CASE STUDY | INDIA

FROM BRAIN DRAIN TO BRAIN GAIN

MIGRATION OF NURSING AND MIDWIFERY WORKFORCE IN THE STATE OF KERALA

World Health Organization

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Abbreviations

ANM	auxiliary nurse-midwife
AYUSH	ayurveda, yoga and naturopathy, unani, siddha, and homeopathy
BSc	Bachelor of Science
CHC	community health centre
ECR	emigration check required
GCC	Gulf Cooperation Council
GDP	gross domestic product
GNM	general nurse-midwife
INC	Indian Nursing Council
KMS	Kerala Migration Survey
KNMC	Kerala Nurses and Midwives Council
LHV	lady health visitor
MPhil	Master of Philosophy
MSc	Master of Science
NORKA	Non-Resident Keralites' Affairs Department
NRTS	Nurses Registration and Tracking System
NSSO	National Sample Survey Office
NUID	national unique identification number
ODEPC	Overseas Development and Employment Promotion Consultants
OECD	Organisation for Economic Co-operation and Development
PHC	primary health centre
PhD	Doctor of Philosophy
RN	registered nurse
RW	registered midwife
WHO	World Health Organization

EXECUTIVE SUMMARY

India has experienced tremendous growth in its capacity to produce health workers. However, the country still encounters challenges in terms of availability of human resources for health. On the other hand, India serves as a major source country for migrant doctors and nurses across the world. In 2010, the Sixty-third World Health Assembly adopted the World Health Organization (WHO) Global Code of Practice on the International Recruitment of Health Personnel. The Global Code endeavours to foster ethical and fair international recruitment of health workers, taking into account the rights, obligations and expectations of the source and destination countries, as well as those of the health workers themselves.

This report uses available data to compute estimates of the production, stock and migration of nurses and midwives for India as a whole and for the state of Kerala in particular, and identifies gaps in and limitations of available data sources. Finally, policy recommendations are offered in the spirit of the Global Code.

The research protocol described in the first phase of the Brain Drain to Brain Gain project,[1] which focuses on the WHO Global Code of Practice on the International Recruitment of Health Personnel, was used to define mapping, data collection and analysis for this report. Multiple secondary data sources were used to gather information on the production, stock and migration of nursing and midwifery personnel. Further, key informant interviews with government and other relevant stakeholders, and group discussions with nursing students, were carried out to understand trends, influencing factors and experiences of migration. The study focused on both migration outside India and migration from Kerala to other states.

The **production capacity** for nurses and midwives has grown over time in India as well as in Kerala. In the decade spanning 2005 and 2016, in Kerala the number of institutions offering General Nursing and Midwifery training more than doubled from 91 to 204. Institutions offering degree programmes in nursing have also rapidly increased—between 2005 and 2016, the number of institutions offering Bachelor of Science (BSc) or Master of Science (MSc) degrees in nursing increased from 12 to 133 and from 3 to 67, respectively. These trends highlight the remarkable increase in production capacity of nurses, particularly for advanced training, in Kerala over the last decade.

Seat capacity is indicative of the total production capacity. In 2016, there were 17 600 (316 572) seats in nursing institutions (i.e. all nursing-related courses, including Auxiliary Nursing and Midwifery) in Kerala (India). This indicates that the upper bound on capacity for producing nurses in Kerala is 17 600. Further, in 2016, there were more BSc (Nursing) seats (7160) than General Nursing and Midwifery seats (6450), suggesting that Kerala has high capacity for producing both basic and advanced trained nurses. In the last few years there has been a gradual decline in the number of General Nursing and Midwifery seats and an increase in BSc and MSc (Nursing) seats, indicating a shift in production capacity from basic to advanced training in nursing. In Kerala (91%) and India (90%) the vast majority of nursing seats were in the private sector, and this is reflective of the situation generally in India.

Seat capacity is indicative of the total capacity for production. Actual production is better reflected in registration data of nursing graduates. In Kerala (as in other Indian states), graduating nurses are required to register themselves with the Kerala Nurses and Midwives Council. Registration data indicate that Kerala produced 9766 nurses in 2016. The registration estimate was almost 50% lower than the seat capacity (17 600) in 2016. It is not clear why there is such a large difference between seat capacity and registration. Several factors might be responsible: nursing schools may be unable to fill all their seats or may overreport seat capacity; students may drop out of their courses; or graduating nurses from other states may be studying in Kerala but not registering themselves in the state. Putting all these sources of information on production together, the production capacity of nurses was between 9766 and 17 600 in 2016.

1 Brain Drain to Brain Gain: Supporting the WHO Code of Practice on International Recruitment of Health Personnel for Better Management of Health Worker Migration project.

The current stock of nurses in Kerala was estimated using several sources of information. One study based on a nationally representative household survey by the National Sample Survey Office (2011/2012) estimated the density of qualified nurses and midwives as 3.16 per 10 000 population in India, while the corresponding figure for Kerala was 18.5. This translates to approximately 61 619 nurses in Kerala. Another household survey conducted in 2016 and representative of Kerala's population reported that there were 68 161 nurses in the state. These estimates from two different surveys are similar and confirm the reliability of the stock estimates.

Kerala has a long tradition of its citizens migrating overseas and to other parts of India for employment. Estimates of nurse migration bases on state representative household surveys indicate that there is a decline in nurses from Kerala migrating abroad. In 2011, 2013, and 2016, the number of Kerala nurses who were working abroad decreased from 30 038 to 26 138 to 20 622. This translates to a decline in the migration rate from 32.8% in 2011, to 30.8% in 2013, and to 23.2% in 2016. Nearly 57% of all emigrant nurses resided in Gulf countries (Saudi Arabia being the most favoured destination) in 2016. Other countries with a significant share of migrant nurses included the United States of America (6%), Canada (5.5%), and a smaller share in Australia, Germany, Ireland, Italy, Maldives and Singapore (2% to 3%).

Trends in nurse migration to the major destination countries follow the general decline observed in the overall migration rate. The share of migrant nurses going to Saudi Arabia declined from 32% in 2011 to 22% in 2016—a decrease of 10 percentage points. The proportion of migrant nurses going to the United States declined from 12.2% in 2011 to 6% in 2016, while the share of nurses migrating to Canada slightly increased from 3.3% in 2013 to 5.5% in 2016. Nurse migrants to Australia also increased in this period. These trends suggest that while overall overseas nurse migration levels from Kerala are falling, there appears to be a shift in destination countries away from the Gulf countries to Canada and Australia.

Migration of Indian nurses to Organisation for Economic Co-operation and Development (OECD) countries is also falling. For the United Kingdom, the annual inflow declined from 3790 nurses in 2005 to 303 in 2016. The United States numbers fell from 2279 in 2005 to 430 in 2015. Canada has been the only country reporting steady increases in the inflow of Indian nurses, from 181 in 2005 to 602 in 2015. However, the numbers of nurses trained in India entering Canada annually are not comparable with the high levels that were witnessed earlier in the United Kingdom and the United States. Indian nurses comprise a sizeable section of foreign-trained nurses in Australia, New Zealand, the United Kingdom and, to a certain extent, in Canada. However, Indian nurses form only a small segment of all practising nurses in these OECD countries. In 2016, the share of Indian nurses among total practising nurses was at 4.9% in New Zealand and at 3.3% in both Australia and the United Kingdom, while in Canada the figure stood at 0.9% in 2015.

A significant number of nurses from Kerala also migrated to other parts of India. The number of nurse or nurse assistant out-migrants increased from 6564 in 2011 to 7662 in 2013, only to decline to 3862 in 2016. These numbers are much lower than the number of nurses migrating overseas, which indicates the much stronger appeal of working overseas. The major destination states in terms of share of internal nurse migrants in 2016 were New Delhi (57.2%), followed by Rajasthan (28.7%) and Maharashtra (14.1%).

For nurses trained in India the pull to migrate to other countries—which offer improved salaries, working conditions, and job security, access to better health care technologies, and enhanced opportunities for the family—is strong. Further, Indian nurses on the whole are often faced with long working hours, lower salaries, stigma against the profession, and lack of autonomy and dignity in the workplace within the country, giving rise to push factors that influence decisions to migrate. This study also highlighted the challenge of fragmented health information systems, which limit our understanding of the entry, stock and migration of the nursing workforce, and which need to be strengthened in order to generate better evidence for policy.

Keywords: India, Kerala, migration, nurses, midwives, WHO Global Code of Practice

KERALA

BRAIN DRAIN TO BRAIN GAIN: MIGRATION OF NURSING AND MIDWIFERY WORKFORCE

1. Background

India presents a complex, heterogeneous health care system. Health services are delivered by both the public and private sectors. In the country's federal structure, individual states are responsible for the delivery of services via the public sector, delivering curative and preventive health services through a vast, multi-tiered network of health facilities comprising health subcentres, primary health centres (PHCs), community health centres (CHCs), and, at the top of the pyramid, district hospitals. In addition, there are public sector tertiary and teaching hospitals. This structure is common to all states in the country, though staffing norms can vary. Services in both allopathic and traditional Indian systems of medicine are offered, though the main thrust of the public sector system is on allopathic medicine. Despite a large public sector network, India's health system is highly privatized. Approximately 80% of outpatient visits and 60% of hospitalization episodes were provided by the private sector *(1)*. The private sector encompasses a diversity of health care providers. The scale of operations ranges from general practitioners operating their own clinics, to small and medium-sized hospitals, to large corporate hospitals. Importantly, a sizeable portion of the private providers, particularly in rural areas, operate without a recognized medical qualification *(2)*.

The public health system in India is financed by the central, state and local governments, though the first two are the most important. However, health care in India is overwhelmingly financed by out-of-pocket payments from patients directly to providers. Although the country has experienced substantial economic growth, especially over the past two decades, the public contribution to overall health care expenditure in India has remained around 1.3% of gross domestic product (GDP) *(3)*. A combination of low health insurance coverage and a dominant fee-for-service private sector in the delivery of curative care services has resulted in a situation where the vast majority (71%) of health spending is financed out of pocket *(3)*. Such high levels of out-of-pocket payments can lead to catastrophic health spending and impoverishment, particularly among the poor and near-poor. Studies have estimated that 3.5% of the population fall below the poverty line and 5% of households suffer catastrophic health expenditures *(4)*.

Human resources for health in India are characterized by a diversity of health workers, including practitioners of allopathic medicine and Indian systems of medicine. The workforce also includes many informal medical practitioners, generally called registered medical practitioners *(5)*. In recent decades, India has undergone a remarkable growth in the capacity to produce medical doctors and nurses. At the national level, the number of institutions offering Bachelor of Science (BSc) (Nursing) increased from 349 in 2005 to 1831 in 2016, and Master of Science (MSc) degree institutions increased from 54 to 637 over the same period. Diploma-granting institutions also witnessed a rise—institutions offering

Auxiliary Nursing and Midwifery qualifications rose from 254 to 1986, and those providing General Nursing and Midwifery qualifications rose from 979 to 3123 between 2005 and 2016 (Indian Nursing Council data). Growth in production capacity of the health workforce has largely been driven by the growth in the number of private sector institutions; in 2016, the share of the private sector amongst total institutions was 85% for Auxiliary Nursing and Midwifery institutions and above 90% for General Nursing and Midwifery, BSc and MSc institutions (Indian Nursing Council data).

Over half of the country's nursing schools are concentrated in the southern states, particularly in Kerala, Tamil Nadu, Karnataka and Andhra Pradesh *(6, 7)*. Nursing education is provided at highly subsidized fee levels in government institutes, while the cost of private medical education is several magnitudes higher.

In spite of the improvements achieved in the production of health workers, India continues to experience shortages of health workers. In 2012, the country had only 6.4 doctors, nurses and midwives per 10 000 population, one seventh of the World Health Organization (WHO) benchmark of 44.5 workers in these categories per 10 000 population *(2)*. Estimated densities of qualified workers indicate that there were 3.3 allopathic doctors and 3.1 nurses and midwives per 10 000 population in 2012 *(2)*. This produces a doctor–nurse ratio of approximately 1:1, which is generally considered a suboptimal mix of health workers in the workforce, with the nurse–doctor ratio heavily skewed towards doctors. This also reflects a failure to institutionalize task shifting, which, given the trend to produce nurses with higher qualifications, would have resulted in significant cost savings with no loss in efficiency. Having similar numbers of nurses and physicians is widely seen internationally as a significant imbalance in the human resources skills mix.

India's health workforce is further characterized by large urban–rural differences in the availability of qualified health workers *(8)*. Around 77.4% of qualified health workers were located in urban areas, while the urban population is only 31% of the country's population *(2)*. This urban–rural difference was higher for allopathic doctors (density 11.4 times higher in urban areas) compared to nurses and midwives (5.5 times higher in urban areas)—78% of all qualified doctors and 27% of all qualified nurses were in urban areas *(2)*. This suggests that nurses are much more amenable than doctors to serving in rural areas. Another interesting feature of India's health workforce is that the vast majority of doctors work in the private sector in both urban and rural areas of India. Amongst nurses, nearly half are employed in the public sector (in contrast with doctors, where around 80% work in the private sector). This suggests a greater inclination for government employment among nurses. The literature attributes this to better job security, working conditions and salaries offered by the public sector. India also has a marked variance in the health workforce across states. States such as Bihar have 0.4 nurses and midwives per 10 000 population while others such as Kerala have 18.5 per 10 000 population *(2, 8)*.

A variety of qualified nurses operate in India's health sector (Table 1). At the most basic level is the auxiliary nurse-midwife (ANM), who provides community

TABLE 1. NURSING QUALIFICATIONS IN INDIA

Nursing programmes	Type of qualification	Duration of training	Registration
Auxiliary Nursing and Midwifery	Diploma	2 years	Registered auxiliary nurse-midwife
General Nursing and Midwifery	Diploma	3.5 years	Registered nurse and registered midwife
BSc (basic)	Degree	4 years	Registered nurse and registered midwife
BSc (post-basic)	Degree	2 years; distance 3 years	Additional qualification
MSc	Degree	2 years	Additional qualification
Master of Philosophy (MPhil)	Degree	1 year (full time), 2 years (part time)	Additional qualification
Doctor of Philosophy (PhD)	Degree	3–5 years	Additional qualification

Source: Indian Nursing Council.

outreach services such as vaccinations and is typically located at primary health centres. The general nurse-midwife (GNM) (with a General Nursing and Midwifery diploma) is the most common type of nurse operating in India. GNMs serve in a range of public and private health facilities, ranging from PHCs to tertiary hospitals. Nurses with a bachelor's degree and above constitute a smaller proportion of the nursing workforce. An MSc (Nursing) degree is the minimum degree required for nurses to serve as instructors in nursing schools (Indian Nursing Council information). As with other categories of health workers, there are a large number of "nurses" working without the requisite qualification. For example, one study estimated that in 2012, 58.4% of individuals claiming to work as nurses did not have the requisite qualification *(2)*. Another study estimated that in 2001, 67.1% of nurses and midwives were educated only up to the secondary level, with the minimum nursing qualification (i.e., Auxiliary Nursing and Midwifery) requiring a post-secondary two-year training course *(9)*.

Nursing education in India is governed by the Indian Nursing Council (INC), which was established with the Indian Nursing Council Act, 1947. It advises state nursing councils, examining boards, state governments and the central government in matters related to nursing education. The INC is responsible for several functions, such as setting curricula for nurse training, maintaining quality standards in nurse training institutes, recognizing nursing institutes, and registering nursing graduates from degree, diploma and certificate programmes. Along with regulating nursing education and research, it is also responsible for the code of conduct and ethics. The INC faces several challenges in regulating the nursing profession, including its ability to steer policy. Limited political influence—perhaps as a result of the historically low status of the nursing profession, and perhaps even the role of gender, particularly within the context of patriarchal societies—inhibits the ability of nurses to influence health policy, and to lobby for the required professional and academic developments. This was suggested in a key informant interview conducted during the present study; similar experiences of restricted decision-making power with professional nursing authorities have been documented in a study within the African context *(10)*.

Box 1 presents further information on the accreditation of nursing institutions.

BOX 1. ACCREDITATION OF NURSING INSTITUTIONS

The following overview of the accreditation process for public and private nursing institutions is based on key informant interviews.

