China and global health

China is the world’s oldest continuous civilization. During the past 30 years, the country has emerged as a strong and confident global partner. At home, China has experienced unprecedented material improvements, doubling its gross domestic product per capita, for example, between 2002 and 2006. What are the major challenges for the health of the Chinese people? What are the implications for global health? The authors of the papers in this special issue of The Lancet on China’s health system were invited to address these questions as China’s global engagement continues to expand in the opening decade of the 21st century.

The reasons for commissioning this report are compelling. Despite accounting for over a fifth of the world’s population, the importance of China to global health has been under-recognised by the international health community. This perception is changing rapidly, especially after the August, 2008, Olympics. There are at least four reasons, contemporary and historical, for China’s growing role in global health.

First, the sheer demographic weight of China’s population undergoing rapid and profound health transitions is of enormous global importance. China is a substantial part of virtually all global health challenges: the prevalence of chronic cardiovascular diseases and cancers; re-emergence of infectious threats such as avian influenza; nutritional transitions due to changing food, diet, and physical activity; and new environmental and behavioural threats. For each of these health challenges, what happens in China is a major driver in the dynamics of global health.

Second, China is a major source of health innovation—whether based on its rich traditional pharmacopoeia, its modern cadres of engineers and scientists, or as a source of social experimentation. For example, artemesinin, the most effective drug against the malaria parasite, comes from traditional Chinese medicine. China’s universities and modern research laboratories are increasingly attracting outsourced research and development investments. Community health workers that were pioneered in the 1930s and subsequently refashioned as barefoot village doctors are an acknowledged Chinese innovation for primary health care. China, like many other countries, is struggling to manage the public–private mix in health care; its new efforts to address various market failures are likely to contribute significantly to global understanding of what does and does not work.

Third, China is a major contributor in the control and spread of global health risks, an inevitable aspect of China’s growing international participation in the trade of goods, services, and people. In other words, what happens in China is important for the health of others around the world. Emergence of new infectious diseases, such as severe acute respiratory syndrome, and persistence of old pathogens (eg, tuberculosis) illustrate why China’s health situation has global importance. The spread of transnational health risks is an inevitable aspect of China’s participation in global transactions, as recently illustrated by controversy surrounding pet foods, cough syrup, and toothpaste. Moreover, as China’s energy consumption grows, industrial pollution and carbon production will assume growing global health importance.

Finally, China’s customary reserved role in international institutions is changing as the country assumes more global responsibilities, especially in peace and social sectors such as health. Although China’s health sector is overwhelmingly internally focused, its global reach is expanding, as shown by its assistance to sub-Saharan Africa, to where China has dispatched more than 40 health teams. China’s success in securing the election of the first Chinese head of a UN agency, WHO, marked a turning point of China’s participation in global health governance.
Comment

To probe the scope and depth of China in the context of global health, a collaboration between Chinese and international health scientists—convened by the Peking University Health Sciences Centre, *The Lancet*, and the China Medical Board—commissioned this report, including 19 papers: seven theme papers and 12 commentaries.1-18 Written by 65 authors, of whom two-thirds are Chinese, the report brings together diverse scientific evidence about China’s major health problems, its current strategies, and China’s health future.

Like many other developing countries, China has experienced dramatic demographic and epidemiological transitions. With a population that is mainly urbanised and elderly, China’s major health threats are chronic diseases, now accounting for more than three-quarters of all deaths.1 Patterns of injury are also changing.3 Although China has been successful in the control of infections and maternity-related conditions, these health problems have by no means been eliminated, as exemplified by continuing infectious outbreaks,2 reproductive health problems,19 and persistent schistosomiasis.14 Evidence underscores the fact that China faces a daunting health future. Behavioural shifts cast a long and dark shadow of burdens due to such risk factors as smoking and changes to diet and physical activity that will be accompanied by new infections, environmental threats, and behavioural pathologies.

An important signal of China’s stronger political commitment to health is shown by the expanding role of the state in health-care provision and stewardship, together with the mobilisation of communities and civil society for health improvement. The results of these changes are already measurable. China is now on track to reach Millennium Development Goal (MDG) 4, reducing child mortality by two-thirds between 1990 and 2015.19 This achievement has been made through antipoverty policies, land reform, investments in agriculture, and economic growth, as well as through improved health services. China has also made important progress on MDG 5, the reduction of maternal mortality.19

Health care in China, however, is distinctive in several ways. First, the scale is vast. Whatever the problem or solution, China’s health conditions are gigantic in size—with more than 300 million smokers, 177 million people with hypertension, and an estimated 140 million urban migrants, stretching demand for new forms of health care.18 Second, the speed of health change in China has been extremely rapid. Health transitions that took nearly a century in other richer countries have taken place in a few decades in China.34 Third, China’s unique national history and ecology have resulted in great diversity in health conditions and responses. Many aspects of health in China will demonstrate both commonality and exceptionalism within the country and among nation states. An example is medical ethics and human rights, in which China has been moving towards universal norms while at the same time contributing a unique tradition of Chinese philosophy and values.36 And fourth, China increasingly has the economic capacity to make profound advances in health. China’s spectacular economic growth enables it to augment its investments in health substantially.

Like many countries facing complex health and health-care challenges, it is all too easy to oversimplify the situation in China, where there are many unanswered puzzles. Even as China has witnessed increasing numbers of deaths from transport injury, for example, it has had a striking but largely unexplained decline in suicides;4 sociocultural dynamics that generate high male but low female smoking rates are inadequately understood;12 and many clinical medicine graduates do not end up working as doctors.2 Understanding these and other health conundrums deserves prioritisation, facilitated by a review of research needs and efforts to improve the quality of and access to relevant health information.

Achieving health equity is China’s main health challenge, in view of the well documented problems of incomplete coverage, uneven access, mixed quality, escalating cost, and high risk of catastrophic health expenditures.4 The Chinese Government recognises these challenges and has announced the Healthy China 2020 initiative to reform disease prevention and health promotion, health-care services, pharmaceutical policies, and health insurance.3 These efforts are the latest and most ambitious round of health reforms that aim to tackle growing health inequities.13 Drastic reforms of health financing (more public investment, improved prevention, universal insurance, containment of costs, enhancement of quality, and alignment of incentives) and human resource development (improved quality and distribution of a quantitatively large workforce) will be necessary.5,6 China has a unique opportunity to mobilise its resources and to harness global knowledge to achieve advances in health, compressing the time and
Biomedical science and technology in China

Advances in medicine in the 20th century, along with an ageing population and changes in lifestyles, have altered the nature of diseases. Malnutrition and traditional infectious diseases have been replaced by chronic non-communicable diseases and emerging infectious diseases. In China, more than 80% of deaths are caused by chronic non-communicable diseases. These increasing worldwide needs have placed biomedicine centre stage. The development of biomedical research in China, a country with 1·3 billion people, is a massive and unique challenge.

Initially when China opened its doors via policy

8 Chen Z. Biomedical science and technology in China. Lancet 2008; published online Oct 20. DOI:10.1016/S0140-6736(08)61352-5.
15 Zhang D, Unschild P. China’s barefoot doctor: past, present, and future. Lancet 2008; published online Oct 20. DOI:10.1016/S0140-6736(08)61355-0.
reform, economic issues were the major concern and Deng Xiaoping advocated the notion of “science and technology constituting a primary productive force”.2 In the mid-1980s, when the national high-technology programme (863) was launched,2 biotechnology was the main priority.

