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# One country, two systems: Public health in China<sup>☆</sup>

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**Summary** This paper, presented in Lisbon in May 2007, uses the framework of the three domains of public health practice—namely, health protection, health improvement and health services—as a reference to outline some of the main current public health challenges in Hong Kong and Mainland China [Griffiths S, Jewell T, Donnelly P. Public health in practice: the three domains of public health. *Public Health* 2005;119:907–13.<sup>1</sup>].

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‘One country, two systems’ has become the catchphrase for Hong Kong, a special administrative region of China. The term usually refers to Hong Kong’s legacy as a former part of the British Empire, whilst at the same time remaining ethnically and culturally Chinese. Although it is a part of China, Hong Kong still retains its own governance and political structures as well as currency and legislation. Increasingly, these are becoming heavily influenced by Mainland China. Within Mainland China, the same catchphrase can be applied to the increasing gap between urban and rural areas.

## Public health in Hong Kong

### Background

In 1997, Hong Kong formally became part of China once more when it was ‘handed over’ after a century of British rule. During the days of the opium wars in the mid-19th Century, the British Empire raised its flag and claimed the barren, rocky outcrop of Hong Kong as British territory. Hong Kong Island was formally ceded to Britain by the treaty of Nanjing in 1842, and in 1898, the New Territories were leased to Britain by the Chinese for 99 years.

In the years that followed, Hong Kong grew in importance and size; for example, when it became a favoured haven for refugee industrialists fleeing from the Communist revolution in 1949. As the manufacturing industry flourished, the estimated population grew from 3.93 million in 1971 to 5.11

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million in 1981. Despite the pre-handover concerns, the transition to becoming a special administrative region of China has been smooth and successful, and Hong Kong continues to thrive. Rather than suppress its entrepreneurial spirit, Mainland China has provided Hong Kong with positive re-inforcement. Now with a population of 7 million, Hong Kong continues to be a hub of financial activity, a global trading centre, a popular shopping area for Mainlanders, and a favourite stopover location for long-haul flights from all continents. Despite the economic downturn in the late 1990s and the financial impact of severe acute respiratory syndrome (SARS) in 2003, Hong Kong's economy is booming again and it holds large government reserves.

Public health has shown great progress, in line with Hong Kong's status as a developed state. In the early days, infectious diseases such as malaria were common; one-quarter of the English garrison and one-tenth of European traders died of malaria in 1843. In contrast, there were no deaths from malaria in 2007, and only 33 reported cases.<sup>2</sup> Today, the new public health challenges are those of a developed society.

Ten years on from the handover, health statistics in Hong Kong reflect the population of a developed country. The life expectancy at birth in 2006 was 79.4 years for men and 85.5 years for women—among the highest in the world.<sup>3</sup> On the other hand, the infant mortality rate (IMR) was 1.8 per 1000 live births in the same year—among the lowest in the world.<sup>3</sup> As ever, these macro figures hide some interesting patterns. Hong Kong has a very low total fertility rate (0.98 per woman) and a large Gini coefficient (0.533), an indicator of the large, and growing, disparity in wealth in Hong Kong.<sup>4,5</sup> Against this background, Hong Kong faces the health challenges shared by many developed nations—the population is ageing and the dependency ratio is increasing.

### Health protection

Pollution is a growing problem as the booming economy increases demand for power. Older power stations in the Pearl River Delta have been reopened and, with their outdated emission standards, they have become major contributors to local pollution, along with the many under-regulated factories and growing numbers of cars and construction sites in the region. Air quality is deteriorating, and Hong Kong is also one of the noisiest cities in the world.<sup>6</sup> There is much discussion on the action needed at national,

corporate and individual levels, and the Government is actively discussing tightening legislation and promoting greater sustainability.

