Health system reform in China 2

Emergence and control of infectious diseases in China

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Infectious diseases remain the major causes of morbidity and mortality in China despite substantial progress in their control. China is a major contributor to the worldwide infectious disease burden because of its population size. The association of China with the rest of the world through travel and trade means that events in the country can affect distant populations. The ecological interaction of people with animals in China favours the emergence of new microbial threats. The public-health system has to be prepared to deal with the challenges of newly emerging infectious diseases and at the same time try to control existing diseases. To address the microbial threats, such as severe acute respiratory syndrome, the government has committed substantial resources to the implementation of new strategies, including the development of a real-time monitoring system as part of the infectious-disease surveillance. This strategy can serve as a model for worldwide surveillance and response to threats from infectious diseases.

Introduction

Since the establishment of the People's Republic of China, the life expectancy of the average Chinese individual born in 1949 has increased from 35 years at birth to 63·2 years in 1970–75, and to 72 years in 2000–05.[1,2] This increase has been accompanied by a reduction in the infant mortality rate from 200 per 1000 livebirths in 1949 to 23 per 1000 in 2005.[1,2] These impressive gains were probably due to a substantial reduction in rates of infectious diseases.[3]

As China entered the 21st century, concern about infectious diseases was abating. However in 2003, the severe acute respiratory syndrome (SARS) epidemic struck, bringing the country to a standstill. The attention of the entire country and indeed the world focused on the control of this infectious disease. Many questioned the readiness and openness of China to confront an infectious disease epidemic. Since the SARS epidemic, interest in the emergence and control of infectious diseases in China has been renewed.

In this paper, our three main objectives are to describe the changing epidemiology of infectious diseases in China; describe the major strategies undertaken by the government to control known and emerging infectious diseases; and discuss the key ingredients for success in the control of infectious diseases and the major challenges confronting their future control. China's experience can provide a model relevant to other developing countries.

Search strategy and selection criteria

We searched PubMed for English language papers, and Wanfang Data and VIP-Information for Chinese language papers. We used the search terms "infectious disease", "morbidity", "mortality", "prevention", "elimination", and "China" in combination with the term "review". We mainly selected publications in the past 10 years. We manually searched the Chinese yearly health statistics and government reports published in the past 5 years. We accessed the national notifiable infectious diseases database for morbidity and mortality data in 1970–2007.

Changing epidemiology

Reporting system for infectious diseases

The Chinese Government established a routine reporting system for selected infectious diseases in the 1950s. Only two major changes have been made to this system in more than 50 years. First, the number of notifiable diseases (class A: highly infectious and can cause large epidemics in very short time [only plague and cholera are in this class]; class B: might cause epidemics [epidemic cerebrospinal meningitis (mainly meningococcal meningitis), scarlet fever, epidemic encephalitis B (Japanese encephalitis), malaria, epidemic haemorrhagic fever (hantavirus haemorrhagic fever with renal syndrome), hook-worm diseases, brucellosis, rabies, anthrax, hepatitis (A,B,C,E, other), diphtheria, pertussis, poliomyelitis, measles, dysentery, typhoid and paratyphoid, dengue fever, gonorrhoea, syphilis, AIDS, tetanus neonatorum, HIV infection, tuberculosis, severe acute respiratory syndrome, schistosomiasis, human avian influenza]) increased from 15 when the system was started in the 1950s to 25 in 1970, 26 in 1996, 27 in 1997–2003, and 28 in 2004, and then decreased to 27 in 2005, with 18 diseases consistently reported from 1970 to 2007 (panel 1). Second, the system switched from paper-based reporting to the submission of electronic files in 1985, and since 2003 has used web-based reporting (figure 1). In 2008, when the earthquake occurred in Sichuan, a cellular phone reporting programme was developed and integrated into the existing system.