Since the mid-1990s, China has used science and education to improve its international competitiveness,3 with an increase in expenditure on research and development from 0.6% of gross domestic product (GDP) in 1996 to 1.4% in 2006 (a period during which the annual rate of growth in GDP reached more than 9%).3 At the same time, China set up policies to develop its talent pool in biomedical research, and is ranked fourth internationally in 2005 for patents granted and publications in indexed journals.4 More than 20% of the Government’s research and development budget was spent on life science and biotechnology, including health-related domains.

While encouraging investigator-initiated projects by augmenting the budget of the National Natural Science Foundation (a five-fold increase over the past decade, rising to 4.3 billion Renminbi [about £0.32 billion] in 2007), China has also launched the national key basic research programme (973) and established major scientific facilities, including synchrotron light-sources and centres for genomics or protein science, drug screening, and biodiversity conservation. By combining resources in human genetics and traditional Chinese and Western medicine, a comprehensive medical research system has been developed.

In addition to the contribution to sequencing of the human genome and the HapMap Project,7 scientists sequenced the genomes of several important species (including rice, chicken, the domesticated silk-moth, and Schistosoma japonicum). The molecular pathogenesis of infectious outbreaks, such as severe acute respiratory syndrome (SARS)8 and avian influenza,9 and several chronic diseases has also been analysed.7 The development of selective differentiation or apoptosis induction in acute promyelocytic leukaemia is an example of how functional genomics can promote targeted cancer therapy.10

China has joined international research efforts in proteomics and structural genomics. Crystal structures of several protein complexes, including mitochondrial respiratory chain complex II, have been characterised,11 and the first human proteome catalogue for the liver has been generated.12 Advances in other domains have also been made—eg, the effect of lymphoid microenvironments on dendritic cells13 and signal transduction, such as the involvement of β arrestin in the regulation of G-protein-coupled receptor signalling.14 Biochips have been applied to clinical medicine and food safety. China is the first country to issue approval through the Government’s regulator (the State Food and Drug Administration [SFDA]) for the use of biochips to screen for diseases such as hepatitis C.

China approved the world’s first gene-therapy product (recombinant human serotype 5 adenovirus, Gendicine) for TP53 tumour suppressor.15 Almost 100 new drugs have either been introduced into the market or are in late-phase clinical trials, such as analogues of artemisinin (a key component in combination therapy for malaria, and recommended by WHO), and quick-test diagnostic reagents for HIV/AIDS. Especially noteworthy are achievements in vaccines for SARS and avian influenza, and the establishment of important platforms for antibody studies.

In stem-cell research, there have been patents and the setting of standards for animal cloning, generation of human embryonic stem-cell lines, nuclear transfer of somatic cells, somatic stem-cell isolation or characterisation, expansion and directed differentiation
of stem or progenitor cells, and tissue or organ engineering. For example, the use of mesenchymal stem cells to support haemopoiesis during bone-marrow transplantation is now in clinical trials, and the SFDA has recently ratified a certificate for a novel artificial skin.

Yet China faces several challenges, including: the need to develop a sound infrastructure for health-care insurance; a lack of effective partnership between the academic and industrial sectors; insufficient investment in drug research and development; and unsatisfactory support for the oversight of food and drug safety.

With the move towards the Outlook of Scientific Development and the aim of developing an equitable society, China has placed public health at the top of its agenda, with the aim of Health for All by 2020. At present, the country is concentrating on primary health care in rural areas and community medicine in cities. The initial goal is a framework for delivery of health care and an insurance system that will cover most people by 2010, in which governmental funding will take the lead. By the end of 2008, the New Rural Cooperative Medicare Scheme, with an 80% contribution from public coffers, will cover all 860 million farmers in China. New initiatives to cover all urban citizens have also been launched.

To use biomedicine to boost accessibility and equal provision of health care, a strategy of “walking on two legs” has been advocated. This strategy suggests that excellence in cutting-edge technologies should be pursued along with a serve-all approach. In the Guidelines on National Medium- and Long-term Program for S&T Development (2006–2020), drug innovation and prevention and control of major emerging infectious diseases have been listed as two of 16 mega projects.

In line with the notion of predictive, preventive, personalised, and participatory medicine, disease prevention should be a priority, with importance attached to provision of clean drinking water, environmental health, natural disasters and disaster preparedness, large-scale production of good-quality food, drug, and vaccine production and regulation, production of reliable reagents for diagnosis and screening, and development of an e-health-care system to manage chronic non-communicable diseases. Moreover, modernisation of traditional Chinese medicine will be strengthened by multicentre clinical trials to evaluate efficacy, and to implement standardisation and quality control, and also by studying systems biomedicine. China’s translational research capacity will be improved by combining its clinical resources and research strength, while creating an environment that considers ethical, legal, and societal input. While encouraging indigenous innovation, China needs to further extend international collaboration through personal exchanges and joint projects. We believe that all these factors will contribute to the improvement of public health in the 21st century.

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This Comment benefited considerably from constructive discussion with Zhan Qimin, Chinese Academy of Medical Sciences. I declare that I have no conflict of interest.

A nation’s health and the health-care services provided to its citizens are determined by inter-related ecological, economic, political, and sociocultural factors. Ongoing changes in these conditions guide the evolution of health and health services in a community. Here we describe major transitions in China since 1949. Five phases are described, but other divisions could also be valid and the timing and characteristics of each phase vary in different parts of the country.

The first phase was post liberation (1949–65). The conflict with Japan and a protracted civil war before the establishment of the People’s Republic of China in 1949 had greatly weakened the health-care system. Following the model of other socialist economies, the Government gradually took over all health-care services, organised a centralised three-tier delivery system, and made all health providers state employees. Emphasis was placed on preventive services, integration of western and traditional Chinese medicine, and the use of mass mobilisation campaigns (eg, for schistosomiasis eradication). The organisation and funding of urban and rural services were fundamentally different: urban services were mainly provided at government-funded hospitals while basic rural services were provided at village and township clinics by the commune-based Cooperative Medical System. Many new medical and nursing schools were established but most graduates worked in urban areas. With the exception of massive famines during the Great Leap Forward (1958–60), the health of the nation advanced dramatically, mainly because of improved sanitation, water quality, and nutrition.

Phase two was the Cultural Revolution (1966–76). All institutions in the country were profoundly affected by the upheaval of the Cultural Revolution when different factions vied for political control. Universities and medical schools were closed for 5 years and their students and faculty members sent to the countryside. The provision of health care became part of the process of politicising the population: in many psychiatric hospitals drug treatment was replaced by political education sessions with use of Mao’s Little Red Book. Mao initiated the programme of barefoot doctors that gave 3–6 months of medical training to tens of thousands of peasants and urban youth who provided preventive and basic health services to rural residents. Health statistics were politicised, so few reliable data on the status of the nation’s health over this period are available.

