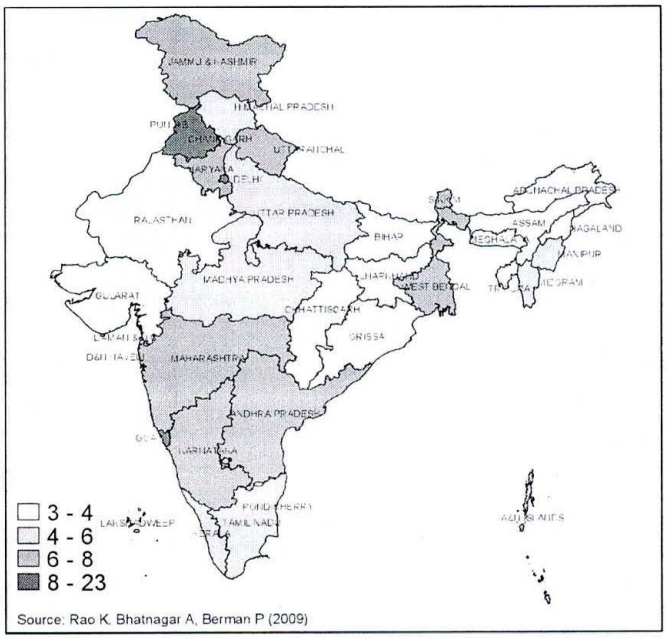


Despite the presence of an extensive network of public sector health facilities, the majority of inpatient and outpatient care is provided by the private sector and this share has gradually increased over time. Latest estimates indicate that 80% of all ambulatory and 50% of in-patient treatment occurs in the private sector. However, the public sector continues to be the major provider of preventive services. One of the unfortunate consequences of India's highly privatized health system is that, coupled with insurance covering only a small percentage of the population; nearly 80% of the total health expenditure is paid out-of-pocket. For many Indians, especially those who are poor, health care payments place an enormous burden leading to people falling into poverty, experiencing catastrophic health care payments or undertaking distress financing to pay for health services.

Since health is a state subject in India's federal system, the respective state governments are responsible for administering and funding the public sector. Common norms guide the states resulting in similar public sector structures across the country. The Central government, however, is also an important financier of health care. This is primarily done through centrally sponsored schemes through which health initiatives of national importance receive direct funding from the center. Examples of these programs include, all the national disease control programs, the family planning program, the reproductive and child health program and, most recently, the National Rural Health Mission (NRHM). These programs, depending on the situation, have their own cadre of workers or fill vacancies in the public sector by hiring workers on contract or make use of the state level health workforce.

The National Rural Health Mission (NRHM), which was launched in 2005, is a key recent health system initiative launched by the central government. It aims to bring about an 'architectural correction to the health system' through a variety of strategies, such as, substantial increases in government funding for health, integrating vertical health & family welfare programs, providing a female health activist in each village, de-centralized health planning, communitization of health services, strengthening of rural hospitals, providing untied funds to health facilities and mainstreaming traditional medicine systems into the public health system (NRHM Mission document). It covers the entire country, with special focus on 18 states, which have relatively poor infrastructure and demographic indicators. One of the core strategies of NRHM is to integrate into the general health system the different national programs, including the disease control programs - the only exception to this is the HIV/AIDS program.

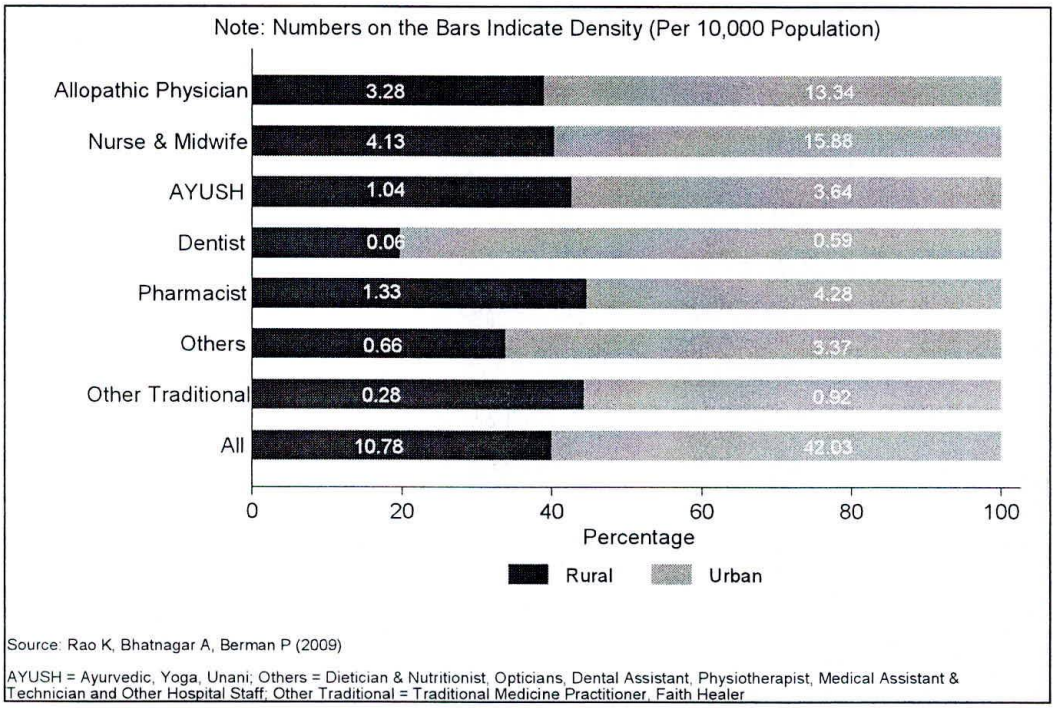
Figure 1.2 Doctor Density (per 10,000 population), 2005



Health workforce distribution

Health workers in India are unevenly distributed across the country (Figure 1.2). In general, the north-central states, which are among the poorest in terms of both their economy and health, have low health worker densities. The distribution of health workers is highly skewed in favour of urban areas with around 60% of the health workers present there (Figure 1.3).[4] This mal-distribution is substantially exacerbated when adjusted for the larger share of the population residing in rural areas. The density of health workers per 10,000 population in urban (42) is nearly four times that of rural (10.8) areas. The density of allopathic doctors is four times larger in urban (13.3) compared to rural (3.3) areas and for nurses and midwifes the difference is three times as large (15.9 urban, 4.1 rural).[4] If these estimates are adjusted for health worker qualification, then the density of allopathic physicians in urban and rural areas reduces to 11.3 and 1.9 per 10,000 population, respectively, reflecting the higher proportion of physicians in rural areas reporting insufficient qualifications.[4] AYUSH doctors also have a stronger presence in urban (3.6) compared to rural (1.0) areas.[4]

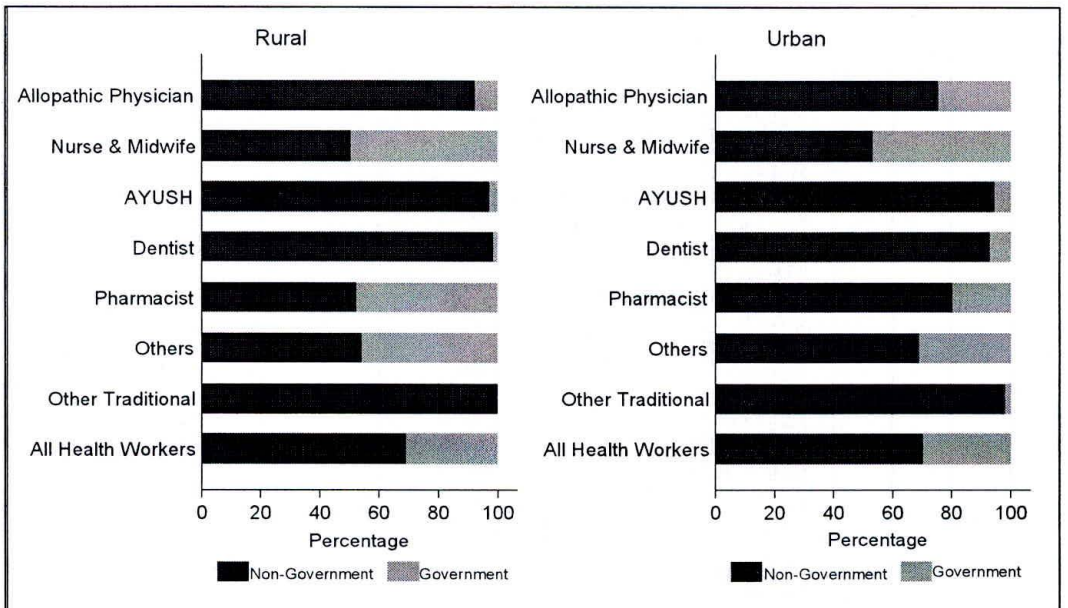
Figure 1.3 Rural-Urban Distribution of Health Workers in India, 2005



Source: Rao K, Bhatnagar A, Berman P (2009)

AYUSH = Ayurvedic, Yoga, Unani; Others = Dietician & Nutritionist, Opticians, Dental Assistant, Physiotherapist, Medical Assistant & Technician and Other Hospital Staff; Other Traditional = Traditional Medicine Practitioner, Faith Healer

Figure 1.4 Distribution of Health Workforce by Sector, 2005



Source: Rao K, Bhatnagar A, Berman P (2009)

AYUSH = Ayurvedic, Yoga, Unani; Others = Dietician & Nutritionist, Opticians, Dental Assistant, Physiotherapist, Medical Assistant & Technician and Other Hospital Staff; Other Traditional = Traditional Medicine Practitioner, Faith Healer

The majority (70%) of health workers in India are employed in the private sector (Figure 1.4). Significantly, the vast majority of allopathic doctors (80%), AYUSH physicians (80%) and dentists (90%) are employed in the private sector. In contrast, only about half the nurses and midwifes are employed in the private sector.[4] This pattern holds for rural and urban areas and also after adjusting for health worker qualification. However, the distinction between public and private sector is not always clear since, for instance, public sector doctors often indulge in private practice.

1.2 The scarcity of qualified health workers in rural areas

Many rural and poor urban Indians receive curative care from unqualified providers due to the scarcity of qualified physicians in these areas.[12,17] This scarcity is due to both the disinclination of qualified private physicians to work in underserved areas and the inability of the public sector to adequately staff rural health facilities. Latest government estimates indicate that currently 18% of the PHCs are without a doctor, about 38% were without a lab technician and 16% lacked a pharmacist.[18] Specialist allopathic doctors are particularly in short supply in the public sector with 52% of the sanctioned posts of specialists at CHCs vacant. This includes vacancies in 55% of surgeon, 48% of obstetricians & gynecologist, 55% of physician and about 47% of pediatrician posts. Nurse vacancies are also high – 18% of the posts for staff nurses/nurse-midwives at PHCs and CHCs are vacant.[18] The actual number of PHCs and CHCs without adequate staff will be considerably higher given high health worker absenteeism.[19]

There are several reasons for the scarcity of qualified health workers in rural areas. The opportunity to earn a better income, to utilize skills, good living conditions, education opportunities for children and safe working and living environments are other important job attributes which tilt the balance in favor of urban location.[4] Of particular concern is the inability of the public sector to place adequate doctors in rural areas. For many medical graduates the desire for post-graduate specilization dissuades them from entering the job market and thereby the possibility of rural posting in the public sector.[20] Once they have specialized, government employment and rural service is not attractive. Nurses are more amenable to public sector enployment than doctors – around half the nurses in India work in government jobs.[4] However, poor service and living conditions for their families makes

urban employment preferable.[21,22] Public sector efforts to recruit and retain health workers to rural postings is also compromised by institutional issues such as changes in service rules, recruitment delays, the lack of transparancy in identifying vacancies, promotions, transfers and the numerous related court cases faced by the state health Directorates.[23]

Historical perspectives

Several policies that affected human resources for health in India were adopted in the early years of Independence. The Indian Medical Service, an all India medical service, which was primarily concerned with the health of the colonial Army, was abolished. The colonial policy of sharing of powers with states was retained; health and the workforce became principally a responsibility of the states leaving the central government with a limited role in these areas, except through financing centrally sponsored programs. Key health workers in undivided India were few with 1.6 doctors and 0.23 nurses per 10,000 population.[24] The majority (70%) of physicians were private practitioners and mostly in urban areas.[24] There were two classes of allopathic physicians present; doctors who underwent a five and a half year course and licentiates (LMPs) who underwent a three-to-four-year course. Nearly two-thirds of the qualified medical practitioners were Licentiates who mostly served in rural areas.[2,3] In addition, there was a substantial presence of Indian system of medicine practitioners and traditional healers.[2]

The adoption of the Bhore (1946) and subsequent committee reports directed government attention and resources towards establishing a publicly funded and managed health system. The focus was on bringing primary health care to rural areas and central to this plan was the production of a 'basic' doctor schooled in clinical skills and public health. The licentiate physician did not find favor with the Bhore Committee leading to, despite much dissent, this cadre being abolished. India was to produce only one type of allopathic physician, the five year MBBS graduate, and this physician would be on par with western doctors.[3] Further, there was no role for physicians schooled in Indian systems of medicine. The result of these policy decisions is starkly visible today. Qualified doctors are scarce in rural areas while the country exports a substantial number to developed countries.[25,26] At primary health centers, AYUSH doctors and paramedical staff fill this vacuum. Interestingly, two states in India

(Chhattisgarh and Assam) have recently reincarnated the licentiate by creating a new cadre of allopathic physician having three years of medical training for serving in rural areas.

Box 1.2 Medical Education

Medical education in India consists of a basic undergraduate degree (MBBS) and then the option to specialize leading to a post-graduate degree. Undergraduate medical education consists of one and a half years' preclinical and three years' clinical teaching, after which the MBBS degree is awarded. The graduate then undertakes one year of compulsory internship in different hospital departments. The relevance of this medical education to India's context and healthcare problems has been questioned. One study noted that students do not learn enough about the common infectious diseases or problems of child and maternal health.[27] Further, the Government itself has noted, most medical graduates are not adequately trained to perform in the primary health care setting.[28-30] Students themselves do not seem confident to treat patients on the completion of their degree.[20,31] Further, the strong desire to specialize, and there is intense competition for the limited post-graduate seats, leads students to utilize the compulsory internship period, which is meant to strengthen clinical skills, for studying for post-graduate entrance examinations.[20,32] Once students specialize there is little incentive or inclination to serve in a primary care setting or in a rural area.

Task shifting and non-physician clinicians

Clinical care providers with shorter duration of medical training are now seen as a cost-effective means of delivering primary care services.[33] Where qualified physicians are scarce, these non-physician clinicians offer an important way to continue services by performing many of the clinical and non-clinical functions of physicians. This task shifting is common in many developing and developed countries. For instance, nurse-practitioners in the United States provide basic clinical services. In developing countries, a variety of non-physician clinicians have been deployed in response to rural shortages of health workers. Depending on their location and function, these health workers have been known as feldshers, medical assistants, hospital assistants, health officers, rural health technicians, health post aides, village/community health workers, health officers, clinical officers, physician assistants, nurse practitioners, or nurse clinicians.[1,34]

The training and functions of these non-physician clinicians vary substantially. Community health workers (CHW) and similar cadres undergo a short period of training, typically lasting a few months or less, and serve to treat simple ailments, provide health education and connect

households with health facilities.[35] At the other end of the spectrum are non-physician clinicians with upto four years of clinical training. They seem to be particularly popular in sub-Saharan Africa with one study reporting their presence in 25 of 47 countries there.[1] In several African countries they form the backbone of the health system being the main providers of clinical care and, in some instances, surgical procedures.[1,36]

Few evaluations have been conducted on the quality of care produced by non-physician clinicians. A systematic review of primary care provided by nurses (practice nurses, nurse practitioners, clinical nurse specialists, or advanced practice nurses) found that, in general, no appreciable differences were found between them and doctors (general practitioners, family physicians, pediatricians, general internists or geriatricians) in health outcomes for patients, process of care, resource utilisation or cost. Further, patients treated by nurses reported higher satisfaction level.[37] An assessment of primary health facility surveys in Bangladesh, Brazil, Uganda and Tanzania compared the clinical performance of health workers with longer duration of pre-service training (those with >4 years of post-secondary education in Brazil or >3 years in the other three countries) and shorter duration trained health workers providing clinical care. Performance was assessed in terms of assessment, classification, and management of sick children according to IMCI guidelines. The authors concluded that IMCI training is associated with much the same quality of child care across different health worker categories, irrespective of the duration and level of pre-service training. In Tanzania, Assistant Medical Officers, who receive three years of training as clinical officers and then an additional two years (including surgery and obstetrics) to become Assistant Medical Officers, provide emergency obstetric surgery. An assessment based on records of patients admitted for complicated deliveries at fourteen district hospitals found that that there were no significant differences between the Assistant Medical Officers and Medical Officers in patient outcomes or quality. [36]

In India, the focus on doctors to provide primary care ignored experiments taking place in other parts of Asia (e.g. barefoot doctors in China) and elsewhere with non-physicians providing clinical services. Though several small area experiments with CHWs took place in different parts of India starting in 1970,[38,39] only in 1978 was the first national Community Health Volunteer program launched. These early attempts were not successful, though later, programs like the *Mitanin* programme (2002) in Chhattisgarh, which is the forerunner of the

national ASHA program under NRHM, have fared much better.[39,40] With the coming of the NRHM in 2005, CHWs are once again being introduced in a major way onto the health landscape.

