Chapter 5: Discussion

A century ago, the Flexner report (1910), sparked groundbreaking reforms that equipped health professionals with the knowledge that contributed to the doubling of life span during the 20th century. (162) Over a decade ago, the World Health Report 2006: working together for health - highlighted the urgency of responding to needs of health workforce as a critical precondition to achieving the MDGs.(163) It proposed creation of a global stakeholders’ alliance for advocating and mobilizing resources; to support health workforce development. (163)

Across the world, health workers can serve as change agents by reorienting health systems towards primary care and action on the social determinants of health. In 2006, the Global Health Workforce Alliance (GHWA) was launched during the 59th World Health Assembly (WHA) in Geneva, alongside new resolutions on the rapid scaling up of health workforce production (WHA59.23).(164) The first Global Forum on Human Resources for Health was convened in Kampala, Uganda in 2008 by the Alliance. Here the Kampala Declaration and Agenda for Global Action was adopted which focused attention on six strategic areas of human resources for health. In the year 2010, the Lancet Commission highlighted that their exist glaring gaps and inequities in health both within and between countries.(165) In the year 2014, GHWA’s report titled ‘A Universal Truth: No Health Without a Workforce’ mentioned about a deficit of about 7.2 million skilled health professionals across the world. (166) Thus, to meet this deficit we anticipate that public health education should grow at a similar pace as recommended by Lancet Commission for the health education system.(165)

The Sustainable Development Goals (SDGs) for health and well-being lay out ambitious targets for disease reduction and health equity for 2030, including universal health coverage (UHC).(167) Today health systems are the crux in designing, implementing and monitoring health programs, delivering quality health services and in ensuring UHC. Health systems across the globe are heavily dependent on health manpower.(15) To meet the aspiration for universal health coverage, gearing up the health workforce will not be a simple task. To achieve universal health coverage a paradigm shift will be required. An ever-evolving epidemiological profile and population structure; increases the burden of non-communicable diseases on health systems. The governments
will have to look beyond the existing shortage of health professionals with more focus on the accessibility, acceptability, quality and productivity of the health workforce.(166)

Thus, these were the major global commitments that were taken up specifically targeting health workforce issues in the past. Despite of these initiatives, achieving and sustaining universal health coverage may remain a challenge for the health workforce in countries at all levels of socioeconomic development, if they continue moving along their current paths.

As per Quartz India’s report (2017), India is the world’s fastest-growing major economy.(168) Its economy is third-largest (8.7 trillion USD) by purchasing power parity (PPP)(169) and sixth-largest (2.454 trillion USD) in the world measured by nominal GDP.(170) As per PricewaterhouseCoopers (PwC), India’s GDP would surpass the GDP of United States of America in purchasing power parity terms by 2040.(171) India’s health sector plays an important role in its economic growth. As stated in Indian Brand Equity Foundation’s (IBEF) 2017 report, healthcare is currently one of the biggest sectors in the country in terms of revenue and employment. The industry is currently observing rise in coverage as well as a growth in services and expenditure. In the year 2015, the health sector was the fifth largest employer with 47.13 lakh employees. (172) Health sector in India is large, it has been forecasted that by 2020 the total size of the health industry will grow from 160 billion USD (for 2017) to 280 billion USD (by 2020). (172) It is estimated that by the year 2020, Indian healthcare market will be amongst top three in the world in terms of incremental growth. (172) Additionally, India’s medical tourism industry is booming due to the availability of low cost and quality medical services, attracting patients from across the world. The Indian medical tourism industry is likely to reach from 3.9 billion USD (2016) to a whopping 8 billion USD (2020), growing at a CAGR of 27 per cent over 2013-16.(172) The research and development (R&D) activities in the health sector have immensely gained from the country’s strong science and technology sector (backed by robust information technology systems). Favorable government policies encouraging Foreign Direct Investment (FDI), tax benefits etc. with promising growth prospects have helped the industry attract private equity, venture capitals and foreign players. Rising income levels, ageing population, growing health awareness and changing attitude towards preventive healthcare is likely to increase demand for healthcare services in future.
India has realized impressive gains in eradicating extreme poverty, achieving universal primary education, promoting gender equality and empowering women, ensuring environmental sustainability, and developing a global partnership for development over the last two decades. (173) On the health front, country’s progress has been mixed. (173) However, with 18% of world’s population, with nearly 30% of its population living in extreme poverty, with more than 50% of population having no access to modern cooking fuels and defecating in the open, ‘sustainable development’ poses as an unachievable target. (174) However, it is clearly visible that India is taking its commitment seriously as NITI Aayog has been assigned the role to ‘coordinate’ the achievement of India’s sustainable development goals both in quantitative and qualitative terms. (174) The HLEG commissioned by erstwhile Planning Commission of India as well echoed that consolidated and strengthened public health provisioning was a key component of universal health coverage. (175) Thus, from the Government’s side there exists a strong policy which is critical in further development of the health sector. The recent National Health Policy (NHP) 2017 aims to increase public health spending to 2.5 per cent of GDP, guaranteeing health care services to all citizens, underprivileged in particular. (154) The NHP also provides a policy framework for achieving universal health coverage and delivering quality health care services to all citizens at an affordable cost. (154)