The next phase was the early reform period (1977–89). Deng Xiaoping’s return to power heralded a period of rapid economic development, decentralisation of political and economic power, and opening up to the global economy that fundamentally transformed the nation. Economic improvements and well-coordinated public-health initiatives resulted in dramatic decreases in the rates of most infectious diseases, decreased infant mortality, and a corresponding increase in longevity. Chronic illnesses (mainly heart disease, cancer, stroke, and mental illnesses) became the leading causes of death and disability. The one-child per family policy accelerated the rate of ageing of the population and focused public attention on child health. Many rural residents moved to urban areas for work, which created an underclass of migrant workers that was not well covered by traditional health services. Financial responsibility for managing health care was decentralised to the provinces, which exacerbated disparities between rich and poor regions. Ownership of health services remained public, but financing was gradually privatised. Price caps for basic drugs...
and services resulted in excessive use of expensive drugs and high-tech services, a rapid increase in costs, a substantial increase in the proportion of costs paid by consumers, and the replacement of the prevention-focused rural Cooperative Medical System by under-trained fee-for-service village doctors, who had no incentive to provide preventive services. Many families could not afford health care and few had medical insurance to protect them from catastrophic medical expenses.

The fourth phase was the late reform period (1990–2002). The Government's attempts to reign in accelerating health-care costs, to provide more community-based health services in urban areas, and to provide insurance coverage to the uninsured were largely unsuccessful, partly because of powerful interests (eg, drug companies, large general hospitals) and partly because poorer provinces did not have the resources needed to implement central policies. For similar reasons policies aimed at decreasing the negative health consequences of economic development (increased tobacco use, obesity, traffic injuries, mining and industrial accidents, the health effects of pollution, etc) were not effective. The rapid decline in infectious diseases seen previously reached a plateau and the rates of some previously controlled diseases increased (eg, sexually transmitted infections, HIV/AIDS, hepatitis B, and schistosomiasis).

The final phase was after the epidemic of severe acute respiratory distress syndrome (SARS), from 2003 to the present. The SARS epidemic, played out in the glare of the international press, was a national wake-up call that highlighted the weakened state of China's public-health infrastructure and the increasing inequity of its health-care system. This watershed event and rising public discontent generated the political will to fundamentally reform the system, including a partial resumption of central management of public-health services and a major reallocation of central resources to address inequities in health. The outcome of these post-SARS reforms remains uncertain, but there are reasons for optimism. Central funding is supporting the re-introduction of a New Cooperative Medical System in rural areas and a parallel programme for the uninsured in urban areas that plans to achieve universal coverage by 2020. The exemplary national monitoring system for infectious diseases implemented after the SARS epidemic (which provides real-time reports of cases across the country) and the effective public-health response to the earthquake in Sichuan are examples of what China can accomplish in health. The most important task ahead is to focus attention and resources on improving the quality, comprehensiveness, and cost-effectiveness of services.

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We are project coordinators for the Lancet–CMB China series. We declare that we have no conflict of interest.
Traditional Chinese medicine

Systematic reviews show that Chinese herbs and acupuncture can be effective for atopic eczema and chemotherapy-induced nausea, respectively.\(^1^,\(^2\)\) Traditional Chinese medicine (TCM) is one of the oldest healing systems. TCM includes herbal medicine, acupuncture, moxibustion, massage, food therapy, and physical exercise, such as shadow boxing. TCM is a fully institutionalised part of Chinese health care and widely used with western medicine. In 2006, the TCM sector provided care for over 200 million outpatients and some 7 million inpatients, accounting for 10%–20% of health care in China.\(^3\)

Most of the principles of TCM were derived from the philosophical basis that contributed to the development of Taoism, and Confucianism.\(^4^,\(^5\)\) Ancient Chinese scholars noted that all natural phenomena could be categorised into Yin and Yang (two opposite, complementary, interdependent, and exchangeable aspects of nature), everything in the universe consisted of five basic elements (wood, fire, earth, metal, and water), and the universe was constantly changing towards dynamic balance or harmony. Such knowledge was applied to understand, prevent, and cure disease.

In TCM, Yin refers largely to the material aspects of the organism and Yang to functions. There is a circulation of Qi (energy) and blood. The organs work together by regulating and preserving Qi and blood through the so-called channels and collaterals. Disease occurs after a disturbance in Yin-Yang or flow of Qi or blood, or disharmony in the organs caused by pathogenic (eg, sadness, joy, lifestyle) and climatic factors (dampness, heat, cold). Treatment aims to expel or suppress the cause and restore balance.

Imbalance is assessed by four traditional examination methods: looking, listening and smelling, asking, and touching. Observations of the pulse, face, tongue, urine, and stool provide essential information. The diagnosis is derived with theories such as the eight diagnostic principles to differentiate between Yin-Yang, exterior-interior, deficiency-excess, and cold-heat, the five elements theory to assess the relations between organs and functions, and the visceral manifestation theory to establish the disease location.

The diagnosis that guides treatment is called Zheng, a temporary state at one time and which is like a syndrome defined by symptoms and signs. The same disease in western medicine can manifest in different Zhengs and vice versa. Thus, treatment in the same patient varies over time and the same disease can be treated differently. For example, kidney Yin deficiency as a Zheng has three components: kidney, Yin, and deficiency. Other examples include preponderant liver Yang, flaring up of heart fire, and spleen-stomach dampness-heat. For each or a combination of the components, there are specific herbs or treatments. For example, bitter herbs are cool in nature and can be used to treat heat-ridden diseases. TCM can make diagnoses and treat patients without needing a scientific understanding of cause and pathogenesis.

Acupuncture was introduced in developed countries in the 1600s.\(^6^,\(^7\)\) Variolation was developed in the 16th century in China as a method to immunise people against smallpox. Dried smallpox scabs were blown into the nose of an individual who then developed a mild form of the disease and lifelong resistance. The method was introduced to Europe in the early 1700s. Artemisinin and ephedrine are also derived from Chinese herbs.\(^8\)

TCM was challenged by western medicine in China in the late 19th century.\(^9\) Western medicine had its most notable effects in surgery and public health, areas that had not been well developed in China until then. The increasing emphasis on western medicine slackened the development of TCM in the early 20th century. Since 1949, TCM has been scientifically studied and integrated with western medicine. Biomedical sciences have made considerable changes to TCM.\(^4^,\(^9\)\) For example, standardised formulae of herbal therapies are now commonly used as tablets, capsules, and even ampoules as well as the traditional decoctions of individualised prescriptions.

The integration of TCM and western medicine has been widely promoted and studied in China.\(^4\) Integration aims to eventually combine the two systems. Currently, integration is mainly at the level of physicians who have received training and can treat patients in both. For example, over a third of the training in TCM schools is in western medicine, and western-medicine schools also offer some training in TCM.

Despite decades of research and integration, the fundamentals of TCM remain largely unchanged and
its theories inexplicable to science.4–5 The absence of scientific understanding has caused scepticism and criticism about TCM. However, randomised trials have shown efficacy for some TCM therapies.1,2,3 The efficacy of most assessed therapies, however, remains uncertain, often because of the low methodological quality of trials.10,11 Furthermore, most of these trials are published in Chinese, inaccessible to western doctors, and not included in systematic reviews. Selective publication of positive trials is another problem.10,12

The quality of TCM trials could be improved by adopting the bias-reduction points in the CONSORT guidelines. Meanwhile, the patient, intervention, comparator, and outcome should also be carefully documented. For example, it is important to compare TCM with a placebo or an intervention of proven efficacy rather than interventions with unknown effects. Furthermore, patients’ inclusion and exclusion criteria, and indications and contraindications of the tested therapy, must be specified clearly in a language comprehensible to users who have never learnt TCM. Tested herbal products also need to be standardised to ensure manufacturing consistency. Standardisation is similarly important for diagnosis and procedural treatments, such as acupuncture.