A notable development in India is the provision of primary care services by AYUSH doctors and clinical care providers with a short duration of training. In keeping with the National Health Policy 2002 and NRHM guidelines to mainstream Indian Systems of Medicine into primary care, AYUSH doctors (see Box 1.3) are being deployed at PHCs as a second medical officer, the first one being the MBBS doctor. AYUSH physicians are recruited on contract and have either an under-graduate or post-graduate degree in a particular Indian system of medicine or homeopathy. AYUSH practitioners in government service undergo some training in allopathic medicine, particularly in the control and treatment of diseases covered in the national disease control programs (e.g. TB, malaria, leprosy, and blindness) and vaccinations. AYUSH physicians posted at health facilities prescribe both AYUSH and allopathic treatment.

In Chhattisgarh and Assam, a significant strategy to address rural doctor shortages has involved creating a clinical care provider with three years of training to serve in rural areas. In Chhattisgarh, these physicians receive a degree of Practitioner of Modern and Holistic Medicine at the end of their three year course (Box 1.4). They are recruited to government service to serve at PHCs as RMAs, though lady RMAs are posted in CHCs where there are no lady doctors.

Box 1.3 AYUSH Doctors

Indian medicine systems such as ayurveda, unani, siddha and yoga, together with homeopathy, have had a long history of existing alongside allopathic systems. These systems of medicine are collectively known by the acronym of AYUSH. Ayurveda and siddha are ancient Indian systems of medicine, yoga is the ancient Indian system of exercise postures, and unani has its roots in ancient Graeco-Arab medicine.

The Government has supported the development of AYUSH by establishing teaching institutions and a dedicated network of hospitals and clinics. After the National Health Policy (1983), integration of AYUSH and allopathic medical systems was promoted. This led to the establishment of the Department of Indian Systems of Medicine and Homeopathy in 1995 within the Ministry of Health and Family Welfare. In 2005 the National Rural Health Mission made mainstreaming AYUSH within the public health system one of the central features of the program.

The Central Council of Indian Medicine (CCIM), a statutory body constituted by the Government of India under the Indian Medicine Central Council Act, 1970, prescribes minimum standards of education, syllabi and course, codes of practice and advises the Government in matters relating to recognition of medical qualification. Currently there are 254 ayurveda, 41 unani and 9 siddha medical colleges offering undergraduate and post-graduate degree courses. [41]

The first degree in ayurveda (BAMS), unani (BUMS), siddha (BSMS) and homeopathy (BHMS) lasts approximately five and a half years and is comparable in duration with a first degree in allopathic medicine (MBBS). The course comprises of approximately four and a half years of in-class work and a one year internship period typically at a District Hospital. While the BAMS (i.e. Bachelor of Ayurvedic Medicine and Surgery) syllabus mainly focuses on training in ayurvedic medicine, during their course work and internship students also receive training in allopathy. They study anatomy, modern physiology and basic pathology. They learn to conduct and evaluate blood, urine and stool examinations. Students are trained to conduct minor surgical procedures like incision, abscess drainage, suturing, wound management, and management of surgical emergencies. They also learn how to conduct ante- and post-natal care and the management of minor and major pregnancy disorders.

The Supreme Court of India has permitted ayurveda, siddha, unani and homoeopathy practitioners to prescribe allopathic medicines under Rule 2(ee) of the Drugs and Cosmetics Rules, 1995 in those states where they are authorized to do so by a general or special order made by the concerned state government. Practitioners of Indian medicine holding degrees in integrated courses can also prescribe allopathic medicines if any state Act in the state in which they are practicing recognizes their qualification as sufficient for registration in the State Medical Register.

Box 1.4 The Rural Medical Assistant (RMA)

Efforts to expand rural health services in the state of Chhattisgarh, like in most states in India, are constrained by a lack of physicians willing to serve in rural areas. The state governments responded to this problem by introducing a new cadre of rural clinical care provider, the Rural Medical Assistant (RMA). RMAs undergo a shorter duration of training in allopathic medicine relative to physicians and can only serve in PHCs.

Six colleges to train RMAs opened in Chhattisgarh between October 2001 and the end of 2002, admitting upto 150 students per year. However, as the course faced opposition from the Indian Medical Association, its name underwent several changes and ultimately came to be known as 'Diploma in Modern and Holistic Medicine'. The training students receive includes three years of course work in allopathic medicine followed by one year of internship. They study the same texts as students in a MBBS degree program. The internship is focused on rural health; it includes one month training at a sub-centre, three months at a PHC, 4 months at a Community Health Center (CHC) and 4 months rotational posting at a District Hospital.

The address the challenge of providing health services in rural areas and to create employment opportunities for these students, the state government created the post of Rural Medical Assistant (RMA) in the state health service. These posts were sanctioned at PHCs classified as remote or in tribal districts. RMAs are hired on contracts. In non-tribal areas they receive Rs. 8,000 per month (significantly less than the salary of a MBBS trained physician) and those in tribal areas receive Rs. 9,000 per month. The state recently increased the total number of RMA posts to 858 and introduced one RMA post at all PHCs and an additional post for Lady RMAs at the CHC level in all the 18 districts (difficult, rural or tribal) of Chhattisgarh.[9] In principle, RMAs are always posted under the supervision of a Medical Officer. Private independent practice is not permitted.

RMAs are permitted to carry out a variety of functions, including:

- Assist in implementation of all national and state level health programs
- Provide preventive health care
- Provide primary health care services and referral
- Provide basic maternal and child health care, conduct deliveries, basic management of complications of pregnancy and childbirth, suturing of first degree perineal tears
- Perform simple operative procedures: repair of small wounds by stitching, drainage of abscess, burn dressing, applications of splints in fracture cases, application of tourniquet in case of severe bleeding wound in a limb injury
- Procedures not to be performed: Medico-legal cases, post-mortem

Chapter 2

Study Objectives

The shortage of physicians in rural areas of India is one of the biggest constraints to achieving universal health care. This scarcity is due to both the disinclination of qualified private physicians to work in underserved areas and the inability of the public sector to adequately staff rural health facilities. One consequence of this public sector shortage is that clinical services in primary health care settings are being provided by a variety of non-physician[7] clinicians. In several states AYUSH doctors, who were meant to serve as the second Medical Officer in a PHC, have become the main providers of clinical services. Some states (e.g. Chhattisgarh) have introduced a new cadre of rural clinical care provider, the RMA, who undergo a shorter duration course in allopathic medicine and can serve only in PHCs when they join government service. Quite frequently paramedical staff (e.g. nurses, medical assistants, pharmacists), with little or no clinical training, provide clinical services at PHCs because no one else is available.

The functioning, either by design or circumstance, of clinical care providers with shorter training duration or AYUSH doctors and paramedical staff (pharmacists and nurses) as the main providers of clinical services at PHCs represents a set of alternatives to physicians. Yet, there is little known about how well these non-physician clinicians perform duties expected of Medical Officers at PHCs.

This study provides a comparative assessment of the performance of different types of primary health care providers – Medical Officers, clinical care providers with short training duration i.e. RMAs, AYUSH Medical Officers and paramedical staff (nurses and pharmacists) – in their capacity as the main providers of clinical services at PHCs. The performance of these health workers is examined on several dimensions. Their ability to manage common illnesses seen at PHCs was assessed in terms of their competence ('how

[7] Throughout this report we use the term physician to refer to a medical doctor or a Medical Officer i.e. those with a MBBS degree or higher qualification. We use the term 'non-physician clinician' to denote clinical care providers who have undergone shorter duration training in modern medicine relative to physicians. In the context of this study non-physician clinicians include AYUSH doctors (BAMS degree or higher), Rural Medical Assistants (RMA) and paramedical health workers (pharmacists and nurses).

much they know'). The perception of their patients was assessed in terms of satisfaction with services and perceptions about the quality of care they received. The use of the local PHC by ill community members and community perceptions of the local PHC was also examined. Assessing the performance of these different types of health workers on a variety of dimensions enables a comprehensive understanding of their suitability as primary health care providers. The study was conducted in the state of Chhattisgarh in central India in 2009.

The rest of this report is structured as follows. Chapter 3 describes the state of Chhattisgarh, the location of this study. Chapter 4 provides a description of the sampling design and Chapter 5 describes the characteristics of the sample. Chapter 6 discusses results from the assessment of the clinical competence of the different clinical care providers sampled in this study. Chapter 7 examines the prescription practices of these clinical care providers. Chapter 8 examines results from the assessment of patient satisfaction and perceived quality. Chapter 9 discusses results from the community survey, including, care seeking and community perceptions of the local PHC. Chapter 10 discusses findings from job satisfaction assessment of the sampled clinical care providers.

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Chapter 3

Chhattisgarh State

Chhattisgarh is one of the youngest states in India. It was carved out of the state of Madhya Pradesh in November 2000 with Raipur as the state capital. Chhattisgarh is the 10th largest state of India and is spread across an approximate area of 135,194 sq km. Nearly half the state is forested and accounts for 12% of India's forests.

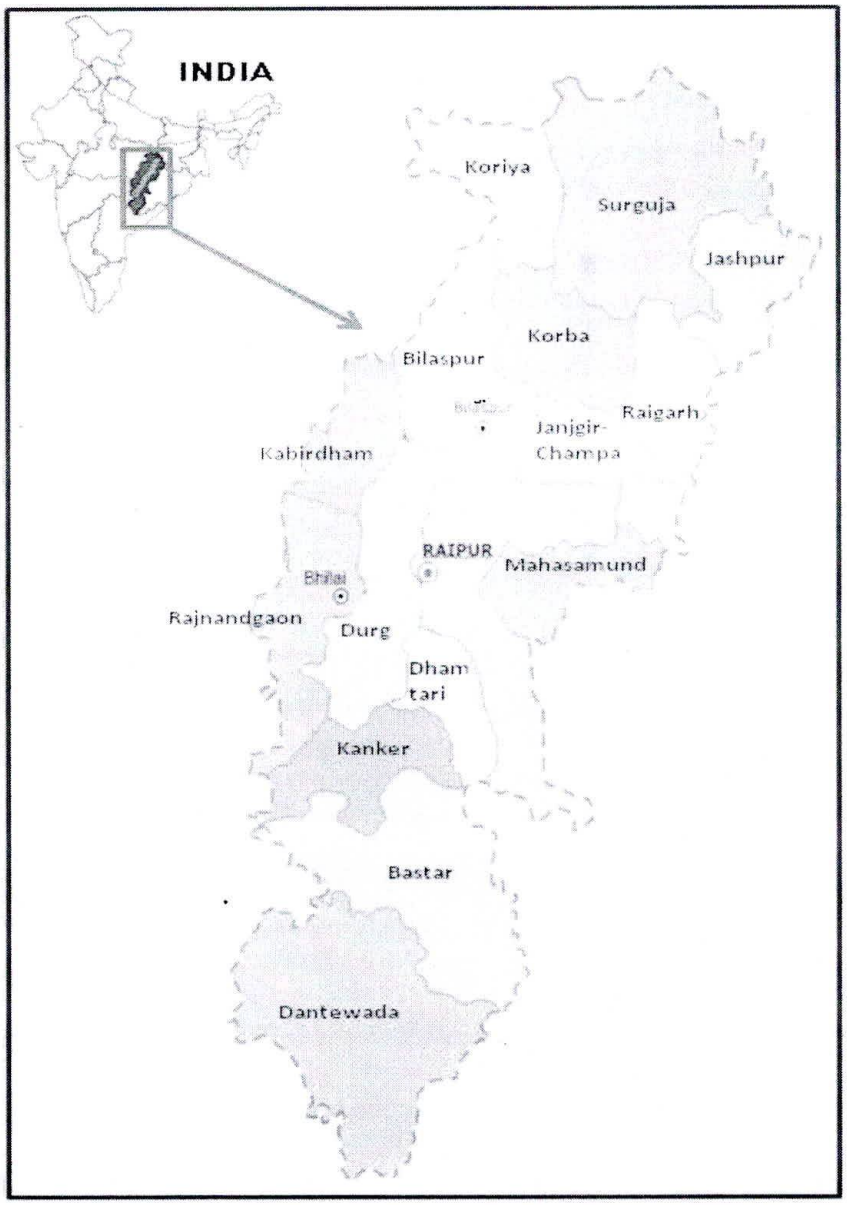
Chhattisgarh shares borders with the states of Madhya Pradesh and Maharashtra in the west, Orissa in the east, Andhra Pradesh in the south, Jharkhand and Uttar Pradesh in the north. Eighteen districts make up the state (Figure 3.1). According to the 2001 Census, Chhattisgarh has a population of 20.7 million people and a population density of 154 persons per square kilometer. This compares favorably with the national average of 324 persons per square kilometer.

Chhattisgarh is a predominantly rural state with one fifth of the population living in urban areas (Table 4.1). It also has a large tribal population; 30% of the population is tribal (Table 4.1). It is home to many of the primitive tribes of India and has a high concentration of Gonds who inhabit the hilly region of the state. Literacy levels are low, particularly for females. Remarkably, there are twice as many literate males than females (Table 4.1).

Insurgency

Large areas of Chhattisgarh state are currently experiencing armed conflict. Seven districts (Bastar, Narayanpur, Dantewada, Bijapur, Kanker, Sarguja and Rajnandgaon) are particularly affected by violence between the government and violent left wing groups (Maoists and Naxalites). The Government is finding it difficult to implement public programs in these areas. Out of these seven districts, five are in the Bastar region in southern Chhattisgarh. These districts lack basic amenities including transportation and communication facilities, electricity, water supply and skilled human resources. Since the start of the conflict in 2006 there have been a lot of killings and social unrest in the northern and southern parts of the state. Frequently, the violence spills into other parts of the state as well.

Figure 3.1 Districts of Chhattisgarh



Economy

Chhattisgarh is rich in natural resources. The state's dense forests offer much potential for forest products. It is also one of the richest states in mineral resources. The state has mega industries in steel, aluminum and cement. Agriculture and allied activities forms the base of the state's economy and provides livelihood to 80% of the rural population.[42] The central plains of the state are known as the 'rice bowl' of central India. The major crops produced include sugarcane, pulses, banana, wheat, rice and pulses. The rural economy also contains a thriving non-farm economy.

Table 4.1 Social and Demographic Characteristics of Chhattisgarh

Indicator		India	Chhattisgarh
Demographic	Population (millions)	1,028.7	20.7
	Male (%)	52	50
	Urban (%)	28	20
	Sex ratio	933	990
Caste and tribe	Tribal (%)	8	30
	Schedule caste (%)	19	14
	OBC/Other	72	57
Religion	Hindu (%)	82	95
	Muslim (%)	13	3
	Christian (%)	3	1
	Sikh (%)	2	0.1
	Other (%)	2	0.7
Education	No education (%)	42	47
Health	Infant mortality rate	57	70.8
	Stunting in children (%)	48	53
	Children fully immunized	43	49
	Institutional deliveries	39	14
	Total fertility rate	2.68	2.62
	Life expectancy at birth	64	58
Economy	Households with electricity (%)	68	60
	Per capita net state domestic product (Rs)	37,490	34,483
	Population below poverty line (%)	28	41

Sources: NFHS (2005-06), Census (2001), SRS (2007), Economic Survey of India 2009-10

Despite all this natural wealth, Chhattisgarh is one of the poorest states in India with 41% of the population below the poverty line. Nationally, 28% of the population is below this line (Planning Commission of India 2004-05). The state's per capita income is slightly below the national average (Table 4.1). Moreover, Chhattisgarh is experiencing a high economic growth rate of 16%, which is higher than the national growth rate of 12%.[43]

Health

Chhattisgarh has some of India's worst health indicators. The infant mortality rate (70.8) in 2005 was among the highest in India and substantially higher than the national average (57). Chhattisgarh also has one of the highest levels of child malnutrition in the country; among children under three years of age in 2005, 53% were stunted and 48% underweight (NFHS-3). However, there have been improvements; in 1997, the prevalence of stunting (61%) and

underweight (53%) in children was substantially higher. Life expectancy at birth is also below the national average. Chhattisgarh is also a malaria endemic area; in 2006, it contributed 7% of the total malaria cases and 11% P. falciparum cases reported in the country (NVBDCP, 2007).

Though full immunization coverage in Chhattisgarh is higher than the national average, 1 in 2 children are still not fully immunized. Remarkably, immunization levels are higher than the national average and testimony to efforts made by the state to strengthen the health workforce at the community level. Institutional deliveries (14%) in 2005 were low and remarkably lower than the national average (Table 4.1).

The state government has taken major initiatives to improve health services. An important initiative of the state is the deployment of 60,000 *mitanins* or community health volunteers (CHV) in 2002. This has been one of India's most successful CHV programs. The *mitanins* undergo 13 rounds of training including in IMNCI and giving first level curative care. Further rounds of training are also being planned. The *mitanin* program has influenced the design of ASHA (Accredited Social Health Activist) scheme under the National Rural Health Mission launched by Government of India. Another important human resource innovation by the state has been the introduction of a carder of allopathic doctors with short duration of training, the Rural Medical Assistant (RMA), to serve in PHCs (Box 1.4).

Chapter 4

Study Design and Sample

4.1 Questionnaires

Five questionnaires were used to collect information related to the study objectives. These questionnaires were used to collect information about clinical care providers at PHCs, their patients and the communities where the sampled PHCs were located. In addition, information was collected on structural attributes of the PHCs and the village where the PHC was located. These five questionnaires were first produced in English after which they were translated to Hindi and the translation verified. All questionnaires were subjected to several rounds of pretesting. The questionnaires used in the study are described below.

