

ORIGINAL ARTICLE

Research environment of clinician–scientists in China in health policy/health services research

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Abstract

Objectives: The aim of the study was to describe the research environment of scientists in health services and policy research in China.

Study Design: Study was conducted during the 2016 Westlake Youth Forum with grantees of China Medical Board and key informants. Mixed methods used anonymous, survey of grantees, semistructured open-ended interviews with randomly selected awardees, convenience samples of extramural reviewers, and senior scientists with research experience in China.

Results: Among 51 awardees, 34 responded fully. Fifty percent were women, averaged 42 years; 88% had PhD/MD and 10 years from their advanced degree. Most had overseas research training (94%); 32% held overseas degrees. Their mean salary, \$24,000, barely qualifying as middle class in China. Their confidence using analytical techniques were variable. Their interaction with those using their work seemed nascent. Interviewees echo young researchers elsewhere: lack of mentors, statistical consultation, collaborators, and help to run the gauntlet of requirements in doing research.

Conclusion: China's health has improved dramatically since 1949. As the ecology of disease change, expectations increase, and services grow, the expertise to evaluate and improve health care needs to expand. This requires recognition of their importance and a concerted effort to recruit, nurture, and sustain this cadre. © 2019 Elsevier Inc. All rights reserved.

Keywords: China; INCLIN; Rockefeller foundation; China Medical Board; Clinical epidemiology; Health systems research

1. Introduction

China's health has improved dramatically since 1949 but principally from the end of wars, improved sanitation, improved nutrition as the country has become prosperous. As the ecology of diseases change, the development of human capital to improve health care delivery and outcomes, to reduce health disparities, to deal with chronic diseases, with the elderly, and mental health, addiction, and other

conditions associated with modernity, the development of a cadre to solve these problems and evaluate them critically is a major need [1,2].

Founded in 1914, the China Medical Board (CMB) endowed by the Rockefeller Foundation established the Peking Union Medical College in Beijing—China's first Western-style medical school. Leaving China in 1950, CMB returned in 1980 and extended its capacity building work across Asia. Its work in China continues to this day—an extraordinary long-term commitment of a philanthropy through the suffering and human and natural disasters endured by the world's largest country.

In 1982 and for nearly two decades, the Rockefeller Foundation also invested nearly \$75 million to sustain the International Clinical Epidemiology Network (INCLIN) to strengthen the research capacity of medical schools in the developing world through the development of clinical epidemiology units to promote a rational approach to clinical and healthcare decision making. Conceived as a

This study follows up efforts beginning three decades ago in China to develop clinician–scientists in quantitative medicine and health policy.

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What is new?

Key findings

- In a group of successful applicants to a new peer review grants program for health services research, one senses their idealism and dedication. However, they are poorly compensated, with few opportunities for meaningful peer-reviewed support often working in isolation in a highly competitive system that rewards publications in English-language journals without a support system nor in the work to improve health systems or population health, meaningful connection with operations, and public policy.

What this adds to what was known?

- China's journey toward modernity and modern health care has progressed rapidly but the human capital to improve the conceptualization, planning, health outcomes, health disparities, and evaluation of new systems of care and services lags.

What is the implication and what should change now?

- The promise of quantitative disciplines such as clinical epidemiology and health services research will not be fulfilled unless these barriers are addressed. Even then, it may take more than a generation to achieve. These require investment to train, nurture, and sustain a clinical sciences enterprise and a viable career path in an increasingly materialistic country.

program to persuade “the brightest young minds in medicine” to practice “population-based medicine,” INCLEN trained more than 450 individuals in clinical epidemiology, biostatistics, clinical economics, management, pharmacoepidemiology, and sociology in 24 countries. In China, clinical epidemiology programs were started at West China University of Medical Sciences in Chengdu and Shanghai Medical University in Shanghai [3,4].

In 2008, CMB launched a new grants program that could be viewed as the intellectual heir of INCLEN to strengthen scientific “critical capacities” among Chinese and Asian institutions to address access to primary and preventive health services in market-driven economies so that all could benefit from the advancement of knowledge. It focused on capacity building in health policy and health systems research and educational activities to advance health equity.

For an investment of \$7.7 million (USD) over 6 years, the Open Competition (OC) grants program has leveraged an inestimable amount of additional resources and funding within China [5,6]. It continues developing an important

area of inquiry with major significance for a young health-care system undergoing growing pains.

We studied the awardees to identify potentially modifiable characteristics of their research work environment associated with the best and most productive laboratories [7,8] and senior scientists with knowledge and experience in contemporary China academics and/or health policy to understand the larger context of their work.