In India, health care services are delivered by a complex network of public and private providers, ranging from single doctors to specialty and multispecialty tertiary care hospitals. Health workforce in India comprises of broadly eight categories of professionals/workers namely: doctors [allopathic, alternative medicine], nursing and midwifery professionals, public health professionals [medical, non-medical], pharmacists, dentists, paramedical workers [allied health professionals], grass-root workers (frontline workers) and support staff. As per an analysis undertaken by PHFI based on the NSSO data (adjusted for 1st January, 2016), there are 3.8 million health workers in India, with over 0.7 million doctors (allopathic physicians), 1.2 million nurses & midwives, 0.5 million AYUSH doctors and 0.8 million health associate professionals. (176)

Health care is provided by the public and the private health sectors. The public health care system is designed as a three-tier structure comprising primary, secondary, and tertiary facilities. It includes sub-centres, primary health centres, community health centres, district hospitals and general hospitals. Since the year 1947, there has been a very sizeable expansion in the primary
health care infrastructure, particularly in rural India. The total number of Primary Health Centers (PHCs) have grown from 725 to 28,863 until the current year. There are total 628,708 government beds, whereas 196,182 are in rural areas. (177) This rise in the infrastructure is paralleled by a growth in the human resources for healthcare. In 1947, there were only 50,000 doctors (178) as compared to 0.7 million doctors in the year 2016 (179) actually available to provide health services. Despite this, there is severe shortage of staff and supplies in public-sector health facilities. India has a doctor-to-population ratio of 1:1,674, compared with the World Health Organization norm of 1:1,000, which leads to acute shortages and uneven distribution of doctors. (177) India’s urban poor are especially vulnerable, given that primary care facilities in the cities are generally less organized and fewer in number than in rural communities.

On the other hand, the private healthcare system includes hospitals, nursing homes, dispensaries, diagnostic and pathological laboratories and blood banks. (180) The private hospital sector has expanded rapidly, Private hospitals currently provide about 80 percent of outpatient care and 60 percent of inpatient care. (177)

Doctors (allopathic physicians), especially in the public sector, conventionally assume the responsibility of managing the function of the health sector and its delivery. Capacity building efforts for doctors in various skills such as: management, administration, statistics, monitoring and evaluation, policy, advocacy etc. has unfortunately not kept pace with the needs of the expanding markets. Thus, over the years, market forces have re-shaped the landscape of public health in India, which is dynamic in current scenario and its growth needs to be sustained by the hands of policy makers and the Government of India.