Form 1 – Clinical Vignettes: This assesses the competence of PHC clinical care providers. The form contains six clinical vignettes (cases) developed for conditions commonly seen at PHCs. These six cases are described below:

Case	Primary Complaint	Diagnosis
Case I	A 35 year old female patient having high fever and a headache	Malaria
Case II	An 8 month old male baby having diarrhea for the last two days	Diarrhea with severe dehydration
Case III	A 2 year old girl having a cough	Pneumonia
Case IV	A 24 year old woman, who is about 6-7 months pregnant, having a severe headache	Pregnancy induced hypertension
Case V	A 50 year old man having cough, fever and fatigue	Tuberculosis
Case VI	A 46 year old man complains of exhaustion and frequent urination in large volumes	Diabetes Mellitus

Each of these cases contained individual sections on patient history, examinations, diagnostics, diagnosis, prescription, referral and advice for home care. These cases were selected based on the disease profile of Chhattisgarh, conditions commonly seen at PHCs and health priorities of the state. The vignettes were developed based on a review of the literature, standard treatment guidelines and common practices suggested by treating physicians at PHCs in Chhattisgarh, experts from All India Institute of Medical Sciences in Delhi, Raipur Medical College, practitioners at district hospitals and private doctors in Chhattisgarh (see Annex 4). The questionnaire was pretested with a sample of practitioners from all four types of clinical care providers under study.

Form 2 – Patient Exit Interview: This form was used to collect information from patients exiting the PHC. It asked about the patient's background, information about their consultation i.e. what the clinical care providers had asked and done, the patient's prescription, the patient's satisfaction and perception of service quality and the socioeconomic status of the patient.

Form 3 – Clinical Care Provider Assessment: This form collected background information about the main clinical care providers at the PHC, the training they have received during service, the cases they have seen in the past three months and the procedures they have performed. Further, the questionnaire collected information on the clinical care provider's intention to continue service and the reasons for wanting and not wanting to do so. The final section of the questionnaire asked about the clinical care providers job satisfaction. This was a self-administered questionnaire.

Form 4 – Household Survey: This form was used to collect information from households in the village where the PHC was located. Sampled households were asked about illness of family members in the past month, whether treatment was sought, if so where it was sought and how much was paid. This form also collected information about household member opinions on the PHC provider and services. Information on household asset ownership was also recorded in this form.

Form 5 – Health Facility Assessment: This form was used to extract information from the PHC registers on monthly visits to the PHC during the past three months and the main

complaints of patients visiting the health center in the past week. The form was also used to record information on the physical characteristics of the PHC building, the cleanliness of the PHC and whether equipments and drugs were present.

4.2 Survey design and sample

Data for the study was collected in two phases between July and September 2009. In the first phase, data on provider competence and job satisfaction was collected i.e. Form 1 and 3, by inviting PHC clinical care providers to designated interview centers. In the second phase, PHCs were visited to collect information from patients, households living in the village where the PHC was located and the PHC.

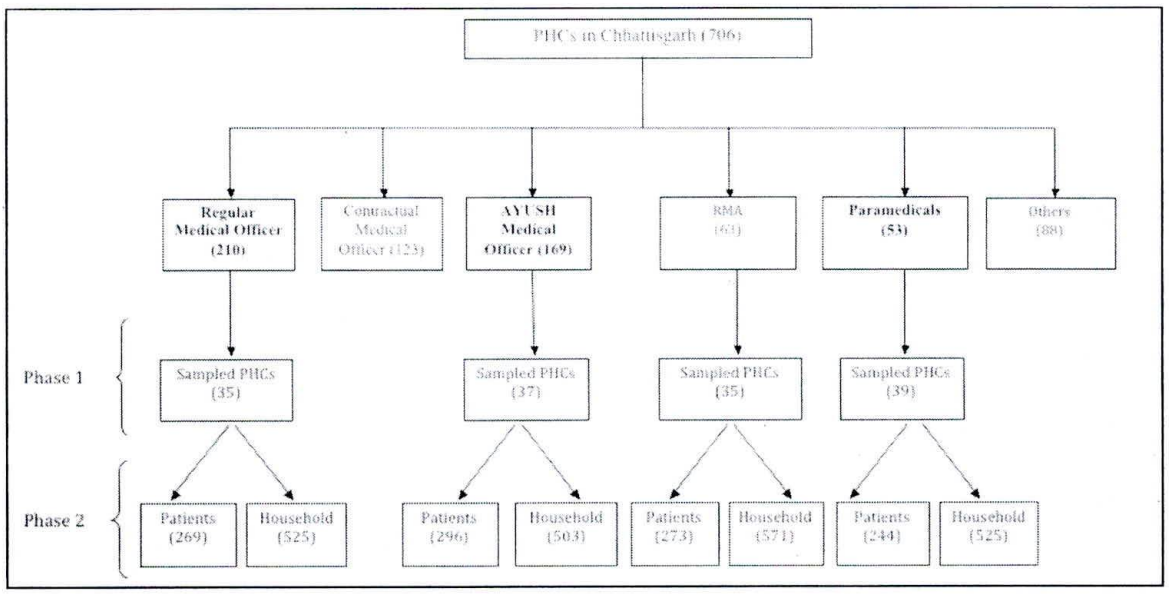
Selection of PHCs

To get a representative sample of different types of clinical care providers serving at PHCs in Chhattisgarh, first, a listing of PHCs and the staff present at these PHCs was compiled based on information supplied by the State Programme Management Unit, NRHM, Department of Health and Family Welfare, Chhattisgarh. This list contained information on the staff currently posted and in-position at PHCs in the state. Second, this information was verified with officials located in the PHC's district like the Chief Medical and Health Officer (CMHO), the Block Medical Officer (BMO). Third, PHCs that were located in areas experiencing armed insurgency and unsafe for surveyors to visit were excluded from the list. This final list constituted the sampling frame for PHCs.

The staffing pattern of PHCs indicated that several types of clinical care providers – regular Medical Officer, contractual Medical Officer, AYUSH Medical Officer and RMAs – were the main providers of clinical services at PHCs in Chhattisgarh. Regular Medical Officers possess at least a MBBS degree and are in regular government service. Contractual Medical Officer possess at least a MBBS degree and have been hired on a contractual basis. AYUSH Medical Officers, in this case ayurvedic physicians, have at least a BAMS degree, have been hired on a contractual basis as the second Medical Officer in the PHC. RMAs are allopathic clinical care providers with a short duration of training and have been hired on a contractual basis. Where these clinical care providers were not present, the PHCs were functioning with

pharmacists, staff nurses, dressers, auxiliary-nurse midwives (ANM) and other lower level health workers. This information allowed PHCs in Chhattisgarh to be classified into the following six groups or strata according to who was primarily responsible for providing clinical services – regular Medical Officer, contractual Medical Officer, AYUSH Medical Officer, RMAs, Paramedicals (pharmacists and staff nurse) and others (dressers, ANM and other lower level staff) (Table 4.1 and Figure 4.1).

Figure 4.1 Sampling Design



There are two issues with this classification. First, several PHCs had more than one type of clinical care providers present. For example, several PHCs had both AYUSH and regular Medical Officers on their staff. In these cases, we considered the regular Medical Officer to be the main clinical care providers there. Secondly, it was not possible to know if the health worker identified as the main clinical care providers at the PHC is regularly present. For instance, a PHC might have a regular Medical Officer posted but the pharmacist provides clinical services because the Medical Officer is typically absent. To minimize misclassification health workers at the selected PHC were telephonically contacted to verify who provides clinical services.

In this study, only PHCs in the regular Medical Officer, AYUSH Medical Officer, RMA, and Paramedical group were sampled. Contractual Medical Officers were not sampled because

they are similarly qualified as their regular counterparts. PHCs where the only staff present was dressers, auxiliary-nurse midwifes and lower level health workers were excluded because these health workers do not generally provide clinical care. To get a representative sample of clinical care providers in each group, within each of these strata, simple random sampling without replacement was used to select 40 PHCs in each strata.

Selection of patients

A convenience sample of ten outpatients was selected as they exited the PHC. Only those patients who were visiting the PHC for the first time for their current illness were eligible for interviews. However, they could have consulted other health providers for the same condition prior to visiting the PHC. In PHCs where more than one clinical care provider was present (e.g. regular Medical Officer and AYUSH Medical Officer or two Medical Officers), only patients of the main clinical care provider who was interviewed in the first phase were selected. Patients were interviewed after taking informed consent.

Selection of households

In Chhattisgarh, villages are divided into *paras* or clusters of households based on caste and religious affiliation. With the assistance of PHC staff, a listing of all *paras* in the village where the PHC was located and the approximate number of households in each *para* was compiled. From this list one *para* was randomly selected and 15 households in the *para* sampled. Households were selected as follows. At the boundary of the *para* the surveyors selected a random direction by spinning a pen. Every second household in this direction was sampled till 15 households were completed. If a selected household refused to be interviewed, the neighbouring household was included instead. In each household visited, a competent adult family member was identified to serve as the main respondent. Households were interviewed after taking informed consent.

Sample

Table 4.1 and Figure 4.2 show the location of PHCs in Chhattisgarh. One notable feature is that there is substantial geographical clustering of clinical care provider groups. For instance,

PHCs headed by AYUSH Medical Officers, RMAs and Paramedicals are clustered in a few districts while Medical Officer headed PHCs tend to cluster in central districts of Chhattisgarh. This geographical clustering of clinical care providers reflects both purposive placement and self-selection. For instance, all the AYUSH Medical Officers are located exclusively in the tribal areas of Chhattisgarh and RMAs have been placed only in a few districts. The geographical clustering of Medical Officers is due to their self-selection to remain in the central regions of Chhattisgarh which are more developed than other parts of the state.

Around 30% of PHCs are headed by regular Medical Officers, 7% contractual Medical Officers, 24% AYUSH Medical Officers, 9% RMAs, 8% Paramedicals and 12% by others. With more than half the PHCs in Chhattisgarh without a Medical Officer, contractual or otherwise, this distribution highlights the difficulty in recruiting and retaining physicians at PHC.

The sampling frame includes 456 PHCs from which PHCs for the study sample were selected. PHCs not included in the sampling frame were those where the main clinical care provider was not of interest to the study (e.g. contractual allopathic doctors) or where no clinical care provider was present (e.g. dressers, auxiliary midwifes and lower level health workers) and PHCs that were too dangerous for field surveyors to visit due to the ongoing insurgency in the state.

The target sample covered 19% of the PHCs headed by regularized allopathic doctors, 24% of the PHCs headed by AYUSH doctors, 64% of the PHCs headed by RMAs and 76% of the PHCs headed by Paramedical staff. 91% of the target sample size of 160 PHCs was achieved. Across groups, at least 88% of the target sample size was achieved. The target sample size was not completely achieved because some clinical care providers could not be contacted. Further, three PHCs (2 AYUSH Medical Officer and I RMA) which were sampled in the first phase could not be surveyed in the second phase.

Patients and households were sampled in the second phase of the study. In this phase three PHCs covered in the first phase could not be reached because of poor roads or bad security. At six PHCs no patients were available when the surveyors visited during clinic hours. These

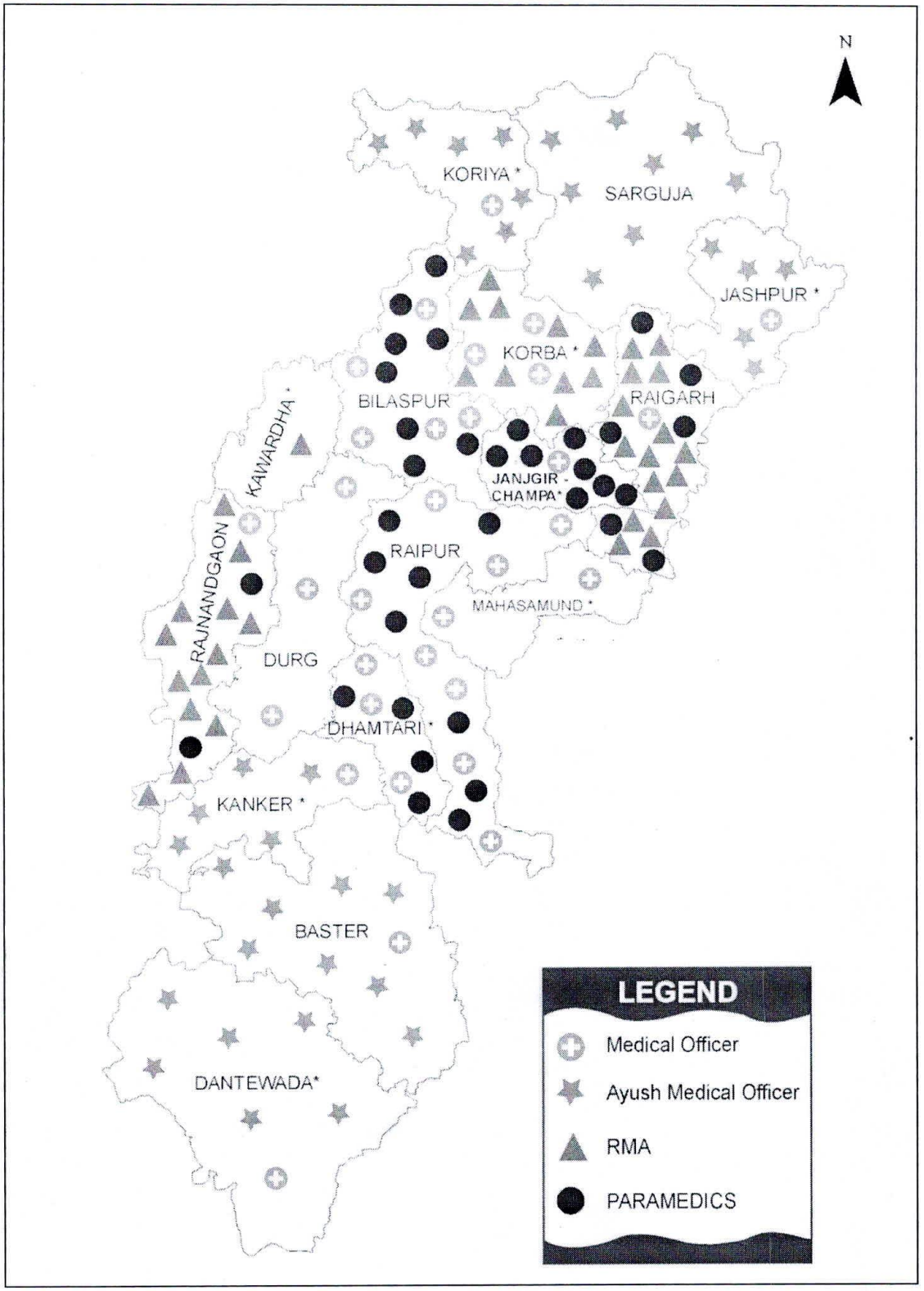
factors led to only 68% of the target sample size of patients being achieved. For households, 89% of the household target sample size was achieved.

Table 4.1 Target and Achieved Sample Size

District	Number of PHCs	Regular Medical Officer	Contractual Medical Officer	AYUSH Medical Officer	RMA	Paramedical	Others
Bastar	53	19 (4)	0	34 (9)	0	0	0
Bilaspur	75	32 (6)	8	0	0	8 (8)	27
Dantewada	37	4 (1)	0	33 (7)	0	0	0
Dhamtari	23	7 (3)	5	0	0	5 (4)	6
Durg	71	16 (3)	28	0	0	0	27
Janjgir Champa	39	12 (1)	6	0	0	16 (10)	5
Jashpur	32	10 (1)	4	18 (6)	0	0	0
Kabirdham	22	4	4	0	2 (1)	0	12
Kanker	28	7 (1)	5	16 (3)	0	0	0
Korba	40	18 (4)	5	0	17 (11)	0	0
Koria	27	4 (1)	0	21 (7)	1	0	1
Mahasamund	28	8 (2)	19	0	0	0	1
Raigarh	50	17 (1)	2	0	25 (15)	6 (6)	0
Raipur	63	24 (9)	19	0	0	14 (10)	6
Rajnandgaon	42	10 (3)	8	0	18 (13)	4 (2)	2
Surguja	76	18	10	47 (8)	0	0	1
TOTAL	706	210	123	169	63	53	88
Sampling frame	456	205		135	63	53	
PHC (target)	160	40		40	40	40	
PHC (actual)	146	35		37	35	39	
Patients (target)	1,600	400		400	400	400	
Patients (actual)	1,082	269		296	273	244	
Households (target)	2,400	600		600	600	600	
Households (actual)	2,124	525		503	571	525	

Note: Figures in parenthesis indicate the target sample in the district

Figure 4.2 Geographical Location of Sampled PHCs



There were two significant deviations from the sampling plan. One PHC which had been classified as belonging to the Paramedical group later turned out to have a regular Medical Officer present. This PHC was classified under the regular Medical Officer group. Another PHC which was originally classified as regular Medical Officer was later found to have a contractual Medical Officer. This PHC was retained in the sample.

4.3 Data collection and processing

Field work

Data collection for the study was conducted in two phases between July and September 2009. In the first phase data on provider competence and job satisfaction was collected i.e. Form 1 and 3. Five regional centers were identified - namely Raipur, Bilaspur, Korba, Sarguja and Bastar districts - the main clinical care provider in the selected PHC was asked to visit a designated center at a specific date and time. Selected clinical care providers were registered as they arrived and then assigned to one of the six interview teams. Consent was taken from all participants. The interviewed clinical care providers were offered an honorarium, according to government norms, for participating in the study.

