

Analysis of the Challenges and Problems in the Development of Public Health System in Beijing, China

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Abstract

Background: To discern the main problems of Beijing's public health service system, in order to provide suggestions to modernize the public health system and to enforce the implementation of the "Health Beijing 2030" plan.

Methods: We carried out a quantitative study mostly based on interviews. There are over 40 directors and scholars who came from public health institutions and government sectors or organization that related to the public health work in Beijing were interviewed. The interview records were summary analyzed on key issues in accordance with the interview outline.

Results: The challenges for the system include the change of structure of the population, the impact of the changing spectrum of diseases and changing environmental factors, and macro-institutional changes. The main problems include structure of the public health system, capacity of public health staff, systems for information management and legal framework for public health. On this basis, several relevant policy recommendations are put forward.

Conclusion: To improve the public health system, the Beijing municipal government should design and construction of a system planning and perfecting their investment mechanism on public health. Stability of personnel and encouragement of innovation in scientific research and reliable health information strategies are also urgent needed.

1. Background

Public health in Beijing has made important contributions to safeguarding people's health, maintaining social stability and promoting economic development. China has implemented the "Healthy China" strategy — to improve the national health policy and provide the people with all-round and full-cycle health services¹. In order to better implement the "healthy Beijing 2030" plan², the development of the Beijing public health system should be consistent with the strategic positioning and construction goals of Beijing city, so as to effectively serve the health and safety of Beijing and its residents and should play an important role in creating a world-class, harmonious and livable capital. Accordingly, in 2017 Beijing launched a "study on strengthening the development of the public health system in Beijing". This article reports the project to investigate and analyze the current situation of all parts of the Beijing public health system, summarizes and analyzes the main problems of the Beijing public health system, and puts forward policy suggestions for future system development.

2. Data Sources And Research Methods

The research mainly adopted the form of interviews to collect opinions from a wide range of perspectives on the challenges and problems faced by the development of the Beijing public health system, and then summarize the interview results on key issues in accordance with the interview outline. All the interviews

were recorded and transcribed, and the qualitative data were sorted and summarized using Nvivo 11.0 software.

Face-to-face in-depth interviews

From September to December 2017, the leaders of institutions and departments directly related to the public health work in Beijing were interviewed. The interview topics and interviewees sources were list in Table 1.

Table 1
Face-to-face in-depth interview participants and topics

Institution and Department		Interviewee	Topics
Beijing Municipal Health and Family Planning Commission	Department for Diseases Prevention and Control	one principal person from each department or institution	<p>(1) The goal of building a moderately prosperous society in all respects, and an international first-class and harmonious and livable capital;</p> <p>(2) The requirements of the Beijing-Tianjin-Hebei coordinated development of public health services;</p> <p>(3) The policy environment for the development of Beijing's public health system and the real challenges involved in the main problems: the systems and mechanisms for managing the main contradictions and problems, service capacity, professional training, the main problems of informatization development and the need to strengthen organization and leadership to ensure the planning for the development of the public health system reform, etc.</p>
	Community Health Department		
	Department for the Elderly, Women and Children		
	Health Promotion Department		
	Department of Information Statistics		
	Department of Comprehensive Supervision		
	Department of Science and Education		
	Emergency Office		
Department of Information Statistics			
Beijing Center for Disease Prevention and Control			
Health and Family Planning Supervision Institute			
Women and Children's Health Care Center			
Tuberculosis Control Institute			
Mental Health Care Institute,			
Red Cross and Blood Center			
Health Emergency Center			

Focus group interviews

From September 2017 to January 2018, a total of 3 focus group interviews were conducted among interest groups involved in public health work. The topics and participants were list in Table 2.

Table 2
Focus group interview participants and topics

Institute and Department	Participants	Topic
Health and Family Planning Commissions in districts level <hr/> Centre for Disease Prevention and Control in district level	1 director or deputy director from each institute (There are 14 districts in Beijing)	The development of the public health system at district and county level
National Health and Family Planning Commission <hr/> Development Centre for Medical Science and Technology <hr/> China Centre for Disease Control And Prevention <hr/> Peking University <hr/> Academy of Military Medical Sciences <hr/> Chinese Medical Association <hr/> Chinese Preventive Medicine Association	1 officer or public health experts from each institute	The major problems and challenges for the development of the public health system in Beijing
Beijing Centre for Diseases Prevention and Control <hr/> Beijing Health and Family Planning Inspection Institute <hr/> Beijing Municipal Health and Family Planning Commission <hr/> Health Information Centre <hr/> Comprehensive Supervision Office <hr/> Department for Diseases Prevention and Control <hr/> Department of Information Statistics <hr/> Department of Health Promotion	1 director or deputy director from each institute or department	Public health planning and the problems existing in the management work

Institute and Department	Participants	Topic
Department of Community Health		
Department for the Elderly, Women and Children		
Department of Science and Education		
Emergency Office		
Department of Finance		
Department of Personnel		

3. Major Problems In The Beijing Public Health System

There are several challenges impede the development of public health system in Beijing, such as the pressure from demographic changes³, changes in the spectrum of diseases and environmental factors⁴ as well as the impact of public institutional reforms^{3,5}. Besides these outside challenges, we acquired three major inner problems for the public health system development in Beijing.