Because TCM and western medicine differ, debates arise about which outcomes to use. Patients’ views might provide an answer: outcomes that patients think relevant and important, such as pain and survival, are where TCM and western medicine can find a common footing. A real challenge is how to interpret and generalise the findings from trials of TCM delivered in the traditional way, in which the same patients are treated differently over time.

International collaborations and dialogues between practitioners of TCM or western medicine are important to further improve the scientific quality and clinical significance of TCM trials. Because TCM has long been in use, research could move to an efficacy-driven approach, in which TCM therapies are tested in trials on human beings first and studies on mechanisms of action and active substances should start only when efficacy is firmly shown.13

TCM does have adverse effects (table).14–18 The main reason for adverse effects is contamination and inappropriate use rather than inherent risks with herbs themselves. Most adverse reactions can thus be avoided by quality control and guided applications. In a sceptical environment, it would be a mistake to dismiss effective therapies on the basis of adverse effects rather than benefit–harm ratios.

Particularly in developing countries, over 80% of the populations depend on herbal medicine for basic health care.19 An absence of evidence of efficacy for these treatments is likely to aggravate the entrenched inequity in access to effective care for poor people.

Table: Adverse reactions and toxic effects caused by TCM

<table>
<thead>
<tr>
<th>Adverse reaction(s)</th>
<th>Reasons for adverse reaction</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury, lead, cadmium</td>
<td>Various</td>
<td>Contamination, such as in Fu Fang Lu Hui Jiao Nang</td>
</tr>
<tr>
<td>Ginkgo biloba, garlic, Chinese angelica, Salvia miltiorrhiza</td>
<td>Severe bleeding</td>
<td>Interaction with western drugs, such as warfarin</td>
</tr>
<tr>
<td>Radix aconiti lateralis, Propionata spp, Aconite spp</td>
<td>Cardiotoxicity, such as severe arrhythmia</td>
<td>Used raw and unprocessed, inappropriately prepared form, or overdosing</td>
</tr>
<tr>
<td>Caulis aristolochiae, Manshurimensis spp</td>
<td>Nephrotoxicity and carcinogenicity</td>
<td>The herb contains aristolacid and is wrongly used as Caulis clematidis armandii (eg, in some weight-loss products and Long Dan Xie Gan Wan)</td>
</tr>
</tbody>
</table>

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We thank Thomas Chan, Chinese University of Hong Kong, Jeng-Nien Lai, National Yang Ming University, for suggestions and references on adverse effects, and Ying Qin, Chinese University of Hong Kong, for information on the use of TCM in China. We declare that we have no conflict of interest.

Comment

Anthropology in China’s health promotion and tobacco

Health problems vex many residents of China, as they do people elsewhere. These problems need attention from medical professionals and public-health funders. They also require academic inquiry, including that offered by medical anthropologists. Medical anthropology addresses the way in which links between illness, culture, politics, and economics unfold over time. Perhaps no problem is a better example than tobacco, which is wreaking a sizable social, emotional, and political-economic toll on Chinese people today and is one of the greatest causes of premature death. Anthropological study holds practical value for the development of innovative interventions to reduce China’s smoking epidemic and attenuate other causes of ill-health.

Health researchers have written many articles about tobacco in China over the past few years, mostly describing smoking behaviours and their biological damage. Of special note is the finding that 3% of women in China smoke cigarettes daily compared with nearly 60% of men. Anthropologists immediately ask what generated this stark contrast. The answer is not a sexist application of tobacco-control policies, because such policies began only a few years ago. More important has been processes that position cigarette smoking as a key gender differentiator that encourages men to smoke as a sign of masculinity and discourages women lest they be regarded as dissolute. These processes began in the early 1900s, when cigarette companies such as American Tobacco and Nanyang Brothers Tobacco were battling to capture initial market share in China. Budding Chinese nationalist and feminist reformers bridled at the way in which the companies inundated cities with sexually charged advertising copy that promoted cigarette use by women. The reformers argued that women needed to show they were progressive and morally upright beacons of “New China” by spurning the advertisements and abstaining from smoking. This protective ethic has existed ever since, most strongly expressed through antiprostitution narratives in which the female smoker and commercial sex worker are portrayed as one.

Meanwhile, various sectors of Chinese society have encouraged smoking among men as a means of development, both economic and personal. This encouragement has involved expansionist practices by...
the tobacco industry (first supervised by private firms, after 1949 by provincial administrators, and from the 1980s onwards by the state’s China National Tobacco Corporation—today the world’s largest cigarette manufacturer). Such encouragement has also involved the insinuation of cigarette use into concepts of the male good life.

During the 20th century, heroic men of the revolution, such as Lu Xun, Mao Zedong, and Deng Xiaoping, were regularly depicted as cigarette smokers. Provincial offices eased mimicry of these heroes between 1949 and 1976 by designing packaging with male revolutionary imagery and by issuing cigarette ration coupons to family heads. Since then, to meet the escalating earnings targets set by Beijing, employees of the China National Tobacco Corporation have positioned cigarettes as an index of male economic success and a convenient tool in social exchange. Keeping tax rates per pack low, the Corporation encouraged stratified cigarette pricing (the cheapest pack of domestic cigarettes today sells for US$0.14, the most expensive for $33) under hundreds of brand names like Fierce Lion, Red Pagoda, Five Bulls, Meeting of Heroes, and Emperor. Add social custom and stir. When men interact today, strong pressure exists for each to flaunt his preferred brand and “courteously” exchange cigarettes, creating cycles of reciprocity that fuel nicotine addiction and impede quitting.

By the end of the millennium, a million citizens were dying every year from tobacco-related diseases, and if the present smoking rates continue, 100 million Chinese men will die between 2000 and 2050, with many of their family members squandering life savings in desperate attempts at treatment. In response, Beijing ratified WHO’s Framework Convention on Tobacco Control in 2005 and members of the Chinese Centers for Disease Control and Prevention, Ministry of Health, and local health offices have begun an uphill, inadequately funded drive to help citizens avoid cigarettes.

Medical anthropology is no panacea. What it offers are distinct methods for perceiving problems and imagining new ways to act. For men and cigarette smoking in China, many interventions are needed, including ones that follow best practices rigorously studied in other countries—eg, legislation on smoke-free public places, uniformly high cigarette prices, and tobacco advertising bans. Other interventions could be more experimental. Anthropological approaches suggest that these experiments should use local male symbols to counter positive views of smoking among young people, from encouraging iconic Chinese men today (eg, basketball star Yao Ming) to take public pledges against cigarettes to distributing computer games with tobacco giants represented as villains. Such approaches further suggest use of public-service announcements to depict cigarette swapping as odious, encouragement of women to organise support for their imperiled families, promotion of smoking-cessation drugs and programmes enticingly packaged for Chinese men, and campaigns that redirect local narratives about fulfilling commitments to the Framework Convention from that of “threatening” regional development to that of “enabling” one’s father, brother, son, or self to live a long modern life without cigarettes.

Praise was fittingly showered on Beijing for running a smoke-free Olympics. It is time now for men and women of vision to embrace a smoke-free China.

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Reproductive health in China: improve the means to the end

China has achieved much in reproductive health. Its maternal mortality ratio and infant mortality rate in 2005 were 47.7 per 100 000 and 19.0 per 1000 livebirths, respectively, and total fertility rate is now less than 1.8. China’s health and family planning services are among the world’s most comprehensive, with a vertical system of reaching villages. State planning, investment in infrastructure and human resources, and setting targets have achieved what other countries, such as India, have not; maternal mortality targets worldwide are unlikely to be met in many developing countries.