- Institutions are granted accreditation to conduct diploma and degree programmes in nursing based on a series of inspections under the Ministry of Health and Family Welfare and the INC.
- Guidelines laying out minimum requirements to offer nursing education are outlined by the Ministry of Health and Family Welfare (Chairperson and Health Secretary) and at the level of the Directorate of Medical Education, and under the purview of the INC.
- At the level of the state, the Directorate of Medical Education, on behalf of the Ministry of Health and Family Welfare conducts inspections of nursing institutions and provides a "certificate of no objection". It also recommends the number of seats (intake of students) based on the facility's capacity.
- The institution then appeals for affiliation to the state and central nursing councils. This is followed by an inspection of the facility by a representative of the nursing council, based upon which another certificate of no objection is issued and the recommended number of seats is defined.
- Upon receiving approval by the council, the process of affiliation will then rest with the Kerala University of Health Sciences, which grants the final affiliation to the institution.

Source: Discussion with officials from Department of Medical Education, Kerala.

1.1 Kerala state

The southern state of Kerala is the focus of the current case study. In light of its human development achievements, Kerala occupies a unique position in the Indian context, exhibiting development outcomes that are significantly higher than other states and comparable with developed country levels. Though Kerala is a small state—it comprises 1.18% of the total area and 2.76% of the total population of India, and ranks eighth in terms of population density with 859 persons per square kilometre *(11)*—its human development achievements have made the "Kerala model" a source of considerable interest among development thinkers, as it demonstrates that considerable progress in human development can

be achieved in resource-poor environments (Table 2). Per capita expenditure (2008/2009) on health in Kerala is approximately 507 rupees (US$ 7), compared to 166 rupees (US$ 2) in Bihar, or even 421 rupees (US$ 6) in neighbouring Tamil Nadu *(12)*. According to the state health accounts for Kerala, 2013/2014, 76% of health financing is out-of-pocket expenditure by households, 14.3% is undertaken by the state government, and the central government accounts for 2.8% *(13)*.

Kerala's demographic structure differs from the Indian average, with a larger proportion of persons 40 years and older than the rest of the country *(11)*. Kerala also has the second lowest growth rate of all Indian states and union territories, at 4.9% between 2001 and 2011, compared to 17.6% for the national average *(11)*. Alongside this, Kerala has historically had the highest reporting of illness in the country, which was 308 per 1000 persons in a 15-day recall period in 2014 (compared to 98 per 1000 persons nationally) *(14)*. Nearly 20.8% of the total population reported suffering from chronic conditions and 11.7% reported other illnesses in the same period. Health care utilization rates in Kerala are also the highest in the country, with 28% of the population utilizing outpatient medical services (15-day recall) and 10.6% of the population utilizing inpatient hospital services (365-day recall) in 2014. Nearly 66% of all outpatient and inpatient episodes in the state were treated in private facilities in 2014 *(14)*.

One key factor responsible for Kerala's commendable achievements is the long-standing commitment to social development, including the development of human capital, by the state's administrators, even prior to India's independence. This focus has led to effective government programmes in health and education, land reforms, public distribution of food, and housing development. Public awareness and public action have also contributed to the sound functioning of government service delivery in health and education in the state.

Kerala has a comparatively large capacity to produce doctors and nurses. In 2016, the numbers of recognized institutes were as follows: 20 Auxiliary Nursing and Midwifery training institutes (9 public), 204 General Nursing and Midwifery training institutes (16 public), 133 BSc (Nursing) institutes (8 public), 68 institutes offering MSc degrees (6 public), 51 institutes offering Post-Basic BSc degrees (6 public), and 36 institutes offering Post-Basic Diploma in Nursing (11 public) (Indian Nursing Council data). Across these institutes, Kerala has an intake capacity of 17 600 seats, of which only 10% are in the public sector. The sizeable capacity of Kerala to produce nurses may be the result of the internal and overseas demand for nurses trained in the state, as well as a reflection of the state's historical contribution to nurse training.

TABLE 2. KEY DEVELOPMENT INDICATORS: KERALA AND INDIA

	Kerala	India
Literacy rate[a]	94%	73%
Total fertility rate (2013)[b]	1.8	2.3
Infant mortality rate (2014)[b]	12	39
Maternal mortality rate (2011–2013)[c]	61	167
Sex ratio (females per 1000 males)[a]	1084	943

Sources: [a] Census of India 2011; [b] Registrar General of India; [c] Sample Registration System, 2011–2013.

1.2 Migration of health workers

Migration of health workers, typically from low- and middle-income countries to more developed countries, is an area of research and health policy that has received increased attention lately. The debate on the migration of health personnel is divided between advantages in the form of transfer of skills, knowledge and technology, professional development and improvements in remuneration and living standards of migrant workers, and the drawbacks arising from its impact on source countries, which often are resource-poor and face health worker shortages. In 2010, the Sixty-third World Health Assembly adopted the WHO Global Code of Practice on the International Recruitment of Health Personnel. The Global Code endeavours to foster ethical and fair international recruitment of health workers, taking into account the rights, obligations and expectations of the source and destination countries, as well as those of the health workers themselves. Member States are called upon to designate a national authority for and to report on the implementation of the Global Code, including data on the international migration of health workers.

Nurses trained in India form a significant portion of internationally educated nurses working overseas,

second to nurses trained in the Philippines. It is estimated that over 30% of nurses who studied in Kerala work in the United Kingdom or the United States of America, with 15% in Australia and 12% in the Middle East *(15)*. Indian nurses also form a significant part of the nursing workforce in the member countries of the OECD *(16)*. An estimated 33 147 nurses from India were working in OECD countries in 2016. In the United States, nurses trained in India account for 9% of the internationally educated nursing workforce *(17)*. Other major destination countries include Australia, Bahrain, Canada, Kuwait, Saudi Arabia, the United Arab Emirates and the United Kingdom. One study found that almost 42% of nurses from Kerala and Punjab had some inclination to migrate overseas, and this was higher than for doctors (32%) *(18)*.

2. Objectives

India is a major source of supply for nurses overseas, even as it experiences a substantial shortfall of nursing personnel. Yet, little is known about the level of migration from India, though it is expected to be large. Further, while attention has traditionally focused on external migration, health worker migration within the country has received little attention, as has the impact of health worker migration from Kerala—overseas or within the country—on the health system of the state. Within the broader context of the Global Code and its implementation, there is a need to understand the "stock" and "flow" of health workers. This underscores the need for better information systems on the health workforce and on migration of health workers to better inform policy-making.

- Using the state of Kerala as a case, this study aims to analyse and understand patterns in the internal and external migration of nurses from the state. The specific objectives of the study are:

- to estimate Kerala's capacity for producing nurses (or "entry" into the workforce);

- to determine the current availability of nurses in Kerala (the workforce "stock");

- to estimate the size and trends in the external migration of nurses from Kerala;

- to understand push and pull factors surrounding migration, informed by a literature review.

In addition, this case study provides a summary and identifies limitations of available sources of data on production, stock and migration of nurses in India. It also provides recommendations for improvements in information systems for human resources for health.

3. Methods

3.1 Production

Production of the nursing and midwifery workforce in Kerala and India was estimated from the number of seats in and graduate registrations from nursing institutions, using data from the INC and the Kerala Nurses and Midwives Council (KNMC). The INC collates statistics from nursing council bodies for each of the Indian states. It publishes historical data on seat counts in nursing teaching schools, subdivided by qualification and type of institution (public or private). Data on the number of nursing colleges—categorized by different nursing qualification courses—in Kerala and India serve as indicators of nurse production and have been cited here as well. The KNMC provided data on the registration of nurses with different educational qualifications—nursing students are required to register with the council upon completion of their education in order to enter the nursing labour market in the state. These data have been presented on an annual basis for the past decade.

3.2 Stock

Data from several sources have been used to estimate the stock of nurses in Kerala. These include (a) estimates from published studies; (b) the Kerala Migration Survey—a large-scale household survey on migration in Kerala conducted by the Centre for Development Studies, Thiruvananthapuram; (c) data reported in the National Health Profile compiled by the Central Bureau of Health Intelligence; (d) official statistics reported by the Ministry of Health and Family Welfare, Government of India's annual Bulletin of Rural Health Statistics; and (e) nurse registration data obtained from the INC.

To be able to enter the job market, all graduates from nursing teaching institutions are required to register with their respective state nursing councils or the INC. One

limitation of using registration data is that it is a one-time registration that is done at the time of graduation. As such, a graduate may not subsequently remain in the state, thereby overestimating the number of nurses present. Moreover, given that development of a "live" register was only recently initiated (January 2017) by the INC, the registration data presented in this report are based on "non-live" registers and therefore potentially includes nurses who are no longer practising, or have migrated or passed away.[2]

The Ministry of Health and Family Welfare collates and disseminates information on the number of nurses employed in the government rural health system across all states through its annual publication, the Bulletin on Rural Health Statistics. This bulletin provides information on the number of positions required, sanctioned and filled for different cadres of health providers—including nurses and midwives—at different government facilities in the rural health system. However, this publication does not include nurses employed in higher-level government facilities, such as secondary (district) or tertiary hospitals.

An additional government source of data on the health workforce is the National Health Profile. This is released annually by the Central Bureau of Health Intelligence, a nodal institute set up under the Directorate General of Health Services, Ministry of Health and Family Welfare. The Central Bureau of Health Intelligence collects, analyses and disseminates information on health care services and health status in India. The National Health Profile is prepared from data shared by health directorates from the states and union territories. The data are shared through a web-based application that contains formats on health risks, disease incidence and prevalence, and performance of health systems.

The current stock of nurses was also estimated using data from a large-scale household survey, the Kerala Migration Survey (KMS), carried out in the state in 2011, 2013 and 2016 by the Centre for Development Studies, Thiruvananthapuram. Methodological details for this are provided in section 3.3 on methods for estimating migration.

3.3 Migration

The migration of nurses was computed from three waves of the KMS conducted by the Centre for Development Studies in 2011, 2013 and 2016. This survey is representative at the state level and is conducted periodically to collect information on emigration from Kerala, migration to other Indian states, and return migration. Additionally, it gathers information on self-reported occupations and educational qualifications of household members currently residing in Kerala, which enables calculation of the stock of nursing personnel from the survey data.

The KMS adopted a stratified, multistage, random sampling technique, taking rural and urban areas as the strata. Sample households were selected from all 14 districts in Kerala. The sampling was designed to provide reliable estimates of migration at the district level. The 2011 KMS sampled a minimum of 1000 households from each of the 14 districts in Kerala, and 1000 additional households split between selected larger towns of Kerala. In the 2013 KMS the sample in each district differed based on interdistrict variation in the standard deviation of the number of emigrants per locality as computed in the 2011 round of the KMS. In addition to the 10 000 new households identified in this manner, the survey was also conducted with 4575 panel households from the previous survey rounds. Hence, the total sample size for the KMS 2013 was 14 575 households. The 2016 KMS also used the same sampling approach as the 2013 survey, and had a sample size of 13 199 households. Survey respondents were asked their current occupation and educational qualification, among other demographic and socioeconomic characteristics, as well as whether anyone in their household had migrated abroad, and details about their occupation and other characteristics were collected. To generate state-level representative estimates from the KMS, district-specific sampling weights were used.

It is important to note that, given its wider focus, the KMS does not sharply define the occupational terminology for "nurses" used in this study. Estimates of "nurses" from the survey would, for instance, also include nursing assistants without providing any further information on the professional qualifications

2 The Indian Nursing Council, with support from the Ministry of Health and Family Welfare, launched a pilot Nurses Registration and Tracking System to enable human resources planning. Electronic nurse registration and issuance of a unique ID were undertaken on a pilot basis in Bengaluru (Karnataka), Tripura, Ahmedabad (Gujarat) and Lucknow (Uttar Pradesh). The registration process will be implemented nationwide in July 2017.

and roles of this cadre. Household members who were reported to be "nurses or nurse assistants" (occupation code 53 in KMS 2011 and occupation code 50 in KMS 2013 and 2016) were deemed as nurses if they had completed at least an undergraduate diploma and were not illiterate/literate with no formal education. The survey results are based on self-reported occupation.

The OECD also collates information on health workforce migration into its member countries—particularly for doctors and nurses. The OECD collates and compiles data on the health workforce from member countries annually through their professional councils. The chief indicators for nurse migration reported by the OECD relate to the following:

- **Stock of foreign-trained nurses.** This comprises foreign-trained nurses with registration to practise in the country of migration as well as nurses who hold a recognized nursing qualification from another country but have not yet acquired full registration to practise in the country of migration. The data are provided from the relevant databases maintained by health and statistics departments, which differ across the different OECD countries.

- **Annual inflow of foreign-trained nurses.** Inflow of nurses accounts for nurses who have obtained a recognized qualification in nursing in a foreign country and are receiving a new authorization in a given year to practise in the country of migration. The OECD regards data from professional registers maintained by the countries of migration as the preferred source of information, followed by work permits (temporary/permanent) issued to immigrants.[3]

Data compiled by the OECD over the period 2005–2016 were analysed to gauge migration trends on a historical and country basis. One limitation of this source is that it offers data for nurses educated in India—granular data on nurses from Kerala are not available. Another limitation is that there are gaps in data available from the OECD member countries, with stock and inflow data missing for certain countries or years. A further limitation is the absence of data on the stock of foreign-trained nurses in the United States[4]—which is likely to be an important destination for Indian nurses—subdivided by source countries; however, corresponding data on annual inflow are available.

Lastly, data were used on foreign recruitment of nurses facilitated by two state-run recruitment agencies—the Overseas Development and Employment Promotion Consultants (ODEPC) and the Non-Resident Keralites' Affairs Department (NORKA), with its field agency NORKA-Roots (established in 1996).

In addition to migration outside India, trends in migration from Kerala to other states of the country were analysed. Results from the KMS were used to generate indicative estimates for the preferred Indian states of migration of Kerala nurses (termed as "out-migration" in the survey), for those nurses who had resided out of Kerala for at least one year. Another way to track the mobility of nurses within India is using certificates of no objection issued by the KNMC. Certificates of no objection are issued to nurses who relocate to another state within India for the purpose of employment. The certificate of no objection allows a nurse to transfer their registration to a state other than where the primary registration lies. Data on certificates of no objection issued by the KNMC between 2012 and 2016 were used to track movement of nurses within India.

To complement secondary data sources, interviews were conducted with officials at relevant government bodies pertaining to nursing, medical education and public health service provision in Kerala. Key informant interviews were also undertaken with other relevant stakeholders, such as officials in nursing union bodies and researchers working on migration. Group discussions were also held with current nursing students at two private nursing institutions and one public nursing institution in Kerala. These were aimed at ascertaining trends over time, "push" and "pull" motivating factors, and destination preferences related to migration outside India and to other states within the country.

3 Further details on sources of data on stock of foreign-trained nurses in OECD countries may be found at http://stats.oecd.org/wbos/fileview2.aspx?IDFile=a79329aa-765c-4c8e-a989-51bf-f25ad471. Details on data sources for annual inflow into OECD countries may also be accessed via http://stats.oecd.org/wbos/fileview2.aspx?IDFile=a79329aa-765c-4c8e-a989-51bff25ad471.

4 Stock data on Indian nurses in the United States are available in the National Sample Survey of Registered Nurses conducted by the United States Department of Health and Human Resources. However, as the most recent round of the survey was conducted in 2008, these data have not been included in the report.

4. Results

4.1 Production

A recent study estimating the production capacity of the nursing and midwifery workforce reported that institutions offering nursing degrees in India rose from 30 in 2000 to 1690 in 2015, and educational institutes offering diplomas rose from 285 in 2000 to 2958 in 2015. In Kerala, the number of colleges offering degree courses in nursing rose from just 1 in 2000 to 126 in 2015, and schools offering diplomas rose from 42 to 209 *(6)*.

Table 3 presents data from the INC and KNMC on the number of nursing institutions in Kerala by the type of degree or diploma offered. KNMC data suggest that the total number of unique nursing institutions in Kerala was 287 in 2016, of which around 11% were in the government sector, and 89% were private self-financing institutions.[5] The most commonly offered degree programme was the General Nursing and Midwifery degree, followed by BSc (Nursing). Table 3 also provides data on the number of nursing colleges in Kerala from 2005, which illustrates the remarkable growth in the nurse production capacity in Kerala over the last decade.