The SARS outbreak in 2003 was a major political and economic disaster, and memories of the epidemic act as a constant reminder of the need for surveillance and preparedness when tackling the potential risk of emerging infections such as avian flu. Control of communicable diseases is a high priority for the health system. In response to the deficiencies highlighted by the epidemic, a new organization, the Centre for Health Protection (CHP, <http://www.chp.gov.hk>), was established and it now plays a key role in co-ordinating Hong Kong's preparedness not only within the special administrative region but also with global partners. Methods of food production and the regulation of food hygiene standards are also a priority, and the Centre for Food Safety (<http://www.cfs.gov.hk>) has been newly established to deal with the health challenges associated with production and preparation of food.

### Health improvement

Hong Kong is no exception to the global trend of increasing obesity rates and subsequent increases in diabetes, coronary heart disease and other chronic non-communicable diseases.<sup>7</sup> The majority of the leading causes of death in 2004 were both directly and indirectly related to lifestyle and socio-economic environment, rather than infection. Fast food has become a staple diet, with many Hong Kongers working long hours and eating out rather than cooking at home. One of the major concerns facing Hong Kong is the impact of urban living. In 2003, the Population Health Survey found that 79.4% of women and 87.1% of men did not include sufficient fruits and vegetables in their daily diet. Health educators within the CHP have promoted a variety of initiatives including their EatSmart campaign, healthy lunch boxes for schools and discussions on food labelling (<http://www.cheu.gov.hk>). Other aspects of healthy lifestyles have shown progress. For example, the regular surveys from the Department of Health indicate low levels of smoking amongst women (4%), and rates for men had fallen to 26.8% by 2006.<sup>8</sup> The bill for designated 'no smoking' areas in public places was introduced successfully on 1 January 2007 and has been deemed successful, although some bars and clubs have been granted temporary exemption until 1 July 2009.<sup>9</sup>

The health system faces many challenges. Healthcare reform is under constant discussion

given the potential costs of longevity and technological progress. The system is unique with the majority of primary health care provided privately by a range of practitioners in the community who are paid out of pocket, whilst much secondary care is provided by the Government-funded Hospital Authority. Whilst recognizing the excellence of the hospital sector, the *laissez-faire* system of primary health care results in doctor shopping, a lack of integration between hospital and community, and concerns over the quality of patient care. In addition, there is minimal participation of private general practitioners in health promotion activities, which are left to the Department of Health. All of these compromise the standards of health-care provision.<sup>10</sup> These concerns are once again being debated in the most recent health-care reform document (<http://www.fhb.gov.hk/beStrong/emain.html>).

## Health services

Many discussions about health care and its reform neglect traditional Chinese medicine (TCM), which is very popular in Hong Kong. Following the hand-over of sovereignty from the UK to China in 1997, the Hong Kong Special Administrative Region Basic Law came into effect, and the development of TCM was explicitly recognized as a priority.<sup>11</sup> Since then, regulations have been introduced and local universities have established full-time undergraduate degree courses to train future TCM practitioners. Utilization of TCM increased by 154% between 1996 (pre-regulation) and 1999 (post-regulation).<sup>12,13</sup>

## Public health history in Mainland China

### Background

Preventive medicine has been recognized as important for many thousands of years. This is best captured in a saying from the Han period: 'The sage does not cure the sick, but prevents illness from arising.'<sup>14</sup> Preventive medicine has long focused on two aspects: self-care and public health legislation. Those who have been fascinated with the emergence of China as a world power may well have read Joseph Needham's book, 'The Grand Titration'. He describes the many scientific advances first made in China, such as gunpowder, printing, paper, foot stirrups, horse harnesses and other mechanical devices.<sup>15</sup> In their portrayal, he sets the scene for the debate between the different scientific philosophies of Eastern Chinese and

Western neo-Hellenic scientific development. The achievements of China are often forgotten in the Eurocentric approach to the history of science and medicine, which assumes the dominance of Greek scientific thinking.