However, when we examine how China has achieved these goals, and consider the disparities in achievements and future challenges, the picture is less rosy.

The gains in maternal mortality ratio are attributable to two separate service systems. The Maternal and Child Health Care System, which focuses on reducing maternal and infant mortality, and the Family Planning System, which focuses on decreasing fertility. Married women have high rates of contraceptive use (>80%), the result of highly organised contraceptive services put in place to achieve demographic goals, while reducing risks of pregnancy and delivery. In the past, the family planning programme was coercive; although the approach has improved, it still maintains strict restrictions on births. Abortions in married women have declined, use of reversible contraception has increased, and women have more choice of contraceptives, but use of contraceptives remains mandatory.

In response to the new paradigms adopted at the 1994 International Conference on Population and Development (ICPD), in Cairo, Egypt, the family planning service has expanded to address other needs, including HIV and AIDS education for rural women, young people, and migrants, and screening for reproductive tract infections in rural women during mandatory contraception check-ups. China’s participation in, and endorsement of, the 1994 ICPD’s programme of action can be credited, although actions are still short of ICPD prescriptions.

Except for free contraceptive services, most other preventive services (health education, prenatal check-up, postnatal visits, and screening for reproductive tract infections) that are essential for good reproductive health have been weakened by decades of fiscal decentralisation and insufficient governmental financing of the health system. Overemphasis on cost recovery, through user fees and drug sales, has skewed health institutions towards providing curative services. The use of reproductive health services in poor rural areas has been undermined by insufficient health education and the perception (and reality) of poor quality of service. Disparities have widened.

The maternal mortality ratio in poor rural areas of western China is four times that of urban areas and double that of average rural areas in eastern China. Hospital delivery rates are 38.9% and maternal mortality ratios 95.4 per 100 000 livebirths in Guizhou, one of China’s poorest provinces, compared with 99.5% and 99.4% (hospital delivery) and 18 per 100 000 and 10.8 per 100 000 livebirths (maternal mortality ratio) in Beijing and Shanghai, respectively. Prenatal check-ups and hospital deliveries in pilot project sites in Guizhou have improved through an intervention programme of reproductive health education and financial subsidies for hospital deliveries.

Many challenges remain as new ones emerge. The legacy of two delivery systems needs to be addressed as integration is hampered by bureaucratic rivalries.

*Published Online October 20, 2008*

**DOI: 10.1016/S0140-6736(08)61356-2**
Although the family planning system tries to carve out a niche that continues to give it meaning, duplication of services and competition for scarce human and financial resources are increasingly making provision of reproductive health services inefficient. Besides the need to overcome fragmentation in service delivery caused by the two service systems, there is an urgent need to regulate the health-care market for unnecessary medical tests and prescriptions. Some of the new challenges are: increasing rates of sexually transmitted and reproductive tract infections, including syphilis and untreated trichomonas in rural women; rising abortion rates in unmarried adolescent girls; providing services to the large number of rural migrants; and an AIDS epidemic in which the number of women affected is catching up with the number of men. These challenges cannot be fully addressed by the Government with its conventional top-down approach despite its best intentions. One such example is the target to achieve a balanced sex ratio at birth by 2010. The high sex ratio of boys to girls indicates how deeply rooted is the interaction of gender bias with policy, technology, and finance. This bias contributes not only to sex-selective abortions but also to the malnutrition of girls, domestic violence, women’s disproportionate share in family planning responsibility, their heavy burden of labour, and disparities in access to care. Social and cultural traditions of a preference for a son and gender inequity set the stage for lifelong reproductive health detriments and risks. Without tackling gender inequity at the bottom, top-down attempts to restore the normal sex ratio are likely to fail.

China’s state-centred approach in which the state defines the priority and means to achieve goals has accomplished a lot, especially accompanied by investment in infrastructure. Although necessary, this approach might not be sufficient to solve old problems and deal with new challenges. Other societies have made and sustained advances through the pressure of social movements advocating for change and holding governments accountable. Models of participation and advocacy from other countries might be difficult to initiate into China’s cultural and political system, but a greater voice of citizen and community in governmental decision making is overdue. A bottom-up approach needs to go hand in hand with a top-down one to effectively meet the challenges. Thus, although China has done a lot to improve reproductive health, more improvement might be achieved by enhancing representation and participation in, and accountability of, its processes.

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China’s HIV/AIDS epidemic: continuing challenges

In 2007, China estimated that there were about 700 000 residents infected with HIV and that 85 000 people had AIDS.1,2 Although the prevalence of HIV infection as a whole was about 0·05%, each of several provinces (including Yunnan, Guangxi, Guangdong, Xinjiang, and Henan) had high numbers of infected people (>30 000).3 Most cases of HIV infection are in injection drug users, men who have sex with men, sex workers, and in infected blood donors who survived the HIV epidemic in rural China during the mid-1990s. The rural focus of the HIV epidemic and low levels of sexual mixing might have prevented a rapid spread, but sexual behaviours are rapidly changing.

Although slow to acknowledge the epidemic since 2003, China has made considerable changes to its policies by implementation of innovative strategies and setting up of a comprehensive anti-HIV programme. The objective is to control spread beyond the major risk groups.3,4 But some of the issues remain to be resolved.

The weak infrastructure of health care implies that the goal of providing treatment for all in need will be difficult, especially in rural areas where most infections occur. Development of drug resistance and toxic effects require use of second-line and third-line drugs and specialised expertise, which urgently needs to be incorporated into the health-care system, and capacity building in local clinical centres and laboratories.

Prevention activities in cities include methadone maintenance programmes, promotion of condoms in sex establishments, and presentations in the mass media. In rural areas, needle-exchange programmes have started and promotion messages about prevention of HIV/AIDS distributed.

The epidemic has affected mainly people who are poor and ostracised; the new policies recognise this problem. Sufficient funding for HIV control should be targeted at the populations most affected and organisations most able to assist them. Stigma remains a barrier to HIV testing, treatment, and care, especially for sex workers, injection drug users, and men who have sex with men. Health professionals themselves are not free of stigmatising their patients.5

Adherence to antiretroviral drugs is important both for effectiveness and to reduce resistance. Patients need to be educated about adherence, and strategies are needed for those with limited education. Use of traditional Chinese medicines for treatment of HIV or AIDS has not been a substantial problem.

The epidemic has gained momentum because of the profound change in sexual attitudes and behaviour, and the rapid growth of the sex industry during the past two decades. This change is evident from the rapid re-emergence of syphilis and sexually transmitted diseases.6 41% of newly reported HIV infections from January to October, 2007, were acquired through sexual contact, both by heterosexual and male homosexual activity.7 Other HIV infections were acquired mainly through injection drug use. HIV testing should be offered to all patients with a sexually transmitted disease.

A more recent development is HIV spread among men who have sex with men,7 many of whom marry women but continue to have sex with men. Because of the social stigma attached to male homosexuality, they are a difficult population to reach. In the past 10 years, such men have begun to organise into support groups. Bath houses and bars for homosexual men have increased in numbers, and the internet is used to arrange sexual liaisons. These venues provide a focal point for behavioural intervention and promotion of condom use.