Table 4 and Figure 1 show the seat capacity in nursing institutions in Kerala between 2012 and 2016,

5 Based on a breakdown of public and private nursing institutions available for 284 of the 287 total institutes, in the following categories: BSc (Nursing) colleges, General Nursing and Midwifery schools, Auxiliary Nursing and Midwifery schools, and female health supervisory centres. Given the data available from the KNMC, unique identification of institutions offering Post-Basic BSc and MSc (Nursing) degrees could not be carried out.

TABLE 3. NUMBER OF NURSING INSTITUTIONS IN KERALA, 2005 AND 2012–2016

Nursing qualification	2005	2012	2013	2014	2015	2016
Auxiliary Nursing and Midwifery	15	20	25	19	19	20
General Nursing and Midwifery	91	219	231	209	207	204
BSc (Nursing)	12	126	129	127	131	133
MSc (Nursing)	3	65	67	65	68	67
Post-Basic BSc (Nursing)	3[a]	53	55	52	51	51
Post-Basic Diploma	–	NA	37	33	35	36

Total number of unique nursing educational institutions in Kerala, 2016: 287 (11% government and 89% private institutions).

Figures as on 31 October for the corresponding years.

NA: data not available.

a. Includes one college for the Diploma in Nursing Education and Administration—this qualification was later replaced by the Post-Basic BSc (Nursing) course by the INC.

Source: State-wise distribution of nursing institutions and the admission capacity, Indian Nursing Council; Kerala Nurses and Midwives Council.

TABLE 4. NUMBER OF SEATS IN NURSING INSTITUTIONS IN KERALA, 2012–2016

Nursing qualification	2012	2013	2014	2015	2016
Auxiliary Nursing and Midwifery	390	500	380	380	475
General Nursing and Midwifery	6 835	7 210	6 529	6 497	6 405
BSc (Nursing)	6 870	7 000	6 880	7 100	7 160
MSc (Nursing)	1 215	1 315	1 287	1 348	1 333
Post-Basic BSc (Nursing)	1 820[a]	1 880	1 800	1 765	1 765
Post-Basic Diploma	NA	452	402	442	462
Total	**17 130[b]**	**18 357**	**17 278**	**17 532**	**17 600**

Figures as on 31 October for the corresponding years.

NA: data not available.

a. Includes one seat in the Diploma in Nursing Education and Administration, which was later replaced by the Post-Basic BSc (Nursing) course by the INC.

b. Total does not include number of seats for Post-Basic Diploma qualification.

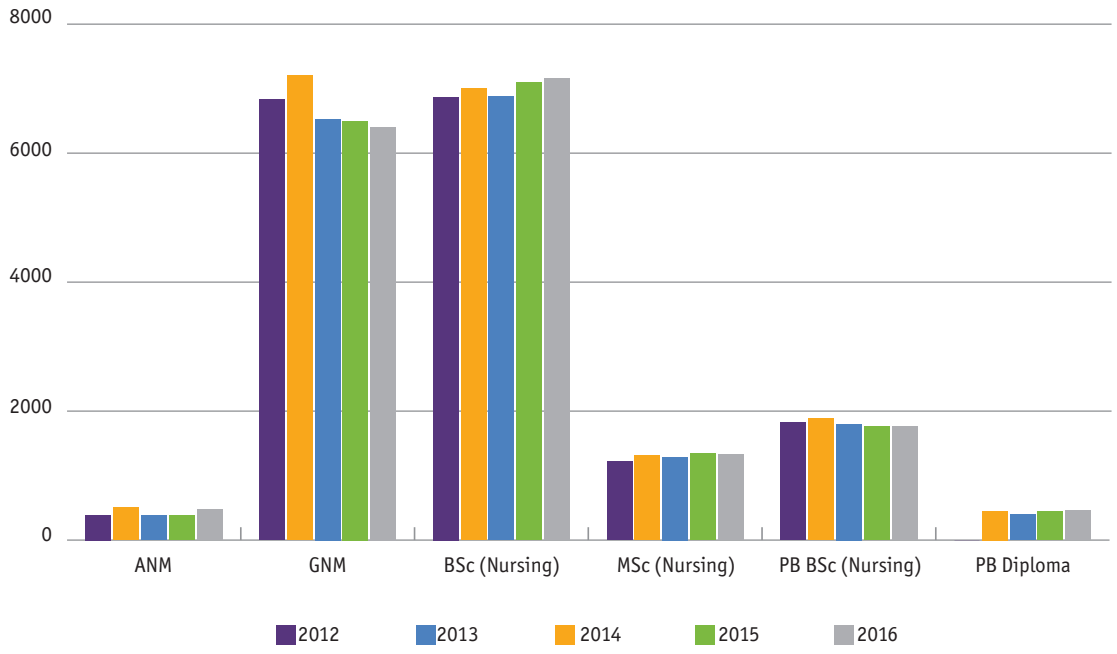
Source: State-wise distribution of nursing institutions and the admission capacity, Indian Nursing Council.

providing an estimate of the production capacity of nurses in the state. The figures have been subdivided by various nursing qualifications. Annex 1 provides a further breakdown of seats based on government and private nursing colleges. From 124 seats in 2005, there were 17 600 seats in 2016. Of these, 8.8% were in government colleges and over 90% in private colleges. The highest numbers of seats are allotted in the BSc (Nursing) and General Nursing and Midwifery courses, accounting for 41% and 36%, respectively, of total nursing seats in 2016. Note that the seat count represents the upper boundary of nurse production, since it is not necessary that all seats are filled or all students graduate.

For all nursing courses apart from BSc (Nursing) the seat count in the state went up from 2012 to 2013, and subsequently declined in 2014. These shifts were primarily due to changes in the numbers of seats offered in private institutions. A key informant at the KNMC said that private nursing schools—which offered only General Nursing and Midwifery diploma courses—saw a decline in demand, and the demand for BSc (Nursing) courses increased. This was, in part, due to the fact that the BSc qualification strengthened prospects of foreign employment. Consequently, private nursing schools shut down or consolidated into nursing colleges offering a wider variety of programmes, leading to a decline in overall production capacity, while General Nursing and Midwifery courses continue to see a fall in the number of seats offered.

Table 5 highlights the distribution of seats in public and private nursing institutions in Kerala and India, based on data from the INC. In Kerala and India, the majority of nursing seats are in the private sector. However, seats in public nursing institutions witnessed a faster pace of growth between 2012 and 2016 as compared with the private sector, suggesting increased public investment in nursing. Between 2012 and 2016, the seat count in Kerala rose by 2.7%: the government seat count rose by almost 23% and the private college seat count grew by 1.1%. The overall growth of nursing institution seats in India over the same period was 17.7%, with a 46% growth in government seats and a 15% growth in private institution seats.

FIGURE 1. NUMBER OF SEATS IN NURSING INSTITUTIONS IN KERALA, 2012–2016



Figures as on 31 October for the corresponding years.

Source: State-wise distribution of nursing institutions and the admission capacity, Indian Nursing Council.

Table 6 provides the number of new nurse registrations with the KNMC for different nursing qualifications over the period 2005–2016. Given that it is mandatory for nurses who graduate from nursing institutes in Kerala to register with the KNMC, these figures provide another estimate of production of nurses in the state, in addition to the seat count.

A comparison of estimates from the seat count (17 600) and registration (9766) data show a significant difference between these two estimates of nurse production. It suggests that nearly 45% of the seat capacity in Kerala is not being used. Stakeholder discussions with the KNMC and the Department of Medical Education were conducted to better understand the difference in the number of sanctioned seats and number of nurses registered. Sanctioned seat capacity as presented by the INC might be an overestimate of the actual number of seats across public and private nursing institutions in Kerala. Seats are sanctioned based on factors such as bed strength, affiliations and training capacity. Inspection of facilities is conducted at the time of accreditation by both the INC and the Department

TABLE 5. NUMBERS AND PERCENTAGES OF SEATS IN PUBLIC AND PRIVATE NURSING INSTITUTIONS IN KERALA AND INDIA, 2012–2016

Location	Type of institution	2012	2013	2014	2015	2016
Kerala	Government	1 268	1 450	1 554	1 537	1 557
		7.4%	*7.9%*	*9.0%*	*8.8%*	*8.8%*
	Private	15 862	16 907	15 724	16 095	16 043
		92.6%	*92.1%*	*91.0%*	*91.8%*	*91.2%*
	Total	17 130	18 357	17 278	17 532	17 600
India	Government	22 354	26 447	27 531	30 279	32 686
		8.3%	*9.0%*	*9.2%*	*9.9%*	*10.3%*
	Private	246 515	268 599	270 330	275 227	283 886
		91.7%	91.0%	90.8%	90.1%	89.7%
	Total	268 869	295 046	297 861	305 506	316 572

Figures as on 31 October for the corresponding years.

Source: State-wise distribution of nursing institutions and the admission capacity, Indian Nursing Council.

TABLE 6. NUMBER OF NURSE REGISTRATIONS WITH THE KERALA NURSES AND MIDWIVES COUNCIL, 2005–2016

Course	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Auxiliary Nursing and Midwifery	1 047[a]			259	398	170	422	214	327	154	337	125
General Nursing and Midwifery	4 899	4 805	5 152	5 147	5 454	5 713	5 242	5 280	5 069	4 445	3 456	2 152
BSc (Nursing)	9 078[a]				2 633	2 919	3 354	2 879	3 164	4 454	4 879	4 890
MSc (Nursing)	–	–	–	–	–	–	1 725[a]				853	832
Post-Basic BSc (Nursing)	–	–	–	–	–	2 756[a]					1 783	1 767
Total[b]											**11 308**	**9 766**

a. Consolidated registration numbers for nurses educated in Kerala and outside Kerala provided—figures on an annual or location of study basis not provided.

b. Totals not reported from 2005 to 2014 as requisite granular data not available for these years.

–. Data not available from the KNMC.

Source: Kerala Nursing and Midwives Council.

of Medical Education (state level, Kerala) for the Ministry of Health and Family Welfare. The Department of Medical Education and the INC issue certificates of no objection, and the final intake is based on the seat capacity recommended by the Kerala University of Health Sciences. The KNMC said that this process may result in discrepancies between the estimates presented on seat capacity by the INC and the actual number of seats in the institutions.

In addition, interviews indicated that the gap between sanctioned seats and registrations may also be due to students being unable to graduate (a rough estimate of 200–400 students per year was mentioned). Another reason is that higher numbers of seats are offered in institutions as compared to demand, resulting in vacant seats, as is particularly seen in MSc and Post-Basic BSc courses. In the case of General Nursing and Midwifery courses it is believed that the reduced demand for diploma programmes has led to almost three quarters of the sectioned seats for GNMs being vacant. In the case of MSc seats, the demand for higher degrees in nurses, initially fuelled by a demand for teaching staff, has reduced as the growth in nursing institutions has levelled off.

4.2 Stock

4.2.1 Estimates from existing studies

Several studies have estimated the number of nurses and midwifes in India based on household surveys or the census. A study by Rao, Shahrawat and Bhatnagar using data from the survey carried out by the National Sample Survey Office (NSSO) in 2011/2012 estimated that there were 383 414 qualified nurses and midwives[6] working in the country *(2)*. This implies a density of 3.16 nurses and midwives per 10 000 population. Moreover, the density of nurses and midwives was higher in urban areas (7.2) compared to rural areas (1.3), suggesting a skewed distribution. A similar pattern may be seen with other cadres of health providers (though the level of disparity is less than for doctors).[7] However, unlike other cadres, a larger proportion of nurses and midwives in both rural areas (51.6%) and urban areas (40.2%) were engaged in the public sector. Another study by Anand and Fan, using data from the 2001 census of India, estimated a total of 207 404 nurses and midwives in the country with secondary or higher education *(9)*. Based on the minimum eligibility criteria set by the INC, the category of nurses and midwives with secondary or higher education levels would include ANMs, GNMs, and nurses with BSc, MSc and Post-Basic BSc qualifications (Indian Nursing Council information).

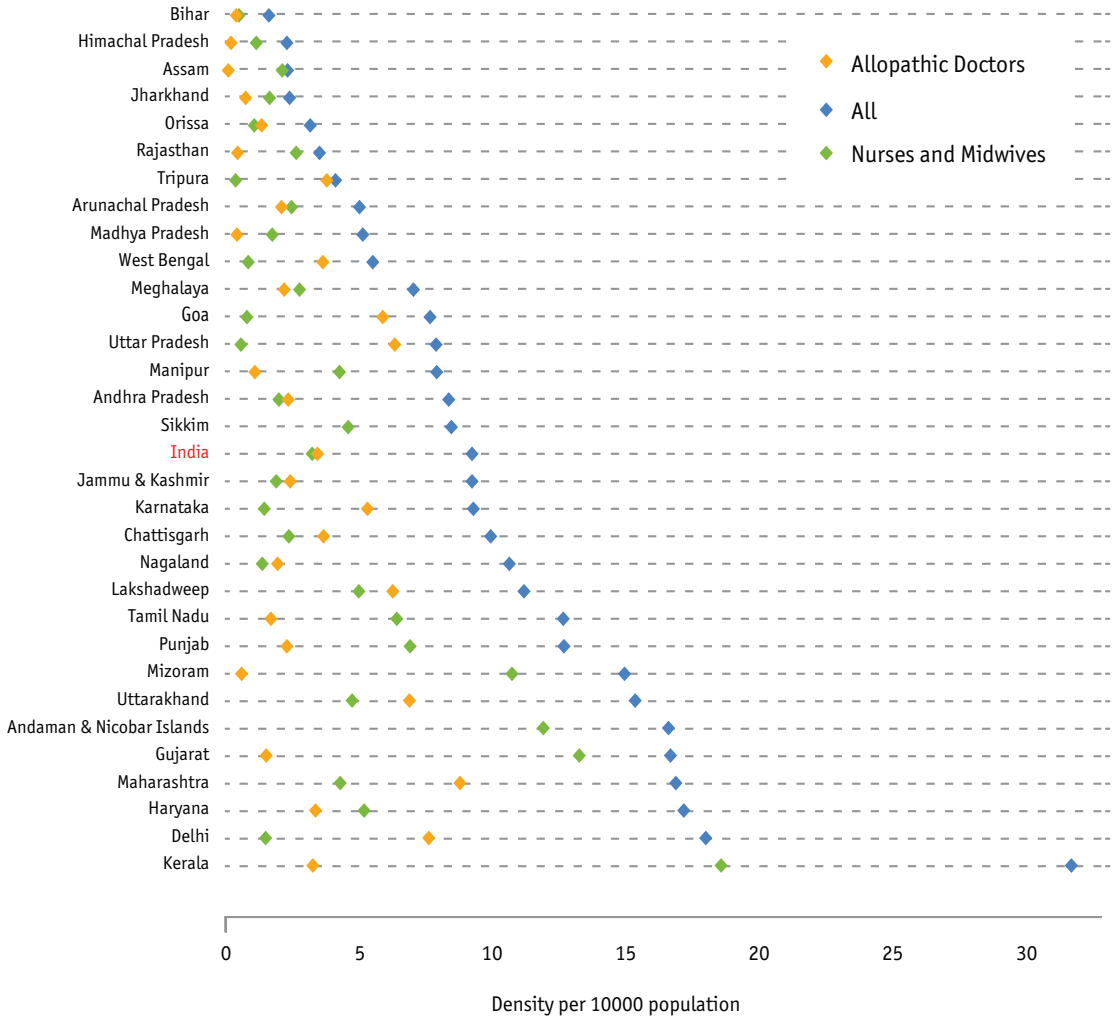
The study based on the 2012 National Sample Survey *(2)* estimated that there were 61 619 qualified nurses and midwives in Kerala, resulting in a density of 18.5 per 10 000 population (Figure 2). This is the highest density of nurses in the country. However, unlike the pattern in distribution seen across the country, about 73% of these nurses and midwives were located in rural areas in Kerala. Estimates based on the 2001 census data indicate that the density of all nurses and midwives with more than secondary education in Kerala in 2001 was 9.5 per 10 000 population *(9)*. Further, this study estimated that in Kerala the density of qualified nurses and midwives with some medical qualification (BSc degree and above) was 7.6 per 10 000 population *(9)*.