The history of medicine in China is a compromise between traditional medicine such as herbalism, acupuncture and bonesetting, and Western medicine, which was introduced by the missionaries from Europe. Their influence in Hong Kong and Mainland China included starting medical colleges and public health campaigns, such as the introduction of Jennerian vaccination in the late 19th Century. The Chinese had inoculated against smallpox since the Song dynasty (AD 960–1279), but the method was not entirely satisfactory. When the Jennerian method was introduced in Macau in the mid-19th Century, it was rapidly adopted not only in Hong Kong but also across the whole of Canton. Other milestones in public health history include the lessons in prevention and epidemic control from the Manchurian plague in 1910–1911, which led to the establishment of public health and sanitation departments.

China faced immense challenges in public health when the People's Republic of China was created in 1949. As expressed by the United Nation Relief Organization in 1948: 'China presents perhaps the greatest and most intractable public health problem of any nation in the world. Underlying this problem is the excessive pressure exerted by a vast and still growing population against economic resources and production.'<sup>16</sup> Against this background, China introduced a health system in the 1950s that was characterized by an emphasis on public health and prevention. The same era saw the integration of Western medicine and TCM.

Mao broached the subject of hygiene in his speeches in the early days of the People's Republic. One such mention was his famous attack on four 'pests': rats, sparrows, flies and mosquitoes, although he later recognized sparrows as inappropriate for the list, and substituted bed bugs in their stead.<sup>17</sup> During the 1950s, diseases such as plague, cholera, smallpox, malaria and blackwater fever were gradually eliminated. By 1983, there were an estimated 1.36 million people affected by malaria, a reduction from 30 million. Through a public health campaign, the rates of bilharzia worm infection were also cut dramatically to near disappearance.<sup>17</sup> The most important aspect of the bilharzia campaign was education of the public, who, for the most part, participated wholeheartedly in the effort to eradicate the snails from which bilharziasis originates.<sup>14</sup> Another achievement includes the reduction of leprosy cases, which in

Shandong Province was reduced from 5.07 cases per 100,000 people in 1955 to 0.14 cases per 100,000 people by the early 1980s. Part of the effectiveness of these public health campaigns was due to the mobilization of local people trained in basic public health. In 1975, there were 1.56 million 'barefoot doctors' or village doctors; this equates to approximately 2.5 barefoot doctors per 1000 people in the rural population.<sup>18</sup> The barefoot doctors are part-time health workers and provide basic primary, preventive and some curative health care in rural communities.<sup>19</sup> Collectively, life expectancy at birth increased dramatically from 35 years in 1949 to 67.9 years in 1981, and the IMR decreased sharply from 200 per 1000 live births in 1949 to 34.7 per 1000 live births in 1981.<sup>20</sup>

## Background to public health in China today

What of public health in Mainland China today? The problems of an ageing society, pollution, emerging infectious diseases and lifestyle-related diseases are all relevant to Mainland China, which is estimated to house one-fifth of the 1 billion obese people in the world.<sup>21</sup> Compared with Hong Kong, the scale of the public health challenges in China are massive, and the significant division between developed urban areas and less developed rural areas throws the problems into sharp relief and makes them more urgent. As highlighted in the China Human Development Report 2005, the struggle to modernize China is not just to promote economic growth but to promote overall social progress, set policy goals that balance development among rural and urban regions, create greater employment opportunities, provide better education, and create a robust public health system.<sup>22</sup>

A major problem for policy makers is the unevenness of economic growth across China. The World Bank has estimated a 50% increase in the Gini coefficient between 1982 and 2002.<sup>22</sup> This means increasing income inequity for the rural poor, the urban poor, rural migrants and land-expropriated farmers. Gaps in healthcare quality can fuel social unrest or even riots in rural areas, raising political anxiety and pushing policy change.<sup>23</sup>

