

India: Towards Universal Health Coverage 5



Human resources for health in India

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India has a severe shortage of human resources for health. It has a shortage of qualified health workers and the workforce is concentrated in urban areas. Bringing qualified health workers to rural, remote, and underserved areas is very challenging. Many Indians, especially those living in rural areas, receive care from unqualified providers. The migration of qualified allopathic doctors and nurses is substantial and further strains the system. Nurses do not have much authority or say within the health system, and the resources to train them are still inadequate. Little attention is paid during medical education to the medical and public health needs of the population, and the rapid privatisation of medical and nursing education has implications for its quality and governance. Such issues are a result of underinvestment in and poor governance of the health sector—two issues that the government urgently needs to address. A comprehensive national policy for human resources is needed to achieve universal health care in India. The public sector will need to redesign appropriate packages of monetary and non-monetary incentives to encourage qualified health workers to work in rural and remote areas. Such a policy might also encourage task-shifting and mainstreaming doctors and practitioners who practice traditional Indian medicine (ayurveda, yoga and naturopathy, unani, and siddha) and homeopathy to work in these areas while adopting other innovative ways of augmenting human resources for health. At the same time, additional investments will be needed to improve the relevance, quantity, and quality of nursing, medical, and public health education in the country.

Introduction

Since India gained independence, universal and affordable health care has been central to the planning of the country's health system;¹ substantial government effort and resources have been devoted to the creation of a wide network of public sector health facilities (ie, primary health centres and subcentres, community health centres, district hospitals, and tertiary hospitals), at which qualified health workers can provide low-cost services. However, attempts to establish such a network have been unsuccessful because substantial socioeconomic and geographical inequities exist in access to health care and health outcomes in India. Many Indians, especially those living in rural areas, do not receive health care from qualified providers.^{2,3}

Although the public sector is the main provider of preventive care services, 80% of outpatient visits and 60% of hospital admissions are in the private sector.⁴ Consequently, 71% of health spending is out of pocket, and, every year, such expenditure forces 4% of the population into poverty.^{4,5} On the whole, the absence of adequately trained health-care providers in public and private sectors is a major cause for concern. Urgent reforms are needed, particularly in human resources, to achieve universal and affordable health care in India.

In this report we review the existing state of human resources for health in India and provide direction for future reform efforts.

Background

In 1947, when India gained independence, it had few adequately trained health workers, and only 1·6 doctors per 10 000 population.⁶ Most physicians (70%) worked in the private sectors in urban areas.¹ The two classes of

allopathic physicians were doctors who undertook a 5·5-year medical degree and licentiate medical practitioners who underwent a 3–4-year course. Nearly two-thirds of qualified medical practitioners were licentiates who worked mainly in rural areas.^{7,8} Additionally, many practitioners of Indian systems of medicine (panel 1) and untrained medical practitioners worked in the health system.⁸ The nursing profession was severely neglected (0·23 nurses per 10 000 population) and hospitals were largely functioning without trained nurses.⁶ In 1946, when

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Key messages

- Develop a comprehensive national human resource policy for health
- Strengthen the public health system, its facilities, and the working and living conditions of public sector health workers
- As a short-term measure to overcome the substantial shortages of qualified health workers in underserved areas, employ task-shifting and mainstream doctors and practitioners of ayurveda, yoga and naturopathy, unani, siddha, and homeopathy; and use private sector resources by leasing-out health centres, contracting key health workers, and purchasing services from qualified private providers
- Strengthen nursing and paramedical cadres
- Offer appropriate packages of monetary and non-monetary incentives to encourage qualified health workers to serve in rural, remote, and underserved areas
- Reorient the education and training of health workers, particularly doctors and nurses, to meet the health and public health needs of the country
- Improve provider quality through systems of continuing education, accreditation, and regulation
- Build an accurate and reliable database that provides information about key aspects of human resources in health, such as the number of different types of health workers and their general locations, on the number of doctors and nurses that emigrate, and student capacity in public and private nursing institutions

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Panel 1: Ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy (AYUSH)

In March, 1995, the Department of Indian Systems of Medicine and Homoeopathy was created; in November, 2003, this department was renamed AYUSH because of the six recognised systems of medicine under its remit.

- Ayurveda (science of life), like the Greek system of medicine, aims to restore the balance of the three humours or doshas (Vata, Pitta, and Kapha) that govern all the biological and metabolic processes of the human body in health and in disease. It has its own texts, many of which are very old, and its own pharmacopeia. Although Indian in origin and development, the similarity with the ancient Greek system indicates substantial exchange of knowledge between Indians and Greeks in the past.
- Yoga consists of a series of postures and breathing exercises that promote health and prevent disease. It is thought to be especially helpful in chronic, allergic, and stress-related disorders. Naturopathy (not unique to India) is a system of stimulating the body's inherent power to heal itself by restoring the harmony between individuals and nature and the natural elements within.
- Unani is a system of medicine that was introduced in India in the medieval period. Originating as a system of medicine in the Arabic and Persian world under the Arabic renaissance, its name suggests that it came to India from Greece (Ionian) in an earlier period. Like ayurveda, unani is also based on the restoration of the balance of the humours.
- Siddha is also one of the oldest systems of medicine in India and is restricted to the Tamil-speaking areas of the country. It is said to be especially useful for liver diseases, dermatological diseases, rheumatoid arthritis, and allergies.
- Homoeopathy owes its origins to a German doctor Samuel Hahnemann (1755–1843) who postulated treatment with substances (at increasing dilutions) that produce symptoms similar to a disease in a healthy person. It first came to attention in India in 1810 and was widely used in the colonial army.
- In 2009, Amchi or Sowa-Rigpa (the Tibetan system of medicine) was added to the list of existing systems of medicine under AYUSH's remit.

AYUSH's role is to promote and ensure that these systems of medicine are easily accessible to people. The government has established a network of research centres, colleges, hospitals, and dispensaries dedicated to these systems of medicine. Under the National Rural Health Mission, a programme was established to make these services available in the district and subdistrict health facilities, which helped to bring the AYUSH services into mainstream medicine.