Stock estimates for the nursing and midwifery workforce based on these two studies differ for several reasons. The studies relied on different data sources and time periods—Anand and Fan *(9)* used 2001 census data, while Rao, Shahrawat and Bhatnagar *(2)* utilized the National Sample Survey on Employment and Unemployment from the 2012 NSSO survey. Moreover, Anand and Fan defined nurses and midwives by considering the occupation definitions of the National Classification of Occupations, while Rao, Shahrawat and Bhatnagar used a combination of National Classification of Occupations and National Industrial Classification codes; and Anand and Fan considered both main and marginal workers in their definition of health workers, while Rao, Shahrawat and Bhatnagar took into account the usual principal activity.

6 This number includes both nursing professionals having 10 + 2 years' education plus any technical education in medicine or a diploma/certificate, as well as ANMs with 10 years' education plus a formal vocational training.

7 Rao, Shahrawat and Bhatnagar *(2)* report that there are 3.3 qualified allopathic doctors per 10 000 population, and the density of qualified allopathic doctors in urban areas is 11.4 times that in rural areas.

FIGURE 2. DENSITY (PER 10 000 POPULATION) OF QUALIFIED DOCTORS, NURSES AND MIDWIVES, AND ALL HEALTH WORKERS, BY STATE (2012)



Note: "All health workers" includes allopathic doctors, AYUSH[8] doctors, dentists, nurses and midwives, health associates (pharmacists, laboratory technicians, opticians, physiotherapists, other technicians) and traditional practitioners.

Source: Rao, Shahrawat and Bhatnagar *(2)*.

8 Ayurveda, yoga and naturopathy, unani, siddha, and homeopathy.

4.2.2 Estimates based on the Kerala Migration Survey (KMS)

Data from the KMS of 2011, 2013 and 2016, conducted by the Centre for Development Studies, Thiruvananthapuram, were used to estimate the stock of nurses and midwives in the state in the respective time periods. Criteria for inclusion in the count of nurses were as follows: individuals who reported their occupational category as "nurse and nursing assistant", had completed at least grade 12 of education, and were not illiterate/literate with no formal education. The estimated stock of nurses and midwives from these surveys suggests a gradual increase from 61 613 in 2011 to 63 224 in 2013 and to 68 161 in 2016. The estimate for 2011 is reasonably similar to the one calculated by Rao, Shahrawat and Bhatnagar *(2)* using data from the NSSO survey carried out in 2011/2012.

The average age of nurses and nurse assistants in the survey was about 30 years across the three rounds. While half were Hindus, a majority of the remaining belonged to the Christian faith. The majority of the nurses and

TABLE 7. NUMBER OF REQUIRED, SANCTIONED, FILLED AND VACANT POSITIONS OF NURSES AND MIDWIVES WORKING IN GOVERNMENT RURAL HEALTH FACILITIES IN INDIA AND KERALA

Position	Year	Required [R]	Sanctioned [S]	In position [P]	Vacant	Shortfall [R–P]
India						
Health workers (female)/ ANMs at subcentres and PHCs	2016	180 423	216 267	219 980	28 255[a]	9 568[a]
Health assistants (female)/ LHVs at PHCs	2016	25 354	26 583	16 480	10 131	11 299
Nursing staff at PHCs and CHCs	2016	63 924	78 530	69 022	12 265	13 115
Kerala						
Health workers (female)/ ANMs at subcentres and PHCs	2007	6 003	5 670	5 634	36	369
	2012[b]	5 384	4 232	4 173	59	1 211
	2016	5 399	7 929	7 950	*	*
Health assistants (female)/ LHVs at PHCs	2007	909	830	740	90	169
	2012	NA	NA	NA	NA	NA
	2016	824	13	13	0	811
Nursing staff at PHCs and CHCs	2007	1 658	2 811	3 064	*	*
	2012	2 328	2 099	2 014	85	314
	2016	2 399	3 610	3 969	*	*

NA: data not available.

a. Total number of vacancies and shortfalls in India calculated by adding all vacancies across states but not deducting surplus positions.

b. Data for 2011 repeated.

* indicates surplus.

Source: Bulletin on Rural Health Statistics, Ministry of Health and Family Welfare

nurse assistants were females; however, the proportion of male nurses increased substantially from about 11% to 25% between 2011 and 2013, and decreased slightly to 21% in 2016. A majority of those reported to be nurses and nurse assistants had completed at least an undergraduate degree across the three rounds, with more than half having finished a professional degree. There was also a steady increase in the proportion completing postgraduate degrees between the survey rounds, from 5% in 2011 to 10% in 2013 and to 13% in 2016. The majority of the respondents were employed in the private sector in Kerala across the survey rounds, though the proportion declined over time—from 82% in 2011 to 73% in 2013 and to 64% in 2016.

4.2.3 Estimates from government health workforce data

The latest Bulletin on Rural Health Statistics, published in 2016, suggested that in India a total of 69 022 nurses and midwives were employed at primary health centres (PHCs) and community health centres (CHCs), and 236 460 ANMs, including lady health visitors (LHVs),[9] were employed across government primary health facilities and subcentres in the rural parts of the country (Table 7) *(19)*. The 2016 Bulletin on Rural Health Statistics reported that in Kerala, there were 3969 nurses employed in PHCs and CHCs, and 7963 ANMs (including LHVs) employed across government primary health facilities and subcentres. According to the Bulletin on Rural Health Statistics, Kerala performs well in terms of staffing of nurses at PHCs and CHCs—both vacancy and shortfall statistics have largely seen a surplus over the past decade, though PHC staffing norms may not necessarily reflect actual population requirements. On the other hand, the staffing for LHVs at PHCs appears to be less than adequate. While the vacancy and shortfall rates for ANMs at subcentres were high a few years ago, figures in the latest publication show a significant improvement.

9 Lady health visitors, having the basic qualification of an Auxiliary Nursing and Midwifery certificate, are entrusted with the task of supervising ANMs positioned at health subcentres.

4.2.4 Estimates based on Indian Nursing Council and National Health Profile data

According to the INC, a total of 1 791 285 registered nurses (RNs) and registered midwives (RMs) and 845 836 ANMs (including LHVs) were registered in India in 2014. In the state of Kerala, the workforce estimates for 2014 from the INC were 215 708 RNs/RMs and 38 217 ANMs (including LHVs). Kerala accounts for the second highest workforce of RNs/RMs in the country, falling marginally behind the state of Tamil Nadu (Indian Nursing Council data, 2014). Note that the numbers of registrations are not based on a live register. As such, it is unclear whether this data source makes adjustments for nurses leaving the population by retirement, death, or migration.

Table 8 provides data on the stock of LHVs, ANMs and RNs/RMs in Kerala for the period 2006–2015, compiled in the National Health Profile by the Central Bureau of Health Intelligence. The National Health Profile was not published for 2014. The National Health Profile figures indicate that in 2015, Kerala had a stock of 8507 LHVs, 29 710 ANMs (including LHVs), and 215 708 RNs/RMs.

The figures also show that the number of RNs/RMs—and consequently, the total stock of nurses—witnessed significant increases each year from 2010 to 2014, with an average annual rate of growth of around 25% over this period. Between 2006 and 2015, the number of RNs/RMs in the state almost trebled and the total stock of nurses increased by 124%. Increases in numbers of ANMs and LHVs were also seen but were relatively smaller.

The National Health Profile data further indicate that at the national level, the total number of RNs/RMs and ANMs saw a significant increase each year from 2010 onwards—from 2010 to 2013, numbers of ANMs in India rose from 576 542 to 726 557 (26% rise), and of RNs/RMs from 1 073 638 to 1 562 186 (45% rise).

Figure 3 charts the growth of ANMs (mapped on the left-hand vertical axis) and RNs/RMs (right-hand vertical axis) in Kerala and India from 2006 to 2015.

TABLE 8. NUMBERS OF ANMS, RNS/RMS AND LHVS IN KERALA, 2006–2015

Year	LHVs	ANMsa	RNs/RMsb
2006	7 797	27 712	77 596
2007	7 797	27 926	83 335
2008	7 897	28 378	85 624
2009	7 897	28 378	85 624
2010	7 897	28 378	85 624
2011	8 012	28 556	109 393
2012	8 144	28 979	136 341
2013	8 303	29 207	165 721
2015	8 507	29 710	215 708

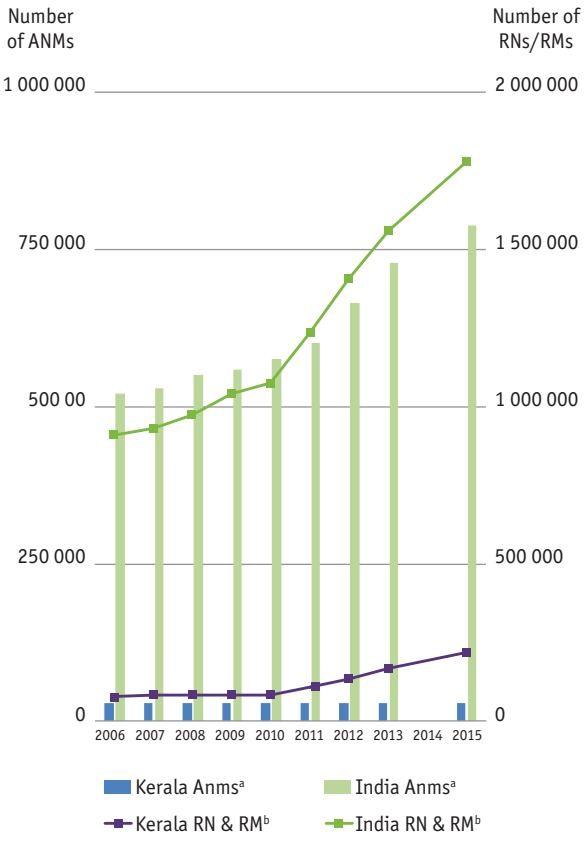
Note: The National Health Profile for 2014 was not prepared by the Central Bureau of Health Intelligence.

a. Figures for ANMs are inclusive of number of LHVs.

b. From 2006 to 2011, the figure was reported as number of GNMs; from 2012 onwards, the figure was reported as RNs/RMs.

Source: National Health Profile, Central Bureau of Health Intelligence.

FIGURE 3. NUMBERS OF ANMS AND RNS/RMS IN KERALA AND INDIA, 2006–2015



Number of ANMs are mapped on left-hand vertical axis and number of RNs/RMs on right-hand vertical axis.

Note: The National Health Profile was not prepared for 2014.

[a] Count of ANMs includes number of LHVs.

[b] From 2006 to 2011 the figure was reported as number of GNMs; from 2012 onwards, the figure was reported as RNs/RMs.

Source: National Health Profile, Central Bureau of Health Intelligence.

4.3 Migration

4.3.1 Estimates of migration outside India

The following subsections present information from various sources on migration of nurses and midwives outside India.

Kerala Migration Survey (KMS) 2011, 2013 and 2016

Based on its periodic, large-scale household survey, the Centre for Development Studies releases migration estimates for Kerala encompassing a range of professions, including doctors and nurses. Migration patterns were estimated using the data set on emigrants from the KMS carried out in 2011, 2013 and 2016. Data analysis was undertaken by examining characteristics such as age, education levels, occupational status and employer category, which could further be broken down by occupational status before and after migration, as well as destination countries for emigrants. District-level survey sampling weights were applied to the data set to generate estimates valid at the state level.

The three rounds of the KMS enable estimation of emigration rates of nurses from Kerala to other countries, defined as the number of trained nurses and nurse assistants reported to be residing in other countries as a proportion of the total number of trained nurses and nurse assistants residing in both Kerala and abroad, for a given year.[10] Emigration estimates are summarized in Table 9.

10 Calculated as: [migrant nurses and nurse assistants / (resident nurses and nurse assistants + migrant nurses and nurse assistants)] x 100.

TABLE 9. ESTIMATES OF EMIGRATION LEVELS FOR NURSES AND NURSE ASSISTANTS FROM KERALA MIGRATION SURVEY

Year	Resident stock of nurses and nurse assistants (N)	Migrant nurses and nurse assistants (N)	Net emigration rate (%)[a]
2011	61 613	30 038	32.8%
2013	63 224	26 138	30.8%
2016	68 161	20 622	23.2%

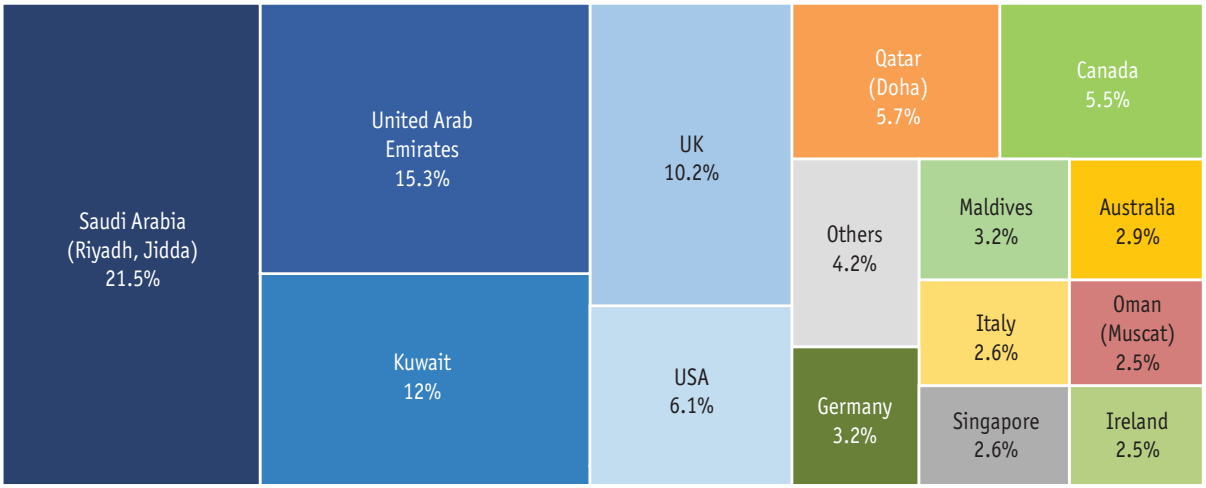
a. Calculated as: [migrant nurses and nurse assistants / (resident nurses and nurse assistants + migrant nurses and nurse assistants)] x 100.

Source: Kerala Migration Survey, 2011, 2013 and 2016; analysis by Oxford Policy Management and Centre for Development Studies, Thiruvananthapuram.

KMS analysis indicates that both the absolute numbers of nurses and nurse assistants emigrating abroad, as well as their proportion in the overall pool of Kerala nurses, declined during the period 2011–2016. The net emigration rate for nurses and nurse assistants in 2016 was 23.2%, having witnessed a steady decline over the different survey rounds. With the educational criteria of completion of at least an undergraduate diploma, estimates of the stock of nurses from the KMS are comparable to estimates of nurses in Kerala in other surveys, such as the stock estimate of 61 619 from the study based on the 2012 NSSO survey.

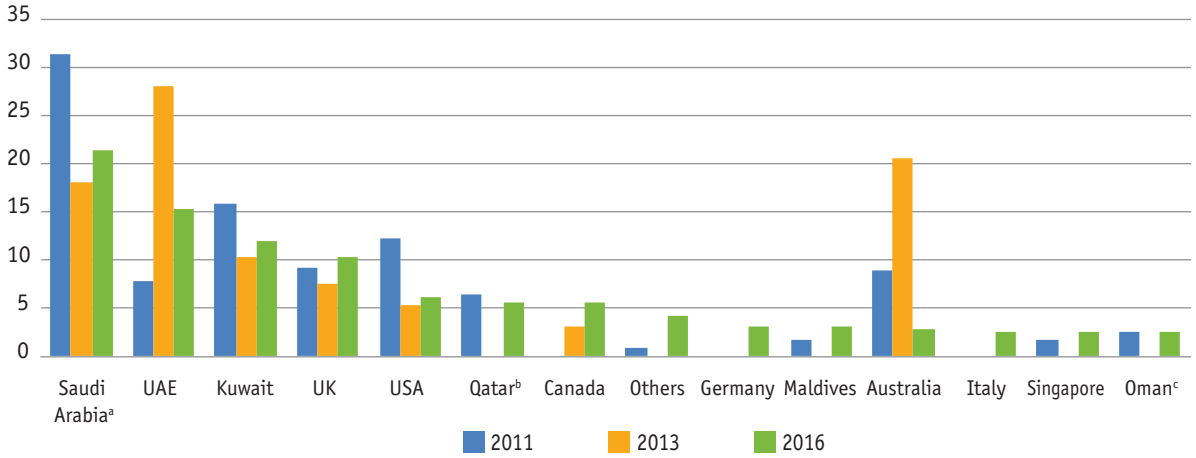
The mean age at emigration of nurses has remained stable over the survey rounds, at 26.6 years in 2011, to 26.3 years in 2013 and 27.1 years in 2016. The mean age of

FIGURE 4. PERCENTAGE SHARE OF EMIGRANT NURSES AND NURSE ASSISTANTS IN MAJOR DESTINATION COUNTRIES, AS PER KMS 2016



Source: Kerala Migration Survey 2016, Centre for Development Studies and Oxford Policy Management analysis.