China's healthcare statistics reflect the growing inequality between rural and urban areas. Although there has been a significant reduction in infant, maternal and under-5 mortality rates overall, the improvement is unevenly spread between different regions. In 2000, the discrepancy in life expectancy at birth between urban and rural settings had increased to 12.5 years (77.7 years in urban areas

versus 65.2 years in rural areas).<sup>24</sup> The IMR in the poorest rural areas was 5.24 times that in the large cities in 1981 (87.0 versus 16.6 per 1000 live births); by 2000, the difference had grown to 9 times (54.0 versus 6.0 per 1000 live births).<sup>24</sup> The major causes of child mortality are neonatal asphyxia and trauma, low birth weight and pneumonia, all of which are eminently treatable. In fact, 63.9% of deaths in children under 5 years old are neonatal deaths, reducible by prevention strategies and by increasing the accessibility and affordability of care.<sup>25</sup>

Urban and rural discrepancies are also reflected in children's nutritional status. Children in rural areas are more likely to be malnourished than those in cities. In rural areas, 10–20% of children aged 1–4 years were below 80% of the median weight for their age, whereas in cities, only 3% were observed to be underweight.<sup>26</sup> While malnourished children are experiencing stunted growth in rural areas, childhood obesity is becoming a major child health problem in the cities.

### A tale of two children: illustrating the disparities between urban and rural living

Child A, an only child, lives in Shanghai. He has passed Grade 5 piano and is on the school sports team. He often goes on holiday with his parents, who pay for his upbringing and schooling, and he expects to go to university when he is older, possibly in the USA. His parents own their flat and have also bought one for his grandparents, who live close by and who take care of him after school. Although he studies hard, he has a games console, a television and a computer of his own. He has had all his immunizations, and if he becomes ill, his parents can get preferential treatment for him because his mother is a civil servant. When his grandmother was sick, Child A heard his parents complain about the medical bills, but they were able to pay for tests and treatment. His grandmother eventually recovered, with the help of the local TCM doctor who gave her tonics and acupuncture.

Child B is the same age as Child A and lives in a small village in Yunnan. She has another sister and her parents were very upset that she was not a boy, because her father, a farmer, will need help in the fields as he gets older. Another child would add to the family expenditure. Her uncle left the village for a job in Shanghai because he wanted to make money as a factory worker and lead a better life. The whole family, including her grandmother, lives in a small house with no electricity and no running water. Her grandfather died last year. He had had an operation but left hospital early to reduce costs. Her father had to sell some of their possessions to

pay for the medical care, but was unable to afford the antibiotics. He is now talking about joining the new health insurance scheme for local farmers.

## Health protection

The scope of health protection includes disease prevention, environmental health, occupational safety, and food and water safety. A few examples of the challenges faced are given below.

### Infectious diseases

Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) ranks as the primary threat among infectious diseases. The first AIDS cases in China were diagnosed in 1985. Their number has been increasing rapidly in the past decade. By the end of 2007, there were 700,000 Chinese living with HIV/AIDS, with a prevalence rate of 0.05% in the general population.<sup>27</sup> The AIDS epidemic is characterized by a wide disparity among different regions, with the Yunnan, Xinjiang, Henan and Guangxi Provinces having the highest prevalence. Furthermore, in areas with a high HIV/AIDS prevalence among high-risk behaviour groups (notably injecting drug users and sex workers), the epidemic is spreading into the general population. The main HIV transmission route has shifted from commercial blood and plasma donation to the intravenous injection of drugs, and may also move towards sexual transmission in the future.<sup>27</sup> Major challenges currently encountered by China include:

- the lack of effective implementation of strategic plans;
- the lack of effective information collection, analysis, integration and utilization;
- the need to improve information, education and communication to enhance HIV/AIDS awareness;
- the lack of effective interventions for reducing high-risk behaviours;
- the need to improve comprehensive treatment, care and support; and
- the gap between health needs and available resources.

Linked to HIV/AIDS and also of major concern to health is the problem created by tuberculosis (TB). China is ranked second in the 22 countries under pressure from TB. Currently, China has an infection rate of 44.5%, with about 5 million TB patients, 80% of whom live in the countryside.<sup>28</sup> The relatively low case-detection or case-finding rate, the absence of a sound financing mechanism, the

development of multi-drug-resistant strains of TB, and the difficulties with controlling TB in floating populations are all major barriers to tackling the TB problem.