Nowadays, an estimated 3371 hospitals and 22 014 dispensaries in the public health system provide only AYUSH services.⁹ Many private facilities also provide these services. How many of the 754 985 registered AYUSH doctors are in active practice is not known.⁹

commenting on the nursing profession, the Bhore Committee—set up by the Indian government in 1943 to investigate and recommend improvements to India's public health system—noted that the pay, status, and general working conditions of nurses needed much improvement if women were to be attracted to the service in adequate numbers.⁶ Furthermore, the government invested little in training colleges, with most Indian nurses being trained in Christian missionary institutions.¹⁰ Such neglect also had cultural roots—the profession was not attractive to upper-caste women because of the functions a nurse did, such as cleaning and bodily contact with individuals from different castes and social backgrounds.

After independence, the government adopted several policies that shaped human resources for health. The report by the Bhore Committee—and subsequent reports¹—directed government attention and resources towards establishing a publicly funded and managed health system. Their focus was on bringing primary health care to rural areas. The creation of a cadre of basic doctors—trained in clinical skills and public health—was central to this plan. On the advice of the Bhore Committee, and despite disagreement from some individuals within the committee, the government no longer allowed licentiate physicians to practice. Thereafter, India was allowed to have only one type of allopathic physician, graduates who had done 5-year medical degrees, equivalent to that of western doctors.⁸ The Indian Medical Service, which was concerned mainly with the health of the colonial army, was abolished. Physicians trained in Indian systems of medicine did not have a specified role in the new plans. The British policy of sharing authority between states was retained; the provision of health care (and maintenance of the workforce) became principally a responsibility of the states, leaving the central government with a restricted role.

Little progress has been made in the improvement of public health education, despite much emphasis from the early planners of India's health system in the post-independence era. To the detriment of public health, public health education was largely restricted to medical colleges. Preventive and Social Medicine departments in medical colleges faced challenges such as low prestige, poor quality of staff, and inadequate facilities. Medical school curricula emphasised clinical education and practice rather than public health education. Preventive and Social Medicine is the least popular specialisation for medical students; the best and the most intelligent medical students prefer to specialise in other disciplines.¹⁰

After independence, the government attempted to improve the state of nursing in the country through standardisation of nursing education and increasing the resources for training public health nurses and midwives. However, despite such efforts, the nursing profession (and other cadres such as auxiliary nurse midwives,

technicians, and community health workers) in India is in a state of neglect. The reasons for this neglect include the establishment of a doctor-centric health system and inadequate financial support from the government.¹¹

Since independence, in an attempt to address the severe shortages in human resources for health, India has tried several ways of recruiting community-based health workers.^{12,13} For example, inspired by the barefoot doctors in China, starting in the 1970s, several small-scale experiments with community health workers were done in different parts of India.^{14–17} In 1975, the Srivastava Committee¹⁸ recommended the recruitment of part-time health workers from the community to “place people’s health in people’s hands”.¹ The national Community Health Volunteer programme was launched in 1978 in line with the Alma Ata Declaration.¹⁹ Within a decade, however, the programme was declared dysfunctional for various reasons.¹⁵ Health system support was weak and most doctors opposed the programme. The government regarded the workers as volunteers but the workers wanted to become government employees with regular salaries instead of receiving honorariums; the programme had little community ownership; roles were not clearly defined; the roles of community health volunteers and other health-care field workers were often confused.¹⁵ In 2005, the National Rural Health Mission established the accredited social health activists—ie, health workers who work in villages. India has 700 000 accredited social health activists, and their contribution to the promotion of increased use of public health facilities, especially for some services like deliveries in institutions, are well documented.¹⁵

State of human resources in health

India’s health workforce is made up of a range of health workers who offer health-care services in different specialties of medicine (panel 2). The workforce includes many informal medical practitioners, generally called registered medical practitioners, such as traditional birth attendants (known locally as dais), herbalists, snake-bite curers, and bone setters. For most of the population, especially the poor, registered medical practitioners are often the first point of contact for treatment. They have no professional qualification or licence to practice any medical discipline. Evidence shows that registered medical practitioners often practice allopathic medicine and often have strong professional links with qualified private allopathic doctors (or the private practice of government doctors), pathology laboratories, and corporate hospitals to which they refer patients in return for commission. They also receive commissions on surgeries and diagnostic tests.²⁰ Results from one study²¹ suggest that 25% of individuals classified as allopathic doctors (42% in rural areas and 15% in urban areas) have no medical training.

Health workforce size

Reliable and systematic data for health workers in India are difficult to obtain (panel 3). Estimates for 2005

Panel 2: Health workers in India

- Doctors (allopathic): medical graduates with a bachelor’s or postgraduate specialist diploma or degree registered with the Indian Medical Council.
- Practitioners of ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy: medical graduates with a bachelor’s or postgraduate degree in ayurveda, unani, siddha, or homoeopathy registered with the Central Council for Indian Medicine or the Central Council for Homoeopathy.
- Nurses: have a diploma in General Nursing and Midwifery (3·5 year course) or a 4-year bachelors degree or a 2–3-year postgraduate degree registered with the Indian Nursing Council.
- Dentists: graduates with a bachelor’s or postgraduate degree in dentistry registered with the Dental Council of India.
- Auxillary nurse midwives: have a diploma in auxillary nurse midwifery (2-year course).
- Pharmacists: have a diploma or bachelor’s degree course in pharmacy.
- Technicians and allied health professionals: professionals who have undertaken specialised studies, including laboratory technicians, radiology technicians, dental assistants, and other technical staff. Allied health professionals include dieticians, nutritionists, opticians, physiotherapists, and administrators.
- Community health workers: professionals who have completed 10 years of formal education and have undergone a 23-day training course. Other community health workers include health educators and health assistants.
- Accredited social health activists: trained community health volunteers who reside in a village, have completed 8 years of formal education, and are preferably aged 25–45 years.
- Registered medical practitioner: unlicensed health practitioners who give allopathic treatment and work in rural areas with little or no formal medical training.
- Traditional medicine practitioners and faith healers: treat physical and mental illnesses with the help of selling talismans and charms, and by performing special rites.