The growth in the infrastructure and human resources has positively influenced key health indicators such as Infant Mortality Rate (IMR), which has improved and showed a secular decline from 145.6 in the year 1947 to 38 in 2017. (181) The mean life expectancy at birth has increased from 32 years in 1947 to 68 years in 2017. (181) Although there is a visible and significant progress in the health indicators over the last seven decades, our current health indicators continue to lag behind some of our neighboring countries. Inequalities in health indicators within the different parts of the country continue to be of concern. The current IMR is 38, but it is 12 in Thailand, 13 in Sri Lanka and far better than us in Nepal and Bangladesh. Similarly, 35 per cent Indian children are malnourished as compared to those in Ghana (14 per cent), Thailand (7 per cent) and Brazil (2
per cent). As per National Family Health Survey Report/ Fact Sheet (2005-06, 2015-16) the immunization coverage has increased from 44 per cent to 62 per cent - by 18 per cent points within the time period from 2005-06 to 2015-16. (182) But, it is lagging as compared to several nations globally. As per a recent WHO report, India has been ranked with having highest number of tuberculosis (TB) cases in the world with 2.8 million incident cases in 2015.(183) Similarly, there is a rapidly rising burden of non-communicable diseases (NCDs) with an estimated 69 million persons with diabetes in the country.

Public health professionals are a component of the overall health workforce and play a vital role in the creation and maintenance of a healthy community. (15) Globally, the total number of PHPs is unavailable. Similarly, estimates pertaining to the supply, need and demand of PHPs are also unavailable. In Indian context for our research study, we have considered public health professionals from several disciplines and diverse fields encompassing: behavioral sciences/health promotion and communication, biostatistics, medical /health sciences, environmental health, epidemiology, health services administration/management, international/global health, maternal and child health, nutrition, public health laboratory practice, public health policy and public health practice.(44) Public health researchers, practitioners and educators work with communities and populations (43) and contribute towards prevention of occurrence of health problems through implementation of health programs, developing policies, administering services, regulating health systems and conducting research. (37) PHPs are an important category playing a vital role in the creation and maintenance of a healthy community.(15)

Across the world, the number of schools offering public health programs are growing.(184) Many universities offer certificates programs, along with undergraduate and masters level degree programs in public health. As per the Commission on Health Professionals for the 21st Century (2010) attempt to measure frequency of world regions with higher education in public health disciplines; it was observed that in USA there was 1 such program per 1.3 million, in South America 1 per 4.7 million.(34) Emerging economies like Brazil with more than 40 schools of public health probably now has one of the greatest concentrations of public health training programs in the world i.e. one course for each 5 million inhabitants. (15)As per our analysis, in the year 2016-17 in India there was one MPH program available for each 28.7 million inhabitants which is nearly six times lesser than Brazil that in itself is not the ‘gold standard’. (22)
MBBS graduates have been excluded for the purpose of current work as their sizeable number works in providing clinical care. Even if they are employed in the public sector, their preeminent role is in provision of clinical care when compared to public health activities. Therefore, we have not considered MBBS graduates as a part of public health professionals. However, MBBS doctors with specialized training in public health have been included for this work.

Public health professionals trained in foreign countries were not included in the research work as their number is very small and it is difficult to track them due to the unavailability of a single database at country level.

Traditionally, in India, medical colleges were the hubs for creating public health professionals. Over the last two decades, public health education sector has seen tremendous changes in the way public health professionals are trained in the country. There has been a conscious shift towards the creation of schools of public health outside the corridors of medical colleges, thereby opening the doors for non-medical personnel to acquire academic competencies in public health disciplines. These new institutions reflect a change in the way public health professionals in India will be produced and lead India in the 21st century. However, in spite of these initiatives, no systematic effort has been undertaken to assess the situation. There is inadequate information detailing the origin, evolution and the current status of public health education in India. There is limited information regarding the supply of public health professionals available in the country.