1.1. Study population/setting

The study was conducted before, during, and after the 2016 Westlake Youth Forum III conference [9]. The invitees included all previous CMB OC awardees, grant reviewers, experts in health policy and health system, clinician–scientists from the United Kingdom and the United States with research experience and/or collaborations in China [9].

2. Methods

A mix of methods was used. They included an anonymous online questionnaire to all CMB OC Research Program awardees ($N = 51$), confidential semistructured, open-ended interviews with randomly selected awardees ($N = 7$), senior experts and clinician–scientists ($N = 10$), and reviewers of CMB OC grants ($N = 5$).

The 20-item online confidential questionnaire elicited information on the respondents demographic characteristics, their research experience and training, their self-rated confidence in 32 methods, their work responsibilities and “protected time”, access to mentors and consultants, their family responsibilities, and how they spend their typical day, including commuting to work and childcare.

2.1. Conceptual framework

The quality and productivity of a researcher are affected by their preparation, training, and work environment [8]. The Bland and Ruffin conceptual framework [7] was used to frame the questions re: the 12 characteristics of the most research-conducive environments: clear goals, research emphasis, distinctive culture, positive group climate, participatory governance, decentralized organization, frequent communication, accessible human resources, sufficient size, age and diversity, appropriate rewards, concentration on recruitment and selection, and leadership with research expertise and management skills.

2.2. Analysis

Descriptive statistics were used to summarize characteristics of the respondents, research training and their work environment and infrastructure. For continuous variables, mean and standard deviation were calculated.

3. Results

3.1. Survey on OC CMB awardees ($N = 34$)

The online questionnaire sent by the CMB had a response rate of 67% (34 respondents from 51) after two waves. This was our first online survey in China and, we not attest to its security and thus made it confidential. Therefore, we have no data on the nonrespondents.

Among the respondents, 50% were women of an average age of 42 years. Eighty-eight percent were MD/PhDs and 10 years from their advanced degree. They had received 8.5 years of medical training on average. Most respondents (32, 94%) had overseas research training, averaging 15 months, usually after the Chinese education, as expected; 32% held overseas degrees. Their reported education background coincides with the education requirement of medical research work in China (Table 1) [10].

The awardees' average annual salary of \$23,950 (\$12,000–\$30,000) barely qualifies as middle class in China [11]. As the percentage of their salary from research, nine received 80–100% and 18 received 0–10% of the salary from research. Junior faculty have few opportunities to obtain research grants, which could exacerbate the competition between colleagues, weaken their motivation and confidence. Compared with their length of training and importance to the country, this amount seems paltry, an indication of its perceived “value” to the country and is a major barrier to developing this activity.

In this relatively elite group, methodologic training was common but probably limited to basic statistics, and they tended to collaborate in evaluation of programs, questionnaire design and clinimetrics, quasi-experimental designs, focus groups, Delphi technique, decision analysis, community needs assessment, qualitative methods, health management

and policy, administrative data analysis, time-series statistics, meta-analysis, and randomized clinical trials (Fig. 1).

Most of them only had course work in health economics, cost-benefit and cost-effectiveness analyses, quality of care, and continuous improvement. They had no schooling in pharmacoepidemiology, Markov and semi-Markov modeling, critical pathways, nominal group technique, clinical effectiveness trials, and practice guideline development, and because of this, they did not use them or consider their use in their work (Fig. 1).

Investigators reported they spent almost no time on patients care (Table 2). This appears very different from many US, Canadian, and UK clinician–scientists who almost by definition have some involvement providing or overseeing patient care. It is also a way to supplement their incomes.

Their typical daily routine consisted of manuscript or grant preparation (2.5 hours), reviewing literature (2 hours 17 minutes), teaching (1 hour 25 minutes), supervising (1 hour 8 minutes), and writing (1.5 hours in Chinese and nearly 1 hour for English). Considering their daily research work accounting for average 2.5 hours, just as their complaint about lacking time for research, it is apparent that the teaching and supervising take up nearly one-third of the total working time (9.5 hours). For them, writing English usually requires more time than one in Chinese, but they averaged less time on English writing (1 hr/d) than on Chinese writing (1.5 hr/d) (Table 2).

Most (22; 64.7%) respondents felt they needed more time to do research. They expressed difficulties finding mentors, making connections with institutions or collaborators, and accessing statistical consultation and secretarial and clerical assistance to run the gauntlet of requirements one needs to do research (Table 3). All these perceptions are common and echoed by their counterparts in the United States, Canada, and the United Kingdom [12].