The interviews were conducted in the privacy of a room. At least two study investigators were present at each of the data collection centers to monitor and supervise the process. The investigators observed interviews at random without interruption or interference. At the end of the interview every completed form was checked by both supervisors to correct any errors. Completed forms were brought back safely and stored at the SHRC office in Raipur.

Interviewers were mostly graduates with degrees in physiotherapy, pharmacy and social work. All the interviewers were fluent in Chhattisgarhi (local dialect). Altogether 21 surveyors participated in the study. Training of interviewers for the first phase was conducted over five days and included both classroom sessions and field training. The initial sessions on the first day were spent orienting the participants to the study objectives, general methods of collecting survey data, basic protocols to follow and the like. The field staff then, with help of a training manual, explained the structure of the vignettes and how each section of the

questionnaire would be administered. The meaning of some of the technical terms which recurred frequently in the six cases such as auscultation, skin pinch test, oedema, stridor were explained to the trainees.

In the second phase of data collection, PHCs contacted in the first phase were visited to carry out exit interviews and the household survey. Interviewers from the first phase were used in this phase and underwent four days of additional training to administer these questionnaires. The training involved a daily routine of in-class review of the questionnaires followed by visits to nearby PHCs for field testing. Training manuals were provided to all the surveyors during the training.

The twenty one interviewers were divided into seven three-member survey teams. Each team had two surveyors and one field supervisor. The job of the field supervisor was to facilitate the exit or household interview, check the completed forms for errors and coordinate the field work. Each team was also closely observed by the study investigators during the course of data collection. At the end of each survey day, the study investigators and the interviewers together went over each questionnaire to identify and rectify errors.

Data processing

Completed survey forms were stored in Raipur in a secure place. The forms were entered into a database created using CSPro[44]. All forms were double entered by independent data entry operators. No personal identifiers were entered into the database. Five different databases corresponding to each of the five survey questionnaires were created. These datasets were converted to the STATA 10[45] format for data analysis.

Chapter 5

Sample Characteristics

This chapter describes the main characteristics of the sampled PHCs, the clinical care providers at these PHCs, their patients and the households in the village where the PHC was located. Further, characteristics of the sampled PHCs and the villages where they are located are also described.

5.1 PHC characteristics

This section examines the characteristics of the sampled PHCs. Described below are the characteristics of the villages where the sampled PHCs were located, the condition of these PHCs in terms of their physical structure and condition, service availability and the mix of cases treated.

Location

About 40% of the sampled PHCs were located in areas exclusive to tribal populations, 19% in non-tribal areas and 41% in exclusively non-tribal areas (Table 5.1). Most (74%) of the PHCs headed by AYUSH Medical Officers were in exclusively tribal areas, by far the highest in any group. This is due to the purposive placement of AYUSH Medical Officers in the tribal areas of Chhattisgarh. In the remaining groups, the distribution of PHCs between tribal/non-tribal areas is generally the same.

All the villages where the sampled PHCs were located had a primary school. Secondary schools were also present in most of these villages. The majority of villages also had a high school. However, this was most frequent in the paramedic group, followed by Medical Officers, RMA and AYUSH Medical Officers.

The mean distance from the nearest town was around 23 Kms. PHCs headed by RMAs were closest (19 Km) to the nearest town, followed by Medical officers, AYUSH Medical Officers and Paramedical staff groups. In terms of the other infrastructure indicators like regular

electricity, piped water, daily bus service, villages in the Medical Officer and Paramedical group appear to be the most developed, followed by RMAs and AYUSH Medical Officer.

Table 5.1 Characteristics of Village Where the PHC is Located

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical Staff	All
Tribal population (%)	26	74	33	26	40
Non-tribal population (%)	29	0	10	37	19
Mixed population (%)	45	26	57	37	41
	100	100	100	100	100
Primary school (%)	100	100	100	100	100
High school/ Sr. Secondary school (%)	77	66	67	80	72
Regular electricity (8 hrs/day) (%)	89	60	74	89	78
Piped water (%)	51	20	36	54	40
Daily bus service (%)	86	77	80	83	81
Mobile connectivity (%)	97	83	92	91	91
Distance from nearest town (Km)	21.2 (15.63)	27.1 (20.52)	19.0 (12.21)	27.4 (41.24)	23.6 (24.89)
Distance from nearest proper road (Km)	1.6 (4.24)	2.1 (5.32)	1.7 (4.55)	13.4 (67.41)	4.5 (33.46)
N	35	35	39	35	144

Note: Figures in parenthesis is SD

Infrastructure

Overall, the sampled PHCs have poor infrastructure; less than half of them have basic amenities like 24 hours electricity and water supply. Less than one in ten had a generator present. In terms of physical infrastructure, less than half had toilets for patients and only one third had living quarters for the resident clinical care provider. Significantly, only 21% had a separate laboratory. One reason for the poor infrastructure at these PHCs is that many of them were sub-centers which have, on paper, been designated as PHCs but their physical infrastructure is yet to be upgraded. In general, PHCs in the Medical Officers group had the best infrastructure, followed by RMAs, AYUSH Medical Officers and Paramedical staff (Table 5.2).

Table 5.2 PHC Infrastructure

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical Staff	All
24 hours electricity supply (%)	57	26	44	50	44
24 hours water supply (%)	60	29	42	35	41
Generator present (%)	20	9	3	0	8
Toilet for patients (%)	63	43	59	47	53
Living quarters for doctors (%)	46	26	39	21	33
Delivery room (%)	63	56	66	41	57
Separate examination room (%)	77	57	67	56	64
Separate drug storage room (%)	71	69	75	62	69
Separate laboratory (%)	23	20	26	15	21
Separate cold chain room (%)	23	6	6	9	11
Cold chain for vaccine storage (%)	83	69	100	73	80
N	35	35	39	35	144

Note: Drug stock outs in the past one year calculated as mean over three months (April, May, June)

Table 5.3 PHC Functionality

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical Staff	All
Number of drug stock outs annually	4 (3.04)	3.7 (2.78)	2.6 (1.00)	3.8 (2.62)	3.4 (2.38)
Medicines present (%)	94	94	94	94	94
Functioning laboratory (%)	32	26	28	18	26
N	35	35	39	35	144

Note: Figures in parenthesis is SD

PHCs in the sample experienced stock outs of one or more drugs for less than two months a year, on average (Table 5.3). This does not differ much across clinical care provider type groups. However, the overwhelming majority of the PHCs had drugs present in storage when the survey team visited and this is found to be consistently high across groups. The presence of a working laboratory (functional microscope and reagents) presented a rather troubling

situation – most (74%) of the PHCs sampled did not have one. Across groups, PHCs in the Medical Officer group had the highest proportion (32%) of functional laboratories and those in the Paramedical group had the lowest (18%).

Overall, the majority of PHCs did not need repairs of their interior walls, floor and outside walls (Table 5.4). Among these, the condition of the outside walls needed the most attention. Further, the majority of PHCs were rated having clean doctor consultation rooms. However, only a small proportion of the PHCs had clean surroundings. On the whole, in terms of the condition of the PHC building and cleanliness, PHCs in the Medical Officers group performed the best and those in the Paramedical staff group, performed the worst.

Table 5.4 Condition of the PHC Buildings

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical Staff	All
		Major repairs needed			
Interior wall (%)	34	47	25	50	39
Floor (%)	20	29	31	27	27
Outside wall (%)	43	56	42	56	49
		Cleanliness			
Doctor consultation room (%)	74	66	62	45	62
Area surrounding PHC (%)	40	43	39	27	37
N	35	35	39	35	144

Patient case mix

Table 5.5 summarizes the distribution of the main complaint recorded in the patient register for the month of June 2009 at the sampled PHCs. Cough, fever, diarrhea and stomach pain were the most commonly presented complaints. TB and animal/snake/scorpion bite cases formed a small proportion of the presenting complaints. The distribution of complaints was similar across groups suggesting that PHCs headed by all four provider types received similar cases. Further, the proportion of both antenatal care cases and the number of deliveries was highest for Medical Officers with an average of two deliveries across providers.

Table 5.5 Main Complaints of Patients at PHCs

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical Staff	All
Fever (%)	100	100	100	100	100
Cough (%)	100	100	97	97	99
Injury/accident (%)	88	94	81	82	86
Stomach pain (%)	88	100	92	82	91
Diarrhoea (%)	94	100	97	97	97
TB (%)	39	20	11	12	20
Animal/snake/scorpion bite (%)	18	14	11	15	15
Antenatal care (%)	97	66	76	62	75
Deliveries conducted mean (SD)	4.7 (8.9)	1.8 (2.61)	2.2 (4.24)	1.1 (2.0)	2.4 (5.29)
N	35	35	39	35	144

Note: Figures in parenthesis is SD

5.2 Characteristics of sampled clinical care providers

Among the sampled clinical care providers – Medical Officers, AYUSH Medical Officers, RMAs and Paramedicals - less than one fifth of the providers are female (Table 5.6). However, among RMAs slightly more than a third of the providers are female. The average age of these clinical care providers is 34 years and is lowest for RMAs (26 years) and highest for Medical Officers (42 years). The young age of RMAs reflect their recent induction to the public system. The majority were married. However, lower proportion of RMAs (21%) and Paramedicals (57%) were married. Among the married, 62% were living with their spouse. Further, while 72% of Medical Officers and 84% of Paramedicals were living with spouse, only 47% of AYUSH doctors and 38% of RMAs were doing the same. Medical Officers and Paramedicals had worked the longest at the PHC level and at the sampled PHCs. Expectedly, the RMAs had worked the least since they had recently been inducted into service.

Table 5.6 Provider Characteristics

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical	All
Male (%)	83	94	64	83	81
Age	42.31 (7.55)	35.08 (5.15)	25.17 (1.76)	33.2 (11.28)	34 (9.33)
Married (%)	91	92	21	57	64
Married and staying with spouse (%)	72	47	38	84	62
Living where PHC is located[8] (%)	60	78	72	69	70
Months working at PHC level	148.4 (88.99)	41 (21.34)	10.78 (1.74)	110.88 (130.47)	77.96 (95.46)
Months working at current PHC	90.3 (68.85)	35.78 (21.5)	10.39 (2.37)	67.26 (88.01)	50.90 (63.82)
Regular employment (%)	97	0	0	100	47
N	35	37	39	35	146

Note: Standard Deviations are shown in parentheses

Table 5.7 Educational Qualifications of Providers

Educational qualification	Medical Officer (%)	AYUSH Medical Officer (%)	RMA (%)	Paramedical (%)
MBBS	83	0	0	0
Post graduate/diploma/DMV	17	0	0	0
BAMS	0	100	0	0
Diploma in Modern and Holistic Medicine	0	0	100	0
Diploma in General Nursing & Midwifery	0	0	0	6
Bachelors of Pharmacy	0	0	0	6
Diploma in Pharmacy	0	0	0	77
Other	0	0	0	11
Total	100	100	100	100
N	35	37	39	35

Medical Officers had either a MBBS (83%) or a post graduate degree (17%) in allopathic medicine (Table 5.7). All AYUSH Medical Officers in the sample had a BAMS degree and

[8] This refers to whether the providers were living in the 'village' where the PHC was located

all RMAs had a Diploma in Holistic and Modern Medicine. Paramedicals had a diversity of degrees, the most common being the diploma in pharmacy.

5.3 Patient Characteristics

More than half the sampled patients were male with an average age was 27 years (Table 5.8). Patients visiting AYUSH doctors were younger (22 years) and those visiting RMAs were older (30 years). Nearly a third of the patients were illiterate. The percentage of illiterate patients (34%) visiting Paramedicals was the highest. A majority of patients owned a cycle and cattle. Only one percent of the patients owned a car. More than half of the patients visiting Medical Officers, RMAs and Paramedicals also owned a fan.

Table 5.8 Patient Characteristics

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical	All
Male (%)	57	62	62	57	60
Age (years)	27	22	30	28	27
Not literate (%)	29	26	26	34	29
Own fridge (%)	7	3	6	2	5
Own car (%)	1	0	0	2	1
Own fan (%)	55	20	53	55	45
Own radio (%)	17	13	22	16	17
Own TV (%)	46	18	36	42	35
Own cycle (%)	77	82	84	76	80
Own motorcycle (%)	17	13	18	14	15
Own cattle (%)	52	81	64	57	64
Own phone (%)	36	23	36	20	31
N	269	296	273	244	1081

5.4 Household Characteristics

Table 5.9 describes the characteristics of the sampled households and their members living in the same village as the PHC selected for the study. Members in the sampled households were young (average age 27 years), about half were male and the majority were able to read. Household size was large with 5.6 members on average per household. These characteristics

were similar across the clinical care provider groups, the only exception being the AYUSH Medical Officer group, where a lower proportion reported being able to read.

Table 5.9 Household Characteristics

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical	All
Male (%)	51	50	50	52	51
Age (years)	27	27	28	27	27
	(18.73)	(18.31)	(19.17)	(18.87)	(18.79)
Able to read (%)	67	57	68	65	64
Household size	5.8	5.4	5.7	5.8	5.6
	(2.63)	(2.27)	(2.48)	(2.33)	(2.44)
Electricity for lighting	92	72	91	91	87
Gas for cooking	6	3	5	4	5
Own fridge (%)	7	3	6	8	6
Own car (%)	1	1	2	2	1
Own sewing machine	19	8	15	16	15
Own fan (%)	68	28	55	61	54
Own radio (%)	17	15	17	21	18
Own TV (%)	57	29	49	51	47
Own cycle (%)	80	77	86	76	80
Own motorcycle (%)	23	17	20	25	21
Own cattle (%)	56	78	70	64	67
Own phone (%)	45	25	41	40	38

The distribution of household assets shows that the majority of households had electricity; very few used gas for cooking or owned a fridge, car, sewing machine, radio and motorcycles. However, the ownership of electric fans, TV, cycles, cattle and phones was more frequent. The household asset distribution is also similar for the Medical Officer, RMA and Paramedical group. However, the AYUSH Medical Officer group generally has lower levels of asset ownership, particularly for more valuable assets like TV, fridge, sewing machine, electric fan and phones. This and the lower literacy in the AYUSH Medical Officer group suggest that the economic condition of households in this group was lower than households in the other clinical care provider groups. This fits well with the fact that most of the AYUSH Medical Officers were in tribal areas.

Chapter 6

The Quality of Clinical Care at Primary Health Centers

Assessments of health care quality can focus on the structural, process or outcomes of care.[46] Linking health outcomes to health programs can be technically demanding, particularly, in determining how much or which component of a program is responsible for the observed changes in outcomes. The effort expended in collecting such information can be substantial. Further, since many health programs (e.g. management of childhood illnesses) have proven efficacy, quality assessments have typically focused on the structural and process aspects of care. Structural quality assessments involve audits of health facilities to record the physical presence or condition of equipment, drugs, supplies, building, staff and staff training. While structural quality metrics inform on the ability of health facilities to produce health services, they provide no information on the quality of health workers and the care they produce. How much health workers know, what they do and how well they do it are in many ways of more immediate relevance to patient welfare. For instance, a patient faced with a health facility without drugs or diagnostic services can usually purchase them from the market. The profusion of pharmacies and diagnostic service providers that are a common sight outside government run health facilities in India are an example of private initiative filling in the structural deficiencies in public health facilities. However, a patient may have little choice of recourse when faced with a poor quality health provider because of the patient's inability to fully evaluate the technical aspects of care or simply because there is no other competent health provider available.

Measures of process quality assess the degree to which providers perform health care processes designed to achieve positive health outcomes. These processes are important because following them is believed to influence health outcomes positively. And the validity of process measures is determined by the degree to which they capture processes. Several methods to measure process quality exist. These include abstraction from patient records, measuring patient perceptions of quality, employing standardized patients, observing patient-provider interactions and using clinical vignettes (this study). These methods provide information on what clinical care providers do (e.g. observations of provider-patient interactions, patient perceptions, standardized patients) or how much they know (e.g. clinical

vignettes). Choosing between these methods involves a trade-off between the degree of comparability across provider types and the range of cases for which process quality can be evaluated (Box 6.1).

Box 6.1 Measuring Process Quality

Abstraction from patient records is a relatively straightforward way for collecting information on process quality. However, it has limited use in developing country contexts because of poor record keeping. Further, patient records frequently do not carry the level of detail necessary to make judgments on the technical aspects of care. Asking patients to rate different aspects of the care received after an encounter with a clinical care provider is another method to collect information on the technical aspects of care. However, it is subject to the vagaries of patient recall and provides better information on the inter-personal aspects of care (e.g. politeness of the provider) than on the technical quality of care received. Further, while it allows collecting information on a range of cases, differing case-mix limits comparability across providers and settings. Direct observation of patient-provider interaction is one of the standard techniques employed for assessing technical quality. However, it does compromise patient privacy and in certain types of cases observers may not be welcome. Further, because of variations in the case mix and patients, comparing providers can be a questionable exercise. The use of standardized patients is considered as the gold standard for measuring process quality.[47] This method involves 'fake patients' who present themselves to providers with specific complaints and conditions and then record the activities of the consultation. Since the patient and the presenting case is standardized it allows for direct comparison between providers and settings. However, the standardized patients can represent only a limited number of conditions.