Most of the MBBS graduates enter public health through MD and other postgraduate courses (in core public health or public health domains) offered by medical colleges. However, other graduates including dental sciences, AYUSH, allied health, social work, law, education, public policy, finance, human resources, management, anthropology, communication, statistics, economics, etc. enter public health through the programs offered by institutions offering public health programs (including Schools of Public Health). Around 90 per cent of the public health graduates who will work in public health across the country will belong to a non-medical background.

From the forecasted figures, it is clear that as the production capacity would grow - the annual production of public health professionals (PHPs) will also grow at 100% growth rate i.e. there will be double the number of seats in 2026 as was in 2017. Due to the launch of new institutions offering
public health programs and the Schools of Public Health in future, we assume that this decadal growth rate will be sustained.

Though a substantial number of seats are available for public health programs, a limited number of students opt for such programs.(95) Thus, public health programs are undersubscribed. Apart from meeting the large shortfall in availability of the public health professionals, at several levels, the knowledge and skills of these professionals and functionaries have to be appropriately and adequately designed to ensure delivery of services at the desired quality and scale. Policy makers will have to examine issues surrounding low uptake of existing seats, review the current framework regulating PHPs education in order to adequately respond to future public health professional requirement. It is therefore becomes important to ensure a numerically adequate and competent workforce.(15)

Additionally, the public health education needs to become more practical, problem oriented and equip the policymaker and practitioners, with the necessary skills. There is also a need to specifically tailor the course contents as per the specialization/ interests of the students. A focus on inter-disciplinary learning, enabling PHPs to identify multiple determinants of health and influence them through multi-sectoral pathways, must be thus promoted through a fusion of several disciplines which have hitherto been taught in relative isolation.(95) Increased clarity on the role of public health graduates in India’s public health infrastructure would help institutions to adjust their programs and ensure graduates are equipped with the required skill-sets. The Government of India has recently undertaken towards designing a model for Master of Public Health (MPH).(185)

In the year 2026, there will be a need for public health professionals for around 27,289 PHPs (in optimistic scenario at moderate seat occupancy) which as compared to the current need (2017) of 26,298 PHPs is not very different. However, as per the gold standards, our actual demand is much higher of about 13,00,000 (2017) and 14,00,000 PHPS in 2026 (as per Brazil’s 100:100 000 ratio). If we calculate demand as per ASPH’s 220:100 000 ratio then this demand would grow to a whopping number of 29,00,000 (2017) and 32,00,000 for 2026 – which without any policy level interventions seems to be totally unachievable in the present day.

As per comparison of India’s current 11 PHPs per 100,000 population ratio; with other select countries, it was observed that India’s PHP: population ratio was better than South Africa (6.5)
and Sri Lanka (6.9) but far lesser as compared to countries like Thailand (56.6), Brazil (97), Switzerland (125) and United States of America (158). As compared to the ASPH’s recommendation of 220 PHPs per 100,000 population (31), India is far below at 11 PHPs per 100,000 population.

To meet the need for public health professionals, the supply capacity of the same needs to be improved. However, due to undersubscription and less popularity of public health programs in the country, there arises a need to increase the demand for these programs. Demand for public health programs can be substantially increased by institutionalizing public health cadre, which would increase the number of job positions in the public health sector. The public health cadre would also provide structured career pathways and progression for public health professionals. This in turn would encourage students to enroll in public health programs and would increase the annual supply of trained public health professionals in the country. Thus, the government and policy makers should undertake these steps to meet the existing shortage for public health professionals by the next decade.

As stated in a recent study, by the year 2030, global demand for health workers may rise to 80 million workers, which would be double the current stock of health workers (2013). While the supply of health workers is expected to reach 65 million over the same period, which may estimate into a worldwide net shortage of 15 million health workers. As per this study by Liu et. al., efforts to scale-up health services to achieve UHC and health development goals are confronted by acute shortages and inequitable distribution of skilled health workers in many low- and middle-income countries. This HRH shortage in turn translates into a constraint towards delivering essential health services. Thus, knowing the importance of the public health workforce in the Indian public health system, and criticality of time and resources invested for educating and developing skilled public health workforce, it becomes crucial to understand the factors that affect the size of the future public health workforce and plan appropriately.