Table 1. Characteristics of respondents ($N = 34$)

Age (average)	41.62 ± 6.6
Gender (female)	17 (50%)
Highest educational attainment	
MD/PhD	30 (88%)
Masters including MPH	4 (12%)
Years from degree/training(average)	10.4 ± 6.6
Medical training (yr)	8.5 ± 6.6
Advanced degree (masters or doctoral)	
Number of months	9.4 ± 16.4
China	21 (61.8%)
Overseas	11 (32.4%)
Overseas training not for advanced degree	
Number of months	14.6 ± 11.7
North America	22 (64.7%)
Europe	8 (23.5%)
Asia	2 (5.9%)

For continuous variables: mean ± standard deviation.

3.2. Interviews with grantees ($N = 7$)

In private, the interviewees had many similar frustrations and were quite frank.

The grantees described working in silos even in major universities and in competitive environments where one works alone. The system is hierarchical in a narrow political environment where senior staff are well funded. International funding is unlikely to mitigate these.

Administrative and clerical support for conducting projects and grant making are modest. There are few forums to discuss and refine work in progress. Access to the best students is not possible, given large and impersonal universities. Everyone is so busy or seemingly so that the amount of contact between the senior faculty, the junior faculty, and students is small. They are acutely aware and preoccupied by the metrics of their systems—publication in English journals [10,13].

What cannot be completely captured from our conversations, albeit with the “choir,” is the impression that, to a

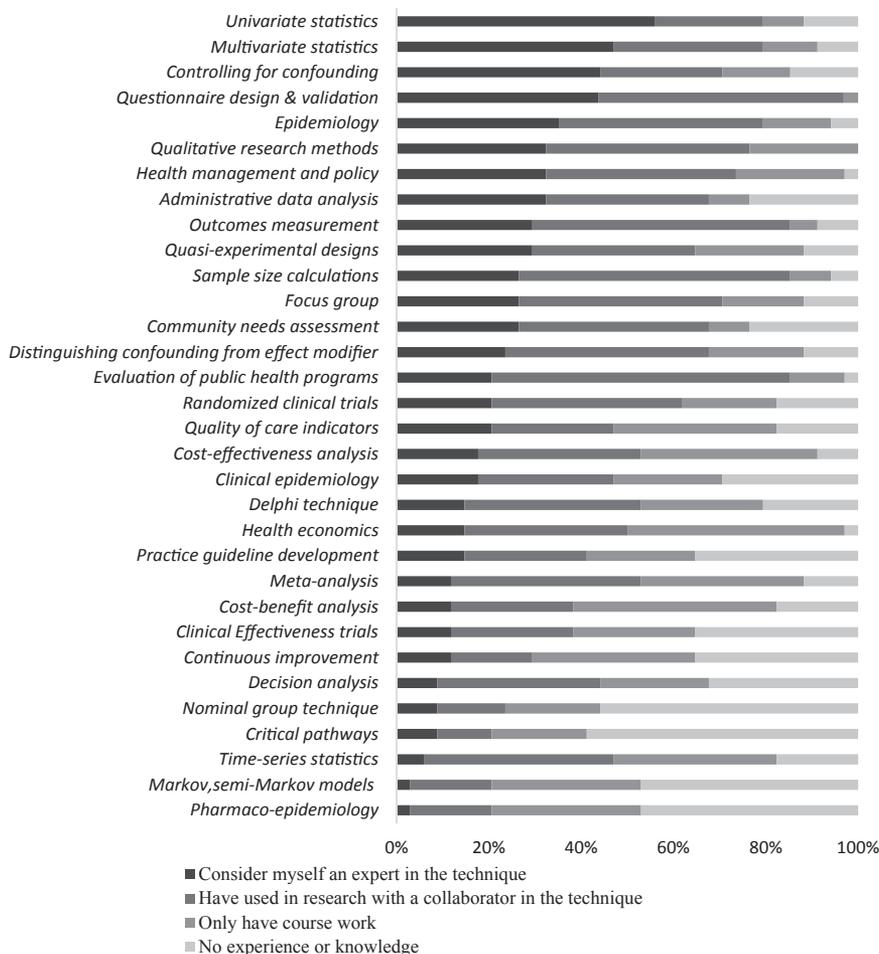


Fig. 1. Self-rated confidence in use of various research methods.

person, there seemed no limit to the ambition, idealism, and their dedication to solving China’s most difficult, seemingly intransigent problems.

