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Bridging the gap between education and practice in public health, with particular reference to less-developed provinces in China

B. Wei^{a,*}, L. Lu^{b,c}, Z.Y. Zhang^d, Z.Y. Ma^d^a Guangxi Medical University, Nanning, China^b School of Public Health, Kunming Medical College, Kunming, China^c Centre for Disease Control and Prevention of Yunnan Province, Kunming, Yunnan, China^d School of Public Health, Guangxi Medical University, Nanning, China

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SUMMARY

Ongoing healthcare system reform is one of the most important issues in China. There is an increasing awareness that public health education should be reformed to meet the demands of public health practice. This paper summarizes the current status of increasing public healthcare demand and public health service capacity in China, especially in less-developed provinces, and introduces the current public health educational system and public health administration structure. The paper also provides evidence for a considerable gap between public health education and practice, and suggests possible measures to bridge the gap.

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Introduction

China is confronting many new challenges in public health, such as the increasing burden of chronic non-communicable diseases, responding to public health emergencies, mental health problems, injury, an ageing population and environmental pollution. Alongside this, infectious disease remains a serious problem, especially in the less-developed provinces of China, such as Guangxi and Yunnan. Both provinces are located in southern China, have a warm climate, many ethnic minority groups and a lower level of social and economic development. For example, the prevalence rates of human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) in Yunnan and Guangxi provinces are

highest and second highest in China. The incidence rates of some infectious diseases, such as HIV and tuberculosis, are much higher than those in more-developed provinces, and pose a serious threat to the health and social stability of these areas. Additionally, both provinces are bordered by other countries of South-east Asia including Vietnam, Laos and Burma. Co-operation with these countries in order to prevent and control new and re-emerging infectious diseases, such as avian flu, H1N1 flu and HIV/AIDS, is an important part of the health strategies of the two provinces.^{1,2}

Additionally, an inverse care law is in operation. The less-developed provinces in China face much greater public health problems than the more-developed provinces, but there are fewer public health professionals available to respond.

* Corresponding author.

E-mail address: weibogx@163.com (B. Wei).

Demand for services is high and this is likely to increase as increasing health awareness (known in China as the ‘health-oriented principle’) is being increasingly filtered into the population mindset. This, in turn, will increase demand for public health professionals. It has been recognized that there are insufficient qualified, capable public health workers in the Centres for Disease Control and Prevention (CDCs) and other public health organizations,³ particularly in less-developed provinces. This is partly a result of the gap between education and practice in public health,^{3,4} with a need to develop capacity in the public health workforce for disease control and health protection, and also to ensure that health systems deliver effective healthcare.⁵

China is currently reforming its healthcare system. The latest iteration of the direction for the reform has emphasized the importance of the public health system as one of the four essential elements of a basic universal healthcare system. Alongside this, in 2002, the Institute for International Medical Education proposed the Global Minimum Essential Requirements in Medical Education, which includes seven core competencies for medical students.⁶ Consequently, the public health education system in China faces challenges from both recent internal healthcare reform and international public health trends for education and workforce development.

Current status in public health education

The current system and structure of public health education in China remain largely based on the Soviet model, which has been in operation since the 1950s.^{5,7,8} Schools of public health, which were mainly developed from the former departments of preventive medicine, are an integral part of medical colleges or medical universities. Public health is a medical degree.

Students who pursue Bachelors degrees with a major in preventive medicine or public health need to study at university for 5 years. They need to complete courses in natural science, basic biomedical sciences and clinical medicine in the first 3 years, before moving to study public health professional curricula. Public health curricula include epidemiology, health statistics, social medicine and health management, nutrition and food hygiene, occupational hygiene, environmental hygiene, child–adolescent and maternal hygiene, health chemistry and health toxicology. Placements, practicums and exercises are conducted in hospitals (clinical training) and CDCs (public health) in the last year of study.

A typical school of public health has the following departments: epidemiology and health statistics, social medicine and health management, occupational and environmental health, child–adolescent and maternal health, health toxicology, health chemistry and a teaching laboratory.^{8–10} The number of staff in schools of public health varies from 30 to 200, and is generally lower in schools in less-developed areas than those in more-developed areas. For example, there are only 80 staff at the School of Public Health of Guangxi Medical University, including 54 teachers, 15 technicians and nine administrative staff. Each year, it recruits 100 students majoring in public health and 50 students majoring in health management. Over 1600 undergraduates and postgraduates

have graduated from the school in the past 30 years, most of whom are working in county-level, prefectural-level and provincial-level public health organizations.¹

These statistics are similar to those of the School of Public Health of Kunming Medical College. In contrast, Peking University School of Public Health currently has over 150 staff and recruits a total of some 60 undergraduate students each year, which represents 40% of the number recruited by either the School of Public Health of Guangxi Medical University or the School of Public Health of Kunming Medical College. Peking University School of Public Health, however, places more emphasis on longer education programmes and postgraduate education, and has more research postgraduate students than the other schools.