As stated by Datta et. al. the demand for public health education depends on the career options available for public health professionals with medical and non-medical backgrounds in a balanced way in the central, state, district and local government health organizations, academic and research institutions. Currently, public health graduates in India are employed in the public, private and
nongovernmental sectors, in teaching, research and implementation roles. However, there are no well-defined career pathways, which is a significant barrier for MPH graduates who wish to work in the public sector. (152) Thus, to generate demand for the public health programs and increase their seat occupancy there is a need to create more job opportunities for non-medical background PHPs to encourage the workforce serving Indian public health system. Revamped designations and clarity of roles must be worked out for appropriate job responsibilities. (157)

Given the rapid rise in demand for public health programs, an educational system that is funded exclusively through the public sector would not be a realistic option. We are witnessing a rapid rise in private institutions that offer MPH programs. In the current regulatory framework, these programs confer degrees under the aegis of the affiliating universities. There can be an argument to augment this university oversight in education. The faculty: student ratio represents the highest number of students that can be enrolled per faculty to maintain the quality and rigor of academics. It was observed that median of faculty strength for 41 institutions offering MPH programs in the country was six (95) which as per UGC’s recommendation should lie between 1:15 and 1:10 for post graduate level programs. (189). Thus, there is a need for public health programs to improve their faculty strength to deliver good quality programs and maintain their faculty: student ratio to

Public health graduates joining public sector get jobs in national health programs at district, state and national level. However, very few graduates join at rural positions due to poor living conditions. For more experienced professionals, compensation packages were found to be higher. However, INGOs pay lucrative compensation packages as compared to NGOs and public sector. There exists a discrepancy between compensation packages being offered to medical post-graduates as compared to non-medical graduates.

It was stated in interviews that the government should recognize public health as an essential qualification in the recruitment for public health positions. As such most of such qualification are mentioned as ‘desirable’ qualification instead of ‘mandatory’.

In India, in spite of obvious need, there is a lack of clearly defined career plans for non-medical public health graduates. (152) MPH graduates have opportunities in the health system and academic institutions and jobs in academic and research institutions are likely to increase in the
near future. Non-academic jobs are in healthcare delivery, monitoring and evaluation, health and financing. There are significant challenges for entry into the public and private health sector, which are due to limited awareness of opportunities, lack of requisite skills for searching and applying for jobs, uncertain recruitment processes, poor working conditions, poor living conditions in rural areas, frequent transfers, lack of competitive salaries, unclear expectations of work roles and feedback. Institutionalizing public health service at central, state and district levels, with clearly defined career pathways is required. (152) Most of the public health professionals are expected to work on various health projects at block/district/national level, requiring specialized skills which necessitate proficiency in transforming the theoretical knowledge into concrete actions. It has been found that there is a huge demand of public health professionals in INGOs followed by NGOs, both of which actively support the government sector.

The shift in the employment trend has prompted the employers to seek professionals who have proven expertise and demonstrated abilities in the past and have adequate knowledge of the thematic areas of work. Most of the organizations prefer hiring a PHPs with degree or diploma in PH, which also ensures that the candidate has adequate understanding of the various issues in this sector. In addition to a professional qualification in public health, it is essential that a public health aspirant is well versed with the various statistical tools especially if he aspires to work in public health research and Monitoring & Evaluation projects. The evaluation process implemented at the time of shortlisting and selecting the candidate plays a vital role to ensure the right hire has been made. To facilitate the hiring process, most employers have pre-designed employment processes to evaluate a candidate on various parameters. Further, the experience at many times also needs to be supported by the desired educational and/or professional qualification.