(based on the 2001 census) suggest that India had almost 2·2 million health workers, including about 677 000 allopathic doctors and 200 000 practitioners of ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy.²¹ India has roughly 20 health workers per 10 000 population (figure 1). The total health-care workforce consists of allopathic doctors (31%), nurses and midwives (30%), pharmacists (11%), practitioners of ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy (9%), and others (9%).²¹ Census estimates are based on self-reported occupation and are therefore susceptible to false reporting of qualifications. To account for this possible inaccuracy, census estimates are adjusted for educational qualifications on the basis of proportions derived from the estimates of the National Sample Survey Organisation. The adjusted census estimates suggest that there are, per 10 000 people, slightly more than eight health-care workers, 3·8 allopathic doctors, and 2·4 nurses and nurse-midwives.²¹

In cross-country comparisons, the total number of allopathic doctors, nurses, and midwives (11·9 per 10 000 people) is about half the WHO benchmark of 25·4 workers per 10 000 population.²¹ When adjusted for qualification, the number falls to about a quarter of the WHO benchmark.²¹ India has roughly one nurse and

Panel 3: Data sources for India's health workforce

Reliable and systematic data for training and distribution of different categories of health workers are not regularly gathered and presented by any government or other agencies in India.^{22,23} The following data sources have been used in this report:

- Census of India 2001²⁴
- Revised Indian National Classification of Occupations–2004: Directorate General of Employment and Training, Ministry of Labour, Government of India²⁵
- Survey on Employment and Unemployment (61st round) done by the National Sample Survey Organisation in 2004–05²⁶
- Recognised medical colleges from the Medical Council of India²⁷

Assessment of the number of health workers in India presents several challenges. First, several types of health workers offer health services in different systems of medicine. Second, many health workers are not properly qualified and need to be identified separately. Third, routine sources of information about the health workforce are fragmented and generally unreliable. The government regularly reports information about the various health workers present in the public sector. For some cadres of health workers (allopathic physicians, physicians trained in ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy, dentists, nurses, pharmacists), data for those who are present in the country are available from their respective professional councils. However, data have several limitations.²⁸ Because professional councils do not maintain live registers, the information they provide is inaccurate due to non-adjustment of health workers leaving the workforce because of death, migration, and retirement, or double-counting of workers because they have registered in more than one state. Furthermore, not all state councils follow the same procedure for registration, raising issues of comparability. Some categories of health workers, such as physiotherapists, medical technicians, registered medical practitioners, and faith healers, are not recorded at all. Data for health workers in some states (eg, northeast of India) are not available because they do not have state-specific professional councils.

nurse-midwife per allopathic doctor and the qualification-adjusted ratio falls further to 0.6 nurses per doctor.²¹ Although no gold standard exists 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 can doctors.

Distribution

Health workers are unevenly distributed across the country (figure 2). Generally, the north-central states, which are some of the poorest in terms of economy and health, have low numbers of health workers. The numbers of health workers per 10 000 population in India range from 23.2 in Chandigarh to 2.5 in Meghalaya. The

numbers of allopathic doctors per 10 000 people in states such as Goa (41.6) and Kerala (38.4) are up to three times higher than in states such as Orissa (19.7) and Chhattisgarh (15.8).²¹ The numbers of female doctors is strikingly low per 10 000 population, ranging from 7.5 in Chandigarh to 0.26 in Bihar.

The number of health workers per 10 000 population in urban areas (42) is more than four times that in rural areas (11.8). The number of allopathic doctors per 10 000 people is more than three times larger in urban areas (13.3) than in rural areas (3.9), and for nurses and midwives (15.9 in urban areas vs 4.1 in rural areas).²¹ More practitioners of ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy work in urban areas (3.6 per 10 000 population) than in rural areas (1.0 per 10 000 population).²¹

Most health workers (70%) in India are employed in the private sector. Most allopathic doctors (80%), practitioners of ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy (80%), and dentists (90%) are employed in the private sector. By contrast, only about half the nurses and midwives are employed in the private sector.²¹ However, the distinction between public and private sectors is not always clear because, for instance, doctors who work in the public sector often also work in the private sector. This high number of health workers per 10 000 population in the private sector impedes universal access to health care because of the burden of out-of-pocket payments. Furthermore, many doctors, particularly in the communities, are not fully qualified.

The under-representation of women in the health-care workforce can affect women's access to health care. Nearly two-thirds of all health workers are men. The number of female allopathic doctors is especially low; only 17% of all allopathic doctors and 6% of allopathic doctors in rural areas are women.²¹ Conversely, 70% of nurses and midwives are women.²¹ The number of female allopathic doctors is only 0.5 per 10 000 population in rural areas, whereas it is 6.5 in urban areas.²¹

Although data for caste, tribe, and religion of health workers are not available, such factors are known to affect an individual's ability to do their duties.^{28–31} Case studies indicate that most auxiliary nurse midwives belong to upper and middle castes.^{32,33} In rural Uttar Pradesh and the tribal belt of south Gujarat, many reports exist of auxiliary nurse midwives pretending to be from a different caste or tribe so they can more effectively deliver immunisation services.^{33,34} The safety of female health workers in rural areas is also a concern.

Shortages

The public health system has a shortage of medical and paramedical personnel. Government estimates (based on vacancies in sanctioned posts) indicate that 18% of primary health centres are without a doctor, about 38% are without a laboratory technician, and 16% are without a pharmacist.³⁵ Specialist allopathic doctors are in very short supply in the

public sector; 52% of sanctioned posts for specialists at community health centres are vacant. Of these vacant posts, 55% are for surgeons, 48% are for obstetricians and gynaecologists, 55% are for physicians, and about 47% are for paediatricians. Many nursing posts are vacant—18% of posts for staff nurses and auxiliary nurse midwives at primary and community health centres are vacant.³⁵ The number of primary and community health centres without adequate staff is substantially higher if high health-worker absenteeism is taken into consideration.³⁶ In the public sector, shortages of laboratory technicians, and pharmacists also exist.³⁵ Similarly, the private sector has a lack of qualified health-care providers. Many unqualified health-care providers work in the private sector, particularly in rural areas and the slums in urban areas.^{2,21} Although little documented evidence exists, this problem might even affect private hospitals, which are unregulated; a court in Delhi has ordered the Delhi Medical Council to investigate the hiring of unregistered doctors by private hospitals.³⁷ A consequence of the shortage of health workers is that many people in rural areas and those who are poor in urban areas receive inappropriate or no health care.²