FIGURE 5. PERCENTAGE SHARES OF NURSES AND NURSE ASSISTANTS IN MAJOR DESTINATION COUNTRIES, 2016: CHANGES OVER KMS ROUNDS



[a] Destination in KMS questionnaire: Saudi Arabia (Riyadh, Jidda).

[b] Destination in KMS questionnaire: Qatar (Doha).

[c] Destination in KMS questionnaire: Oman (Muscat).

Source: Kerala Migration Survey 2011, 2013 and 2016, Centre for Development Studies and Oxford Policy Management analysis.

the emigrant nurses at the time of the survey was 31.9 years in 2013, increasing to 33.4 years in 2016, indicating that nurses had on average resided out of Kerala for 5 to 6.5 years. The proportion of male nurse emigrants has steadily increased, from 11.3% in 2011 to 22.6% in 2013 and to 26.1% in 2016.

The distribution of nurse emigrants from Kerala from the three waves of the KMS are shown in Figures 4 and 5. Figure 4 presents the percentage of emigrant nurses and nurse assistants in major destination countries as per KMS 2016, and Figure 5 maps changes in these percentages over the three survey rounds. In 2016, Saudi Arabia was the most favoured destination country—however, its share of total migrants declined to 21.5% from 32% in 2011. In 2016, the United Arab Emirates and Kuwait were the second and third largest destination countries, respectively.[11] Nearly 57% of all emigrant nurses resided in Gulf countries in 2016. The proportion of migrant nurses in the United States declined from 12.2% in 2011 to 5.3% in 2013—in 2016, the figure stood at 6%. The share of nurses migrating to Canada increased from 3.3% in 2013 to 5.5% in 2016. Other countries with migration in the range of 2–3% of all nurses in 2016 included Australia, Germany, Ireland, Italy, Singapore and Maldives.

Of the emigrant nurses in the KMS analysis, a majority reported to be employed in the private sector before emigrating: 96.2% in 2011, 98.1% in 2013 and 92.6% in 2016.[12] After emigrating, most nurses and nurse assistants continued to work in the private sector: 93.7% in 2011, 91.5% in 2013 and 92.6% in 2016.

OECD information

The OECD gathers from its member countries' data on the stock and annual inflow of nurses trained in foreign countries. Table 10 shows the stock of foreign-trained nurses from India in OECD destination countries from 2005 onwards. Countries that serve as major destinations for Indian nurses, based on stock data for 2015, are presented in the table. As noted earlier, the OECD database did not offer these data for the United States, which is likely to constitute an important destination country for Indian nurses. The United Kingdom has consistently had the largest stock of Indian foreign-trained nurses among countries for which information is available, with close to 17 000 such nurses in 2016.

11 As per official statistics released by the Government of Kuwait, there were 13 530 Indian nurses working in Kuwait in 2015, comprising 64% of the nursing workforce. Of the Indian nurses, 2633 were male (19.5%).

12 Data collection formats in the KMS make a distinction between employer categories "State/Central Government" and "Semi-government aided school/college, co-operative/local administrative bodies".

Australia has the next largest stock, increasing from 6504 Indian-trained nurses in 2013 to 9173 in 2016. Canada, Italy and New Zealand also witnessed a steady upward trend in the number of Indian foreign-trained nurses in the same period, albeit of smaller magnitude.

For the major OECD destination countries outlined above, Table 11 presents the percentage composition of foreign-trained nurses from India among the total stock of foreign-trained nurses and total practising nurses in these destination countries for 2016. The data indicate that Indian nurses comprise a sizeable section of foreign-trained nurses in New Zealand, Australia, the United Kingdom and, to a certain extent, in Canada. However, Indian nurses form only a small segment of all practising nurses in these OECD countries. In 2016, the share of Indian nurses among total practising nurses was at 4.9% in New Zealand, and 3.3% in both Australia and the United

TABLE 10. OECD FOREIGN-TRAINED NURSES: STOCK OF NURSES FROM INDIA

Destination country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
United Kingdom	NA	15 436	NA	NA	NA	NA	NA	NA	NA	16 502	16 885	16 931
Australia	NA	NA	NA	NA	NA	NA	NA	NA	6 504	7 724	8 479	9 173
Canada	1 050	1 148	1 236	1 340	1 527	1 671	1 750	1 923	2 355	2 756	3 215	NA
New Zealand	NA	NA	NA	563	666	882	1 200	1 457	1 526	1 697	2 076	2 373
Italy	226	282	358	476	616	847	1 085	1 242	1 341	1 419	1 510	1 455

NA: data not available.

Source: Health workforce migration statistics, OECD (https://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_WFMI#).

TABLE 11. OECD FOREIGN-TRAINED NURSES: PERCENTAGE OF INDIAN NURSES AMONG TOTAL FOREIGN-TRAINED NURSES AND TOTAL PRACTISING NURSES IN DESTINATION COUNTRIES, 2016

Destination country	Number of foreign-trained nurses from India	Total foreign-trained nurses in destination country	% of Indian nurses among total foreign-trained nurses	Total practising nurses in destination countries	% of Indian nurses among total practising nurses
United Kingdom	16 931	105 811	16%	516 974	3.3%
Australia	9 173	51 438	17.8%	281 752	3.3%
Canadaa	3 215	30 184	10.7%	353 738	0.9%
New Zealand	2 373	12 894	18.4%	48 256	4.9%
Italy	1 455	23 308	6.2%	326 841	0.4%

a. Data for 2015 provided, as 2016 data not available on OECD statistical database.

Source: Health workforce migration statistics, OECD (https://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_WFMI#).

TABLE 12. OECD FOREIGN-TRAINED NURSES: ANNUAL INFLOW FROM INDIA

Destination country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Canada	181	157	129	133	209	221	203	266	451	516	602	NA
United Kingdom	3 709	2 926	1 152	402	83	157	411	330	264	236	537	303
United States	2 279	4535	4 610	2 059	798	460	427	451	340	331	430	NA
New Zealand	NA	NA	NA	NA	NA	NA	NA	NA	NA	617	404	278
Italy	57	57	82	126	150	247	268	202	146	117	81	66

NA: data not available.

Source: Health workforce migration statistics, OECD (https://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_WFMI#).

Kingdom; in Canada, the figure stood at 0.9% in 2015. As seen earlier in Table 10, although migration of nurses from India to these four destinations has been climbing steadily in recent years, their percentage shares are still low.

Table 12 shows the annual inflow of nurses trained in India into OECD countries. Nearly all countries shown in the table exhibit steady declines in the annual inflow of Indian nurses since 2005. In the United Kingdom, the annual inflow declined from 3790 nurses in 2005 to 303 in 2016. The United States numbers fell from 2279 in 2005 to 430 in 2015. Canada has been the only country reporting steady increases in the inflow of Indian nurses, from 181 in 2005 to 602 in 2015. However, the number of nurses trained in India entering Canada annually are not comparable with the high levels that were witnessed earlier in the United States and the United Kingdom.

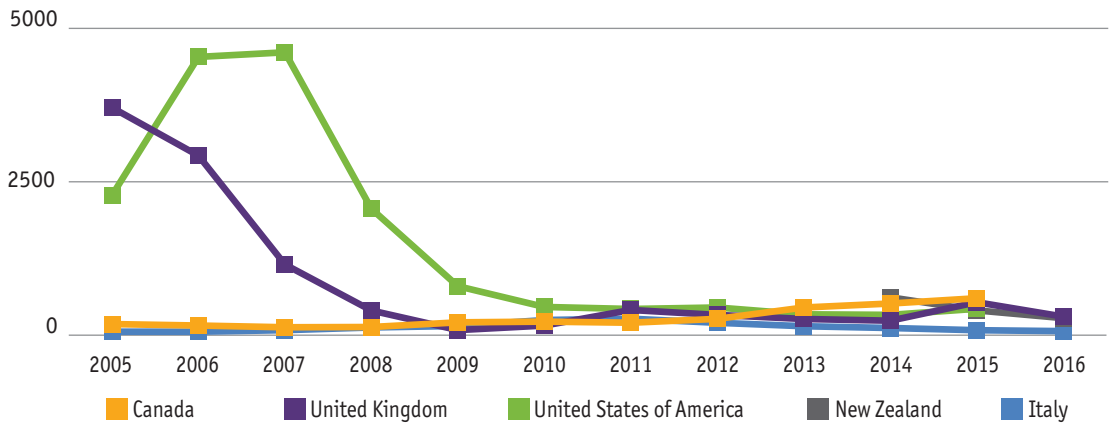
The shifts in preference for destination countries could, in part, be a result of the migration policies of individual countries. Such policies could impact the professional and personal pathways of a migrant nurse by defining opportunities for the immigration status of a nurses' spouse and children *(20, 21)*. For example, in a qualitative study on the retention of foreign-trained health workers in Ireland, respondents highlighted the opportunities for skilled migrants to sponsor children over the age of 18 years and other family members to Canada as an enabling and attractive factor for migration *(21)*. Figure 6 depicts the declining trend of inflow of nurses to the top five OECD destination countries (as in 2015) from India.

Two state-run agencies in Kerala—ODEPC and NORKA-Roots—are responsible for the recruitment of nurses for overseas employment, particularly to the Gulf Cooperation Council (GCC) countries, for which nurses are now required to apply for emigration clearance. ODEPC was facilitating the recruitment of unskilled workers and nurses even before the change in migration policies for nurses in 2015. For the period from 2011 to mid-2017, ODEPC deployed 1739 personnel, of which 1521 were nurses. Details of destination countries by professions of deployed persons were unavailable, but the largest numbers of recruitments across all professions were to Saudi Arabia (421 personnel deployed in 2016/2017) and the United Arab Emirates (223 deployed in 2016/2017). For the period between 2015 and August 2017, NORKA-Roots deployed a total of 640 nurses overseas—the majority of these were to Saudi Arabia (393), United Arab Emirates (142), and Oman (105).

4.3.2 Estimates of migration within India

In addition to collecting data on migration outside India, the KMS also enquires about persons who are "members of a Kerala household who are living outside Kerala at the time of the survey but within India", referred to as "out-migrants" in the survey. The number of nurse or nurse assistant out-migrants increased from 6564 in 2011 to 7662 in 2013, only to decline to 3862 in 2016. The mean age of these out-migrants increased from 24.6 years in 2011 to approximately 28.6 years in both 2013 and 2016. Earlier, a larger proportion of male nurses were out-migrants (nearly 32.7% in 2011); this has declined to proportions comparable to their distribution within the

FIGURE 6. OECD FOREIGN-TRAINED NURSES: ANNUAL INFLOW FROM INDIA



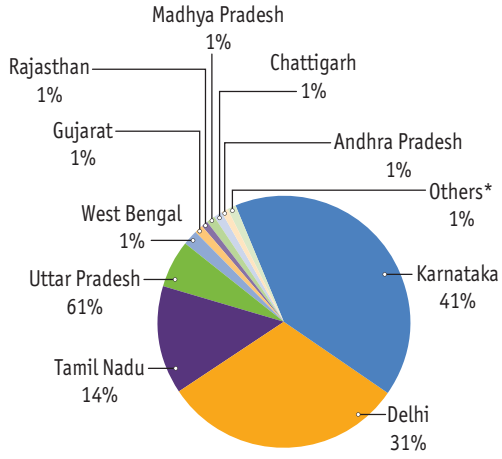
Source: Health workforce migration statistics, OECD (https://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_WFMI#).

entire pool of Kerala nurses (17.8% male out-migrants in 2016, as opposed to 22.9% males in all Kerala nurses).

In 2011, the states with the highest numbers of out-migrant nurses from Kerala were New Delhi (31.9%), Maharashtra (19.9%) and Karnataka (18.5%). Other states included Andhra Pradesh (14.9%) and Rajasthan (7.5%). In 2013, the highest out-migration was in the states of New Delhi (34.6%), Tamil Nadu, Madhya Pradesh and Bihar (11.1% each), Pondicherry (9.5%) and Uttar Pradesh (8.8%). In 2016 New Delhi was again the highest reported state at 57.2%, followed by Rajasthan (28.7%) and Maharashtra (14.1%). It is important to note that given the small samples of internal migrants from all three waves of the KMS, these internal migration estimates may be considered as indicative of the prevalent status for out-migration.

A further estimation of migration outside Kerala but within India may be obtained by analysing data on the issuance of certificates of no objection by the KNMC. These certificates are issued to nurses who have migrated to other states of India, and are seeking a certificate of no objection for employment in a state other than where their primary registration lies. A total number of 9560 certificates of no objection were issued by the KNMC between 2012 and 2016. Over this time period, Karnataka (41%), Delhi (31%) and Tamil Nadu (14%) were the top destinations for nurses seeking employment outside Kerala (Figure 7). A smaller proportion of nurses also sought jobs in Uttar Pradesh (6%) and West Bengal (2%). In addition, certificates were also issued, albeit

FIGURE 7. PERCENTAGE SHARES OF DESTINATION STATES IN INDIA FOR NURSES MIGRATING FROM KERALA, 2012–2016



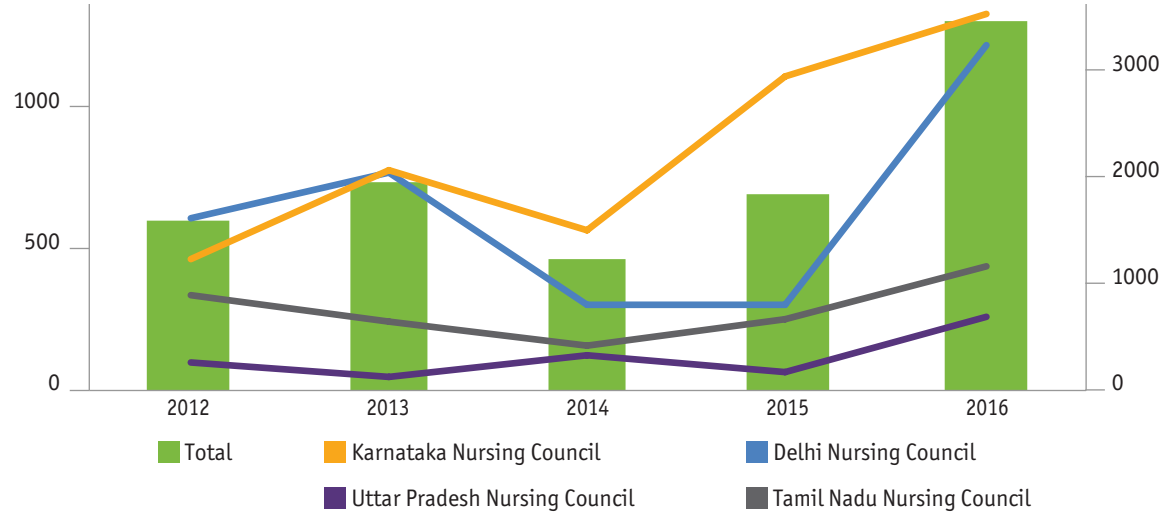
* Others include Haryana, Uttarakhand, Telangana, Punjab, Meghalaya, Bihar, Odisha, Jharkhand, Arunachal Pradesh, Himachal Pradesh.

Source: Data on issuance of certificates of no objection, Kerala Nurses and Midwives Council.

to a much smaller degree (less than 1%), for Gujarat, Rajasthan, Madhya Pradesh, Andhra Pradesh and Chhattisgarh.