6.1 Clinical vignettes and process quality

Vignettes have been employed in a variety of fields for measuring process quality.[13,17,47,48] Several types of vignettes have been used in health research and all of them involve presenting a standardized case to a health provider and then recording how he or she manages the case. The form of clinical vignette used in this study involved two persons interviewing a clinical care provider. One played the part of the patient and the second recorded responses. The 'patient' presents a case (e.g. *I am a mother who has brought her 8 month old male baby having frequent loose stools to you*) and the provider is asked to proceed as in a consultation and sequentially ask history questions and conduct examinations and investigations. Whenever a relevant question, examination or investigation is mentioned by the clinical care

provider, a standard response is given by the 'patient'. For example, if the provider asked *"For how many days has he had these loose stools?"* the standard response is *"For two days."* After the history, exam and diagnostic sections is completed the clinical care provider is asked to state their diagnosis, treatment (i.e. write a prescription), advice for home care and recommendations for referral and follow-up. The vignettes are structured in a manner that if the provider asked the relevant history questions, examinations and investigations then there is only one correct diagnosis that can be arrived at. Clinical care providers were asked to respond to the vignettes as if they were in a fully functional PHC and the patient would comply fully with their prescriptions and recommendations. Because clinical vignettes involve the use of standardized cases they offer the important advantage of allowing cases to be compared across providers and settings.

The clinical care provider's responses to the items contained in the vignette – history, examinations, diagnostics, diagnosis, prescription and home recommendations - are judged with reference to protocols of best practices according to standard treatment guidelines or expert opinion. How well a clinical care provider is able to cover these items reflects the degree to which his or her responses correspond to best practices. Therefore performance on the vignettes reflects provider knowledge of best practices i.e. his or her competence in managing the case.

The form of clinical vignette used in this study attempts to bring a degree of realism to the assessment with one of the interviewers interacting with the provider as a patient might do in an actual consultation. However, the clinical care provider knows that the patient is imaginary and has to rely on questions and answers for all aspects of the consultation including physical examinations and diagnostics. Performance on the vignettes is different from what providers do in practice. What they do in practice is influenced by how much they know (i.e. competence), the structural constraints and incentive environment within which they operate, and their expectations of patient compliance. For instance, providers who work in settings where x-ray machines don't work or certain drugs and key staff are not available will suitably alter their case management. Provider behavior can also be influenced by incentives that make them prescribe unnecessary drugs or investigations. In such situations what provider's do in practice can deviate from what they know they should do (i.e. competence) and from standard procedures.

A few studies have compared performance on vignettes with other measures of process quality. One study from Tanzania found correlation between performance on vignettes and provider practice (Leonard and Masatu 2005).[48] Further, vignette performance was better correlated with the best practices of physicians than what they typically (average) did in practice, leading the authors to conclude that vignettes are useful for measuring ability but not practice. Another study set in the United States examined physician outpatient performance on vignettes with standardized patients and chart abstraction.[47] Performance on standardized patients was consistently higher than on the vignettes suggesting that practice was better than competence. The mean performance scores of vignettes were closer to that of standardized patients (the gold standard) than to chart abstraction leading the authors to conclude that it is a valid measure of practice quality. A study set in Delhi, India found that the difference between performance on vignettes and practice varied by provider type and the sector (public or private).[13] Private sector medical doctors did more of what they knew compared to public sector doctors. Further, non-qualified doctors did most of what they knew. The authors attribute these differences to the incentives clinical care providers face. These assessments, though few, suggest that performance on vignettes is associated with provider practice, and the distance between them depends on provider effort.

Developing the vignettes

The clinical vignette used in this study involved presenting six standardized cases to the main clinical care provider at PHCs. The six cases were malaria in an adult woman, diarrhea with severe dehydration in an infant boy, pneumonia in a young girl, pregnancy induced hypertension, adult male with TB and an adult male with type II diabetes. Several factors influenced the selection of cases. First, these cases were selected based on the disease profile of Chhattisgarh and conditions typically seen at PHCs. Results from a study on illness patterns conducted by the Chhattisgarh State Health Resource Centre (SHRC) suggested that malaria among adults, ARI and diarrhea among children to be the most common illnesses suffered by these age-groups respectively. In addition, Chhattisgarh also has a high incidence of tuberculosis. The high maternal mortality in the state and India made it important to include the case of pregnancy induced hypertension and the growing burden of non-communicable diseases nationally made the diabetes case necessary. Second, the cases were selected so that a clinical care provider in a fully functional PHC can diagnose and treat these cases, except for pregnancy induced hypertension, where the correct practice is to refer to a

higher level facility. Third, the cases were selected to gauge the ability of clinical care providers at PHCs to treat a range of patients (adults, children, and women) and conditions (communicable diseases, chronic disease and reproductive health).

The specific questions, examinations, investigations and home care recommendations for each case was developed in a multi-step process. In the first step, standard treatment guidelines prescribed both by the state and national health agencies were reviewed for formulating an initial set of items to be asked for patient history, examinations and investigations, prevention advice, danger signs for worsening conditions and duration for follow-up. In the second stage, after an initial draft of the vignettes was prepared on the basis of standard treatment guidelines, each case was shown to an expert in the field working at the All India Institute of Medical Sciences in New Delhi. Concurrently, five Medical Officers working at PHCs in Chhattisgarh were also consulted on the types of questions, examinations, investigations and home recommendations they give in each case. Based on these inputs, the questionnaire was modified and adapted to fit a clinical setting. This adaptation involved omitting unnecessary questions or adding questions and responses that commonly occurred in clinical practice. In the third stage, the questionnaire was tested on Medical Officers, AYUSH physicians, RMAs and pharmacists in PHCs .located in Chhattisgarh. This was an important step because it ensured that the instrument was flexible for different types of clinical care providers. As a general rule, if the 'patient' was asked about symptoms not specified in the vignette the standard reply was "*No*" and if questions were asked about the pattern, duration and type of illness not already specified in the vignette, the standard reply would be "*I cannot remember.*"

An important consideration in designing the vignettes was their applicability to providers from different traditions, principally AYUSH doctors. The AYUSH doctors serving at PHCs in Chhattisgarh are all trained in ayurveda and had completed a five and a half years course in Bachelors of Ayurvedic Medicine and Surgery (BAMS) (see Box 1.3). However, their medical coursework includes training in allopathic medicine. In addition, many had also received in-service training in allopathic medicine. Finally, all the AYUSH doctors in the sample reported practicing allopathic medicine, either solely (32%) or in combination with ayurvedic medicine (68%). This allowed for the vignettes tool to be applicable to AYUSH doctors. In addition, during the pre-testing phase, specific attention was given to how the

vignettes performed when applied to AYUSH doctors and this experience suggested that the existing set of questions and their standard responses were adequate.

6.2 Analytical methods

In each case, history questions, examinations and diagnostic tests and home recommendations of critical importance were scored. Items of clinical importance were identified by three independent experts in the areas of internal medicine, gynecology and pediatrics from Raipur Medical College, a district hospital and among private doctors in Chhattisgarh. History, examination, diagnostic and home care items for each case in the vignette were rated by the experts as 'must be asked' or 'should be asked' or 'not important'. Items that at least one expert felt 'must be asked' and the other 'should be asked' were scored.

Each vignette consisted of five broad sections – history, examinations, diagnostics, diagnosis, prescription and home recommendations. Items within the history, examinations and diagnostic section received a score of one if they were asked or mentioned by the provider and experts had identified it as being of clinical relevance. Correct responses to items in the diagnosis, prescription and home recommendation sections, as identified by experts, received a score of one. Items were scored in a manner which gave each of these sections a weight of one, which meant that individual items in a section would have the same weight but items in different sections would have differing weights. Section scores were summed across cases and scaled so that the maximum attainable score was one hundred. Scores were standardized and expressed as standard deviations from the overall sample mean.

The prescriptions written by the providers were first classified into three groups - Recommended (prescription strictly follows the standard treatment guidelines); Minor errors (prescription deviates from standard treatment guidelines); Major error (significantly reduces the effectiveness of the prescription and/or increases the risk of harm and/or does not cure the disease). Prescriptions in the middle group were given to a panel of three experts in the areas of internal medicine, gynecology and pediatrics who classified this set of prescriptions as being 'effective' and 'less effective' or 'ineffective' based on their judgment of the prescriptions. These five groups were re-classified into two groups by combining prescriptions that matched standard treatment guidelines with those marked as 'effective' or

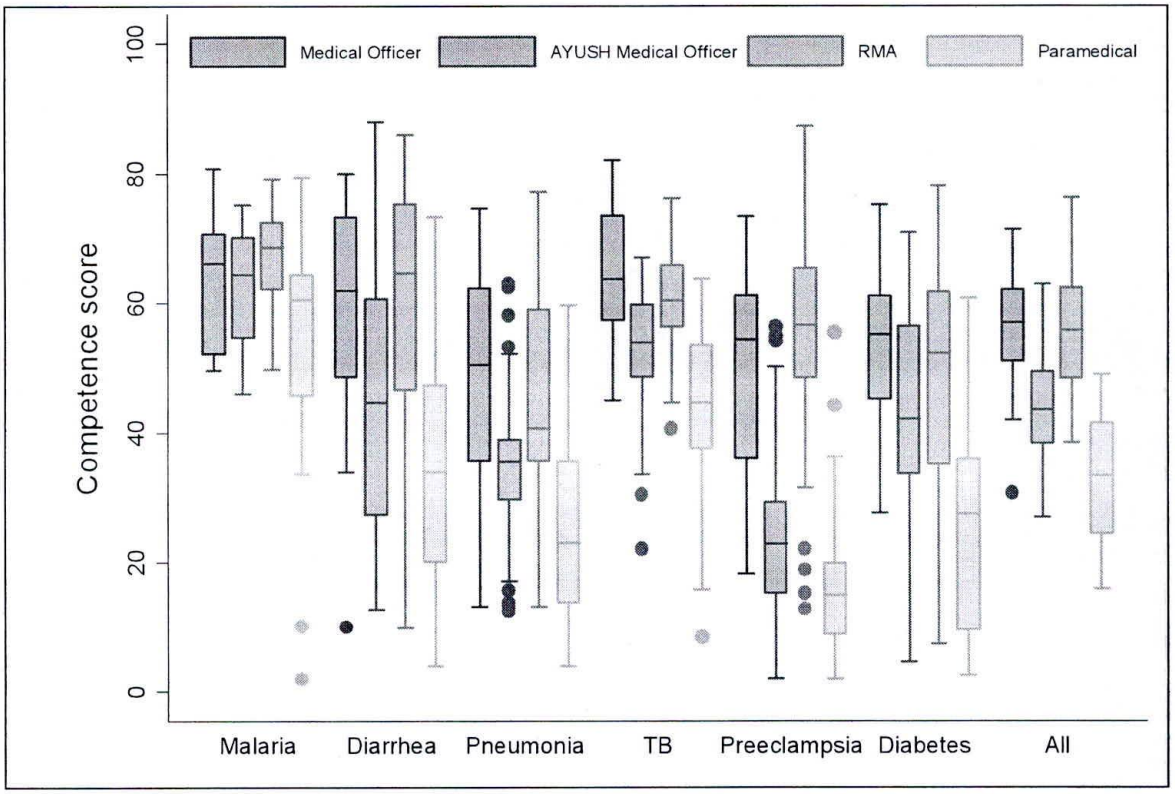
'less effective' and the remaining prescriptions were classified as being 'ineffective'. No prescriptions were evaluated for the TB case because, national guidelines require that suspected TB patients be referred to a Designated Microscopy Center for sputum testing and if positive then they are enrolled for DOTS treatment at the nearest DOTS center and given a kit containing all the medicines they need to take. A second issue was referrals. For the preeclampsia and particularly the diabetes case, several health providers, especially among AYUSH and paramedics, indicated that they would directly refer the case instead of prescribing medicines. For cases of preeclampsia, the recommended course of action for a PHC clinical care provider is to refer the case; therefore these prescriptions were not evaluated. For diabetes, a patient going to a fully staffed and properly equipped PHC should expect to receive treatment; consequently referrals were categorized as ineffective for the prescription analysis.

6.3 Results

Figure 6.1 presents box plots of the clinical care provider competence scores (range 0 to 100) for each of the six cases and overall. Clinical care providers performed their best in the malaria (i.e. highest median competence[9]) and TB case and their worst in the pneumonia and preeclampsia case. The competence scores also had a large range indicating that provider ability varies substantially within cases. In every case, Medical Officers or RMAs had the highest median scores followed by AYUSH Medical Officers and Paramedicals. Median scores of Medical Officers and RMAs were similar in all cases. Paramedics had the lowest median scores in all cases. Further, AYUSH Medical Officers did particularly poorly in the preeclampsia case where their median scores are substantially lower than Medical Officers and RMAs and marginally better than Paramedicals. The combined scores from all six cases indicate that Medical Officers and RMAs have the highest overall median competence. However, with their median score being around 50, even the best performers had substantial room for improvement. AYUSH Medical Officers had substantially lower overall median scores compared to these two providers and Paramedics had the lowest median score.

[9] In the box plot, the median is represented by the horizontal line which divides the box.

Figure 6.1 Provider Competence Score by Case



All providers tended to do poorly in history taking and physical examinations – no clinical care provider was able to correctly respond to more than 44% of the relevant history or examination items (Table 6.1). However, clinical care providers correctly identified the majority of relevant diagnostic tests and case diagnosis. One reason for this disjoint between performance on history/examinations and investigations/diagnosis is that health providers typically arrive at a good idea about the underlying condition after asking only a few history questions and doing a few examinations. Further, the high proportion of correct investigations and diagnosis suggests the greater reliance of providers on diagnostic tests for arriving at diagnosis. Clinical care provider performance on prescription practices was moderate with 61% writing non-ineffective prescriptions. Similarly, no more than 37% of the essential home care advice items were identified by the best performing group.

Table 6.1 Proportion of Correct Responses and Overall Competence

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical
History	44% (2170)	32%*(2294)	43% (2418)	25%*(2170)
Examinations	42% (1365)	29%*(1443)	40% (1521)	21%*(1365)
Investigation	81% (105)	75% (111)	80% (117)	61%*(105)
Diagnosis	86% (210)	66%* (222)	86% (234)	54%*(210)
Prescriptions (effective)[10]	61% (140)	51% (148)	61% (156)	33%*(140)
Home care	37% (1155)	31%* (1221)	37% (1287)	26%*(1155)
Competence score (range 0 to 100)	56.5 (8.42)	43.7 (8.36)	55.8 (9.10)	33.8 (9.43)
Competence score (standardized and adjusted)	0.51 (0.47)	-0.46* (0.20)	0.44 (0.22)	-1.24* (0.19)
Number of providers	35	37	39	35

Note: Figures are % (number of relevant items) or mean (SD); * Significantly different from Medical Officer at alpha=0.05

In every area of competence, Medical Officers and RMAs have the highest proportion of correct responses, followed by AYUSH Medical Officers (Table 6.1). In every component, Paramedicals do the worst. Overall competence scores indicate that Medical Officers and RMAs have similar competence scores, followed by AYUSH Medical Officers and Paramedicals. However, the best performers are not 'best' with average competence scores peaking at around 60, leaving considerable room for improvement. ANOVA results indicated that the different clinical care provider groups significantly differ from each other in standardized average competence. Multiple comparisons of group differences (Bonferonni corrected) indicated that there was no statistically significant difference between the mean competence scores of Medical Officers and RMAs. AYUSH Medical Officers and Paramedics had average competence scores significantly different from Medical Officers and RMAs. Average competence of AYUSH Medical Officers was significantly different from Paramedics.

[10] Effective prescriptions include those classified as 'effective' and 'less effective'. The proportions reported here slightly differ from those reported in Chapter 7 'Prescription Analysis' because of the differences in the cases included.

Observed differences in average competence between clinical care provider types could be due to reasons other than their training and knowledge. The characteristics of the sampled providers, the PHCs they work in and the location of the PHCs can also be responsible for the observed differences when these characteristics systematically differ across provider groups. In such circumstances estimates of provider competence will not be unbiased. Provider experience is one such factor; those with more experience might manage cases differently than those with lesser experience. In the study sample, RMAs had the least experience at PHCs because they were recently inducted. PHCs which frequently experience drug stockouts may induce providers to prescribe differently than those located in well stocked PHCs. PHCs located in less remote areas might attract better qualified providers or be better equipped or have better availability of drugs and supplies – all of which can influence observed provider competence. In the study sample, AYUSH Medical Officers are located in the tribal areas of Chhattisgarh while the Medical Officers, RMAs and Paramedicals are located in non-tribal areas.

To control for factors which influence provider competence, standardized competence scores were regressed on individual, PHC and location characteristics (Annex 1). The adjusted estimates are presented in Table 6.1. The results indicate that there are no statistically significant differences in the adjusted average standardized competence scores of Medical Officers and RMAs. Further, the adjusted scores of AYUSH Medical Officers and Paramedicals are significantly different from Medical Officers. Medical Officers performed the best with adjusted standardized scores 0.51 standard deviations above the sample mean, followed by RMAs (0.44). Adjusted competence scores for AYUSH Medical Officers was 0.46 and Paramedicals 1.24 standard deviations below the sample mean.

6.4 Discussion

This study measured the competence of different types of clinical care providers serving at PHCs in Chhattisgarh to manage some common and important conditions relating to child, adult and maternal health. Several aspects of provider competence was assessed – history taking, examinations, diagnostics, diagnosis, treatment and home care. How well providers responded to the clinically relevant items in these sections reflected their ability and knowledge to manage these cases.