In some areas, 10% or more of sex workers are injection drug users, and are at risk of infection via needles and
Farewell, God of Plague

in the 1950s, as documented in Mao Zedong’s poem

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Schistosomiasis control: experiences and lessons from China

Schistosomiasis is a chronic and debilitating disease that also exacerbates poverty. The disease is endemic in the tropics and subtropics, including China.1,2 Worldwide, almost 800 million individuals are at risk. About 200 million people are infected, over half of whom have various degrees of morbidity,3 which leads to a disease burden that might be as high as 4.5 million disability-adjusted life-years. This estimate of burden, however, might considerably underestimate the true burden of schistosomiasis.3

Schistosomiasis is often neglected, because it mainly affects poor rural communities in developing countries.4 In China, however, the public-health and socioeconomic importance of schistosomiasis was recognised already in the 1950s, as documented in Mao Zedong’s poem Farewell, God of Plague.5 Political will, sustained financial and technical support, and an integrated approach readily adapted to different eco-epidemiological settings and fine-tuned over time have substantially reduced the burden of schistosomiasis. For example, although there were more than 10 million individuals infected with Schistosoma japonicum in 12 provinces of southern China in the mid-1950s, this number was reduced to less than 1 million half a century later.6 In parallel, transmission was interrupted in five provinces.

However, further progress has been hampered by many factors, such as climate change, profound demographic and ecological transformations, market-based reforms of the health sector, and the termination of the World Bank loan project on schistosomiasis control in 2001.7,8 Re-emergence of schistosomiasis, at least in hilly environments of
Sichuan province, is a growing concern. At present, most schistosomiasis cases are concentrated in lake and marshland regions. Since 2004, after the outbreak of severe acute respiratory syndrome and fuelled by the potential re-emergence of schistosomiasis in China, the disease has moved up as one of the top public-health priorities, and is now in the same league as HIV/AIDS, tuberculosis, and hepatitis B. Several features in the life cycle of *S japonicum* govern its epidemiology and need to be taken into account for disease control. First, *Oncomelania* spp, the intermediate host snail of *S japonicum*, is amphibious. These snails can, therefore, proliferate in an array of habitats, such as networks of water in lakes and marshlands and in different kinds of microhabitats in hilly and mountainous environments. Second, more than 40 species of mammals can act as reservoir hosts. Domestic water buffaloes in marshland regions are of particular relevance: these buffaloes can contribute up to 90% of the transmission of *S japonicum*. The Chinese authorities noted some of these issues more than 50 years ago, which guided the initial design of the national control programme. With the ultimate aim to eliminate schistosomiasis, many approaches have been used, and the overall strategy has been adapted as new approaches and evidence emerged in response to the changing epidemiology of schistosomiasis. Early efforts focused on the control of the intermediate host snails and it was thought that schistosomiasis could be eliminated by chemical molluscicides and environmental management that targeted entire snail habitats. Large-scale community participation was a central feature in environmental management. Although the snail habitats were substantially reduced and the number of human infections steadily declined, the disease remained hard to eliminate.

In the 1990s, morbidity control was the backbone of disease control, helped by the administration of praziquantel, which had been introduced for large-scale use in the previous decade, coupled with health education. An important lesson learnt during the 10 years of the World Bank loan project was compliance with chemotherapy, which was dropped as the programme evolved. This finding, coupled with factors such as severe flooding of the Yangtze river in the late 1990s, other ecological transformations, and forced movements of population might explain the resurgence of schistosomiasis after the project was terminated. Indeed, the number of acute cases of human schistosomiasis and the snail-infested areas increased at the start of 2000.

So what are the lessons from 50 years of schistosomiasis control in China? The panel gives a summary, which we hope will stimulate the scientific community and national schistosomiasis control-managers elsewhere. In view of the remaining challenges for sustainable control of schistosomiasis in China, mid-term and long-term goals have been developed: ie, reduce prevalence of infection by *S japonicum* below 5% by 2008 (infection control) and decrease infection below 1% by 2015 (transmission control) in all endemic areas. To achieve these targets, the feasibility and cost-effectiveness of a four-pronged approach is being investigated in different settings, with the aim of interrupting environmental contamination of schistosome eggs by human beings and bovines. This strategy consists of: first, improved mechanisation of agriculture, to replace buffaloes with tractors. Second, avoidance of marshland pastures and introduction of fenced cattle-farming, as has already been done for pig-farming. Third, installation of sanitation facilities in houses. Fourth and last, provision of toilets for mobile populations (eg, fishermen).

Preliminary data from pilot studies suggest that near-complete elimination of *S japonicum* contamination is possible if such a multipronged strategy is integrated with other control activities. Importantly, such a strategy will not only be effective against schistosomiasis but also
against a range of other helminthic diseases (eg, ascariasis, hookworm disease, and trichuriasis) that are still rampant in China. This strategy needs to be adapted in hilly and mountainous areas, although key challenges include the difficulty of mechanising agriculture in hilly terrains and fencing of cattle. Cost-effectiveness in different settings also needs to be investigated, so that schistosomiasis can eventually be eliminated as a public-health problem in mainland China.

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We received support from the Ministry of Health, China. X-NZ receives a grant from the National Natural Science Foundation of the People’s Republic of China (grant no 30590373), and the UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (grant no A30298). JU receives financial support from the Swiss National Science Foundation (grant no 30590373), and the UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (project no PPOOB-102883, PPOOB-119129). LDW declares that he has no conflict of interest.

China’s barefoot doctor: past, present, and future

China’s long struggle with rural coverage for health care goes back to the early part of the 20th century. However, these early efforts were seen at that time as unsuccessful. Although the Government tried to draft private practitioners into the rural medical service corps, delivery of health care was still scarce after 1949. Health-care expenditure for 8.3 million urban citizens covered by the state was more than that for 500 million peasants in 1964. After Mao Zedong criticised the urban bias of medical services and pointed out the stress placed on rural areas in 1965, mobile teams of doctors from urban hospitals were sent to deliver health care and train indigenous paramedics.

In 1968, the programme of barefoot doctors was introduced by the journal Red Flag as a national policy focused on quickly training paramedics to meet rural needs. Most barefoot doctors, who generated their work points with medical services just like agricultural work (ie, their income was counted by transferring time for medical service to similar time for agricultural work,) were not at par with the regularly trained doctors and their incomes were 50% lower.

Despite a low level of service in terms of technique and medical instruments, the barefoot doctor programme

![Figure: Rural health personnel and institutions in China, 1950–2000](https://www.thelancet.com)

Note that x-axis is non-linear. Data are from references 6 and 7.
effectively reduced costs and provided timely treatment to the rural people. The programme also provided other services, including immunisation, delivery for pregnant women, and improvement of sanitation. Rather than herbs and acupuncture, antibiotics and western medicines were prescribed and even simple surgical operations commonly done. Thus the arrangement solved the distribution of health-care resources under the urban–rural dual-economic system, and played an important part in modernising health care in rural China. WHO regarded China’s barefoot doctor system as a successful example of solving shortages of medical service in developing countries.

Although training of barefoot doctors was varied (and recruitment depended on a candidate's political attitude and local relationships rather than educational background), most of them were still interested in improving their skill and having better training. In 1975, the then vice-premier Deng Xiaoping pointed out that the barefoot doctors would improve their knowledge gradually and “put on shoes” in the future. However, Deng’s idea was criticised for dividing itself from agricultural production. During the Cultural Revolution, there was a constant tension between improving educational quality and pursuing political goals of mass production.