The total number of certificates of no objection issued declined between 2012 and 2014, but has subsequently been increasing steadily. In particular, a steep jump was seen between 2015 and 2016. The number of certificates issued for the top three destination states—Delhi, Karnataka and Tamil Nadu—also follows a similar trajectory (Figure 8).

FIGURE 8. TRENDS IN MIGRATION OF NURSES FROM KERALA TO OTHER INDIAN STATES, 2012–2016



* Others include Haryana, Uttarakhand, Telangana, Punjab, Meghalaya, Bihar, Odisha, Jharkhand, Arunachal Pradesh, Himachal Pradesh.

Source: Data on issuance of certificates of no objection, Kerala Nurses and Midwives Council.

5. Health workforce information systems

5.1 Entry, stock and exit estimates

One of the key challenges in planning and generating evidence for policy is the availability and quality of data on the health workforce. Where available, sources of data on health workers are fragmented and unreliable *(2)*. Comprehensive sources of data on the internal and external migration of workers are scarce; often, data from multiple sources are needed to arrive at estimates on the health workforce. This absence of comprehensive and reliable data, at both the central and state levels, may be reflective of the limited priority granted to health information systems.

Sources of information on nurses and midwives may be obtained from government sources, which include information on those employed under the public health system, data from the census, and other national and regional surveys. In addition, professional councils maintain databases of health workers—however, until 2017 there were no live registers, and existing systems do not account for health workers who may not be practising or who have retired or died. This section presents details on the sources of data available and used to arrive at estimates on the production, stock, and migration of nurses trained in Kerala, and to generate national-level estimates on the nursing and midwifery cadre in India.

5.2 Production and stock

Professional councils collect and publish statistics on the number of registered members. In the cases of nurses, the state nursing councils are responsible for registering nurses who graduate with a diploma (Auxiliary Nursing and Midwifery or General Nursing and Midwifery) or a degree (BSc or Post-Basic BSc Nursing). It is compulsory for nurses to register with the state they have received their training from. This information is shared annually with the INC. This has been used as one source of estimating the number of nurses entering the workforce. At the central level, the INC also maintains a register (handwritten) and collects information on graduating nurses. Information gathered includes name, year and place of graduation, and course taken. This information has been collected and stored from 1947, when the Indian Nursing Council Act came into force. These data do not account for nurses who have exited the workforce due to migration, death, change in profession or post-retirement, presenting a challenge in terms of estimating the stock of nurses. The reliability of the data is further hampered by the quality of documentation, including content and format, and the challenge of obsolete information. Often details on further qualifications of nurses are not updated, and information on nurse mobility is not tracked. In addition, access to and use of these data are limited by challenges of integration and standardization across platforms and state councils, with limited information as to if and how these data can be accessed and used across state councils. In cases of change in domicile within India, nurses are required to transfer their registration (after obtaining a certificate of no objection) to the state where they are practising. Information on certificates of no objection issued by the KNMC for the period 2012–2016 has been used in this study to gauge the states within India where nurses from Kerala tend to migrate.

In an effort to maintain a more updated database of nurses practising in the state, the **Kerala Nurses and Midwives Council** has made it mandatory for nurses registered with the council to renew their certificates every five years. This was implemented on 1 January 2013. Efforts are being undertaken to update information on nurses registered with the KNMC from 2000. In order to increase compliance, the KNMC has also informed employers to ensure that nurses employed by them have renewed registration certificates. Box 2 presents information on the registration of nurses.

BOX 2. REGISTRATION OF NURSES

Kerala

- Compulsory to register with the KNMC upon receiving diploma or degree (primary registration)
- Reciprocal registration is offered by the KNMC to those who have studied outside Kerala
- Certificate of no objection required in case of transfer of registration to other state council.

Central

- KNMC and other state councils provide annual registration data to the INC
- Live Nurses Registration and Tracking System (NRTS) introduced in 2017 (see Box 3 and Figure 10 for further information).

The **Kerala University of Health Sciences** maintains data on the number of nurses graduating from degree programmes from the institutions falling under the university's ambit. The **Directorate of Medical Education** also compiles the number of seats across public and private nursing institutions. This may also be indicative of the state's nurse production capacity.

Until 2005, the **Central Bureau of Health Intelligence** collected and presented data on nursing and paramedical professionals employed by the public and the private sector as part of its medical health and nursing human resources statistics, published as the *Health information of India* (Figure 9).[13] The publication has been replaced by the National Health Profile available in the public domain. The National Health Profile provides a comprehensive overview on demographics, health indicators, socioeconomic indicators, as well as health financing and human resources for health.

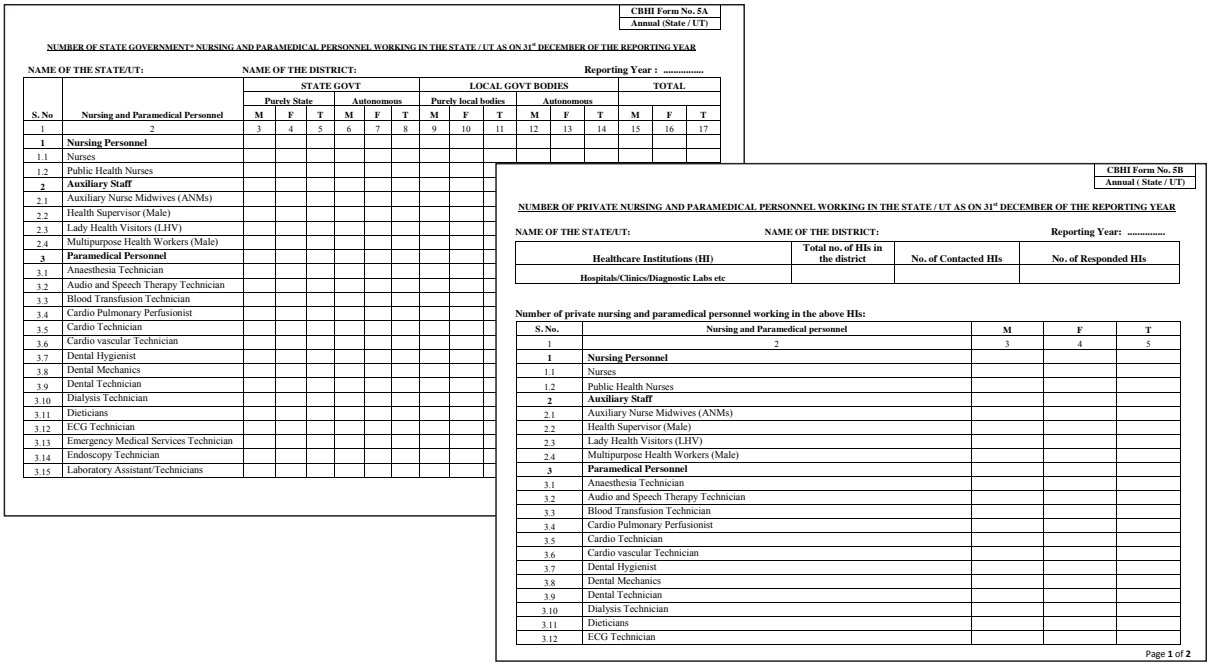
The Ministry of Health and Family Welfare, Government of India, collates and disseminates information on the number of nurses employed in the government rural health system across states through its annual publication, the **Bulletin on Rural Health Statistics**. Information on nurses presented in the bulletin includes details on the number of positions required, sanctioned, and filled for different cadres of health providers, including nurses and midwives, at different government facilities in the rural health system. The information excludes data on nurses employed at higher levels of the public health system, including secondary hospitals at the district level. This report uses data from 2016 Bulletin on Rural Health Statistics.

The **Kerala Migration Survey**, a large-scale household study conducted periodically by the **Centre for Development Studies**, collects information on emigration from Kerala to other states in India, as well as overseas, and return migrants. The survey, which is representative at the state level, collects information on self-reported occupations and educational qualifications of household members currently residing in Kerala, which enables calculation of the stock of nursing personnel from the survey data.

In addition to these sources, the census and other published studies that gather data through household surveys offer other sources of data to estimate stocks of health workers (including nurses).

13 It was not clear if this was compulsory reporting or voluntary reporting by the facilities.

FIGURE 9. REPORTING FORMATS FOR NUMBERS OF NURSING AND PARAMEDICAL PROFESSIONALS USED BY CENTRAL BUREAU OF HEALTH INTELLIGENCE UNTIL 2005: GOVERNMENT (LEFT), PRIVATE (RIGHT)



CBHI Form No. 5A
Annual (State / UT)

NUMBER OF STATE GOVERNMENT* NURSING AND PARAMEDICAL PERSONNEL WORKING IN THE STATE / UT AS ON 31st DECEMBER OF THE REPORTING YEAR

NAME OF THE STATE/UT: NAME OF THE DISTRICT: Reporting Year : .....

S. No	Nursing and Paramedical Personnel	STATE GOVT						LOCAL GOVT BODIES						TOTAL		
		Purely State			Autonomous			Purely local bodies			Autonomous					
		M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	**Nursing Personnel**															
1.1	Nurses															
1.2	Public Health Nurses															
2	**Auxiliary Staff**															
2.1	Auxiliary Nurse Midwives (ANMs)															
2.2	Health Supervisor (Male)															
2.3	Lady Health Visitors (LHV)															
2.4	Multipurpose Health Workers (Male)															
3	**Paramedical Personnel**															
3.1	Anaesthesia Technician															
3.2	Audio and Speech Therapy Technician															
3.3	Blood Transfusion Technician															
3.4	Cardio Pulmonary Perfusionist															
3.5	Cardio Technician															
3.6	Cardio vascular Technician															
3.7	Dental Hygienist															
3.8	Dental Mechanics															
3.9	Dental Technician															
3.10	Dialysis Technician															
3.11	Dieticians															
3.12	ECG Technician															
3.13	Emergency Medical Services Technician															
3.14	Endoscopy Technician															
3.15	Laboratory Assistant/Technicians															

CBHI Form No. 5B
Annual (State / UT)

NUMBER OF PRIVATE NURSING AND PARAMEDICAL PERSONNEL WORKING IN THE STATE / UT AS ON 31st DECEMBER OF THE REPORTING YEAR

NAME OF THE STATE/UT: NAME OF THE DISTRICT: Reporting Year: .....

Healthcare Institutions (HI)	Total no. of HIs in the district	No. of Contacted HIs	No. of Responded HIs
Hospitals/Clinics/Diagnostic Labs etc			

Number of private nursing and paramedical personnel working in the above HIs:

S. No.	Nursing and Paramedical personnel	M	F	T
1	2	3	4	5
1	**Nursing Personnel**			
1.1	Nurses			
1.2	Public Health Nurses			
2	**Auxiliary Staff**			
2.1	Auxiliary Nurse Midwives (ANMs)			
2.2	Health Supervisor (Male)			
2.3	Lady Health Visitors (LHV)			
2.4	Multipurpose Health Workers (Male)			
3	**Paramedical Personnel**			
3.1	Anaesthesia Technician			
3.2	Audio and Speech Therapy Technician			
3.3	Blood Transfusion Technician			
3.4	Cardio Pulmonary Perfusionist			
3.5	Cardio Technician			
3.6	Cardio vascular Technician			
3.7	Dental Hygienist			
3.8	Dental Mechanics			
3.9	Dental Technician			
3.10	Dialysis Technician			
3.11	Dieticians			
3.12	ECG Technician			

Page 1 of 2

Source: Central Bureau of Health Intelligence (http://cbhidghs.nic.in/index1.asp?linkid=275).

BOX 3. NURSES REGISTRATION AND TRACKING SYSTEM

One of the ways to tackle the challenge of reliable data presented by a database of nurses with a previously one-time registration would be to maintain a live register. Towards this, the INC piloted the Nurses Registration and Tracking System (NRTS) in early 2017, with implementation initiated by mid-2017. The system aims to create and maintain a live database on nurses of Indian nationality and trained in India. Stakeholder discussions conducted with the INC as part of this study indicated that the NRTS is expected to provide better quality of information on nurses to enable better nursing human resources planning and to generate evidence for policy-making and policy advocacy.

The NRTS aims to capture information such as name, qualification, year of graduation, and state of primary registration, along with a photograph of the nurse. This is also linked with the Aadhar card, and the registration team provides support towards applying for an Aadhar card if a nurse does not have one.

The NRTS is expected to facilitate the registration process for internal mobility of nurses. Initially it could take 6–24 months to obtain a certificate of no objection in case a nurse wanted to register outside the state of their primary registration for employment purposes. Under the national unique identification number (NUID) system, nurses are to be given a unique national ID card and passbook, and only need to have their passbook stamped if they shift from one state to another. The NUID is limited to Indian nationals only—non-resident or based in India. Tracking international mobility is harder to capture, but the system encourages nurses moving overseas to inform the INC within three months of moving—failure to do so may result in the cancellation of their registration.

The new electronic registration and tracking system is expected to give better-quality, updated information on nurses—production, stock and mobility. The NRTS would allow for more real-time estimations of nurse mobility and highlight areas of shortage and surplus supply, enabling better nurse workforce management and deployment.

FIGURE 10. SCREENSHOT OF INC'S NURSES REGISTRATION AND TRACKING SYSTEM

Source: Indian Nursing Council (http://nrts.indiannursingcouncil.gov.in/registerpage1.nic?mode=register1).

5.3 Migration

In April 2015, nurses were brought under the "emigration check required" (ECR) category and are required to apply for clearance before emigrating to an ECR country. The Ministry of External Affairs' Protector of Emigrants facilitates this process. Data collected as part of the ECR process, as well as the emigration cards for Indian nationals (another potential source of data on emigrants) that are filled at the time of departure to a foreign country, are not accessible for analysis, and there is limited information in the public domain as to how this information is stored and used. Stakeholders were consulted to understand what sources of data are available to estimate the numbers of nurses migrating overseas, and the following sources were discussed.

5.3.1 Internal migration

Mechanisms that enable tracking the mobility of nurses within the country are limited. Certificates of no objection are issued by the KNMC to nurses seeking to transfer their registration to another state for the purpose of employment. This offers a proxy indicator for tracking the mobility of nurses within India. With the introduction of the NRTS in 2017, there now exists the possibility of capturing more reliable data on the numbers of nurses entering the workforce, and estimating stock more accurately. In addition, the validity of the unique nurse ID across the country would allow for easier tracking of nurse mobility within the country.

5.3.2 External migration

Following reports of exploitation of nurses seeking employment overseas, nurses were brought under the ECR category in 2015. As of 30 April 2015, nurses seeking employment in the 18 ECR countries are required to apply for emigration clearance. In addition, since 2015 the recruitment of nurses for overseas employment to the 18 ECR countries has been routed via two state-run recruitment agencies in Kerala: ODEPC and NORKA-Roots (registered with the Ministry of Overseas Indian Affairs). Data on nurse recruitment facilitated by these agencies have been discussed in the estimates on external migration. However, since these agencies focus on ECR countries, the data only reflect migration to these countries.

Another source of estimating external migration is by tracking verification certificates. Upon employment, a nurse's credentials are verified to check for authenticity. This is often requested by employers within India, as well as overseas. The nursing councils, in this case the KNMC, conducts routine verification of certificates of nurses registered with the council. The verification data—numbers of nurses and country or state of employment for which the verification is being conducted—offer one way to map destination countries. However, the data may not be reliable, as there is no guarantee that a verification is followed by a definitive shift in country or state. The Kerala Migration Survey is another source of data to estimate the internal and external migration of nurses.

From the perspective of the destination countries, data published by the OECD on the inflow of foreign-trained nurses was used to provide estimates on the numbers of nurses trained in India and working in OECD destination countries. The data do not provide information on the state in which the Indian nurse trained.

Another source of data on health workers trained in India and working abroad is overseas professional associations and councils. In the case of nurses, associations of nurses trained in Kerala or India but working overseas were difficult to find and contact (as compared to medical doctors, who had better-organized professional associations based on state of origin, speciality, etc.). Other potential data sources could include departments and councils conducting qualifying exams in the destination countries, nursing councils working with internationally educated nurses, and private employment agencies based overseas and recruiting nurses from Kerala.

6. Discussion

6.1 Production, stock and migration of nurses

The following subsections provide discussion and analysis of the issues surrounding the production, stock and migration of nurses.