The shortage of health workers in rural areas is because of both the disinclination of qualified private providers to work there and the inability of the public sector to attract and adequately staff rural health facilities. Many health workers prefer to work in urban rather than rural locations because, in urban areas, they can earn a better income, can work more effectively (because of better access to, for example, equipment and facilities), have good living conditions, and have safe working and living environments, and because their children can have better education opportunities.¹⁰ For many medical graduates the desire for postgraduate specialisation dissuades them from entering the job market and from taking posts in the public sector in rural areas.³⁸ Furthermore, higher salaries in the private sector than in the public sector are an incentive for doctors not to join the public health system. Nurses are more amenable to public sector employment than are doctors—nearly half the nurses in India work in government jobs.²¹ Public sector efforts to recruit and retain health workers in rural posts (panel 4) are also compromised by institutional factors such as changes in service rules; recruitment delays; the lack of transparency in identifying vacancies, promotions, and transfers; and the many court cases related to such matters that state health directorates face.³⁹

International migration

Many doctors, nurses, and technicians emigrate from India, which contributes to the country's shortage of health workers. Indian doctors constitute the largest number of foreign trained physicians in the USA (4·9% of physicians) and the UK (10·9% of physicians), the second largest in Australia (4·0% of physicians), and third largest in Canada (2·1% of physicians).^{40–42} The Planning Commission cites WHO¹⁶ to show that about 100 000 Indian doctors work in the USA and the UK.⁴³

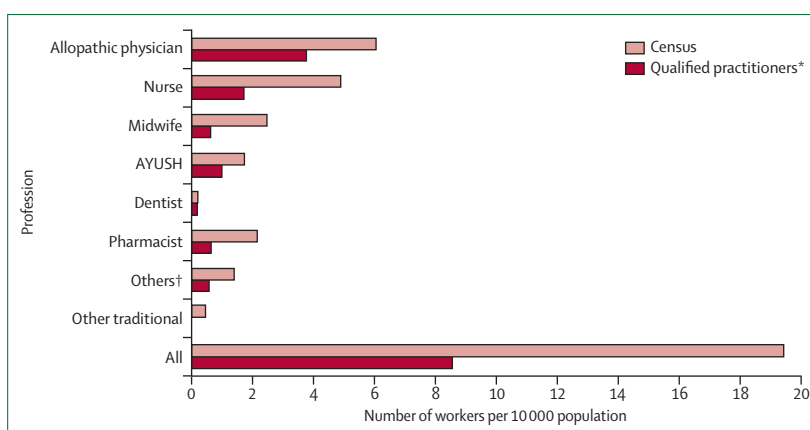


Figure 1: Number of health workers per 10 000 population in India in 2005

Data from reference 21. AYUSH=ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy. *Estimates based on National Sample Survey Organisation.²⁶ †Dietician, nutritionist, optician, dental assistant, physiotherapist, medical assistant, technician, and other hospital staff.

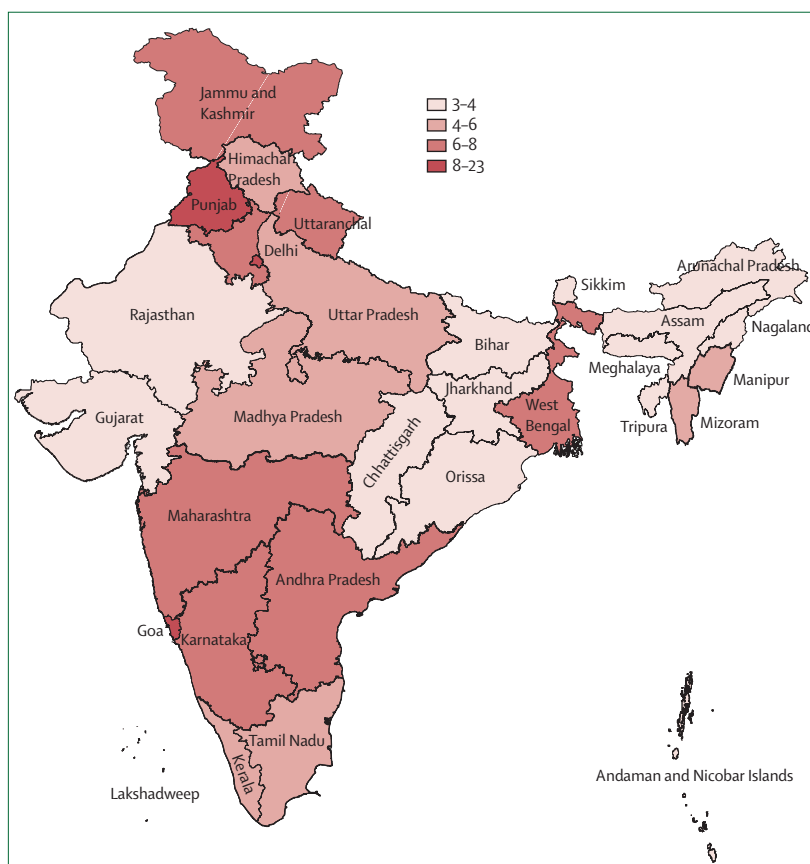


Figure 2: Number of doctors per 10 000 population in India in 2005

Data from reference 21.