3.1 Lack of top-level design, and lack of co-ordination

The public health as a baseline responsibility for public safety in Beijing still falls short of the ideal. Government leaders at all levels have not yet come to a shared understanding of the connotation and importance of public health, and there are differences in their understanding of the concept of "big hygiene, big health", especially among district governments. There is also a lack of evaluation of the government's public health work effectiveness.

Most public health institutions work in isolation from each other, and the related assessment and evaluation have not been given "top priority". Professional institutions are highly organized and territorial, while the medical and prevention health systems have been divided for a long time, and the person-oriented whole-of-life cycle health management service has not been realized. The current public health work has failed to adapt to the changes in the spectrum of diseases, and the prevention and control of chronic diseases lacks a clear focus. Job descriptions are unclear and efficiency is low. The allocation of responsibility of public health functions of medical institutions in chronic disease management and

health promotion is still unclear, and the conferment of authority and the assessment of work still lack a rational basis.

3.2 Inadequate government investment

The total amount, structure and mode of government investment in public health do not meet the needs for the development of the system. There are three important reasons.

First, government spending on public health is low. Although Beijing municipal governments at all levels have increased the investment in public health, the government's financial guarantee is still insufficient in terms of its status as the capital, and its goal of building a world-class, harmonious and livable city. The medical and health expenditure in the city's total fiscal expenditure is relatively low. Compared with education expenditure, the city's fiscal expenditure on education is basically 2.3 ~ 2.5 times the medical and health expenditure, and the proportion of expenditure on education in the city's budget is 9 ~ 10 percentage points higher than that of medical and health⁶. In addition, funding of public health institutions makes up a relatively low proportion of the overall funding of medical and health institutions. Government funding for medical and health institutions has been increasing, but the proportion for medical institutions has always remained in absolute dominance (about 82%), and public health institutions (including specialized public health institutions, nursing homes and medical professional scientific research institutions and other institutions, including the main public health agencies) receive only 18% with no growth in funding⁷. The investment in system construction (software and hardware) for public health is also still low. At present, the government's funding for public health mostly concentrates on the basic public health service and major public health projects, while there is insufficient investment in the software and hardware development to promote the development of the system.

Second, the dynamic adjustment of financial investment guarantees mechanism has not been established, which creates difficulties in meeting the current development needs of disease prevention. During the 12th Five-Year Plan period, the average annual growth rate of financial allocations to professional public health institutions in Beijing was only 3.67%, which was lower than the growth rate of Beijing's GDP (9.09%) and the growth rate of funding for medical and health institutions in Beijing (14.01%), which restricted the financing channels for the development of the public health system.

Third, the municipal government only funds the day-to-day cost of public health program. It focuses on routine operations but does not consider investing in special projects or new major health research. At the same time, public health investment focuses more on hard infrastructure (buildings, standard equipment), and insufficient attention is paid to "soft" development such as staff development or skill updating.

Fourth, the public health investment in each region is not balanced, and some districts and counties are comparatively underfunded. According to the results of "the 2017 comprehensive evaluation report on Beijing's health development", the per capita government health expenditure and per capita health human

resources in Fengtai, Daxing and Changping districts are significantly lower than those in other districts and counties.

3.3 Challenges to the stability and development of public health staff

There is a high turnover of professional and administrative staff in the public health institutions. First reason is there is no rational planning for promotion, and the staff recruitment policy is not attractive. The city's professional public health institutions are funded by the development project for high-level technical personnel team of Beijing health system, with only 13 person, including 2 academic leaders (Municipal Center for Disease Control and Prevention) and 11 academic core staff, a far lower percentage than the medical institutions. On the other hand, with the shift of emphasis of public health from prevention and control of infectious diseases to prevention and control of chronic diseases and response to public health emergencies, there is a lack of inter-disciplinary staff who have both professional and management skills, and the leadership of public health talents needs to be further improved. In addition, there is a shortage of basic level staff. Recruiting new staff is difficult, especially for the areas of women and children's health, mental health and health. The promotion and assessment mechanism of public health related institutions and personnel do not motivate institutions and personnel to perform their public health functions.