Findings from this study suggest that Medical Officers and RMAs are equally competent to manage conditions commonly seen in primary care settings. AYUSH Medical Officers are less competent than Medical Officers and RMAs. Paramedicals are the least competent. This was observed for infectious, chronic and maternal health conditions and for a range of patient types – infants, children and adult men and women. Further, these results hold even after controlling for various individual, facility and location characteristics. This relative performance is consistently found in all aspects of the outpatient consultation - history taking, examinations, investigation, diagnosis, prescription and home recommendations. An important implication of this is that, in terms of clinical competence for primary health care, clinical care providers with short duration of training appear to be a viable alternative to physicians.

Most states in India have been posting AYUSH doctors to fill vacancies of Medical Officers at PHCs and to mainstream Indian systems of medicine. This study casts doubt on the appropriateness of this practice when it results in the AYUSH doctor becoming the primary clinical care provider in the PHC. The overall competence of AYUSH doctors and their performance on different aspects of the consultation (expect for prescriptions) is below that of Medical Officers and RMAs. Nearly half the treatment prescribed by AYUSH Medical Officers was ineffective compared to 39% for Medical Officers. Without additional clinical training, particularly in primary health care, AYUSH doctors do not seem to be the best alternative to physicians at PHCs. However, they certainly are a better alternative to having paramedical staff provide clinical care. Moreover, their competence with additional allopathic training can be quite different and it is important to explore this potential.

The average competence of paramedics is both expected and disturbing. They do not receive any formal training in clinical care nor are they meant to perform such activities. Yet, because there is no physician, these paramedics continue to treat patients in numerous PHCs across Chhattisgarh and in the rest of the country. Their activities as clinical providers are clearly a danger to their patients and undermine trust in the public health system. However, in other countries paramedical staff like nurses have been found to be as effective as fully qualified physicians in providing primary health services. Paramedics in the study sample are, however, dominated by pharmacists. Nevertheless, the potential of paramedical staff with appropriate training to serve in PHCs is an important area of future research.

In several other countries, available evidence indicates that clinical care providers with shorter duration training perform as well as those with longer training. A study on the performance of different types of health workers trained in implementing the IMCI protocol in Bangladesh, Brazil, Uganda and Tanzania found that there was generally no difference in the quality of child care between long and short duration trained health workers.[34] Another study from Tanzania reported that for managing complicated deliveries and major obstetrical operations there were no differences in outcomes, risk indicators, or quality between medical officers (medical school graduates) and assistant medical officers.[36] In as many as 47 sub-saharan countries non-physician health workers have been trained to diagnose and treatment and have helped ameliorate the shortage of qualified health workers in rural areas and at lower training and better rural retention than medical doctors.[1]

The findings of this study are subject to several limitations. Provider competence was assessed only for six cases and as such the validity of the findings is limited to these cases. While these cases represent those that are commonly seen at PHCs, the present findings need not necessarily hold for other serious conditions such as accidents, snake bites, complicated deliveries and more complicated conditions. However, these six cases cover a range of patient types and illness conditions and the consistency seen in the results across these cases makes it likely that the relative competence levels observed are robust. A second issue is that providers were assessed only on their clinical competence. Health providers at PHCs are responsible for a range of non-clinical duties such as preventive care and health education. It is quite possible that these providers perform quite differently in these other activities. A third issue has to do with the difference between competence and practice. The vignettes measured competence but this could be, as several studies have indicated, quite different from what these same health providers do in practice. Though competence and practice are associated, it is not necessary that the relative competence levels observed here also hold in practice.

Clinical care providers at PHCs were better at managing certain cases. In general, everyone did better in managing malaria and TB and tended to do poorly in diarrhea, pneumonia, preeclampsia (AYUSH and Paramedicals) and diabetes. Both malaria and TB are the focus of established national disease control programs and clinical care provider competence in managing these two cases reflects the success these vertical programs have had at the

peripheral levels of the health system. The cases on which clinical care providers did not perform well have a large disease burden. Both diarrhea and pneumonia are well known child killers in India and account for a substantial portion of morbidity and deaths in children.[49] The relatively poor competence of PHC clinical care providers in managing these diseases is remarkable because it indicates how poorly equipped frontline health workers are in dealing with this common and important problem. Another area of concern is the poor ability of AYUSH Medical Officers and Paramedicals to manage the preeclampsia case. With these two types of clinical care providers commonly being the sole clinical provider in PHCs, efforts to improve maternal health and deal with pregnancy related complications need to pay attention to appropriately skilling these providers.

Chapter 7

Prescription Analysis

Two sets of prescriptions were analyzed in this study. The first set is from the clinical vignettes used to assess clinical care provider competence in managing standardized cases. The second set is from the prescriptions of the patients of these clinical care providers. The analysis presented here examines the quality of these prescriptions, their effectiveness in treating the diagnosed condition and the rational use of drugs.

7.1 Prescription analysis for clinical vignettes

Clinical vignettes were used to assess the technical competence of clinical care providers to manage the following six cases – malaria in an adult female, diarrhoea in an infant, pneumonia in a child, preeclampsia in a pregnant woman, TB and diabetes in an adult male. Each clinical vignette was divided into six sections – history questions, examinations, investigations, diagnosis, treatment (prescription or referral) and home care (including follow up). For the treatment section, clinical care providers were asked to write a prescription based on their diagnosis of the case with the understanding that all the medications prescribed are available and the patient will fully comply with the prescription.

7.1.1 Methods

The sampled clinical care providers were asked to write prescriptions for malaria, diarrhea, pneumonia, preeclampsia and diabetes. TB prescriptions were not analyzed because the standard procedure is for suspected TB patients to be referred to a TB unit for testing and DOTS treatment. Preeclampsia cases are also to be referred, however, we include these prescriptions in the analysis. Prescriptions where clinical care providers indicated that they would refer the case without any treatment were not included in the analysis. The following steps were followed in evaluating the prescriptions.

Standard treatment guidelines

A comprehensive guideline was prepared defining standard treatments for each of the cases. These guidelines were prepared after an exhaustive review of the relevant standard treatment guidelines being used in India (see Box 7.1). Based on these standard treatment guidelines prescriptions were classified as: Recommended (prescription strictly follows the standard treatment guidelines); Minor errors (prescription deviates from standard treatment guidelines); Major errors (significantly reduces the effectiveness of the prescription and/or increases the risk of harm and/or does not cure the disease).

Panel of experts

Prescriptions in the 'Minor errors' group, which were the majority, deviated from the standard treatment guidelines but could either be beneficial or not to the patient. To further examine this, three panels of experts was formed. The panels represented the specializations of internal medicine (for the malaria and diabetes cases), gynecology (for the preeclampsia case) and pediatrics (for diarrhea and pneumonia cases). Each panel comprised of three experts, drawn from Raipur Medical College, a district hospital and one private practitioner.

These experts were asked to classify the 'Minor error' prescriptions into the following three categories: Effective (prescriptions are effective in treating the condition of the patient); Less effective (prescriptions have little effect on the condition of the patient); and Ineffective (significantly reduces the effectiveness of the prescription and/or increase the risk of harm and/or do not cure the disease). Experts were blinded to the identity and qualification of the clinical care provider who wrote the prescription. Prescriptions were rated independently. If all three experts did not agree on the classification, the particular prescription was taken back to the panel till a consensus was reached.

Finally, prescriptions were classified into three groups by combining the results from the standard treatment guidelines exercise and the ratings of the expert panels. Prescriptions were classified as 'Effective' if they were rated as 'Effective' by experts or were in the 'Recommended' group (i.e. followed standard treatment guidelines). Prescriptions termed 'Less effective' were classified as 'Less effective' by the expert panel. Prescriptions

categorized as 'Ineffective' were classified as 'ineffective' by the expert panel or were judged to be in the 'Major error' group according to standard treatment guidelines.

Box 7.1 Standard Treatment Guidelines

1. Department of Health & Family Welfare, Govt. of Chhattisgarh. Standard treatment guidelines for Medical officers, 2003
2. Armed Forces Medical College, Panel In Collaboration with Ministry of Health & Family Welfare, Government of India &WHO Country Office, India. Standard treatment Guidelines Medical Management & Costing of Select Conditions, 2007
3. National Institute of Malaria Research and National Vector Borne Disease Control Programme, Government of India. Guidelines for Diagnosis and treatment of Malaria in India, 2009
4. Ministry of Health & Family Welfare, Govt. of India & World Health Organization Child & Adolescent Health and Development (CAH). Integrated Management of Neonatal and Childhood Illness: Physician Chart Booklet, 2003
5. Tripathi KD. Essentials of Medical Pharmacology, 6th Edition, Jaypee publications, 2009
6. Maternal Health Division, Department of Family Welfare, Ministry of Health & Family Welfare, Government of India. Guidelines for Pregnancy Care and Management of Common Obstetric Complications by Medical Officers, 2005

7.1.2 Results

Case 1: Malaria in a 35 year old woman

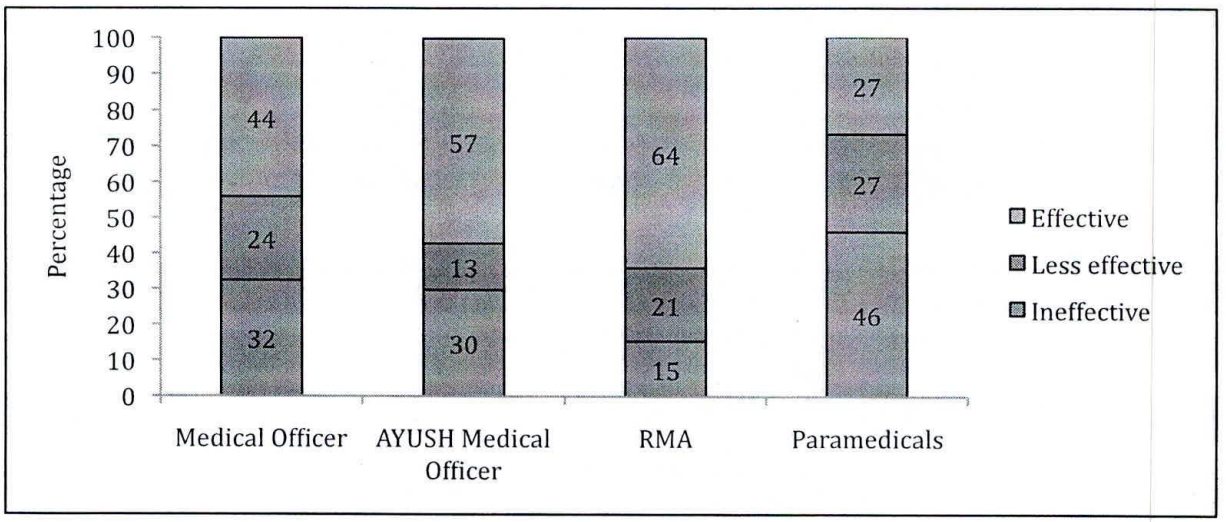
Out of a total of 146 prescriptions, 143 were analyzed. Two prescriptions, one by a Medical Officer and another in the Paramedical group were not included in the analysis due to lack of consensus among the experts in how they should be classified. One case in the Paramedical group was referred.

The largest proportion of 'Effective' prescriptions were written by RMAs (64%) followed by AYUSH Medical Officers (57%), Medical Officers (44%) and Paramedicals (27%) (Figure 7.1). Almost half of the prescriptions written by paramedics were scored as 'Ineffective.' The reason why Medical Officers had a lower percentage of 'effective' malaria prescriptions was because clinical care providers in other groups frequently wrote 'blister packs' in their prescriptions. Because blister packs come with standardized dosage, frequency and duration,

they were automatically classified as following standard treatment guidelines. For example, out of 37 AYUSH Medical Officers, 10 prescribed blister packs for malaria. Analysis excluding the AYUSH Medical Officers' prescriptions with blister packs showed that RMAs still performed the best with 64% 'Effective' prescriptions followed by Medical Officer (42%), AYUSH Medical Officer (41%) and Paramedicals (25%).

Rational drug use: Medical Officers prescribed the most number of recommended drugs per prescription (1.76) followed by RMAs (1.51), AYUSH Medical Officers (1.19) and Paramedicals (1.12) (Table 7.1). Prescriptions by Medical Officers had the lowest number of antibiotics and injections.

Figure 7.1 Classification of Malaria Prescriptions

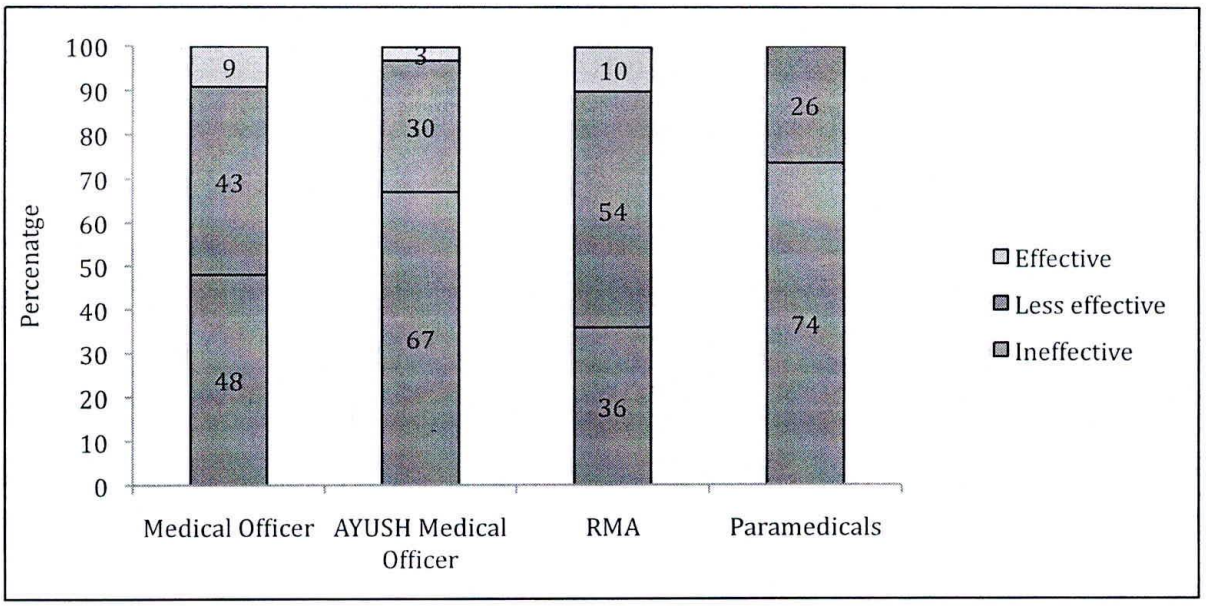


Case 2: Diarrhea with severe dehydration in an eight month old baby

145 out of 146 prescriptions were analyzed. One case was referred by Paramedicals. In general, clinical care providers did not do well in writing effective prescriptions for diarrhea (Figure 7.2). RMAs (10%) performed the best in terms of writing 'effective' prescriptions, followed closely by Medical Officers (9%) and AYUSH Medical Officers (3%). No one in the Paramedical group wrote an 'Effective' prescription for diarrhea. 'Ineffective' prescriptions were most frequently seen in the Paramedicals (74%) groups; followed by AYUSH Medical Officers (68%), Medical Officers (48%) and RMAs (36%).

Rational drug use: Prescriptions by RMAs had the highest number of recommended drugs (1.5) followed closely by Medical Officers (1.3) and AYUSH Medical Officers (1.2) (Table 7.1). Number of antibiotics per prescription for treating diarrhea was highest for Paramedicals and AYUSH Medical Officers (1.5).

Figure 7.2 Classification of Diarrhea Prescriptions

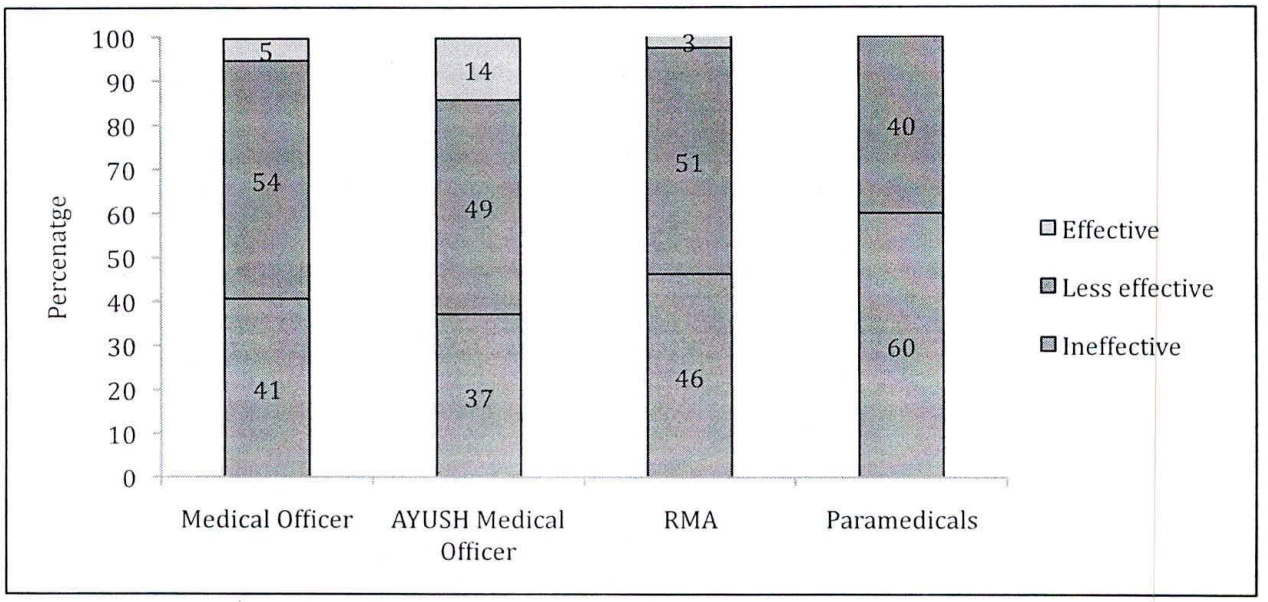


Case 3: Pneumonia in a two year old child

All 146 cases of pneumonia were analyzed. Pneumonia prescriptions displayed a similar pattern as diarrhea in terms of an overall poor performance in writing 'effective prescriptions' (Figure 7.3). Medical Officers (14%) performed considerably better than other providers in writing 'effective' prescription followed by AYUSH Medical Officers (5%), RMAs (3%). Paramedicals did not write a single 'effective' prescription. The majority of Paramedicals wrote 'ineffective' prescriptions, followed by RMAs (46%), Medical Officers (41%) and AYUSH Medical Officers (37%).