Migration seems to be substantially higher for graduates from the best medical colleges. The results of a study⁴⁰ at India's premier medical college between 1989 and 2000 showed that 54% of graduates left the country; most went to the USA. In response to the

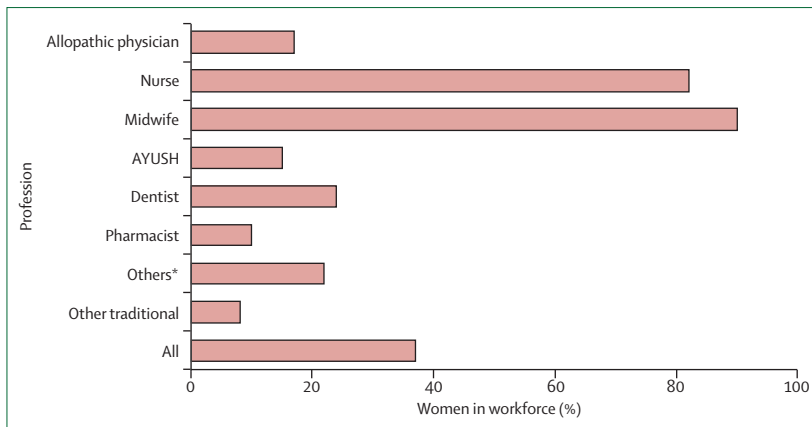


Figure 3: Women in the health workforce

Data from reference 21. AYUSH=ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy. *Dietician, nutritionist, opticians, dental assistant, physiotherapist, medical assistant, technician, and other hospital staff.

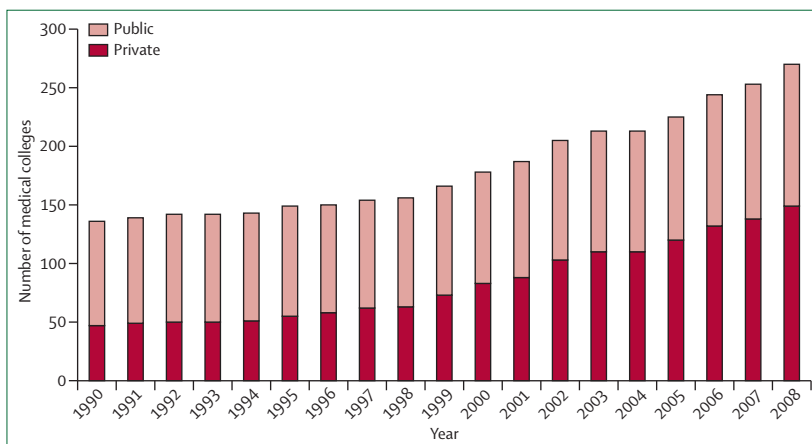


Figure 4: Medical colleges in India

Data from reference 53.

increasing dependency of developed countries on foreign trained nurses, the presence of Indian nurses in developed countries is substantial and increasing.^{44,45} Although no comprehensive information exists, available data suggest that emigration from India is substantial. For instance, the number of new Indian nurse registrants in the UK grew from 30 in 1998 to 3551 in 2005.⁴⁵ The National Council Licensure Examination for Registered Nurses, a qualification needed to become a registered nurse in the USA, had 417 Indian first-time examinees in 2000; this number increased to 5281 in 2007.^{46,47}

Many developed countries rely on and actively recruit foreign health workers to fill their human resource needs. For instance, the UK Department of Health made an agreement with the Government of India to recruit nurses from India.⁴⁸ In 2003, the US Commission on Graduates of Foreign Nursing Schools opened a new examination centre in Kochi to enable Indian nurses to enter the US labour market.⁴⁹ The Commission on Graduates of Foreign Nursing Schools, which gauges

nurses' ability to work in the USA, has four offices in India, the most from any country.

The Planning Commission⁴³ notes that shortages of nursing staff are worsened by migration of trained nurses to other countries. Medical and nursing schools are having difficulty in filling teaching-staff vacancies.⁵⁰ Nurses who emigrate are better qualified and have more experience, resulting in a shortage of competent nursing staff in hospitals.⁴⁴ More than anything else, health-worker migration draws attention to the need to improve working conditions and professional development, particularly for nurses, in India.

The Indian Government's inattention to the shortages in the numbers of health workers and the simultaneous promotion of health-worker migration, draws attention to the government's thinking that the numbers of doctors and nurses are adequate, or that the numbers leaving are not large enough to affect the health services. Health-worker migration, especially for those whose training is funded by the public, is a substantial loss of scarce public resources. The number of doctors and nurses leaving the country has important implications for the capacity and quality of health services, research, and faculty development for training future generations.

Medical education

Since independence, access to medical education has increased substantially in India. At the time of independence, India had 19 medical schools, from which 1200 doctors graduated every year.⁵¹ Nowadays, according to the Medical Council of India, India has roughly 270 medical schools, from which 28 158 doctors graduate every year.⁵² Private medical institutions have helped this rapid increase in medical education (figure 4).⁵³ In 1990, 33% of 135 medical schools were privately operated; nowadays, 57% are privately operated. Private medical schools include those managed by faith-based organisations and private trusts and societies.⁵¹ Government medical colleges are mostly funded by state governments and municipal corporations; fewer are supported by central government.⁵¹ The rapid increase in the number of medical colleges has drawn attention to the problem of poor quality of medical education being provided (panel 5).

Many medical colleges have been set up because of political pressure, with grossly inadequate facilities, an acute shortage of faculty, and poor-quality training.⁴³ The cost of medical education at private (non-faith based) medical schools is high; tuition fees at one of the country's leading medical colleges is about INR2 million (about US\$45 000) for the medical degree.⁵⁷ In addition to the regular tuition fees, private institutions usually charge substantial fees, termed donations. By contrast, the All India Institute of Medical Sciences, a leading government-funded medical school from which about half of graduates emigrate, charges roughly INR3000 (about \$60) in tuition fees for the same degree.⁵⁸ The public subsidy is enormous. The shortage of available doctors is partly due to the

failure of the Medical Council of India to set and monitor standards (panel 6).

Medical colleges are not evenly distributed across India. The southwestern states of Andhra Pradesh, Maharashtra, Karnataka, Kerala, and Tamil Nadu (which together account for 31% of the country's population) account for 58% of all medical colleges (public and private) in India. The high number of medical schools in these states is because of the growth of private institutions and specific political and caste groups that have invested in the lucrative business of medical education.⁶⁴ States with poor health, Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh, have 36% of the country's population but only 15% of the medical colleges. Private medical colleges dominate, accounting for 65% of medical schools in the five southwestern states and for 50% of medical schools in the four states with poor health.⁵²

Despite the increase in the numbers of medical schools and graduates, medical students from public and even more so from private medical colleges are not attracted to employment in rural areas or the public sector. High capitation and tuition fees for medical education mean that students are more likely to seek employment in the private sector where they can earn more money.⁵⁷

Nursing education

In India education for nurses has also increased rapidly. In 2006, there were 271 teaching institutions for auxiliary nurse midwives, 1312 offering the general nurse midwifery degree, 580 offering bachelors degree in nursing, and 77 offering masters degrees in nursing.⁶⁵ Private nursing institutions have added to the increase in nursing education. Of the nursing colleges offering courses in general nurse midwifery, 88% were private sector institutions.⁶⁵ Corporate sector hospitals have also started training nurses for employment abroad.⁶⁶ Little is known about several unrecognised and unregistered nursing schools, especially about those in southern states.