Second, the reform of public organization funding has had a great impact on the stability of the whole public health system. The income level of the personnel of public health institutions has been generally lower after the reform. The average salary of the Beijing CDC, the Health and Family Planning Supervision Institute and the Prevention and Control Institute is generally 20–60% lower than the average wage level of the rest of Beijing's health staff, Moreover, there is a gap of nearly 40% between the salary level of public health personnel in first-tier cities, such as Shanghai, Guangdong and Shenzhen, and Beijing, resulting in a serious problem in attracting new staff. At the same time, there are serious staff losses, and the vacancy rate in some institutions such as mental health is high. Grassroots public health workers have a heavy workload and great pressure, but their sense of occupational achievement and material incentives cannot be matched reasonably. As a result, the stability of the grassroots public health team is affected.

Third, there is a lack of analysis and definition of the functions and categories of public health activities under the concept of the slogan "great hygiene and great health". The scientific research responsibility of different levels and functions of public health institutions is still unclear, and the development of priorities and key disciplines is weak.

3.4 Lack of overall planning for a public health information system

The health information management system is inadequate. There is little integration of IT professionals into the public health system. Information security is also inadequate.

First of all, existing information systems are mostly built around specific fields and scopes, which are relatively closed systems. They lack public health information platforms that can facilitate connectivity, information sharing, unified standards, and convenience and efficiency. Thus the current systems cannot meet the needs of a human-oriented health management information service for the population. It is necessary to further improve the overall planning and integrated utilization of information resources.

Second, the investment in public health informatization is insufficient, and health informatization manpower is also insufficient. Compared with the current needs, the informatization development has not been clearly included in the scope of capital investment policy. At the same time, there is a shortage of interdisciplinary health informatization workers with multiple backgrounds in medicine, public health and informatics, and the recruitment policy is relatively weak.

Third, the balance between information security and information disclosure has not been clearly thought out. Information security and supervision still face challenges. On the other hand, privacy protection is weak. Personal data is too easily available to unauthorized persons. And the information that should be publically available is too often kept secret. There is no system for deciding what data is confidential and what should be public.

4. Policy Recommendations

4.1 Design and construction of a system planning

There is a great need for upper levels of government to design and carry out a system of planning for public health needs. First of all, Beijing governments should earnestly implement the concept of "great hygiene, great health", and make it clear that public health is the responsibility of governments at all levels, and should engage the attention of government departments and leaders at all levels. The evaluation of government work should include the implementation and results of public health work. This work includes promoting the realization of comprehensive public health governance, practical integration of health into all policies, realizing the provision of continuous public health services covering the whole population and the whole life cycle, in order to fully meet residents' health needs.

Second, Beijing governments need to comprehensively plan the development of Beijing's public health system and implement the requirements of the "Beijing Health 2030" plan. Based on this plan, the competencies and functions of each department and institution of the Beijing public health system should be analyzed and restructured to meet the development goal of "the whole people and the whole life cycle". At the same time, the system work mechanism and strategy are adjusted, and the whole field of public policy integration and public participation are emphasized. As an important part of system reconstruction, the improvement of service capacity and the staff professional development need the input of relative planning. Based on functional orientation and reasonable positioning, the capacity building and talent team building of the public health system of Beijing should be focused on both the shortcomings existing in reality and the gaps existing with the requirements of the "outline". The

supplementary and newly built simultaneous planning should be carried out step by step according to the key priorities.

Third, a comprehensive promotion of the development of a public health work evaluation system is needed. On the basis of an analysis of the tasks of primary health care institutions and medical institutions undertaking public health services, it need to suggest the establishment of a performance evaluation mechanism for primary health care services and medical institutions, and to suggest incorporating the evaluation results into the annual evaluation of the institutions, so as to truly reflect the public welfare functions of public medical and health institutions. At the same time, Beijing Government should improve the existing performance evaluation mechanism of professional public health institutions, improve assessment methods and contents, so that they reflect the work value of employees, and promote the improvement of service efficiency.

4.2 Perfecting investment mechanism and broadening financing channels

Since public health is a financial responsibility of government, the degree and speed of the development of public health are closely related to the government's financial investment. The Beijing government needs to further improve the funding mechanism of the public health system.

First, funding for public health system needs to be adjusted incrementally to match rising costs. A dynamic mechanism for adjusting funding levels to match the characteristics and demands of the public health service, and a hierarchical financial guarantee system should be established to facilitate the sustainable development of the public health system.