Rational drug use: Prescriptions by AYUSH Medical Officers had the highest number of recommended drugs (1.29) followed closely by RMAs (1.2) and Medical Officers (1.11) while those written by Paramedicals had the lowest (0.97) (Table 7.1). AYUSH Medical Officers also had the highest number of antibiotics per prescription, while RMAs had the highest average number of steroids and injections.

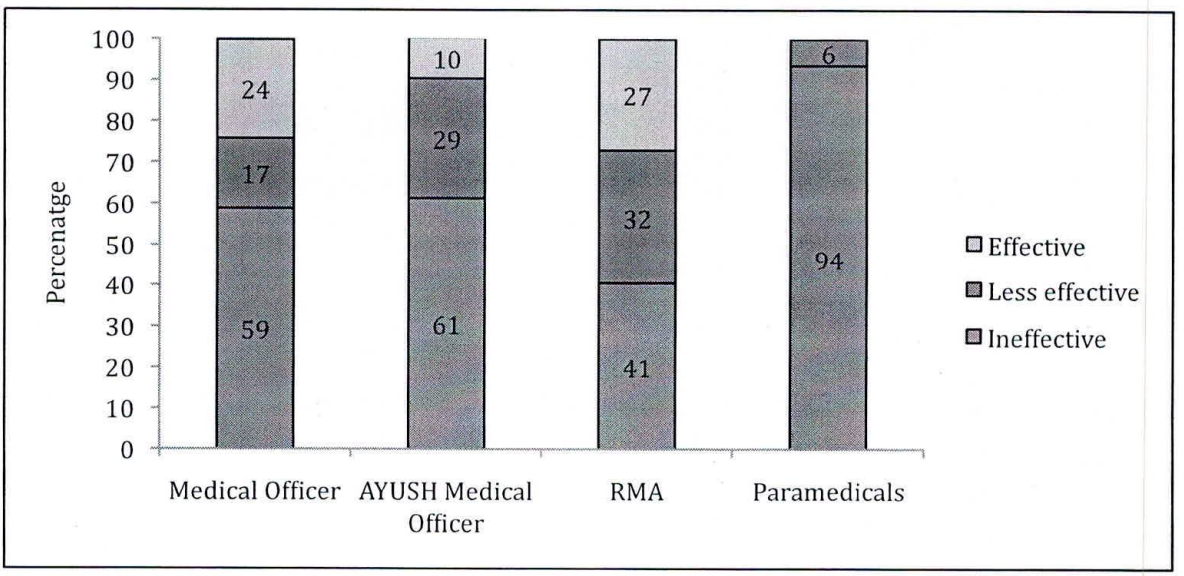
Figure 7.3 Classification of Pneumonia Prescriptions



Case 4: Preeclampsia in a six month pregnant woman

Out of a total of 146 prescriptions, 133 were analyzed as 13 cases were referred. RMAs (27%) performed the best in terms of writing 'Effective' prescriptions, followed by Medical Officers (24%), AYUSH Medical Officers (10%) (Figure 7.4). Not a single 'Effective' prescription was present in the Paramedicals group. The majority of the prescriptions written by Paramedicals (94%) were 'Ineffective', followed by AYUSH Medical Officers (61%), Medical Officers (59%) and RMAs (41%).

Figure 7.4 Classification of Preeclampsia Prescriptions



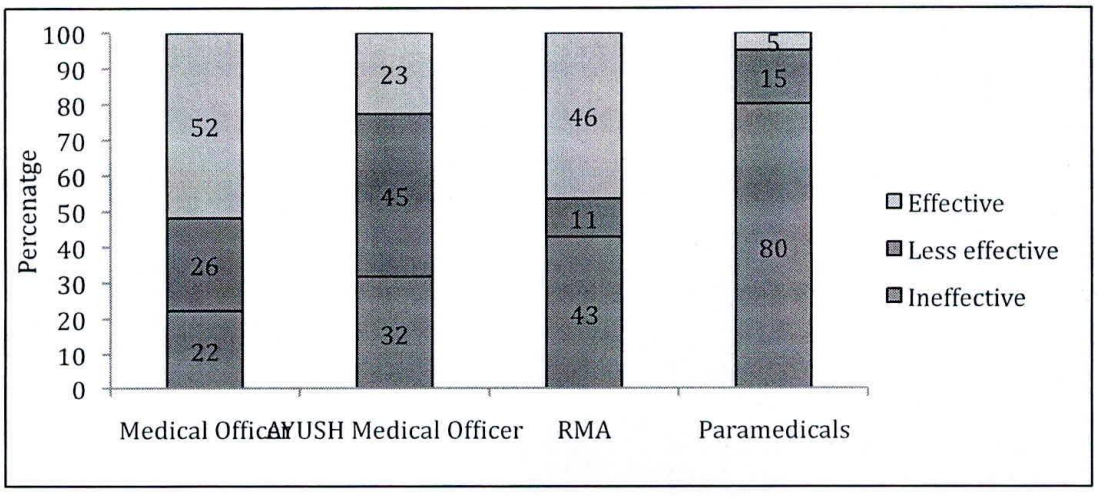
Rational drug use: Prescriptions by RMAs (0.65) and Medical Officers (0.47) had the highest number of recommended drugs per prescription, while none of the prescriptions written by Paramedicals had any recommended drug (Table 7.1). A significant number of prescriptions had hazardous/contraindicated drugs with this being most frequent among Medical Officers (24%). AYUSH Medical Officers prescribed steroids and injections most often (0.03 steroids and 0.06 injections per prescription). Prescriptions written by RMAs had the highest number of antibiotics (0.14).

Case 5: Diabetes-Type II in a 46 year old male

Out of a total of 146 prescriptions, only 97 were analyzed as the remaining 49 were referred (Figure 7.5). Medical Officers had the highest proportion of 'Effective' prescriptions (52%) followed by RMAs (46%) and AYUSH Medical Officers (23%). Paramedicals (80%) had the highest percentage of 'Ineffective' prescriptions.

Rational drug use: Table 7.1 indicates that Paramedicals prescribed the highest number of antibiotics per prescription (0.65) followed by AYUSH Medical Officers (0.27), RMAs (0.21) and Medical Officers (0.11). On the whole, Medical Officers wrote the most rational prescriptions with the highest number of recommended drugs per prescription, least number of antibiotics and no steroids and injections for treating diabetes cases.

Figure 7.5 Classification of Diabetes Prescriptions



All cases

Figure 7.6 summarizes the performance of the sampled clinical care providers in the five cases. Overall, the percentage of 'Effective' prescriptions was fairly low across all clinical care providers. RMAs (30%) performed the best, followed closely by Medical Officers (28%), AYUSH Medical Officers (19%) and Paramedicals (7%). Paramedicals (70%) had the most number of 'Ineffective' prescriptions, followed by AYUSH Medical Officers (47%), RMAs (35%) and Medical Officers (40%).

Rational drug use: The total number of drugs per prescription ranged between 3 and 4 (Table 7.1). RMAs (1.15) and Medical Officers (1.12) most frequently prescribed recommended drugs. Among clinical care provider groups, Medical Officers prescribed the least antibiotics (0.65) and steroids (0.03) and had the second lowest frequency of prescribing injections (0.48).

Figure 7.6 Overall Classifications of Prescriptions

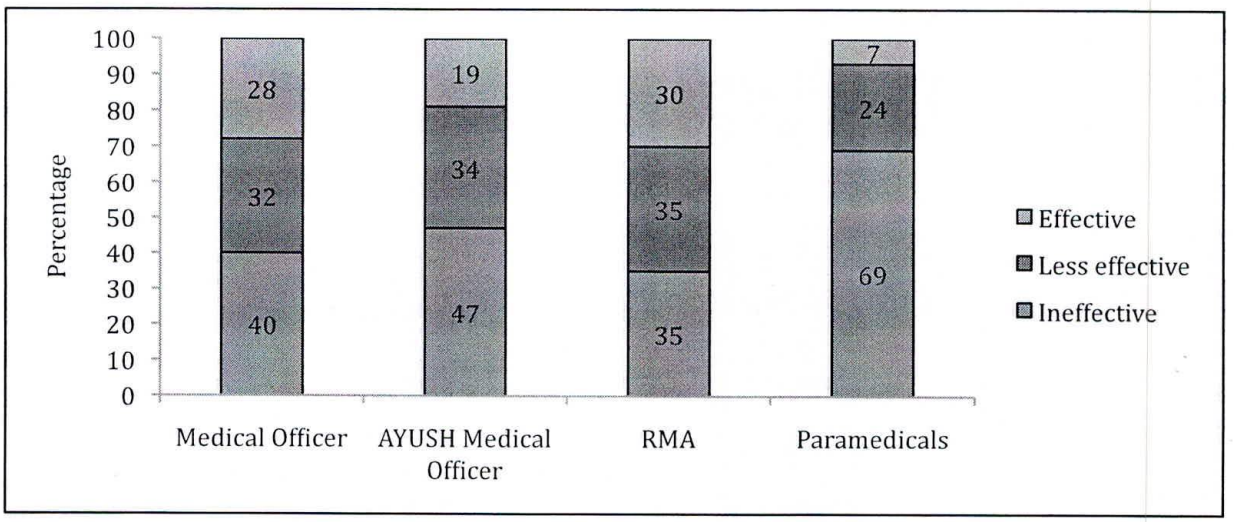


Table 7.1 Rational Drug Use

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical
		Malaria		
Drugs	4.60	5.35	4.77	3.84
Recommended drugs	1.76	1.19	1.51	1.12
Antibiotics	0.35	0.95	0.64	0.81
Injections	0.29	1.03	0.72	0.36
Sample size (n)	37	34	39	33
		Diarrhea		
Drugs	4.54	4.16	4.82	3.88
Recommended drugs	1.31	1.27	1.51	1.09
Antibiotics	1.37	1.51	1.33	1.5
Steroids	0.06	0.03	0.03	0
Injections	1.37	1.19	1.51	0.79
Sample size (n)	37	35	39	34
		Pneumonia		
Drugs	3.71	3.54	3.89	2.8
Recommended drugs	1.11	1.29	1.20	0.97
Antibiotics	1.20	1.46	1.33	1.11
Steroids	0.11	0.13	0.18	0.08
Injections	0.60	0.57	0.77	0.40
Sample size (n)	37	35	39	35
		Preeclampsia		
Drugs	3.40	3.00	3.03	2.19
Recommended drugs	0.47	0.3	0.65	0
Antibiotics	0.06	0.13	0.14	0
Steroids	0	0.03	0	0
Injections	0.03	0.06	0.05	0.03
Hazardous/Contraindicated drugs (%)	24.24	12.90	8.11	6.25
Sample size (n)	31	34	37	31
		Diabetes		
Drugs	1.90	2.14	2.75	2.60
Recommended drugs	0.90	0.73	0.80	0.50
Antibiotics	0.11	0.27	0.21	0.65
Steroids	0	0	0.36	0.15
Injections	0	0.14	0.11	0.10
Sample size (n)	22	27	28	20
		All cases		
Drugs	3.72	3.79	3.92	3.11
Recommended drugs	1.12	1.00	1.15	0.77
Antibiotics	0.65	0.94	0.76	0.84
Steroids	0.03	0.04	0.04	0.04
Injections	0.48	0.65	0.67	0.36

Note: All values are calculated as averages per prescription

7.2 Prescription analysis for provider practice

In the second phase of the study, clinical care providers sampled in the first phase were visited at the PHCs where they work. Patients of these clinical care providers were interviewed when they exited the PHC and information contained in their prescriptions was recorded. At each sampled PHC, a convenience sample of ten new patients was selected for exit interviews. Against the target of 1,460 patients, 1,082 patients were interviewed.

7.2.1 Methods

From the prescriptions of patients exiting the PHC, surveyors recorded if it mentioned the patient's age, sex, chief complaint, signs and symptoms, and findings of any physical examination. Surveyors recorded details of the investigations, referral (and next appointment), diagnosis and the name, dose, frequency and duration of the prescribed drugs mentioned in the prescription. This information was used to estimate various indicators of rational drug use.

7.2.2 Findings

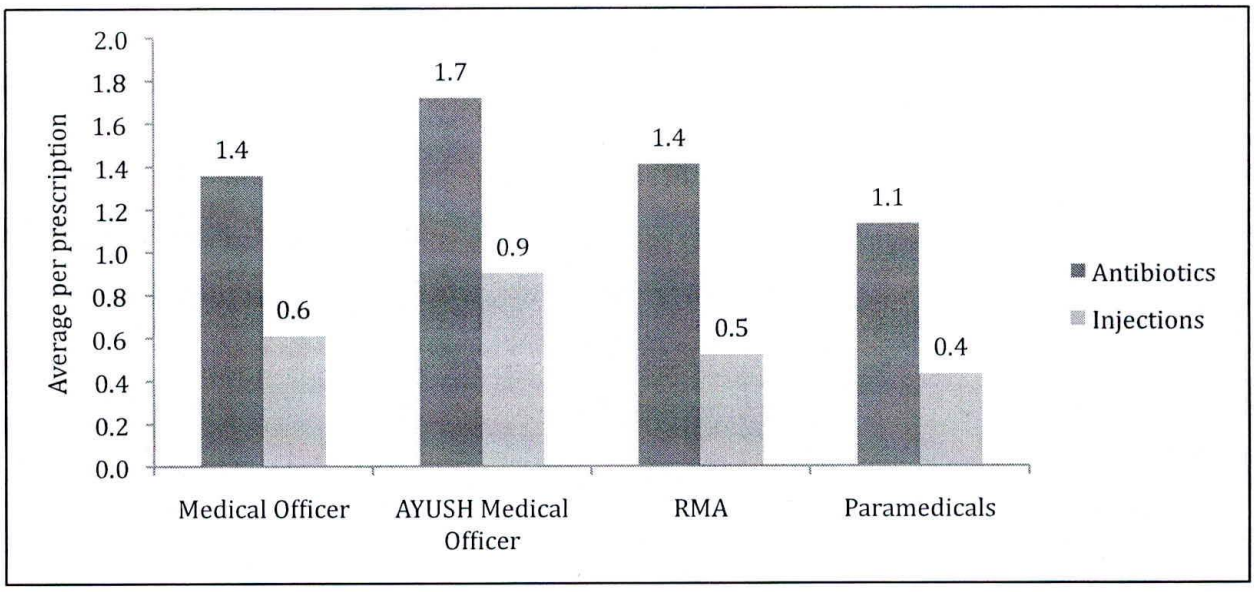
Out of the total 1,082 patients interviewed, 954 patients received a prescription. There is little difference between the clinical care provider groups in the proportion of prescriptions providing information on the patient's background-name, age, sex. Patient complaints were most frequently mentioned in prescriptions written by RMAs (81%), followed by AYUSH Medical Officer (73%), Medical Officers (70%) and Paramedicals (55%) (Table 7.2). Very few prescriptions noted signs and symptoms; RMAs (13%) and Medical Officers (14%) had about the same proportion, followed by AYUSH Medical Officers (2%). None of the prescriptions written by Paramedicals mentioned signs/symptoms. Further, prescriptions that mentioned the patient's diagnosis were also fairly low across all clinical care provider groups; Medical Officers (47%) did the best, followed by AYUSH Medical Officers (40%), RMAs (35%) and Paramedicals (23%).

Table 7.2 Prescription Practices

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical
Total number of patients interviewed	268	296	275	242
Patients with prescription N(%)	99% (264)	100 (296)	89 (244)	62 (150)
Prescriptions with complaint (%)	71	73	81	55
Prescriptions with signs/symptoms (%)	14	2	13	0
Prescriptions with diagnosis (%)	47	40	36	23

Rational drug use: The average number of antibiotics and injections per prescription was similar across the different clinical care provider groups (Figure 7.6). AYUSH Medical Officers had the highest average for both antibiotics and injections, followed by Medical Officers, RMAs and Paramedicals.

Figure 7.6 Rational Drug Use



7.3 Discussion

Prescriptions written as part of the standardized cases in the clinical vignettes allow comparing prescription practices of different types of clinical care providers. Findings suggest that Medical Officers and RMAs are equally effective in treating conditions

commonly seen in primary care settings. AYUSH Medical Officers are less so and Paramedicals have the least ability to prescribe effectively. This was observed for infectious, chronic and maternal health conditions and for a range of patient types – infants, children and adult men and women. This implies that in terms of ability to treat conditions seen at primary health care settings, physicians with short duration of training appear to be a viable alternative to fully qualified physicians.