The increase in the number of nursing institutions has been accompanied by deepening geographical imbalances. The southern states Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu have 63% of the general nursing colleges in the country, 95% of which are private, with the others distributed unevenly across the rest of the country.⁶⁵ The distribution of nursing institutions that offer higher education (ie, BSc and MSc degrees) is even more disproportionately distributed—78% are located in the four southern states, all of which have higher numbers of nurses and midwives per 10 000 population than the national average (7·4 per 10 000 population).⁶⁵ States such as Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh have fewer numbers of nurses per 10 000 population than the national average, but account for only 9% of nursing schools in the country.⁶⁵

Nursing education has had sustained neglect in India.⁶⁷ Despite steps taken after independence to standardise

Panel 4: Initiatives to attract qualified health workers to underserved areas

Monetary incentives

Most states in India offer a higher salary for public sector medical officers serving in rural or remote areas than for those serving in urban areas, though the amount of the incentive varies between states.

Educational incentives

Compulsory rural service bonds have been introduced by some states (eg, Tamil Nadu and Kerala for specialist doctors and Meghalaya for general doctors) in exchange for subsidised, government-provided medical education. Other states have introduced mandatory rural service for a doctor to be considered for admission to postgraduate specialisation programmes. Other states, such as Tamil Nadu, Gujarat, and Andhra Pradesh, reserve postgraduate seats for or give preference to those who have completed a specific number of years of rural service.

Workforce policies

Haryana has adopted a simplified, decentralised recruitment process with incentive packages as a way of filling medical officer and specialist vacancies. West Bengal has introduced location-specific recruitment of candidates from underserved areas. These candidates have to undergo an 18-month training course for nurse midwives after which they are posted in their respective local facilities.

New cadres

In Chhattisgarh, Assam, and West Bengal, a 3-year course for the provision of a rural medical practitioner with adequate skills for primary health care has been introduced and it has helped fill most vacancies in the public sector. In most Indian states, physicians trained in ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy are being recruited to primary health centres, where they often serve as medical officers. In Rajasthan, nurse practitioners are being used for primary health care in select areas.

Public-private partnerships

These take several forms, the most common is the temporary employment (from private hospitals) of physicians (and other staff) to fill vacancies. In Karnataka and Arunachal Pradesh, select primary health centres have been contracted out to non-governmental organisations. In Gujarat, the government has purchased services from private gynaecologists to increase deliveries in institutions among individuals who are poor.

nursing education and increase the training capacity for nurses, public health nurses, and midwives, the nursing profession continues to be neglected, although Indian nurses are much sought after abroad.¹ The main reasons for this neglect are the focus on medical education, the substantial political influence of the medical community, and poor health financing by the Indian Government. One survey showed that 61% of nursing colleges were unsuitable for teaching, with an acute shortage of faculty and facilities.⁶⁸ The geographical imbalance of the best nursing institutions, which provide faculty for teaching the basic courses, is contributing to the near collapse of basic nursing education in several states.⁵⁰ A survey of five states (Assam, Bihar, Gujarat, Uttaranchal, and West Bengal) showed that 20% of posts for Principal Nursing Officer and 28% for Senior Tutor were vacant.⁶⁷ The condition of the teaching infrastructure is generally poor with inadequately equipped libraries and demonstration rooms, overworked teaching staff, little practical experience for students, and few opportunities for

Panel 5: Quality of medical and public health education

Medical education in India consists of a basic undergraduate degree (MBBS) and then the option to specialise, leading to a postgraduate degree. Undergraduate medical education consists of 4·5 years of preclinical and 3 years of clinical teaching, after which an MBBS degree is awarded. The graduate then undertakes 1 year of compulsory internship in different hospital departments. The relevance of this medical education to India's health-care problems has been questioned. One study⁵¹ noted that students do not learn enough about the common infectious diseases or problems of child and maternal health. The government has noted that most medical graduates are not adequately trained to work in the primary health-care setting.⁵⁴⁻⁵⁶ Students do not seem confident in treating patients on the completion of their degree.^{10,56} The strong desire to specialise, and the intense competition for the few postgraduate places, leads students to use the compulsory internship period, which is meant to strengthen clinical skills, for studying for postgraduate entrance examinations.¹⁰ Once students specialise they have little incentive or inclination to serve in a primary-care setting or in a rural area.

Institutes teaching public health and related disciplines were established in India during the British colonial period. The School of Tropical Medicine (established in 1922) and the All India Institute of Hygiene and Public Health (established in 1932) are the earliest of such institutions. With the independence in 1947, the Bhore Committee report put in motion ambitious plans for public health education in India.¹ It recommended the setting up of Departments of Preventive and Social Medicine in medical colleges so that Indian doctors could be trained in public health.¹ In addition, the committee recommended training for nurses, public health engineers, and other cadres of public health professionals. The Mudaliar Committee (1965) recommended establishing schools for education in public health in every state and 1-year public health training of medical officers to learn about public health sanitation.¹ It also recommended that universities offer degrees in public health for non-medical personnel.

in-service training for teaching staff.⁶⁷ These problems seem to be common in private nursing colleges.⁶⁷ The situation with auxiliary nurse midwives is much the same; in many states training institutes for these midwives were shut down even as the National Rural Health Mission seeks to induct more auxiliary nurse midwives into government service.¹⁰

Many other factors account for the neglect of nursing education. For example, nursing councils in India are typically managed by medical and health-service personnel, which means that nursing staff have difficulty exercising their authority and leadership because the nurse's role is subordinate to the roles of the clinical and public health personnel. This problem is further compounded by gender inequities in the health professions and the low social and educational status of nurses compared with other health professionals.²³