During the research work, we analyzed domain wise available job vacancies, their compensation packages, work experience required and the job sector. It has been observed that public health being an evolving field, employs candidates with diverse backgrounds and experiences.(157) There is scope of work in the Central and State Governments with both in a bid to increase and enhance the health care delivery systems. Career opportunities include all sectors of industry, universities, research organizations, laboratories, governmental agencies and NGOs involved in the areas of environment, occupational health and safety, public health, energy and development.
Despite a large number of such professionals being available to serve the public health community, there is a massive dearth in employment opportunities available. There are no set recruitment rules that may open up avenues for non-medical background people to be place in the public health system. Such openings are only available to Medical professionals trained in public health. (95) Public health graduates are employed in public, private and NGO sector in teaching, research and implementation roles.(95) There are no well-defined career pathways laid down for them. Lack of pre-structured career pathways pose to be a significant barrier for entry of MPH graduates into the public health sector.(152)

Recently the National Health Policy 2017 has proposed creation of Public Health Management Cadre in all states based on public health or related disciplines, as an entry criterion. The policy also advocates an appropriate career structure and recruitment policy to attract young and talented multi-disciplinary professionals. Health professionals with medical background would form a major part of this, but professionals coming in from diverse backgrounds such as sociology, economics, anthropology, nursing, hospital management, communications, etc. who have since undergone public health management training would also be considered. As per the policy, states could decide to locate these public health managers, with medical and non-medical qualifications, into same or different cadre streams in public health sector.(190) As stated by Rao S K in 2004, developing a public health cadre will also advance the promotional and career opportunities of existing staff and cadre. (155) National Commission on Macroeconomics and Health has identified that failure to develop a public health cadre and widening the eligibility criteria to include clinicians, without making public health training a mandatory requirement for working in posts that need public health skills, have adversely affected the implementation of public health programs.(155)

Additionally, there is need to revise the salary brackets of public health professionals in India. PHPs are expected to work in tough terrains on poor pay packages by most of the organizations working in the field of public health. (48) This trend must be changed soon to generate demand for these public health programs and ensuring higher seat occupancy at SPHs. Public health professionals with an MPH degree must be paid minimum of Rs 85,000 and those with MD/Ph.D. degrees around Rs 1,50,000 per month. The government should ensure good quality of life for PHPs entering into the public system in order to meet the HRH shortage. (48)
The competency frameworks adopted in public health courses in India are an adaptation of the programs offered by reputed institutes in the west. In the presence of this discordance about the context of the program, the content of the program needs to be suitably contextualized to India. Efforts should be underway towards the development of competency frameworks for these courses. The competencies that need to be acquired at the completion of the course need to be defined at the country level by identifying the core skills that need to be acquired and applied by the graduates at their workplace. The elements under these core skills need to be delineated and a choice must be made about the pedagogic methods to be used in order to develop these skills.(81)

In recent decades, in order to bring a reform in major health professions and change the educational practices, core competencies have been used to redefine curricula. In the year 2006, the Association of Schools of Public Health (ASPH) identified core competencies for the master of public health programs.(191) With the ever-increasing number of institutions offering MPH programs in India, it is an appropriate time to develop a public health competency framework to bring all MPH programs on the same page. In India, an institutionally agreed upon skill-set for an MPH graduate is non-existent.(192) However, efforts are underway as the Government of India is now working towards developing a model public health curriculum for MPH programs. Recently, a ‘Taskforce on Public Health in India’ at the Government of India level has been constituted to work upon developing an MPH curriculum focusing on skills related to analysis & assessment, policy planning and development, communication skills, financial planning, management and leadership. (95)