### Environmental health

The environmental challenges facing China today form a study in themselves, with particularly serious concerns on air, water and food safety. The price of economic growth has been the worsening of air quality, and newspapers frequently display pictures of thick smog in urban areas, with stories of children unable to use new playground equipment because of the sooty deposits. Equally worrying are the questions on food quality, which arise from dubious manufacturing or animal-rearing processes. Amid stories of chemical spills polluting drinking water, as well as the increasing drought from climate change, it becomes uncertain how the water supply will meet the needs of the growing population in the long term. Approximately 70% of the water in five major river systems has been deemed unfit to drink, and it is estimated that 700–800 million people drink contaminated water on a daily basis.<sup>29</sup>

### Occupational safety

In the rush to exploit the natural resources needed for manufacturing processes, shortcuts are not uncommon. The mining industry is particularly hazardous, and mining accidents have become a major cause of avoidable mortality.<sup>30</sup> These accidents, as well as the problems created by natural disasters, highlight the need for a co-ordinated public health response.<sup>31</sup>

### Health improvement

One of the impacts of economic growth has been the growing rates of overweight and obesity. According to Chinese definition, 303 million Chinese (23.2%) are currently overweight, with a body mass index (BMI) greater than or equal to 24 kg/m<sup>2</sup>. Among them, 73 million (5.6%) are clinically obese (BMI ≥ 28 kg/m<sup>2</sup>).<sup>32</sup> The rise of overweight and obesity in China started in the late 1980s, mainly caused by increased energy intake and decreased physical activity. According to the data from national nutrition surveys, the prevalence of obesity and overweight increased by 80% and 47%, respectively, in the 10 years between 1992 and 2002.<sup>33</sup> Dynamic analyses of data from four National Surveys on Chinese Students' Constitution and Health in 1985, 1991, 1995 and 2000 clearly showed the epidemic of overweight and obesity in

Chinese children and adolescents.<sup>34</sup> From 1991 to 2000, the prevalence of obesity in large cities increased 4.2 times in boys (from 1.3% to 5.4%) and 3.2 times in girls (from 0.9% to 2.9%). By 2000, the prevalence of obesity in boys aged 7–9 years, in Beijing and other developed cities in China, had reached 12.9%, which is the average level in middle-income countries across the world.

Another major public health challenge is smoking. Tobacco poses a massive threat for future generations. The recent Tobacco Atlas emphasized that three out of every 10 cigarettes smoked globally are smoked in Mainland China; 67% of all Chinese men are smokers, although only 2% of Chinese women smoke.<sup>35</sup> Moreover, 60% of male doctors smoke, and cigarette production increased seven-fold between 1960 and 2003. Estimates suggest that one-third of men under 30 years of age will be killed by tobacco if smoking patterns continue, and the direct costs of smoking are currently around 4.3 billion US dollars per year. As a signatory to the World Health Organization Framework Convention on Tobacco Control, China is committed to addressing the problem, but there is a long way to go.<sup>36</sup>

## Health services

Perhaps the biggest challenge for the Government of Mainland China is healthcare reform—a topic of constant debate. Undoubtedly, one of the biggest dilemmas is in providing an equitable and sustainable healthcare system. The current system, which is heavily reliant on users who pay for medical services, favours the better off. Whilst many other health systems have emulated the community-based outreach healthcare services, latterly known as ‘barefoot doctors’, these have all but disappeared in China with the introduction of a market-based system. There is no healthcare ‘safety net’, and many of the rural poor struggle to find accessible and affordable health care. It has been estimated that more than 500 million peasants lack adequate health care and risk impoverishment if they become ill.<sup>23</sup> Studies have found more than one-third of the drugs dispensed to rural communities are counterfeit. Not surprisingly, there is little confidence in community-based systems, and building this confidence is one of the major challenges facing the Government.<sup>37</sup> In 2006, medical concern was ranked the primary social concern by the public. According to research by the Chinese Academy of Social Sciences, 58% of the Chinese thought it was difficult and expensive to see a doctor.<sup>38</sup> The Central Government of China