The findings also indicate that the majority of prescriptions were not effective in treating some of the most common and important diseases in Chhattisgarh. Strikingly, in every clinical care provider group there was a non-ignorable proportion of prescriptions that harm the patient. Notably, almost half the prescriptions written by AYUSH Medical Officers and the majority written by Paramedicals were ineffective. In terms of rational drug use, Medical Officers wrote the most rational prescriptions followed by AYUSH Medical Officers, RMAs and Paramedicals.

Clinical care providers did better at prescribing effective treatments for the malaria and diabetes cases. However, they did poorly for treating cases of diarrhea, pneumonia and preeclampsia. Malaria is the focus of an established national disease control program and clinical care provider ability to prescribe effectively reflects the success this vertical program has had on frontline health workers. The cases where clinical care providers did not perform well have a large disease burden; both diarrhea and pneumonia are well known child killers in India and account for a substantial portion of morbidity and deaths in children. The poor ability of PHC clinical care providers in treating these diseases is remarkable because it indicates how poorly equipped frontline health workers are in dealing with this common and important problem. Another area of concern is the poor ability of providers to prescribe effective treatments for the preeclampsia case. Efforts to improve maternal health and deal with pregnancy related complications needs to pay attention to appropriately skilling these providers.

Analysis of the prescriptions collected from exiting patients indicates that, overall, the sampled clinical care providers did well in mentioning information on the patient's background and complaint in their prescriptions. However, few prescriptions mentioned signs/ symptoms and less than half mentioned diagnosis. In terms of rationality of drug use,

there was little difference between clinical care provider groups in the average number of antibiotics and injections per prescription. AYUSH Medical Officers were most liberal in prescribing antibiotics and injections and Paramedicals the most conservative. The greater predisposition of AYUSH Medical Officers to prescribe antibiotics was also observed in the prescriptions from the clinical vignettes.

The analysis presented here has several potential limitations. For one, the vignettes measure the clinical care provider's prescribing knowledge, but this can be quite different from what they do in practice because of what they face in terms of drug availability and patient compliance. Secondly, the panel of experts used for classifying the prescriptions, were mostly serving at tertiary care centers in urban areas of Chhattisgarh. Their experience, the type of patients they get, the constraints (or lack of) they face in terms of availability of drugs are different from what clinical care providers at PHCs face. Consequently, what PHC clinical care providers prescribe, given their specific contexts and constraints, might deviate from what experts would expect. Another potential limitation was that the expert panel comprised of allopathic doctors who lack knowledge of ayurvedic medications. However, AYUSH physicians working at PHCs, mostly prescribe and practice allopathic medicine. This was confirmed by the presence of only two prescriptions written by AYUSH Medical Officers that mentioned ayurvedic medications (one for preeclampsia and one for diabetes) and none of the prescriptions were exclusively ayurvedic.

The results presented here are revealing about the prescribing abilities of clinical care providers at PHCs. The similar performance of Medical Officers and RMAs increases the legitimacy of the latter to provide clinical services at PHCs. AYUSH Medical Officers don't perform as well as Medical Officers or RMAs, nevertheless, their performance can potentially be much better with additional clinical training. The poor performance of Paramedicals highlights the harmful treatment people can receive when there is no qualified physician at a PHC. Indeed, clinical services delivered by Paramedicals, who are not properly trained to perform this function, only serves to undermine the public's trust in the primary care system.

Chapter 9

Service Utilization, Equity and Community Perceptions

In the second phase of this study, households were sampled from the village where the PHC was located. From these households information on their care seeking behavior, health expenditures and perceptions of the local PHC were collected. In addition, the asset ownership of these households was also recorded. This chapter describes findings from the household survey. From the 146 PHCs sampled in the first phase of this study a total of 2,124 households were contacted and information on 11,929 individuals collected in the second phase. The method used to select households is described in Chapter 4.

9.1 Care seeking behavior

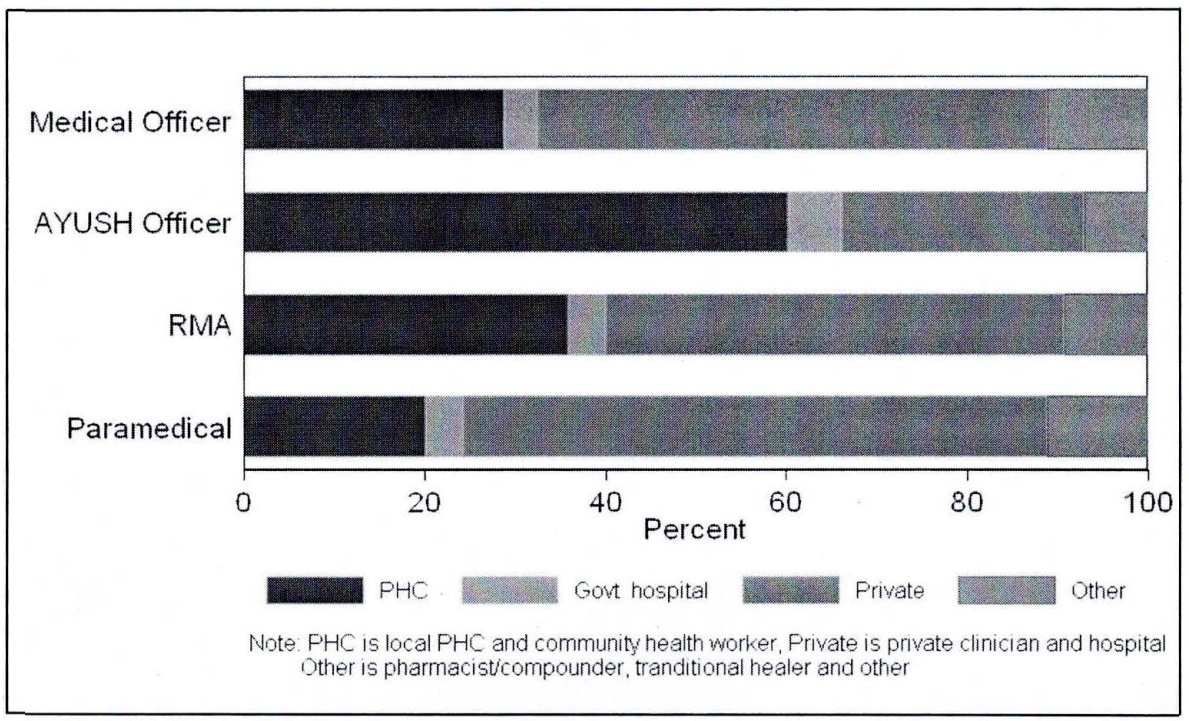
Around one third of members in the sampled households had either fallen ill or suffered an injury in the past 30 days (Table 9.1). The main complaints were fever, cough, cold and diarrhea. The distribution of these complaints was also similar across the four clinical care provider groups. Almost all who fell sick sought care outside their homes. Households were asked where members sought treatment for each instance of illness in the past month for which care was sought out side home. Visit information was collected for upto five visits made for that particular episode of illness.[11] Results indicate that treatment is mostly sought from private providers, except in communities where the local PHC was headed by AYUSH Medical Officers (Figure 9.1). PHCs headed by AYUSH Medical Officers received the largest share (60%) of total visits, followed by RMAs (35%), Medical Officers (29%) and paramedics (20%). Where there is no qualified clinical care provider, as in the Paramedical case, the local PHC is hardly used for treatment. Indeed, the share of visits to private providers is largest for this group. The pattern of visits to the local PHC suggest that, all else being the same, there is at least as much public trust in AYUSH Medical Officers and RMAs as there is in Medical Officers.

[11] For example, an ill person could have visited a private doctor first, then the local PHC and then a private hospital for treatment.

Table 9.1 Burden of Illness and Care Seeking

	Medical Officer	AYUSH Medical Officer	RMA	Paramedical	All
Ill during past 30 days (%)	31	34	32	35	33
Care outside home (%)	92	93	92	93	92
N (individuals)	3,003	2,696	3,211	3,019	11,929
Main complaint/illness (%):					
Fever	36	43	40	37	39
Cold	18	9	17	18	16
Cough	8	8	7	6	7
Diarrhea	6	7	7	6	7
Stomach pain	2	4	3	4	3
Injury	3	2	3	1	2
Other	26	26	24	27	26
	100	100	100	100	100
N (Ill individuals)	936	921	1,046	1,067	3,970

Figure 9.1 Health Care Providers Visited for Treatment



Why people bypass the local PHC cannot be attributed only to the type of provider since other factors could be responsible e.g. the availability of drugs and equipment, the regularity with which staff is present, the characteristics of the area and the presence of alternative providers. Sampled households were asked why they did not use the local PHC for treatment (Table 9.2). Overall, the most common (i.e. the top five and excluding illness not severe, other) reasons for not using the local PHC had to do with disliking the service at the PHC, non-availability of the doctor/health provider, lack of drugs, and the presence of better private providers in area. Further, the distribution of reasons for non-use are similar between PHCs headed by Medical Officers and RMAs suggesting that there was nothing particular to the clinical care provider, PHC infrastructure or location characteristics which differentiated these two groups.

Table 9.2 Reasons for Not Using the Local PHC for Treatment

Reasons for not using PHC services (%)	Medical Officer	AYUSH Medical Officer	RMA	Paramedic	Overall
Illness/condition not severe enough	10	19	10	8	11
Illness/condition serious	4	13	6	4	6
PHC too far/ no transport	2	4	5	5	4
Treatment too expensive	1	0	0	1	1
Doctor/ health provider not available	8	7	10	28	15
Doctor/health provider not competent / able to cure illness	10	6	8	8	8
Don't like service	18	14	14	16	16
No drugs available	13	9	12	13	12
Doctor/staff does not talk politely	2	1	0	1	1
Doctor/staff ask for bribe	0	1	1	0	0
Other health providers in the area give better service	14	4	19	7	11
Other	35	32	30	29	31
N (Non-user household members)	568	308	581	748	2205

The distribution of reasons for non-use of PHCs headed by AYUSH Medical Officers and paramedics follow a different pattern. For both these clinical care provider groups, "other health providers in the area give better service" was not a frequently cited reason for non-use. This partly explains the popularity of PHCs headed by AYUSH Medical Officers, seen in Figure 9.1, who mostly serve in the tribal areas of Chhattisgarh where alternatives to public sector providers are few. In contrast, the lack of private alternatives does not result in the increased popularity of the PHCs run by paramedics – their PHCs received the least visits because no doctor/health worker was available. The remoteness of these PHCs, their average distance from a tarred road was 13 Km compared to less than 2 Km for the other three groups (Table 5.1), appears to be a deterrent to both public and private physicians from serving there.

9.2 Equity of health service use

The community survey collected information on household asset information. Matching rural assets from a representative survey of the state – the National Family Health Survey (2005-06) for Chhattisgarh was used to create a rural asset index. Applying principal components analysis to the selected assets and extracting the first component created this index. This rural asset index was used to divide the population of Chhattisgarh into quintiles. Asset weights from this exercise were applied to the assets from the community survey and the sampled individuals placed in one of five population quintiles which were merged into three groups. Figure 9.2 shows the economic distribution of individuals who used the local PHC for treatment when sick.

Utilization of services at the local PHC was pro-poor. For every clinical care provider group, the proportion of people who sought care at the local PHC declined with better economic status. Further, there is a clear socioeconomic gradient; except for AYUSH Medical Officers, use of the local PHC decreased use with better economic status. The ratio of PHC utilization of the lowest and highest economic groups suggest that AYUSH Medical Officers (1.3) were the most equitable, followed by Medical Officers (1.4), RMAs (1.6) and Paramedicals (2.6).

Mission, their posting at public health facilities, indeed the ones in the study sample are de facto Medical Officers, makes them an important part of the public sector health workforce. The opportunity for them to practice at PHCs not only enables them to build local reputations but they can also professionally develop and grow within the public sector system by moving within the hierarchy of PHCs, CHCs and district hospitals.

Table 10.4 Job Satisfaction Dimensions and Scores by Provider Type

	Cronbach's alpha	Medical Officer	AYUSH Medical Officer	RMA	Paramedical
Family life	0.74	2.6	2.9*	2.5	2.7
		(0.40)	(0.45)	(0.35)	(0.65)
Job performance	0.71	2.2	2.9	2.2	2.5
		(0.34)	(0.44)	(0.28)	(0.51)
Professional development	0.68	2.5	2.7*	1.8*	2.4
		(0.36)	(0.52)	(0.32)	(0.46)
Overall job satisfaction	0.77	2.8	3.0*	2.4*	2.8
		(0.51)	(0.58)	(0.4)	(0.51)
N (clinical care providers)		35	37	39	35

Note: Figures in parenthesis are SD. Significantly different from Medical Officer at alpha = 0.05*

The consistently low job satisfaction level of RMAs, overall and across all job satisfaction dimensions, is due to several issues. Like AYUSH Medical Officers, they are hired on annual contracts, but their future prospects are quite different. They are not allowed to use the title of 'doctor' which has been a long standing contention of theirs. Their future as a cadre is uncertain because it is unclear if the Chhattisgarh government will continue with them due to strong lobbies, particularly from the medical community. Further, being a new cadre, they are not fully acceptable to their co-workers or their superiors (who are all physicians). Importantly, they can only serve at the PHC level, irrespective of how long or how well they serve. They have limited career prospects within the public health system.

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Annexure

Annex 1 Correlates of Clinician Competence

Individual characteristics include age (which also controls for their experience working at PHCs) and sex. PHC characteristics include a PHC infrastructure index composed of the sum of 13 items indicating the presence of such things like the availability of electricity, water, number of rooms, specific rooms for drug storage, cold chain, and consultations. A second PHC level variable is the number of drug stock outs in the past year at the PHC. Village level variables include a village development index composed of the sum of six items indicating the presence of a high school, regular electricity supply, piped water, regular bus service and cell phone connectivity. Other village level variables include the population of the area being non-tribal and the distance of the village from the nearest town. The magnitude of the regression coefficients and their statistical significance remains the same across models. None of the individual and PHC level variables had any significant effect on provider competence scores. Four different models were fit starting with the simplest case in which only dummy variables for provider type are included. The reference category is the Medical Officer.

Table A2 Regression Analysis of Correlates of Provider Competence

	(1)	(2)	(3)	(4)
AYUSH Doctor	-0.986**	-0.996**	-0.966**	-0.973**
	[0.17]	[0.18]	[0.19]	[0.20]
RMA	-0.054	-0.051	-0.024	-0.074
	[0.16]	[0.21]	[0.21]	[0.22]
Paramedical	-1.773**	-1.777**	-1.746**	-1.748**
	[0.17]	[0.18]	[0.19]	[0.19]
Male		0.057	0.061	0.154
		[0.15]	[0.15]	[0.16]
Age (years)		-0.000	0.000	-0.003
		[0.01]	[0.01]	[0.01]
PHC Infrastructure Index			0.013	0.005
			[0.02]	[0.02]
Drug stock out frequency in past year			0.007	0.003
			[0.02]	[0.02]
Village Development Index				0.056
				[0.05]
Distance of nearest town (Km)				-0.004
				[0.00]
Non Tribal Area				-0.163
				[0.17]
Constant	0.692**	0.665	0.552	0.510
	[0.12]	[0.37]	[0.41]	[0.47]
Observations	144	144	144	144
R-squared	0.530	0.531	0.532	0.554

Standard errors in brackets; ** p<0.01

Annex 2 Correlates of Patient Perceived Quality

	Medical Advice	Physician Behaviour	Staff Behaviour	Facility Infrastructure	Overall Perceived Quality
AYUSH Doctor	-0.049	-0.080	0.096	0.113	0.008
	(-0.53)	(-0.88)	(1.02)	(1.28)	(0.09)
RMA	0.144	0.044	0.186*	0.205*	0.181*
	(1.63)	(0.50)	(2.09)	(2.43)	(2.09)
Paramedical	-0.175	-0.370**	0.108	-0.042	-0.203*
	(-1.92)	(-4.10)	(1.17)	(-0.48)	(-2.26)
Male	0.150**	-0.092	-0.044	-0.099	-0.134*
	(-2.72)	(-1.70)	(-0.80)	(-1.88)	(-2.48)
Age (years)	0.004*	0.001	0.000	0.001	0.002
	(2.44)	(0.93)	(0.31)	(0.55)	(1.52)
Illiterate	0.238**	-0.160*	-0.096	0.060	-0.160*
	(-3.39)	(-2.30)	(-1.35)	(0.89)	(-2.32)
PHC Infrastructure Index	0.015	0.034**	0.029**	0.106**	0.059**
	(1.39)	(3.14)	(2.69)	(10.21)	(5.56)
Drug stock out frequency in the past year	-0.022	-0.006	-0.008	0.038**	-0.001
	(-1.74)	(-0.45)	(-0.63)	(3.16)	(-0.08)
Village Development Index	0.027	0.000	-0.012	0.007	0.009
	(1.02)	(0.01)	(-0.45)	(0.29)	(0.33)
Distance of nearest town (Km)	-0.001	-0.004**	-0.002	0.001	-0.002*
	(-0.52)	(-3.23)	(-1.96)	(0.43)	(-1.98)
Non tribal area	0.147	0.128	0.294**	0.084	0.211*
	(1.70)	(1.50)	(3.36)	(1.01)	(2.47)
Constant	-0.104	0.074	-0.123	-0.674**	-0.240
	(-0.62)	(0.44)	(-0.73)	(-4.21)	(-1.46)
Observations	1074	1074	1074	1074	1074
R-squared	0.041	0.062	0.028	0.117	0.075

Note: T-statistics in parentheses; ** p<0.01, * p<0.05