Reforms in the health-care system in the early 1980s, which were unsuccessful during this period, resulted in the collapse of the cooperative medical system to a payment-based system of medical care in rural areas. The percentage of villages with a cooperative medical system fell from 90% in the 1960s to 5% by 1985. Barefoot doctors thus lost their institutional and financial support. In January, 1985, the title of barefoot doctor was cancelled by the Ministry of Health, and some of them either became village doctors or were lost to other professions. As private practitioners, however, village doctors focused on treatment of diseases with economic benefits in mind, such that the public health of the village was a low priority.

Collapse of the cooperative medical system and change in the role of barefoot doctors resulted in a huge decline in primary health-care coverage in rural areas. On the basis of this rural health policy, the Government proposed the development of a new cooperative medical system in 2003. The new system differs from the old: it is organised and financially supported by the Government. The local government pays 10 Renminbi per year for everyone covered by the new system, and the fund covers the costs of serious diseases. The new system also faces serious challenges, such as how to train village doctors and what kind of service is to be provided. Meanwhile, disease prevention and public-health efforts remain ignored.

The barefoot doctor was an attempt by the Government via political mobilisation to solve the basic health-care problems of rural areas when the nation was developing. Despite critiques, people have a generally positive memory of the barefoot doctors who provided equitable medical services, especially when the health-care crises of peasants substantially increased after the system broke down in the 1980s.

The new cooperative medical system tries to meet the medical needs of peasants, but it still faces challenges, such as how to balance clinical service and public health, how to ensure the qualifications of the village doctor and provide their income, and how to manage and allocate resources. The new system, which draws heavily on the experiments of the barefoot doctor programme, will take responsibility for the health care of peasants in rural China.

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Medical research ethics in China

Medical research ethics has been a growing issue in China over the past two decades. In the 1990s, many relevant documents were translated into Chinese, and many ethics workshops were held in major Chinese research centres. Initially, momentum was generated by the need for ethical review in collaborations funded by international scientific agencies and the drug industry. The Ministry of Health issued requirements for good clinical practice in 1999 (revised in 2003) that also included ethical review. Another factor has been the recent trend toward documentation by ethics committees before publication in international journals.

The protection of human participants in international medical research collaborations in China, and in other developing countries, has been a focus of attention in the mass media in developed countries and in the scientific literature. These moves have provided models for ethical implementation and brought attention to the controversies around the protection of participants in clinical trials and observational studies. Recently, as research funding from Chinese governmental sources has increased, so also has the requirement for ethical review of domestic research protocols.

Currently, most of the ethical codes for medical research, including the regulations issued by the Ministry of Health in 2007, are based on the principles of autonomy, beneficence, and justice. Autonomy includes situations when consent might be compromised by low literacy or mistaking research for routine health-care services. Justice considerations can arise when large drug-company trials are done in less developed regions (the findings might not be reported back to participants and their communities, or the standard of care in such trials might be measured by domestic rather than global standards).

There are two major criticisms of the principle-based framework in China. The first concerns whether, and how, a framework that focuses on individual autonomy can coexist with a traditional ethic that emphasises social harmony over individual interests. This debate is part of the worldwide critique of ethical imperialism, to which some have responded that principle-based ethics are universal and compatible with other ethical systems whereas others have argued that many medical moralities coexist in all societies. As with virtue-based ethics in developed countries, traditional Chinese ethics focus on relationships and the responsibility of a person to work for the good of others, rather than adherence to general principles of common morality. Some contend that this ethic undermines the protection of individual participants in medical research. However, leading Chinese bioethicists argue that virtues and ethical principles are compatible, and that respect for people, non-maleficence or beneficence, and justice are principles and virtues for a good person. For medical research, major ethical responsibility is placed on the researcher. Thus a signed consent form might be seen less as protection for participants’ rights than as a legal mechanism that will relieve researchers from their important virtue-based responsibilities. To further the goals of the ethical conduct of medical research, it is essential to continue to clarify how principles and virtues can be used together to enhance the protection of participants.

The second critique takes a broader view of the purpose of medical research ethics, beyond both the function of institutional review boards and their principle-based reasoning, and assessment of actions based on good intentions or achieving good outcomes. Reflecting recent discussions of professional ethics in the context of market reforms, this critique encourages consideration of ethical aspects of the entire research domain, from funding to dissemination of findings, thus capturing...
the influences underlying economic and social changes within China today and locating potential participants within a broader domain of power and influence. In recent years, economic incentives in medical practice and research exacerbate the potential for conflicts of interest, which can undermine ethical relations between medical professionals and researchers, drug companies, or other research funders, patients who become research participants, and even the regulatory agencies whose mandate is to protect participants’ safety. Although forces at play in China might aid advocacy for research participants through the rise of civil society and non-governmental organisations, others might act to undermine essential human rights. The most crucial threat to the protection of human participants in research lies in failing to be aware of and to counteract these dangers. Essential here is maintenance of the independence of ethics committees, and fostering their ability to develop community-engagement mechanisms.

The future looks promising. As China’s role in research continues to expand, principle-based ethical review of protocols will become increasingly widespread and standardised. The key issue is not whether, or to what extent, foreign versus traditional ethical theories are relevant in the Chinese context. Rather, it is more vigilant regulation of the business of medical research that is needed to ensure protection of research participants.

Government policy and organ transplantation in China

Transplantation in China began in the 1960s, and the number of procedures increased until 2004; since then, the numbers have fallen (figure). In 2006, with 11 000 organ transplants, China ranked second in terms of number of transplants per country. The need for donors, both deceased and living, increases the need for regulation to ensure that the rights of all parties are protected. Therefore a legal framework is urgently needed to regulate professional behaviour, to establish clinical protocols, and to restore equilibrium between the extreme demand for organs and their limited supply.

In China, regulations have lagged behind medical progress, with transplantation expanding in an under-regulated manner. There are four major concerns for China and the international community: regulating quality, an organ market, tourism for transplantation, and the source and rights of the donor. Regulation of transplant centres and quality and the rights of the donor are important issues for developed countries.1–3 China’s desire to regulate its transplant programmes and the willingness of developed countries to assist is reflected in a grant to the Peking Union Medical College and the University of Chicago from the China Medical Board to improve the practice and policy of transplantation.

In March, 2006, the Ministry of Health issued the Interim Provisions on Clinical Application and Management of Human Organ Transplantation.4 The provisions stipulated the requirements that medical centres must meet for transplant services, and

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made the provinces responsible for plans for clinical applications. Institutions that do transplantation need to show leadership by incorporating ethics, medical and surgical expertise, and intensive care. In April, 2006, the Ministry set up the Committee of Clinical Application of Human Organ Transplantation Technologies to standardise clinical practice, organised a national summit on clinical management in November, 2006, and issued a declaration that outlined regulatory steps. In March, 2007, the Regulation on Human Organ Transplantation was approved by the State Council and came into effect on May 1, 2007. These actions have received praise from WHO and The Transplantation Society.

The under-regulated growth of transplantation in China provided an atmosphere for organ donors to get financial compensation. The Chinese Government addressed this issue firmly and directly in the Regulations on Human Organ Transplantation by banning such activities with severe penalties, and saying that altruism should be the driving principle.