Schools of public health offer a range of academic programmes, which include diploma programmes, certificate programmes and short courses, as well as undergraduate and postgraduate programmes. The 5-year Bachelors degree, Masters degree and Master of Public Health (MPH) programmes are the most important of these courses.^{11–13} The Masters degree is a science degree that focuses on academic research ability, whereas the MPH is a professional degree with a focus on professional knowledge, practice and skills needed in the current practice of public health and health management.¹³

Public health structures

An emphasis on public health and prevention has characterized the health policies in China since the beginning of the 1950s.^{13–15} Since 1949, the Ministry of Health was established to take responsibility for healthcare policies and activities, including both medical and public health services. Healthcare in both rural and urban areas in China is organized through a four-tiered service system consisting of national, provincial, municipal (formerly prefectural) and district (in cities) or county (in rural areas) organizations and facilities under the management and supervision of the Department of Health. At each level of the system, there are hospitals and a CDC. Hospitals provide clinical care and CDCs offer preventive and public health services. More recently, in many cities and rural areas, community health centres and clinics have been established to re-inforce primary care, enabling the co-location of primary clinical and public health services.

The responsibilities of CDCs include disease surveillance and control, public health emergency response, laboratory analysis and evaluation. A higher-level CDC is also responsible for the public health agenda in its entire region, has an advisory and consultant role for lower-level CDCs in its region, and will provide fieldwork experience and internships for the public health education sector.

A CDC must prioritize the scientific research and public health services in the region to achieve measurable health impact for the public, and emphasize prevention of disease by targeting early risk factors and supporting healthy lifestyle behaviours.¹⁶ The role of the CDC in providing leadership to strengthen the health impact of the state and local public health systems is crucial to realizing the vision of optimizing life expectancy and health experience, addressing health

disparities and supporting equitable health outcomes across the population and life course. One of the duties of the provincial CDC is to provide fieldwork experience and internships for the public health education sector.

A typical CDC has functional departments including occupational safety and health, nutrition and food health, infectious diseases surveillance, injury prevention and control, emergency response, health information services, health promotion and vaccination. The number of staff at a CDC varies from 50 to 500, depending on its tier. There are approximately 50 staff in county centres, 100–200 staff in municipal centres and 400–500 staff in provincial centres, with various educational and professional qualifications. Workers in public health organizations at the district/county level are, in general, a practice-oriented workforce, with a typical qualification being a 3-year higher diploma. At municipal/prefectural level, most staff have a 5-year Bachelors degree, whilst at the provincial level, a large number of staff have education above Bachelors degree, such as a Master of Science, MPH, Master of Philosophy or Doctor of Philosophy. In summary, the national CDC and provincial CDCs have many qualified public health professionals, whereas those working in the rural areas tend to have the minimal education necessary to practice.

Gaps between education and practice

There is a considerable gap between education and practice in public health that has been hindering the further development of public health in China. The most prominent problem is the disconnection between theory and practice. There are several contributory factors.

First, schools of public health seem to have an educational goal which is different to that expected by the service sector, and thus the educational objectives may not reflect the needs of public health practice. Many schools of public health place more emphasis on producing research-oriented graduates, and pay less attention to the knowledge and skills required in public health practice.¹⁴ It is true that some public health graduates will choose a research career, but most will end up working as a public health practitioner. More diversified educational programmes may be required, and different programmes, such as 7-, 5- and 3-year programmes, Master of Science programmes and MPH programmes, would help to meet different needs but must set clearly different educational objectives.

Secondly, there is very limited communication between CDCs and the education sector around curriculum development. As a result, many of the basic and essential skills and knowledge required in the CDC, such as the sterilization and disinfection process, are missing in public health curricula.

Thirdly, many staff move to work in a university immediately after graduation from the university, and fewer and fewer university teachers have first-hand practice experience themselves.⁴ As universities are increasingly emphasizing research and paying less attention to teaching, many teachers lack sufficient field experience and practical skills to support their teaching.^{1,4} For example, in Kunming Medical College, only seven out of 60 teachers have experience of working in

a public health service organization, and have had any practical disease control experience. Many teachers responsible for teaching infectious disease have little or no direct experience in the taught areas. Few have ever seen a bubonic plague or cholera patient, or participated in dealing with serious public health emergencies such as severe acute respiratory syndrome, H1N1 influenza or avian flu. Most of the teachers do not understand the latest national health policies, nor know the requirements of potential employers of their students. Many schools place more emphasis on laboratory research than population research, having limited content in the curriculum that can be applied to practical situations, as the former is more likely to produce high-impact publications.