Provider quality

Insufficient investments in medical and nursing education have largely caused India's crisis in human health resources.⁴³ Poor quality of care in the public sector, particularly at peripheral health facilities, is often cited as the reason for people seeking private medical care. State incentives for the development of the health tourism industry has led to many health personnel moving from the public to the private sector, which has contributed to

the lower standards in the public sector.⁶⁹ Although the quality of health care provided at some private sector facilities is excellent, such high-quality care is not necessarily provided at all privately run facilities. The results of a study⁷⁰ in Chennai showed, for instance, that private hospitals have grown without any norms for infrastructure (in terms of equipment, staffing, and buildings), and with a strong tendency to overprovide services and to overcharge, depending on a patient's ability to pay. The results of a study⁷¹ in rural Maharashtra showed that 55% of private sector institutions were registered, only 38% maintained standard records, and that a very high proportion lacked basic equipment; only 10% of hospitals had an electrocardiogram monitor, 65% had a steriliser, and 56% had an oxygen cylinder. Moreover, nearly 30% of private institutions were operated by doctors who were not trained in allopathic medicine and only 2% of institutions employed trained nurses.

Evidence indicates that patients' perceptions of the service provided by physicians and health workers in the public sector range from moderate to high.⁷²⁻⁷⁴ Studies of the technical ability (knowledge and skill) of physicians are few. A recent assessment of physicians in the city of Delhi indicated that qualified private sector doctors tend to be the most competent and put in the most effort, followed by public sector doctors at hospitals, and then doctors in primary health centres.^{3,75} Registered medical practitioners who provide health services to many people living in rural areas and those who are poor in urban areas had the lowest competence.³

Little private sector oversight has led to practices that are detrimental to quality of care. Evidence suggests that doctors in the private sector prescribe more drugs than do those in the public sector.^{3,75-77} Registered medical practitioners prescribe more drugs and antibiotics than do qualified physicians.⁷⁵ Caesarean sections were done three times more often in private hospitals than in public hospitals.⁷⁸ Furthermore, untrained physicians and nurses were practicing in private hospitals.^{70,71,79}

Recent initiatives

The Indian Government is aware of the additional requirements and shortages in the availability of health workers for the future. The National Rural Health Mission, for instance, recommends a vastly strengthened infrastructure, with substantial increases in personnel at every tier of the public health system.⁸⁰

According to the National Rural Health Mission, a district of 1·8 million people should have about 400 subcentres, 50 primary health centres, nine community health centres, and a district hospital. To achieve these targets, every district would have to employ about 1450 midwives and nurses and 370 medical officers—currently, a district with roughly 1·8 million people employs roughly 500 nurses and 100 medical officers in the public sector. The Indian Government's estimates⁸¹ call for 41 additional medical colleges and 137 nursing

schools. The government has recently relaxed norms for private medical colleges to be set up in the districts with government hospital facilities.⁸²

A fair assertion would be that despite the many policy recommendations in committee reports or plan documents, India has not created a coherent human resource policy for health.⁴³ Some efforts are being made to address the gaps in human resources. With the launch of the National Rural Health Mission, a serious effort to increase availability of community health workers was undertaken in the scheme for accredited social health activists. Local women (aged 25–45 years), married or widowed, with at least 8 years of formal education are recruited and trained to each serve a population of about 1000 people. In many states, an important first step has been taken in identifying accredited social health activists, and training and supporting them to provide basic health care and ease cooperation with the public health system by acting as a point of reference for people's health queries. These female health workers receive no pay but do receive incentivised compensation. Some states have recruited traditional birth attendants to be trained as accredited social health activists.

Several states in India have experimented with strategies to recruit and retain health workers in underserved areas. States such as Tamil Nadu have also made substantial efforts to augment human resources in health (panel 7). Chhattisgarh and Assam have created a new class of allopathic clinicians (with 3·5 years of medical training) to work in rural areas only.⁸³ Physicians who are trained in ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy now work at primary health centres. The government is also considering a cadre of non-physician clinicians who will have a Bachelor of Rural Health Care degree to provide health care at rural subcentres.^{84–86} Other states have engaged in public–private partnerships to improve the availability of general and specialist health services in the public sector. Many states are now training general physicians to provide emergency obstetric services (eg, caesarean sections) or to give anaesthesia for emergency obstetric care. Close attention needs to be given to these efforts; they are local solutions to a national problem and are the templates for future strategies to bring qualified health workers and their services to all Indian people.

Way forward

India urgently needs to develop a national human resource policy. Such a policy should also examine the creation and establishment of cadres of trained health professionals (medical and non-medical) who can provide leadership (technical and administrative) and direction to the health sector in the states and nationally. Such cadres could correct the imbalance in competencies and improve channels of communication between technical and administrative personnel in addition to providing necessary incentives and opportunities for career progression in the health sector.

Panel 6: The Medical Council of India (MCI)

The MCI was established as a statutory organisation in accordance with the Indian Medical Council Act of 1933. Its initial mandate was to ensure good and uniform standards in medical education and to grant recognition to medical degrees offered by universities in India and abroad. One author has argued that the primary purpose of the MCI was to ensure that the General Medical Council in the UK would continue to recognise Indian medical degrees.⁵⁹ Nowadays, as an autonomous organisation, the MCI has the mandate to set and monitor standards for medical education, recognise medical degrees offered by universities in India and abroad, and register qualified medical doctors.

MCIs focus on obtaining international recognition had some consequences. First, medical education was planned according to international standards, which made the emigration of India's medical personnel easier.

Second, it signalled that licentiate programmes that had been running in the country would no longer be recognised, which indeed the Bhore Committee (that set the blueprint for health sector development in the country) recommended.¹ India was to produce only allopathic clinicians with MBBS or higher degrees.

Third in response to the Chopra Committee Report in 1948,¹ which suggested that all students of medicine should be taught both allopathic and Indian systems of medicine, allopathic medical education in India sought to protect itself from any association with non-allopathic systems of medicine. An amendment to the Act in 1956 permitted the MCI to derecognise degrees awarded by Indian or foreign universities.