stated, ‘China’s health system has changed greatly and has made much progress since the reform and “opening up”, but the problems are still serious. Overall, the reform was unsuccessful’.<sup>39</sup> The political response has been to launch a campaign to create a ‘new socialist countryside’, making the development of healthcare systems—including public health—a priority for the Government.<sup>40</sup>

Major issues to be addressed include the need to address inequitable healthcare resources, to develop new policies at government level, to rebuild the safety net formerly provided by the barefoot doctor system, and to re-invest in preventive medicine and promotion of personal hygiene. Price regulation has unintentionally increased the sale of high-tech interventions and expensive drugs, and the cost of health care has risen sharply, with a nearly 600% increase between 1990 and 1999.<sup>41–43</sup> Total health expenditure rose by 40 times from 1980 to 2002, increasing that paid by individuals by about 110 times. Meanwhile, many have lost their healthcare coverage; 80% of people in rural areas and 40% in urban areas did not have any medical insurance prior to the introduction of the new insurance reforms in 2007.<sup>20</sup> According to Wang et al., in poor rural areas, medical expenditure was greater than total income in 18% of families; in families with an average per-capita income of less than 500 RMB, medical expenses represented approximately 23% of income; 24.3% of households borrowed money and 5.5% sold their property or belongings to pay medical bills; and the proportion of poor people in rural areas increased from 7.2% to 10.5% after paying medical expenses.<sup>42</sup>

In addition, rural areas, in particular, face workforce shortages. For example, only a small proportion of doctors working at township or county levels have medical qualifications of 4–5 years, since many of the better qualified have gravitated to urban areas.<sup>20</sup> As a result, public health services are understaffed, and having to work in a complex, hierarchical organizational structure merely compounds the difficulties. Deficiencies in Continuous Professional Development and a lack of evidence-based guidelines create further problems in delivering effective, integrated primary health care.

## Response

Earlier in 2006, the Government of the People’s Republic of China decided to initiate a novel reform of the health system to overcome these problems. Gao Qian, a former minister of the Health Ministry,

announced that the reform will have four guiding principles:

- the Government is committed to balanced development;
- health is the goal of economic and social development;
- the Government should take responsibility for protecting people's basic health needs; and
- the Government should take the leading role in health care, while the private sector acts as a supplement.

The new medical reform plan aims to establish a basic health system covering both urban and rural people, and to promote health for all.<sup>44</sup> Improving health equality is key to achieving the overall objective. The focus will be on improving the systems for the public health service, medical services, medical insurance, and drug production and supply. Current policy initiatives include increasing health expenditure, particularly in poor rural areas; establishing and accelerating the Rural Co-operative Medical Scheme;<sup>45</sup> developing community health services and improving the health insurance system in urban areas, especially for migrants; and strengthening the public health system. Resources are also being used to build up an Internet-based reporting system, to strengthen hospital management, and integrate TCM and Western medicine.

China has now set its important strategic goal, 'Healthy China 2020', with the aspiration that 'all people will enjoy basic medical care and health services by 2020'.<sup>46</sup> The challenge for health care in China is massive and while the need to build the public health infrastructure is clear, it will take time to turn the situation around in such a vast country.

## Conclusion

This paper aimed to use the three domains of public health as a framework to paint a picture of public health challenges faced by Hong Kong and China. In summary, whilst the laissez-faire, capitalist society of Hong Kong faces problems associated with its economic success and unique environment, Mainland China faces the same challenges on a greater scale, compounded by the challenges of health inequalities which reflect the complexity of the social and economic revolution currently taking place.

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