3.3. Interviews with OC grant reviewers and key informants (N = 15)

From five reviewers of the CMB proposals, all China watchers in academic medicine, certain limitations of the proposals were often noted. They mirror those by eight reviewers posted online by the China Health Policy and Management Society but not interviewed by us [5,6].

The reviewers noted that proposals often lacked involvement of people with content or medical expertise or collaborators sophisticated about processes of care. Projects seemed uncoupled with managerial decisions and quality improvement initiatives. In many projects, the questions and approaches were ahead of the stage of program development, state of the knowledge, or policy implementation it sought to influence. Frequently randomized clinical trials were proposed before there was sufficient knowledge of effect sizes or metrics and underestimated the effort, time, or real costs even acknowledging that these in China might be much less or subsidized by other sources.

The best managers want to learn what is really going on with their organizations, not just “happy talk” and to improve their organization’s performance. Their counterparts in China, we were told, are abhorrent to change, want to keep research and potentially negative findings in-house, and wish not to disturb existing policies. It may be reasonably asked whether China’s policymakers are ready to hear what research finds.

Table 2. Average time spent in nonresearch and research activities per day

Nonresearch activities		Research activities	
Events	Time (min/d)	Events	Time (min/d)
Patients care	6	English writing	58
Parents care	29	Supervision	68
Reading for pleasure	40	Teaching-related activities	85
Physical activities	40	Chinese writing	90
Traveling to work	50	Reading for work	137
Children care	80	Research work	153
Total	245	Total	591

Table 3. “Need and Wants” of respondents ($N = 34$) for their research

More time	22 (64.7%)
How much more (hr)?	1.7 ± 0.7
Mentor/collaborators/assistance for...	
Secretarial tasks in research projects	26 (76.5%)
Connecting with other institutions	22 (64.7%)
Constructive criticism, suggestions, research ideas	21 (61.8%)
Help with scientific writing in English	21 (61.8%)
Career development advice	19 (55.9%)
Performing interviews	18 (52.9%)
Statistical guidance	17 (50.0%)
Help designing questionnaire/survey	13 (38.2%)
Recruit subjects and/or data entry	13 (38.2%)

For continuous variables: mean ± standard deviation.

Health services, health systems, and health policy research have the additional burden of being used to formulate actual policy. In the United States, some of the most effective and influential research is done by contract mechanisms or by pre-approved grants to such groups as RAND, Brookings Institute, and ad hoc Institute of Medicine groups. Many already have the ear of policymakers or include persons “at the table” involved with policy decisions in their research on their teams. In quality improvement, these include organizations such as Institute for Healthcare Improvement, the Armstrong Institute for Patient Safety and Quality, and Ariadne Labs with close ties to operations and/or driven by clinicians and multidisciplinary teams with expertise in behavioral research and management sciences.

4. Discussion

This study gives one an impression of the professional and personal challenges of this group. They seem undervalued and undercompensated for the level of their training and their value to rapidly growing healthcare system. No significant funding stream for clinician–scientists is apparent. Their research methodologic grounding is limited, and their research environment and institutional support are lacking. These are similar to those of young researchers at research universities in the United States, the United Kingdom, and Canada.

It also echoes a report on INCLN 30 years ago:

The problems encountered during phase 1 will need to be addressed. These include time protection for research, the limited availability of research funds, the low priority given to research careers and the poor linkage between health researchers and government policy makers [4].

4.1. Limitations

Limitations of the study require comment: first, the sample size is small and not representative of the most

populous nation in the world, nor of researchers in other fields. The response rate for the questionnaire the only population we have with a known denominator is acceptable but because of its intentional confidential design, we cannot comment on the nonrespondents. Those 17 also did not attend the conference and could not have been interviewed as well. Second, the study attempts to describe the opinions of senior practitioners and investigators in health policy and health systems and lacks key informants from the academic institutions and the government itself.

5. Conclusions

It is been approximately 40 years since China started on a journey toward developing a cadre of people in quantitative clinical and population studies. There is still much work to be done. The promise will not be fulfilled unless the barriers described herein are addressed and rectified. Even then it may take at least a generation to achieve. The major challenges would seem to be as follows:

1. The desire and will to invest in the development of an enterprise that is free to objectively evaluate health and public health practices and narrow the gap between what is known and possible and what is delivered.
2. To train, nurture, and sustain a clinical sciences enterprise for discovery, critical evaluation, and translation to the bedside and the population
3. To develop a viable career path in an increasingly materialistic society.

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Supplementary data

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