More recently, the role of the MCI in setting and monitoring standards has come under severe criticism especially with the rapid increase in private medical education after the 1990s. The National Knowledge Commission, for instance, has noted that regulation by the MCI was neither adequate nor appropriate.⁶⁰ Anecdotal evidence indicates that several private medical colleges had opened up with permission from the MCI, although they had insufficient staff and infrastructure.⁶¹ MCI officials have been repeatedly investigated for charges of corruption. These issues reached a crucial point when, in an unprecedented judgment, the Delhi High Court in 2001 ordered the president of the MCI to step down on grounds of corruption.⁶² In 2005, the union health minister publicly stated that the MCI, with its absence of transparency, had been taken over by mafias.⁶³ At the time of writing, the head of the MCI has been arrested on charges of corruption. Critics of the MCI also claim that it has prevented the growth of specialties to preserve medical monopolies. Even its task of registering medical graduates has been inadequate—the MCI does not maintain live registers, making it difficult to determine how many practicing physicians there are in the country.

India has to move away from the idea that only allopathic doctors should deliver primary health services. Other cadres of health workers, such as allopathic clinicians with less than 3 years of training, nurse practitioners, and physicians trained in ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy, can take this responsibility with appropriate training. These cadres, as experience suggests, are more likely to undertake rural service within the public sector than are allopathic physicians. We are not suggesting that allopathic doctors have no role in rural health, but rather, their presence and expertise are perhaps better used at subdistrict and district hospitals, where they can supervise and receive support from peripheral health facilities staffed by these other cadres. Special efforts should be made to address the shortage of specialist allopathic doctors at district and subdistrict hospitals. At

**Panel 7: Augmenting human resources for health—
Tamil Nadu's initiatives**

The Government of Tamil Nadu has introduced several important measures to strengthen human resources in the health system:

- New posts for health workers in primary health centres were created and filled. The number of nurses in these centres was increased from one to three. Together with two medical officers, the five-member team allowed primary health centres to offer 24-h care.
- Provision of education for physicians and nurses in the public sector has been expanded. Several incentives and enabling policies have been introduced to attract and retain health personnel: 3 years of rural service is mandatory for all doctors and nurses passing through government institutions; postgraduate posts are reserved for those who have worked in government service, particularly those who have worked in remote areas.
- The state has a separate Directorate of Public Health with its own dedicated cadre and budget. New entrants to government service in this cadre are given 3 months training in public health and are posted in peripheral health facilities. They are trained in public health management and to do clinical duties. After 4 years of service, they are given the option to join the public service cadre. Those who opt for the public health work must obtain qualifications in public health; they are also promoted quickly. They also receive an allowance for not undertaking private practice.

This mix of financial and non-financial incentives, backed by effective training, support, and infrastructure strengthening, has contributed to the higher retention of medical practitioners within the public health system. The creation of a dedicated public health management cadre has led to better management of public health programmes. Hospital management is open to those in the clinical stream and this is distinct from public health management.

the same time, creative solutions such as the provision of specialist training to general physicians, which several states are implementing, should also be considered.

Strengthening health worker competencies in primary health care, both numerically and qualitatively, is also crucial for reform of human resources. New training institutions for nurses need to be created by the public sector, especially in states where they are few; existing institutions also need to be strengthened. In conjunction with such reforms, the capacity of staff and public health nursing colleges for producing qualified trainers needs to be strengthened. The provision of specialist courses to strengthen nurses' clinical skills will enable them to provide basic health services while also increasing their professional status. To strengthen the nursing profession, the status of nurses within the health workforce and their working environment needs to be improved.

Therefore, nurses need to be given more authority and representation in all national, state, and district health decision-making organisations.

For a strong primary health-care system, the availability and quality of other health workers engaged in the provision of basic health services needs to be strengthened. In particular, basic health workers, health assistants, lady health visitors, and technical staff (eg, laboratory technicians) are also essential for the provision of primary health care.

Physicians trained in ayurveda, yoga and naturopathy, unani, siddha, and homoeopathy are an important resource if universal health care in India is to be achieved, and their skills for providing primary health care should therefore be strengthened. Moreover, such physicians should work in primary health centres; the integration of these physicians within the public sector health system requires that they be retrained to provide primary health services.

Appropriate packages of monetary and non-monetary incentives are crucial to encourage qualified health workers to serve in rural, remote, and underserved areas. Such packages could include a salary increase, reservation for postgraduate seats in return for rural service, and improved housing. Additionally, a system of scheduled transfers is important so that public sector health workers only work in rural areas for a finite time, which could increase their willingness to take such roles. All health workers, including accredited social health activists, should have clear avenues for promotion. Incentives that focus health worker attention on select activities or programmes are counterproductive and not desirable. Efforts to build positive practice environments and support to reduce professional and social isolation would also help. Most importantly, to address India's crisis in human health resources, increased emphasis on recruiting candidates from these very underserved disciplines, training them as close to their homes as technically feasible, and enabling them to work in these areas would be very beneficial.

The education and training of health workers, particularly doctors and nurses, need to be oriented towards the public health needs of the country, particularly those of underserved areas and populations. Health workers in India receive little training to work in underserved areas. Faculty development programmes for more relevant curricula and teaching-learning programmes are therefore important. Continued education, credibility, and regulation are urgently needed to improve provider quality. This calls for improved governance and draws attention to the failure of regulatory organisations such as the professional medical and nursing councils to implement such measures. Political will is needed to implement necessary legislations because opposition from organised and powerful professional groups (such as medical, nursing, and other professional councils) exists.

A database that provides comprehensive, reliable, and up-to-date information about all the health workers who offer health services in different systems of medicine is urgently needed. Data should be gathered for the key aspects of human resources, such as on the numbers, location, and qualification of different categories of health workers (including physiotherapists, medical technicians, registered medical practitioners, and faith healers); on the emigration of doctors and nurses from India; and on student capacity in public and private nursing institutions. This information will become essential as India begins to plan more systematically towards addressing the large human resource gaps.

Contributors

KDR, MR, and TS led the writing of the paper and did the analysis. AKSK and MC provided guidance and contributed to the writing of the paper.

Conflicts of interest

We declare that we have no conflicts of interest.

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