Fourthly, the number of practice and internship placements for students of schools of public health is limited. The relationship between CDCs and schools of public health is not as close as that between medical schools and affiliated hospitals. In clinical education, students can practice and apply the knowledge and skills immediately after they are taught, whereas such opportunities do not exist for public health students. Student learning in schools of public health is further hindered by the old didactic teaching methods which are still the main methods of teaching, and limited opportunities are available for practice, discussion and application.¹⁴

Bridging the gap and new opportunities

A number of strategies and methods can be applied to bridge the gap between education and practice in public health. These strategies would require greater changes in the education sector than in the service sector, and only the Department of Education can make most of the changes in the education sector. However, in China, schools of public health are financially and administratively under the Department of Education, which is independent of the Department of Health under which CDCs work. Communication and collaboration between the education and service sectors in public health would be crucial for any such efforts to succeed.

The Department of Education needs to continuously investigate the new needs and requirements in public health practice, and ensures that education and training in most undergraduate public health education programmes is service- and practice-oriented and its graduates can gain experience working in grassroots public health institutions. To make this happen, the central and local governments have a role in co-ordinating the education and health departments, and facilitating the exchange of ideas, communication and cross-sector collaborations on public health education and practice.

Ideally, schools of public health and CDCs could be placed under the same department of administration. However, this is unlikely to become possible in the foreseeable future. Alternatively, schools of public health and CDCs can be brought together to work more closely in other creative ways. A promising model has emerged in Yunnan. The Director of Yunnan CDC was concurrently appointed as the Dean of the School of Public Health of Kunming Medical College in 2008. This was the first appointment of its type in China. As

a result, good communication, fruitful collaborations and a reduction in the education–practice gap have occurred in the region. For example, senior experienced staff at the provincial CDC have been appointed as adjunct professors to teach at the school, and are able to participate in both teaching and research. Conversely, teachers at the school are also appointed as adjunct staff of the provincial CDC, so that they can participate in and observe the service work on the one hand and help with training programmes for the CDC on the other. Staff of the two organizations are frequently invited to give lectures and seminars at the opposite institution, and they can also attend each others' lectures and seminars of interest. Furthermore, municipal and county CDCs have become members of the teaching base of the school, and 18 municipal and county CDCs have opened their laboratory facilities to the school. These arrangements have extensively widened the opportunities for exposure to real public health work for both teachers and students, and also opened up many new opportunities for collaboration in public health activities across the two sectors.¹⁷

The model for public health education in China needs to be reshaped to reflect the needs and implications of the new biopsychosocial medical model and the ecological model for the determinants of health,^{18,19} which would entail the development of a multidisciplinary public health workforce, rather than hygiene and disease control technicians.

The guiding principle for public health education should be to strengthen students' on-site working capacity, including professional, social and learning capacity.²⁰ Theoretical teaching should adopt the five-in-one method, incorporating lectures, tutorials, self-directed learning, question and answer sessions, and open discussions, alongside a practical aspect, which supports social practice, on-site teaching, seminars and undergraduate mentorship programmes.^{21,22}

Today, the term 'public health' is used with a much wider connotation than the old term 'preventive medicine'. Most schools in China and worldwide are now called 'schools of public health'. However, in official communications and policy documentations in China, 'preventive medicine' is still used to represent all aspects and areas of public health. This may negatively affect the development of some new public health areas in the schools of public health. At the same time as maintaining public health as a medical degree, efforts should be made to develop multidisciplinary public health, which recognize the contribution to public health from many other disciplines.

Alongside this, sustaining existing learning opportunities, such as the 3-year higher diploma and 5-year Bachelors degree, is essential, especially for the less-developed areas in China such as Guangxi and Yunnan provinces, where there is a need to develop capacity and capability to work at multiple levels of the system, including at grassroots levels. Further development of the MPH programme, and 5- and 3-year courses should be considered to ensure the training of an application-oriented workforce. Finally, health education and health promotion courses must be strengthened, to include a practicum in addition to the 30 class hours taught. First-hand experience of epidemiological investigations, health education and health promotion courses are an important tool for CDCs to carry out their routine work.

Conclusion

There is a considerable gap between education and practice, particularly in less-developed areas in China. Largely due to the administrative disjuncture between the service and education sectors, the major gap is that education is aimed more at theories and research, while the service sector lacks updated knowledge and skills to solve practical problems. Creative ways of bringing schools of public health and CDCs together to work more closely are needed to bridge the education–practice gap.

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