As per a survey conducted by Sharma et. al. in the year 2010, MPH graduates in India must have competencies such as: monitoring of health problems and epidemics in the community, applying biostatistics in public health, conducting action research, understanding social and community influence on public health developing indicators and instruments to monitor and evaluate community health programs, developing proposals, and involving community in planning, delivery, and monitoring of health programs.(192) Similarly, an exercise for developing core competencies for monitoring and evaluation (M&E) tracks in South Asian MPH programs was undertaken by Negandhi et. al. in the year 2013. A set of 15 core competencies for M&E tracks in the South Asian context were identified through a consultative group exercise involving
representation from 11 institutions from various South-Asian countries. The recent work undertaken by Pandav et. al. was a comprehensive exercise to standardize the core and cross-cutting competencies needed by public health workers. Family & community diagnosis, health planning & management, program implementation, human resource development, monitoring & evaluation, health promotion are some of the core competency domains identified in this study for MBBS doctors. However, the analysis was restricted only to medical undergraduate programs which (in comparison with other core public health programs) constitute a very small part of public health education.

As a part of current status, we observed that at the macro level, the institutions and academic programs are confronted with certain challenges. Benchmarking and accreditation of public health programs in the absence of a Public Health Council / central regulatory mechanism is a challenging task. Currently there is no public health council or a body that is governing public health education. In the absence of a council, we are witnessing variability in public health program design, curricular contents, competencies acquired and ultimately job proficiencies.

In the absence of a central regulatory body governing these programs, the primary question is identifying or creating a body that would be able to provide accreditation to these programs. A joint mechanism of accreditation of the public health programs being offered in India needs to be identified and developed. The Medical Council of India has a mandate that covers only those courses that are offered to medical graduates. This makes it unlikely to collectively provide accreditation to programs that are offered to both medical and non-medical graduates across all the institutes in the country.

5.1 Way forward
Thus, based on our analysis it is clear that there is a need to move away from piecemeal approaches and short-term solutions. Concrete long-term actions, backed up by political commitment and adequate investments, may lead to the transformative changes required to attain sustainable results in meeting the gap for public health professionals over next ten years.

A standardized definition of PHPs should be coined in India’s context. There is a need to specify the names and details of professionals (their educational qualifications) included or excluded
within this gamut. Such a standardized definition will be helpful to bring clarity for undertaking any research/ policy level work in the future. At government’s level, there is a need for some mechanism for obtaining information on number of PHPs existing/ functional in the country’s health workforce. Public health may be included as a separate profession within Census / NSSO classification so that this information can be procured by the government on regular basis.

Government should provide a conducive environment ensuring 100 per cent growth rate to the institutions supplying public health professionals into the health system. Our gap estimates are solely based on need (estimated through service target approach and benchmark analysis) as demand related estimates were not available for PHPs in India. Thus, in future there is need for undertaking concrete work using econometric principals for demand of PHPs in the country. Estimation of needs and demand of PHPs is necessary so that the medical colleges, universities and institutions supplying PHPs may market match seats of the public health programs.

Developing competency framework for public health education is critical for teaching ‘realistic’ curriculum to the public health students. A strong component of field based / community-based teaching will contribute to improving quality of public health programs – making students more prepared and market-ready for real life situations.

In the 21st century, public health challenges will be different and will seek innovation. As suggested by Salvo et. al. (2017), in the new era of public health, public health entities would partner with environmental health agencies for addressing the environmental determinants of health.(193) In this IOM research study, it is also suggested that public health leaders would pursue local partnerships to ensure population health is central in all community development efforts.(193)

**Operationalization of PH council**

It has been frequently discussed that a public health council needs to be established however the future role has not been described. The Public Health Council will provide accreditation to public health programs being offered to both medical and non-medical graduates. The Council also should register a trained PHP, allowing them to work in the health system. Additionally, for estimating accurate PHP estimates the council should periodically undertake ‘Annual Public Health Workforce Survey’ to obtain data/ information on status of public health in the country. A
similar survey is conducted by Australian Institute of Health and Welfare (AIHW) which is administered annually for finding the actual workforce participation. (66)

Moving forward, the government will have to work towards estimating the actual number of PHPs being supplied into the health system. This would help to comprehend a more in-depth and useful picture of the PHP workforce. Additionally, initiatives must be undertaken to understand the composition of PHP workforce including the details of their educational qualifications, gender and age distribution. State wise distribution of PHPs would also provide a finer landscape in the Indian context and help the policy makers to strategically plan for PHP supply capacity in the coming years. To attract more There is a need to sensitize the young generation about public health as a discipline and career opportunity. (157)

5.2 Limitations of the study

• Additionally, in the absence of a public health council or a body that is governing public health education there was lack of clarity regarding educational programs to be included/ excluded from the research while estimating supply of PHPs. Currently there is no standardized definition of PHP which clearly spells out the educational qualification of professionals included/ excluded from this category.