6.1.1 Production

Socioeconomic factors, including religion, status of women and overall literacy rates, have contributed to the growth of nursing education in Kerala. The state has undergone a significant rise in the production capacity of nurses over the past decade. Nursing colleges—institutions offering degree courses in nursing—were started in 1976. Prior to that only diploma courses were offered by nursing schools. Until 2002, nursing education was available only via publicly funded institutions, after which nursing education was opened to the private sector. After this, between 2005 and 2016, the number of nursing institutions in Kerala across different categories of nursing qualifications increased from 91 to 204 for General Nursing and Midwifery courses, from 12 to 133 for BSc degrees, from 3 to 67 for MSc degrees, and from 3 to 51 for Post-Basic BSc programmes. In 2016, Kerala had 287 nursing institutes.

Multiple sources were used to estimate nurse production and stock in Kerala, but broadly production was based on the number of new registrations with

the KNMC (9766 new registrations in 2016), and the number of sanctioned seats by the INC (17 600 sanctioned seats for 2016). Stakeholder interviews with the Department of Medical Education and KNMC indicate that the large gap between the number of sanctioned seats and registered nurses may be attributed to differences in estimates of sanctioned seats at the level of the Nursing Councils (KNMC and INC) and those of the Kerala University of Health Sciences. The discrepancies may also be due to some students failing to graduate and a drop in demand for higher education, for example MSc and PhD programmes in nursing.

The demand for these courses was initially fuelled by the establishment of new nursing institutions in the state and the resulting need for qualified teaching personnel. Stakeholder interviews also point towards the limited benefits of pursuing further nursing education, as this does not lead to improvements in competitiveness in the job market, position, remuneration or promotions for nurses. For example, entry-level staff nurse positions in the public sector are filled from a pool of General Nursing and Midwifery, BSc and MSc graduates who earn the same salary, irrespective of their qualification. Representatives of professional associations echo similar experiences, but highlight opportunities for skill building and higher education within the government sector as one of the motivations for studying for an MSc degree.

The growth in nursing institutes offering degree courses has probably been fuelled by, and is reflective of, the demand for nurses within the country as well as internationally *(6, 22)*. Around 91% of seat capacity in nursing institutions in the state are in the private sector. Private nursing institutions are largely owned by individuals or are family run, and are operated via corporative societies, private management trusts or boards. Some are affiliated to charitable organizations. Unlike publicly funded institutions, these typically have higher tuition fees, entailing loans for education, often followed by poor working conditions and low pay for the period of training after graduation.

The INC prescribes standards for nursing education and failure to meet basic requirements can lead to deregistering of nursing institutions. However, key informant interviews reflect the challenge of upholding quality of education across private nursing institutions, citing the lack of adequate clinical experience and lack of other facilities as reasons for poor quality of training. In 2010, examinations to qualify for entry into nursing programmes were discontinued; instead, marks from higher senior secondary school were used as a criterion for admission to nursing programmes. Key informants said that this has lowered the quality of students entering the profession. Government institutions offering nursing programmes are believed to offer better exposure to clinical skills (often as a result to their affiliation to hospitals with a larger patient load) and resources. The preference for education at a government nursing institution was highlighted during interviews with students as well as other stakeholders.

6.1.2 Stock

Multiple sources were used to estimate the stock of nurses currently working in India and Kerala. Table 13 summarizes the stock estimates of nurses and midwives across different categories and from several sources. Sources that provide reliable estimates of stock have been highlighted.

Rao, Shahrawat and Bhatnagar *(2)* compute stock on the basis of the 2011/2012 National Sample Survey on Employment and Unemployment conducted by the NSSO, and the KMS estimates are based on a large-scale household survey that is representative at the state level. The use of household surveys provides a snapshot of stock at a point in time—it ensures that estimates take into account persons who are employed as nurses and midwives at the time of the survey, in both government and private sector employment (while excluding persons who may have migrated, retired or died). Stock estimates from these two sources are at comparable levels with each other, which further suggests their reliability.

Stock information based on the remaining data sources have limited reliability. Estimates from Anand and Fan *(9)* are based on the 2001 census, and hence rely on dated information. The Bulletin on Rural Health Statistics releases information on nursing and midwifery cadres. However, these figures are incomplete as they pertain only to specific categories of the workforce and levels of public health facilities, leaving out nurses in the private sector. Data reported in the National Health Profile are based on

TABLE 13. SUMMARY OF ESTIMATES OF STOCK OF NURSING AND MIDWIFERY WORKFORCE IN KERALA

Name of data Source	Type of data source	Year considered	Estimate
Rao, Shahrawat and Bhatnagar (2), based on NSSO	Household survey	2011/2012	61 619 qualified nurses and midwives
Anand and Fan (9), based on census of India	Household survey	2001	9.5 per 10 000 population, i.e. 30 249 nurses and midwives with secondary education or higher[a]
			7.6 per 10 000 population, i.e. 24 199 nurses and midwives with medical qualifications[a]
Kerala Migration Survey	Household survey	2016	68 161 nurses and nurse assistants
Bulletin on Rural Health Statistics	Government administrative data	2016	7950 ANMs/female health workers at subcentres and PHCs
			3 969 nurses at PHCs and CHCs
National Health Profile	Government administrative data	2015	29 710 ANMs (including 8507 LHVs)
			215 708 RNs/RMs

a. Number of nurses and midwives computed on the basis of density of health workers from Anand and Fan *(9)* and total population of Kerala from the 2001 census—31 841 374 persons.

figures from the INC and, in the absence of a live register for nurses and midwives, do not make corrections for health workers exiting from the workforce.

Poor mechanisms to document and update information on a nurse's current state or country of residence and employment, changes to educational qualifications, and deregistration in the case of death also affect estimates of stocks. The existence of disparate systems and their respective deficiencies emphasize the need for strengthening the mechanisms for collecting and updating data regarding the health workforce, and would ultimately benefit planning and policy-making in the health sector.

6.1.3 Migration

As with figures on production and stock, reliable and comprehensive data on nurses who migrate are scant and spread across multiple sources. Estimates presented in the report reflect findings from the KMS, and data on internationally educated nurses working in OECD countries. The report also presents information based on applications for certificates of no objection for mobility within India, and recruitment data for nurses emigrating to ECR countries from the state-run recruitment agencies—ODEPC and NORKA-Roots.

Stock figures in the KMS indicate an increase in the total number of nurses and nurse assistants from 2011 to 2016. The absolute number of nurse emigrants declined from 30 038 in 2011 to 20 622 in 2016, with a decline in the net migration rate of nurses by almost 10 percentage points, from 32.8% in 2011 to 23.2% in 2016. This stands in contrast to overall migration out of Kerala for all occupations, which as per the KMS 2013 survey has steadily increased, although the rate of increase has declined in recent years *(23)*.

There have also been shifts in migration patterns to different countries. Gulf countries such as Saudi Arabia, which in 2011 accounted for 30.5% of emigrant nurses from Kerala, received 18.5% of emigrant nurses in 2013, rising to 20.7% in 2016. The United Kingdom received 3709 nurses trained in India in 2005, and 303 in 2016, though the country has the largest stock of internationally educated nurses from India at 17 000 nurses in 2016. While the United Kingdom and the United States have exhibited declining shares of emigrant Kerala nurses, countries such as Australia and Canada have registered increases in the proportion of nurses, even though the absolute numbers are much smaller than for Gulf countries. This could be because of more family-friendly immigration policies offered by these countries and longer-term residency prospects. Group discussions with enrolled nursing students also reflected familial or other social networks as being pull factors for destination countries. Other countries that have been reported as destination countries in the KMS 2016 include Canada, Ireland, Italy and Singapore.

It is possible that the drop in migration to GCC countries is due to recent changes in policies in India governing

nurse migration. As of April 2015, nurses migrating to the 18 ECR countries (including the GCC countries) require emigration clearance from the Protector of Emigrants. In addition, recruitment to these countries is now only allowed via state-run recruitment agencies such as ODEPC and NORKA-Roots in the case of Kerala, with detailed processes in an effort to regulate and prevent the exploitation of nurses seeking overseas employment by private recruitment agencies and potential employers. Foreign employers are required to register themselves with the newly introduced eMigrate system prior to undertaking recruitment of nurses, and private recruitment agents are no longer permitted to facilitate foreign migration to the ECR countries.[14] These agents formed an important channel for movement of nurses, though they often charged exorbitant fees for their services *(24)*. Discussions with officials at the state-run agencies suggest that the number of recruitments enabled by them so far are quite low, and foreign employers are yet to adapt to the new rules. Another key informant mentioned that employers received a commission from recruitment agents for nurses hired by them—as this financial gain can no longer be earned, some employers are meeting their demand for nurses from other countries (especially the Philippines). Information was also provided that nurses may migrate via alternative channels, such as applying for a visa through Indian embassies in foreign countries or moving overseas under a different visa category. One official stated that they employers were expected to adjust to the new system over time, which will, in turn, result in an increase in migration via the government-appointed agencies.

KMS analysis shows that migrant nurses work predominantly in the private sector before and abroad after migration. However, interviews with nursing students indicate a preference among students and existing nurses for a permanent, full-time position under the public health system in Kerala over migration. For many nurses, such a job within the government system would be preferable to working overseas, particularly in the Middle East. Many indicated they would prefer working in the public sector in Kerala or going abroad over working in the private sector within Kerala. Recent nurse graduates work within the private sector primarily with the objective of gaining work experience required by foreign employers. The increase in the number of males joining the nursing profession may also be fuelled by the economic and migration opportunities offered by the profession. Group discussions suggest that for some students better salaries and working conditions within the private sector in India may bolster the incentive to remain in Kerala.

> "Nurses should be given more importance and acceptance at a level near to the doctors, as the patient care is given by nurses. Most of the nurses wish to work abroad because of the high salary and respect they receive there."
>
> *Student, private nursing college, Kerala*

Concerns over the quality of education offered by private sector nursing institutions, and the soft skills and English language abilities of nurses from Kerala, were expressed in stakeholder discussions. Towards this, professional and government organizations at both national and Kerala levels—such as the Trained Nurses' Association of India, the Department of Medical Education, NORKA-Roots and the India Centre for Migration—provide additional skills development for nurses seeking to emigrate. Interviews also indicated that reintroducing entrance examinations for nursing institutions may result in the selection of higher-quality students and, as a result, improve the quality of nurses produced for internal and overseas recruitment.

Stakeholder discussions highlighted that nurse migration to Middle Eastern countries is usually temporary, while nurses who migrate to English-speaking countries do not tend to return to India.

Most literature tracking nurse mobility from Kerala focuses on emigration to countries outside India. Information on internal migration is limited. The present study relied on data on provision of certificates of no objection by the KNMC to nurses who sought employment in other Indian states. Karnataka, Tamil Nadu and Delhi emerged as major destinations for nurses trained in Kerala. Discussions with nursing students and other stakeholders highlighted that migration to other states was driven by accessing

14 Except in the case of a set of government-empanelled private recruitment firms enabling employment of nurses in Saudi Arabia.

employment opportunities in major cities and leading hospital facilities, in both the public and private sectors. Students mentioned institutions such as the All India Institute of Medical Sciences, Medicity (Delhi), Narayana Hrudayalaya (Karnataka) and the Jawaharlal Institute of Postgraduate Medical Education and Research (Tamil Nadu) as preferred places of work. These institutions are regarded as providing higher salaries, greater respect for nurses, exposure to health care advancements, and access to other social contexts. Ultimately, work experience in other states of India is regarded as a stepping stone offering greater connectivity and experience for overseas migration.

A key consideration for policy is the impact of migration on availability of health workers in the source country. The data indicate adequate production and stock of nurses in Kerala, and migration does not adversely affect the availability of nurses in the state. Nursing as a profession offers scope for better quality of living for the migrants. Increased earnings and consequent remittances (except in the case of permanent migration) also contribute to the economy of the source state.

6.2 Factors influencing migration patterns

The movement of people in search of better opportunities, education and quality of life is not new. Such mobility can foster the interaction and exchange of ideas, technology and knowledge among countries. However, the migration of skilled human resources, particularly health workers, which is usually from poorer "source" countries to richer "destination" countries, and its implications for the distribution of the health workforce and health sector planning in low-resource settings, has been a cause of concern since the 1970s *(25)*. Our understanding of the scale and impact of movement, and its impact on source and destination countries, is inhibited by challenges in the availability of data.

In India too, the mobility of health workers, including that of nurses, reflects the tendency to move from settings with low availability of resources to settings with more resources and better opportunities. This may be in the case of internal migration within the country—from rural to urban areas, or from smaller towns to larger cities—or in the case of international migration, usually from India to high-income countries *(7, 26)*. This section discusses the factors governing migration of nurses from India to other countries.

Migration, including that of health personnel, is often studied within the context of "push" and "pull" factors *(27)*. Pull factors are those that attract and facilitate the movement of health workers to the country of destination, while push factors are those that provide the impetus to move, such as adverse economic, social or political conditions *(26, 27)*. Padarath et al. *(26)* further classify push and pull factors into endogenous (health system) push and pull factors, and exogenous (not related to the health system) push and pull factors. The authors go on to list three points relevant to health worker mobility: (a) variations in health worker mobility between different cadres of health workers; (b) bi-directional mobility from urban to rural, or rich to poor countries; and (c) temporary and permanent migration *(26)*. Presented below are some of the endogenous and exogenous push and pull factors influencing the international migration of nurses from Kerala and India, found in the literature and based on a key informant interview with the INC.

6.2.1 Endogenous push and pull factors

> In Kerala, the three work-related factors identified by the majority of respondents as most important in their decisions to migrate were all related to income. These included their income compared to that earned by others in their own country (chosen by 31% of respondents), their income compared to what is needed to enjoy a good quality of life in their country (16%), and their income compared to what they would like to earn (15%).
>
> *Walton-Roberts et al. (18)*

During the period of the present study, private sector nurses in Kerala were on strike demanding an increase in the minimum wage level for the profession (Box 4). A review of health services in developing countries found that many health workers in these countries are "underpaid, poorly motivated and increasingly dissatisfied and sceptical" *(28)*.

BOX 4. SALARIES FOR NURSES AND ALLIED HEALTH PROFESSIONALS

At the time of developing the first draft of this report in July 2017, nurses in Kerala and Delhi were on strike demanding better wages and working conditions. Nurses in Kerala have been on strike demanding better wages since June 2017, with the support of the Indian Nurses' Association and the United Nurses' Association. In Delhi, with the support of local associations and the Trained Nurses' Association of India, nurses, including those in government hospitals, have been on strike, with the government invoking the Essential Services Maintenance Act to deal with striking nurses in the city.

In 2011, the Trained Nurses Association of India filed a petition towards protecting and safeguarding the interest of nurses and paramedical staff working in private hospitals and health care facilities. It was found that "the nurses who are working in private hospitals and nursing homes are not being treated fairly in the matter of their service conditions and pay". Early in 2016, a committee chaired by Dr Jagdish Prasad was set up to examine the grievances under the petition of the Trained Nurses' Association of India. By September 2016, the committee, having found less-than-adequate salary and working conditions for nurses in the private sector, presented its recommendations with suggestions towards ensuring that nursing salaries in the private sector were at a par with the government sector *(29)*.

A year later, implementation of the recommendations is still a challenge, particularly within the context of the multiple existing acts, including the Wages Act, the Labour Act and the Clinical Establishments Act, 2010. Ongoing nurses' strikes have led to discussions between the Industrial Relations Committee and the Ministry of Labour and Employment towards addressing the issue of wage revision of nurses *(30)*.

Poor remuneration, in addition to poor working conditions, have featured prominently as push factors for nurse migration *(6, 31)*, and have been identified as "a symptom of the deteriorating health systems in many poor countries" *(31)*. Negative working conditions, as articulated in the literature, include physical and verbal abuse, high patient–nurse ratio, limited opportunities for further training and education, and paucity of promotions and a fulfilling career pathway. In the case of nurses working in the public sector in India, better salaries, as well as job security and better working conditions (even if salary levels are lower than their counterparts in high-income countries), made them less likely to want to migrate overseas *(18)*.