Second, distribution of funding needs to be considered. In terms of distribution of funding, attention should be paid to both routine work and to the development and construction, as well as to “hardware” construction and “software” development such as staff development and capacity improvement.

Third, funding guidelines of input needs to be refined. In addition to the previous full or partial financial allocation to guarantee infrastructure and basic salaries, residents' own health needs can be met by setting up routine basic investment, special development plans and projects for the benefit of the people to meet the future development needs. Fourth, special development projects need to be established to respond to new conditions. To deploy the healthy Beijing 2030 planning outline, a number of service system plans and projects need to be set up in batches in order to address the existing problems and shortcomings of the current public health system in terms of service capacity.

4.3 Stability of personnel and encouragement of innovation in scientific research

The high turnover of staff needs to be addressed, to develop a stable core of professionals. In addition, the public health systems need to encourage more innovative research to keep pace with changing conditions.

First of all, Beijing governments need to set up a staffing plan to improve working conditions and promote development of a cohort of qualified and experienced professional staff. It is need to set up a strong staff training plan, as well as to improve the conditions for those staff already in the system, to stabilize the professional teams, provide an all-round program for its professional development, and improve the quality and efficiency of scientific research. At the same time, an effective staff induction system needs to be set up to follow up on the recruitment of new staff. Finally, well qualified and experienced staff in the field of public health should be encouraged to 'come, stay and make achievements' and comprehensively improve the research strength of the system.

Second, Beijing governments should pay attention to the cultivation of basic and applied skills to avoid alienation of staff. To do this requires active cooperation with the department of higher education to solve the problem of students' training engaging in basic practical application of skills at the grassroots level, which may solve the problem of recruitment of basic practical staff in basic public health institutions at the grassroots level. At the same time, a specialized personnel training program should be established to systematically improve the professional skills of existing grassroots non-professional staff to promote continuing work on education.

Third, Beijing government should make clear the responsibilities of public health research institutions at all levels, and set up a number of key subjects for research of public health in Beijing. It needs to make clear responsibilities of research capacity building for public health institutions at all levels and of various types. At the same time, a group of key research projects of public health in Beijing and a research team should be set up in combination with the staffing plan.

4.4 Health information strategies

Information connectivity is a prerequisite for providing efficient and continuous service. If connectivity is strong, it can promote the management of health diseases in the whole life cycle of residents in Beijing.

First, "medical and public health fusion", that is, the whole process of orderly integrated information services and management system for the prevention and treatment of chronic disease should be developed. Beijing government should strengthen the integration of medical treatment and prevention as well as integrate traditional disease prevention and control into each prevention program. It need to build a "health management cloud platform" by integrating such systems as family doctor management and bidirectional referral.

Second, the resident health information management strategy should be implemented to meet Beijing's status as the national capital of China. The integration of information collection and management of human diseases should be strengthened to break professional barriers and realize people-oriented and life-cycle health management; whole-life health management should be carried out for residents, with the focus on implementing holistic health management, and establishing and improving comprehensive prevention and treatment services based on big data covering the life cycle, from pregnancy, through

infancy, school, adolescence and adulthood, and old age, for both infectious diseases and chronic diseases.

Third, the construction of an information security and information disclosure system should be done well to ensure the residents' health privacy yet facilitate the effective promotion of health-related information, so that residents can better realize comprehensive self-health management.

Fourth, it is necessary to establish the recruitment and training of public health informatization professionals. This recruitment needs to be synchronized with the construction of the information system to ensure its stable and efficient operation.

5. Conclusion

To improve the public health system, the Beijing municipal government should design and construction of a system planning and perfecting their investment mechanism on public health. Stability of personnel and encouragement of innovation in scientific research and reliable health information strategies are also urgent needed.

Abbreviations

CDC

Center for Disease Control and Prevention; GDP:Gross domestic product.

Declarations

Ethics approval and consent to participate

The research design, methods, the interview, and questionnaire guidelines were approved by the Institute of Medical Information, Chinese Academy of Medical Sciences and Peking Union Medical College Human Research Ethics Committee (HREC) on Human Research Ethics (Protocol Number IMICAMS/06/19/HREC). Interviews and focus groups were carried out only when informed consent was obtained. Protocols to ensure confidentiality and anonymity were followed.

Consent for publication

All authors have approved this manuscript for submission, and claim that none of the material in the paper has been published or is under consideration for publication elsewhere.

Availability of data and materials

The original interview materials, in Chinese, involved in the study were stored in the database of the project team.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

AM carried out the study design and drafted the manuscript, participated in the data analysis. CC in charge of the research guidance. YY participated in the relevant Journals review. YM participated in the data analysis. WQ conceived of the study, and participated in its design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

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