• Data analyzed during the study came from two time points (i.e. 2013 & 2017). We do not have detailed time series data about the enrolments

• Numbers obtained for service statistics doesn’t specify the role of public and private sectors distinctively

• Any change in technology (increasing efficiency) of current public health services was not considered for the projections

5.3 Conclusions

• Public health professionals include professionals from several disciplines and diverse fields.

• In the year 2017, there are 1,128 seats being offered in public health related courses offered to medical graduates through medical colleges & NBE and 14,447 seats are offered by institutions (other than medical colleges, including Schools of Public Health) offering public health programs

• Public health programs are currently undersubscribed.
Enrolled public health students are not currently trained according to an explicitly stated, standardized competency framework that is tailored to the Indian context.

An overall normative need of around 1,80,916 PHPs was estimated for 2017.

In case a public health cadre is set up then there will be an additional need for 33,236 PHPs.

Currently, there are 11 PHPs per 100,000 population in India.

As per benchmark analysis currently 13,39,180 PHPs are needed (Brazil’s 100:100,000 PHPs: population ratio) and 29,46,196 PHPs (as per USA’s 220:100,000 population ratio) are needed.

By the year 2030, an increase in the global demand for PHPs is expected; as PHPs are part of the overall health workforce and by then an increase in overall demand for health professionals is expected to happen.

Job opportunities are available for both freshers as well as experienced professionals trained in public health.

INGOs/UN organizations/contract research organization (CROs) pay higher compensation packages as compared to public sector & NGOs.

National Health Policy 2017 has proposed creation of Public Health Management Cadre in all states based on public health or related disciplines.

Lack of structured career frameworks for non-medical public health graduates.

Competency frameworks are available/adapted for Indian context. Epidemiology, biostatistics, health policy, health management and research methodology are covered in much greater depth in MPH programs.

Tuition fee of select post graduate public health programs depicts a wide variability it ranges from Rs 480 to Rs 14,29,461. Tuition fee ranges from Rs 480 to Rs 1,90,000 for institutes owned by public sector, whereas the tuition fee ranges from Rs 28,500 to Rs 14,29,461 for institutes owned by private sector.

5.4 Contributions of the research

In the year 2017, there are 1,128 seats being offered in public health related courses offered to medical graduates through medical colleges & NBE and 14,447 seats are offered by institutions (other than medical colleges, including Schools of Public Health) offering public health programs.

An overall normative need of around 1,80,916 PHPs was estimated for 2017.
• There will be a need for public health professionals for around 27,289 PHPs (in optimistic scenario at moderate seat occupancy) which as compared to the current need of 26,298 PHPs is not very different

• As per benchmark analysis currently 13,39,180 PHPs are needed (Brazil’s 100:100 000 PHPs: population ratio) and 29,46,196 PHPs (as per USA’s 220: 100 000 population ratio)

• In case a public health cadre is set up then there will be an additional need for 33,236 PHPs additionally

• Currently, there are 11 PHPs per 100 000 population in India

5.5 Further scope of work

• Demand analysis from a labour market’s perspective to be undertaken

• Need to specify the names and details of professionals (their educational qualifications) included or excluded in the broader public health professionals’ definition for India

• Analyzing the composition of PHP workforce including the details of their educational qualifications, gender and age distribution

• Estimating state wise distribution and future need and demand of PHPs in India