The huge volume of transplants led to an influx of non-Chinese individuals travelling to China for the procedure, where access to organs was more rapid and programmes were less expensive than in developed countries. In July, 2007, the Ministry issued a notice that ensured Chinese citizens would be given priority for receipt of an organ. This move supports the recent Istanbul Declaration condemning transplant tourism.

In China, more than 90% of transplanted organs are obtained from executed prisoners. Additional safeguards set up to ensure the rights of these individuals include: written consent for organ removal from the donor; review of all death sentences by the Supreme People’s Court; transplant professionals must not be involved until death is declared; and participation by the Red Cross to publicise the need for organ donation. The Ministry is working with many organisations to set up an organ-donation policy that will allow people to express their wishes on their driver’s licences. The Ministry also organised a symposium to discuss the diagnostic criteria for brain death in April, 2008, which is a necessary initial step to set up alternative sources of organs in China.

The new regulations have successfully established baseline requirements for medical institutions to do transplantations. At present, 87 institutions have full approval from the Ministry of Health; 77 others have provisional approval and 18 months to comply with all the regulations. This number is a reduction from the more than 600 institutions that did transplants 1 year ago. Regulations have been set up to ban transplant tourism. The penalty for participating in a transplant that involves payment for organs is substantial. Reforms have decreased the number of cadaveric organ transplants by more than two or three fold and increased the number of living-related organ transplants by more than 100% in China in 2007. The drop in transplantation over the past 3 years is a result of these changes acting in tandem. Currently, post-transplant registries are being developed.

An organisational structure for transplantation must be established to oversee, implement, audit, and set up a balance of authority between the central and provincial governments. A registry of recipients that uses robust methods of data-collection should be started. Donation, use of organs, and selection of patients are currently hospital based, without centralised standards, and a transparent system for organ procurement, equitable organ allocation, and selection of patients is needed.

China is planning regulations for the new phase of transplantation, which will largely conform to international standards. There are nuances within the system to accommodate cultural differences. For example, the laws for brain death will incorporate language that will respect the family’s wishes, especially when they are based on religious belief that requires the whole body be buried. Despite a sharp decrease, capital punishment still exists in China. The long-term goal for
Comment

Internal migration and health in China

China has a highly mobile population of 140 million rural-to-urban migrants (10% of the total population), a number that is expected to increase in the coming decade. Migrants tend to follow a temporary and circular pattern, moving between cities and provinces in search of improved opportunities. Overall, the migrant population tends to be younger, and is more likely to be male and single, than the general population, although more women and families have also started to migrate in recent years and more people are settling in cities.

Indicators of socioeconomic status place the migrants below that of the urban population but above their rural counterparts. Migrants are largely excluded from urban services, including access to public health. National policy has long been established on locality-based schemes that depend on household registration (hukou), which is not easily transferable from rural to urban areas. Migrants, therefore, do not qualify for public medical insurance and assistance programmes, and have to pay out-of-pocket expenses for medical services in cities.1 City governments are faced with the dilemma of not wanting to overburden public finances by extending medical cover to migrants versus the need to provide some services to prevent potential public-health crises. Local policies are being piloted in various cities to meet this challenge.

The health-care community in China has focused on three main concerns about migrant health. The first is infectious diseases: this highly mobile group can be both victims and vectors of such diseases, which was particularly highlighted during the epidemic of severe acute respiratory syndrome. The range of diseases in migrants tends to be different from that in the non-migrant urban population. Migrants have more communicable diseases, such as acute respiratory infections, diarrhoeal, parasitic, and sexually transmitted diseases, and tuberculosis.4,5 Hence health authorities are concerned about these diseases, especially sexually transmitted diseases and tuberculosis.4,7

The second issue is maternal health. On every indicator of maternal and infant health, the migrant population fares worse than the urban population.8,9 Maternal health of migrants is a challenge for urban health-care systems, and many cities have started pilot programmes to address needs. For example, Shanghai has experimented by offering subsidies to migrant women to be able to deliver in public hospitals (instead of illegal private clinics), and has achieved good outcomes.9 But this success has created an ambivalent attitude about making the policy public for fear of attracting too many people into Shanghai.

The third concern has been occupational disease and injuries in migrant workers, including silicosis, chemical poisoning, and accidents caused by machinery. The outsider status of migrants in the city’s health-care system, lack of medical insurance, weak enforcement of occupational health and safety regulations, and little awareness of occupational risks contribute to

social development is to abolish the death penalty but, until then, regulations need to protect prisoners’ rights and desires and separate transplant programmes from the prison system.

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We are supported by a grant (06-837) from the China Medical Board, New York, NY, USA. We declare that we have no conflict of interest.


Published Online
October 20, 2008
DOI:10.1016/S0140-6736(08)61360-4

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this widespread problem. Improved access to proper emergency or preventive care can help this situation, but the solution goes beyond the health sector. Improvement will need much stronger governmental regulations and enforcement of safety laws at workplaces.

Those three main concerns, however, are only part of a broader picture that is poorly indicated in research about health issues for migrants. At the root of the issue is the self-selection of migrants that affects health in two ways. First, young and healthy people are more likely to migrate than elderly people, leaving the weak and sick at home. Second, more serious and incapacitating diseases and intensive-care conditions (including old age, pregnancy, and delivery of the newborn child) result in a migrant’s return to the home in the village to seek family support and to avoid the high medical and living costs in cities. In essence, the countryside is exporting good health and reimporting ill-health.

As a result, counterintuitively, rural migrants on average are healthier than the urban population. This situation has the perverse effect of making the total urban populations (with improved health-care systems) healthier than the rural population in terms of able-bodied workers per sick individual, while the burden of the negative consequences of migration is in the countryside (with poor health-care systems).

The ongoing rapid extension of the New Rural Cooperative Medical System, which now officially covers 87% of all villages in the country should, if it works, stem the crisis affecting the rural health-care system since the start of economic reforms. However, the double self-selection of migration could overwhelm any rural insurance system in the future, by decreasing healthy contributors and increasing the number of unhealthy ones. On the other hand, studies that include migrants into the urban health system (in the form of reimbursement of some medical expenses incurred in their cities of work, rather than their original rural residences) are still at an early stage.

Two additional issues deserve more attention. One is mental and behavioural health, a domain that is understudied in China. International experience suggests that, as with physical health, immigrants also have better mental health than the general population. Whether this is true of China’s internal migrants is unknown.

Clearly, migrants face a different set of stressors from non-migrants that include high mobility, high risk, low social status, and separation from family and familiar social surroundings. We expect that their mental-health issues will have a degree of specificity that deserves more research and specific intervention.

The second area is risk perception. Apart from some research on views about AIDS and tuberculosis, little systematic research exists on how Chinese rural migrants perceive health, disease, and the health-care system. Their high geographical mobility has consequences. When expected residency in a given location is limited, strong disincentives exist for migrants to invest time and money in locality or employer-based insurance programmes, or even to invest in personal health and safety measures. Youth mining (conscious and unconscious trading of future ill health for present economic opportunities) is a prevalent behaviour in migrant populations, and might cause grave health consequences in the long term.

What is needed is an understanding of how this group perceives the various possibilities for health care: self-medication, informal healers, traditional medicine, private clinics with varied levels of care, and more formal hospital treatment. These notions of risk and care opportunities, combined with their traditional models of medicine and of healing, play a big part in health-related behaviours in migrants. Understanding them will be crucial to prevention, intervention, and other health-related measures for the migrant population in China.
We declare that we have no conflict of interest.