The demand for nursing staff emanating from a shortage of nursing personnel, the presence of an ageing population in need of care, and the ability to pay higher salaries make high-income countries attractive destinations for health workers. Studies documented in the literature quote the possibility of earning a higher salary, improved working conditions, greater professional satisfaction, and personal opportunities as major pull factors for nurses from Kerala and India *(32)*. Access to and availability of higher-quality resources in the workplace are also significant pull factors for potential migrants. Working conditions, such as better treatment by staff and patients, maternity benefits and opportunity to enhance skills, are also documented as relevant factors in the literature.

6.2.2 Exogenous push and pull factors

Factors outside the health system also play an important role in the migration process. For example, having relatives or networks in destination countries who can offer both information on professional opportunities and support while relocating is a major pull factor to be taken into consideration. This is perhaps demonstrated by the enabling networks facilitating the migration of health workers from Kerala to the Middle East. Interviews also highlighted the important role of social networks in destination countries (acquaintances, friends, etc.) as pull factors influencing a nurse's decision to move to a particular country to work. Pull factors also include a destination country's broader immigration policies, and strategies to retain health workers *(33)*.

Push factors include a general negative view of living conditions in India, and the potential for a better quality of life for nurses and their families in a more developed country. In addition, the perception of nursing as a profession of comparatively low worth not only reflects a society's disregard for or negative attitudes towards nurses, but also perhaps plays out in the issues of salaries, rights and working conditions: "The desire to avoid the stigma associated with basic nursing tasks forms a strong cultural backdrop to the way in which clinical nursing is valued and practised today" *(34)*. For instance, studies from Italy show that for Indian nurses, emigration to Italy is important in order to gain opportunities to expand economic and social privileges and to escape

from historical assumptions of stigma associated with nursing work, especially for women *(33)*.

However, issues of better salary, professional satisfaction and personal life do not end with one move. A second layer of "stick" and "stay" factors also impact onward mobility. A qualitative study on internationally educated nurses in Ireland highlighted that challenges in getting visas and citizenship for the spouse and offspring resulted in lower retention of migrant nurses in the country. The literature indicates that the desire to "settle" and "be stable" outweighed career-related considerations for nurses from India and the Philippines working in Ireland. Some countries in the Middle East that do not permit family stations for female workers also face a similar situation *(21)*.

A complex range of factors influence nurses' decisions to migrate, and while career-related factors such as salaries, better working conditions and opportunities have been documented, the link between these and exogenous factors—such as those that provide opportunities to live with families, education and livelihood opportunities for children and spouses, and a chance to build a life in a new location—also play an important role in choosing to migrate, move onwards, or return to one's native country. It is noteworthy that a key informant at the INC indicated that the migration of nurses from India does not pose an acute issue, while also stating that the limited availability of reliable data constrains the measurement of the degree of migration (including tracking of permanent and temporary migration), and its impact on the health system.

6.3 Health workforce information systems

At present there is no centralized, comprehensive and reliable source of data on the nursing workforce (indeed on the health workforce) in India. Where available, sources of data on health workers are fragmented and unreliable. Several secondary data sources were identified, documented and tapped into to arrive at estimates on the production, stock and migration of nurses trained in Kerala for this study. The gaps in the availability of quality data were also mentioned in interactions with stakeholders during the study. The limited availability of reliable, consistent data is a challenge towards generating evidence for policy and for improved health workforce planning. One of the more recent attempts to address this gap in information is the INC's NRTS, which provides nurses with a unique ID (usable across the country) that is linked to the Aadhar card (India's unique identification system for citizens). Discussions were conducted with the INC to understand the objectives and set-up of the NRTS, and its implications for monitoring nurses' mobility. Upon relocating from one state to another a registered nurse will be required to update their location via a "passbook" system, making it easier to track nurse mobility within the country. For nurses relocating overseas, a three-month window will be granted to update their information, and failure to do so will result in deregistration.

7. Conclusion and recommendations

This report has highlighted the remarkable capacity that Kerala has for producing nurses and for supplying the rest of world and India. Estimates of overseas and internal nurse migration indicated a declining trend in the overseas migration of nurses. In the context of high production capacity within the state, this suggests that increasing numbers of Kerala nurses will find themselves without adequate employment. Moreover, given that the overseas jobs are much more remunerative, the lack of these jobs could also translate into demands for salary increases within the state. The recent nurse strike in Kerala is reflective of this.

Extensive divergence in estimates from different data sources was noted when compiling estimates of production, stock and migration for the purposes of this study. Important issues in this regard are (a) the lack of a live register for registering nurses; and (b) poor information systems tracking the movement of nurses overseas and to other parts of India. Given these issues, the following recommendations are put forward:

1. A nodal institution in Kerala should be identified and tasked with tracking and compiling information on migrant health workers (including nurses).

2. Because overseas jobs are such an important part of the nursing economy in Kerala, the welfare of migrant nurses should be given importance, including ensuring that any labour issues with overseas jobs are

addressed swiftly. In this regard, the government of Kerala could promote the signature of memoranda of understanding with the destination countries to make sure that Kerala nurses are properly recognized and paid. This could also potentially increase the demand for Kerala nurses abroad.

3. For nurses who remain within Kerala, as the majority of them do, the government should ensure better working conditions and salaries, and should also regulate and enforce the minimum salary of nurses in the private sector.

4. Since greater professional satisfaction is cited as one of the reasons for migration, the government could examine options for creating conditions that enhance the role of nurses in the health system, including through licensing nurse practitioners and creating a prescription formulary.

5. The reasons for the decline in the migration of nurses from Kerala to foreign countries—despite the surplus among nurses in the state and their willingness to work—need to be investigated further. If this is the result of deficiencies in quality or skill levels, these may be augmented through improvement of teaching or remedial education developed in consultation with the nursing authorities in receiving countries.

6. A live register for nurses should be implemented and made interoperable with other information systems (education, payroll, etc.) to provide strategic information (including migration data) on the health labour market in Kerala. This would aid production of the state health workforce accounts and help policy-makers to take policy decisions to improve human resources for health in Kerala. A unique identification and tracking system for nurses has been initiated by the INC. These efforts can be strengthened further, including enactment of the renewal of licenses, as proposed by the KNMC in 2013.

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ANNEX 1. PRODUCTION OF NURSES IN KERALA

Table A1.1 Number of seats in nursing colleges in Kerala, by nursing qualification and type of institution, 2012–2016

	Auxiliary Nursing and Midwifery			General Nursing and Midwifery			BSc (Nursing)			MSc (Nursing)			Post-Basic BSc (Nursing)			Post-Basic Diploma		
Year	Govt	Pvt	**Total**	Govt	Pvt	**Total**	Govt	Pvt	**Total**	Govt	Pvt	**Total**	Govt	Pvt	**Total**	Govt	Pvt	**Total**
2012	165	225	**390**	403	6 432	**6 835**	465	6 405	**6 870**	50	1 165	**1 215**	185	1 635	**1 820**	NA	NA	**NA**
2013	205	295	**500**	403	6 807	**7 210**	465	6 535	**7 000**	100	1 215	**1 315**	185	1 695	**1 880**	92	360	**452**
2014	165	215	**380**	417	6 112	**6 529**	525	6 355	**6 880**	130	1 157	**1 287**	225	1 575	**1 800**	92	310	**402**
2015	165	215	**380**	425	6 072	**6 497**	525	6 675	**7 100**	130	1 218	**1 348**	190	1 575	**1 765**	102	340	**442**
2016	165	310	**475**	425	5 980	**6 405**	525	6 635	**7 160**	130	1 203	**1 333**	190	1 575	**1 765**	122	340	**462**

Figures as on 31 October for the corresponding years.

NA: data not available.

Source: State-wise distribution of nursing institutions and the admission capacity, Indian Nursing Council.

ANNEX 2. OVERVIEW OF SELECT DATA SOURCES

Name of organization	Type of organization	Data: Entry/ Stock/Exit	Data type	Strengths, limitations and other details
National-level data sources				
Indian Nursing Council	**Professional council**	**Entry/Stock** Data on nursing institutions	Number of undergraduate and postgraduate nursing institutions Number of seats (by course): intake capacity, state-wise for all India	State-wise estimates on the number of institutions offering diploma and degree courses in nursing—public and private sector Details on the types of courses offered, level of education and type of course Numbers of seats across institutions Data include year of establishment for nursing institutions, which allows for tracking growth of production capacity of nurses, preferred nursing courses Data need to be sourced from independent state councils Inability to track how many students enrol per course, per year

(continued)

ANNEX 2. OVERVIEW OF SELECT DATA SOURCES (continued)

Name of organization	Type of organization	Data: Entry/ Stock/Exit	Data type	Strengths, limitations and other details
Indian Nursing Council	Professional council	**Entry/Stock** Registered nurses	Nurse registration: nurses by qualification and state council registered with	INC maintains a register (handwritten) Information on stock available digitally and published in the annual Snapshot report Live registration—Nurses Registration and Tracking System initiated in 2017 Registration with the state council is mandatory upon completing primary nursing diploma/degree Additional qualifications are to be shared with the state council and updated accordingly Registration data are provided by the state councils to the INC annually NRTS—offers the possibility to maintain a live register with data usable and transferable between state councils, enabling the opportunity to track nurse production, stock and mobility Data sourced from state councils Until now no live register, therefore difficult to estimate actual stocks and to ensure compliance in registration in the following cases: (a) if practising in a state other than where first registered; (b) if retired, deceased or no longer practising; (c) if migrated overseas Access to the data
		Exit Certificate of good standing	Certificates of good standing issued to nurses seeking employment overseas/ other	Issued to nurses [required] seeking employment [within the country/outside] and if needed, towards other purposes such as applying for higher education and/or migration Does not capture whether the nurse [applicant] actually relocated/completed course of movement Six-month validity implies applicants may apply for and receive multiple certificates
National Sample Statistics Organization	**Government**	**Stock** National Sample Survey on Employment and Unem-ployment, 2011/2012	Numbers of nurses present in India	Collects information on nursing professionals and nursing and midwifery associates currently present in the country as well as at the state level based on a household sample survey conducted every five years Report presents estimates based on a study (2) which use data from survey conducted in 2011/2012, and computes total number of nursing professionals and nursing and midwifery associates based on a combination of National Classification of Occupations and National Industrial Classification codes Occupations are self-reported, though the study adjusts for this by taking into account educational qualifications

(continued)

ANNEX 2. OVERVIEW OF SELECT DATA SOURCES (continued)

Name of organization	Type of organization	Data: Entry/ Stock/Exit	Data type	Strengths, limitations and other details
Ministry of Health and Family Welfare	**Government**	**Stock** Bulletin on Rural Health Statistics	Numbers of nurses employed in the public health system (primary levels of care)	Data available in the public domain (open government data), across multiple formats Details on the number of positions required, sanctioned, and filled for different cadres of health providers, including nurses and midwives, at different government facilities in the rural health system Report uses data from the 2016 report Excludes data on nurses employed at higher levels of the public health system, including secondary hospitals at the district level Data capture only permanent staff and not contractual positions, so do not present a complete picture of staffing at public health facilities
Central Bureau of Health Intelligence (National Health Profile)	**Government**	**Stock** National Health Profile	National Health Profile	The Central Bureau of Health Intelligence is a collaborating centre of the WHO family of international classifications, under the Directorate General of Health Services, Ministry of Health and Family Welfare. Chapter 5 of the National Health Profile published by the Central Bureau of Health Intelligence is on human resources in the health sector, and provides details on human resources in the public sector as well as registration information from professional councils. Information on the total number of registered nurses in India till a specified date is available for each year, including ANMs, RNs/RMs and LHVs Data collection: data on nurses and midwives are sourced from (a) relevant central ministries and departments; (b) state and union territories health authorities; and (c) autonomous organizations and agencies such as the Indian Nursing Council. Source agencies are responsible for the veracity of the data presented. Limits of the data, such as non-reporting, different reference periods and reporting institutions, are mentioned for each table Limitations: it is not possible to determine the overlap between the three nursing categories provided (ANM, RN/RM and LHV). Moreover, the text indicates that the reported numbers are cumulative registrations up to the specified date, yet many of these registered nurses may no longer be part of the Indian nursing workforce through career shifts, retirement, death or emigration

(continued)

ANNEX 2. OVERVIEW OF SELECT DATA SOURCES (continued)

Name of organization	Type of organization	Data: Entry/ Stock/Exit	Data type	Strengths, limitations and other details
Kerala (state)-level data sources				
Kerala Nurses and Midwives Council	**Professional council**	**Entry/Stock** Data on nursing institutions	Number of undergraduate and postgraduate nursing institutions Number of seats (by course): intake capacity of private and public institutions across Kerala	Details on the institutions and courses offered by the public and private sector across Kerala Number of seats by institution type, course and year of start of programme for nursing education across Kerala Difficult to estimate how many of the seats offered or earmarked are actually filled
		Entry Registration of nurses		Registration of nurses with the council mandatory upon graduation Additional qualifications to be updated upon completion of the course As of January 2013, renewal of registration every five years mandatory for nurses. Will be undertaken with effect from 2000 (for nurses first registered in 2000) Details on nurses trained in states outside Kerala who are now registered with the KNMC Other types of services offered by the KNMC: reciprocal registration, good standing certificates, verifications Additional qualifications to be updated by registered nurses, but not mandatory Not a live register; difficult to estimate actual stocks and to ensure compliance in registration in the following cases: (a) if practising in a state other than where first registered; (b) if retired, deceased or no longer practising; (c) if migrated overseas
		Exit Verification of certificates	The KNMC verifies that the academic certificates of a nurse are legitimate. This is done for the purpose of employment (within India and overseas), emigration, others reasons	Proxy indicator for potential migrants Relevant for internal and international mobility Database does not capture whether applicant actually migrated outside India—but since it is issued at a later stage of the process, it is probable that they will go ahead with their plans
Directorate of Health Services	**Government**	**Entry**	Staffing norms for the public sector	Management of nurse workforce employed in the public sector in Kerala Have an internal system of monthly reporting on promotions, post creation, vacancy creations: reporting by public health care facilities Internal health management information systems are in place; data used largely for internal monitoring and reporting purposes

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ANNEX 2. OVERVIEW OF SELECT DATA SOURCES (continued)

Name of organization	Type of organization	Data: Entry/ Stock/Exit	Data type	Strengths, limitations and other details
Overseas Development and Employment Promotion Consultants (ODEPC) Ltd.	**Government** State-run recruitment agency	**Exit**	Number of nurses recruited for overseas employment Destination countries	Database of nurses seeking overseas employment Database of personnel deployed by ODEPC (country-wise), but not according to profession Data on nurses recruited overseas 2011–2017 Countries served—largely GCC countries Data not available in the public domain
Non-Resident Keralites' Affairs Department (NORKA-Roots)	**Government State-run recruitment agency**	**Exit**	Number of nurses deployed to GCC countries	Details on nurses recruited and sent to GCC countries for the period 2015–2017 Yearly figures unavailable
KIMS College of Nursing	**Private nursing college**	**Entry/Stock**	Number of graduates	Number of graduates by year and course completed
Ananthapuri College of Nursing	**Private nursing college**	**Entry/Stock**	Number of graduates	Number of graduates by year and course completed
Government Nursing College, TRV	**Government nursing college**	**Entry/Stock**	Number of graduates	Number of graduates by year and course completed
Centre for Development Studies	**Research and academic institution**	**Stock/Exit** Kerala Migration Survey 2016	Data set from large-scale household survey	Survey estimates representative at level of the state Enables gleaning estimates for stock and migration of doctors in Kerala from the same data collection exercise Self-reporting of occupations Occupational category does not distinguish on the basis of allopathic/other forms of medicine, or specialist/non-specialist doctors Extrapolation of survey estimates to generate state-level estimates provided unreliable results for migration destinations
Destination country data sources				
Organisation for Economic Cooperation and Development (OECD)	**International**	**Exit**	Annual inflow of foreign-trained nurses	Foreign-trained nurses (Indian) practising in OECD countries

Note

India Centre for Migration Government think tank funded by the Ministry of External Affairs. Offers the potential of being able to tap into potential sources of data on migration such as those by the Protector of Emigrants on ECR clearances, or emigration cards. We met with the India Centre for Migration to conduct a key informant interview on sources of data to estimate the migration of nurses, as well as to understand the policy environment on the migration of nurses better

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