Morbidity and mortality of infectious diseases

China had a rapid reduction in the yearly incidence of the 18 consistently reported infectious diseases from 1970 to 2007, decreasing from between 4000 and 4340 cases per 100 000 population per year in 1970–71 to between 120 and 250 cases per 100 000 per year in 1990–2007 (figure 2). These diseases included malaria, measles, pertussis, and dysentery.[4] However, the reported rates from 1990 to 2007 changed little (figure 2). A similar pattern of reduction was reported in the mortality rate of the 18 consistently notifiable infectious diseases. For these diseases, mortality decreased from 8–9 deaths per 100 000 population per year in 1970–73 to less than one death per 100 000 population per year in 1991–2007 (figure 3).[4] In 2006, deaths from infectious diseases accounted for only 1·2% (3·38 per 100 000 population for deaths from infectious diseases, and 530·46 per 100 000 population for overall deaths) of the overall mortality in both urban and rural areas.[5]

Most commonly reported infectious diseases

In the past a few years, the most commonly reported cases of and deaths from notifiable diseases have resulted from a small number of major infectious diseases. In 2006, the five most frequently reported infectious diseases in China were tuberculosis, hepatitis B, dysentery, syphilis, and gonorrhoea, accounting for 3 963 663 of 4 608 910 (86%) reported cases of the 27 notifiable infectious diseases. In 2006, five infectious diseases—ie, tuberculosis, rabies, HIV/AIDS, hepatitis B, and Japanese encephalitis B, accounted for 9439 of 10 726 (88%) deaths from the 27 notifiable infectious diseases in China.[6]

Re-emergence of selected infectious diseases

In the past few years some infectious diseases—particularly sexually transmitted diseases—have substantially increased. Sexually transmitted diseases were nearly eliminated in the 1970s after a 20 year effort,[7] but since the start of socioeconomic reforms in 1978, and a large increase in migrant populations and in commercial sex, these diseases have been proliferating.[7–9] Gonorrhoea and syphilis are now among the top five most common notifiable infectious diseases.[6,10,11] The incidence of measles per year has increased in the past few years; half these cases occur in children of migrant workers who have lower immunisation coverage and lower antibody concentrations than do the children of non-migrants.[12,13]

Emergence of infectious diseases

Spread of HIV/AIDS

HIV/AIDS was first reported in China in 1985 and by 1998 infection had spread to all 31 provinces. The 2007 estimate suggests that about 700 000 people are living with HIV/AIDS, with 50 000 new infections per year.[14] The Chinese Government has identified HIV/AIDS as a major threat to public health. The continuing challenges in the control of HIV/AIDS are outlined in a review by Zhang and colleagues[15] in this Series.

SARS

The first new infectious disease identified in the 21st century was caused by the SARS coronavirus—an airborne pathogen.[16] The first cases of SARS were retrospectively identified in Guangdong Province in November, 2002. Infection spread within Guangdong and to Hong Kong, then from Hong Kong to other parts of the world. Simultaneously, SARS spread to other provinces in China, including Beijing (in March, 2003), resulting in the world's largest local SARS epidemic.[17] Overall, China reported 5327 of 8071 (66%) cases and 349 of 776 (45%) deaths from the 2003 worldwide SARS epidemic.[18] After some delay in response, the government mobilised the entire country

Panel 1: **List of notifiable diseases in China, 1970–2008**

Present notifiable diseases*
- Plague†
- Epidemic cerebrospinal meningitis (mainly meningococcal meningitis)†
- Scarlet fever†
- Epidemic encephalitis B (Japanese encephalitis)†
- Malaria†
- Epidemic haemorrhagic fever (hantavirus haemorrhagic fever with renal syndrome)†
- Hook-worm diseases†
- Brucellosis†
- Rabies†
- Anthrax†
- Hepatitis (A,B,C,E, other)†
- Diphtheria†
- Pertussis†
- Poliomyelitis†
- Measles†
- Dysentery†
- Cholera†
- Typhoid and paratyphoid†
- Dengue fever (1990)
- Gonorrhoea (1990)
- Syphilis (1990)
- AIDS (1990)
- Tetanus neonatorum (1996)
- HIV infection (1997)
- Tuberculosis (1997)
- Severe acute respiratory syndrome (2004)
- Schistosomiasis (2005)
- Human avian influenza (2005)

Past notifiable diseases (notified from 1970–89)
- Smallpox
- Relapsing fever
- Tsutsugamushi disease
- Forest encephalitis (tickborne encephalitis)
- Influenza

Past notifiable diseases (notified from 1970–2004)
- Ship-fever (mainly louse-borne typhus)
- Kala-azar (visceral leishmaniasis)

*Notification began in 1970, unless otherwise shown within parentheses. †One of the 18 consistently notifiable infectious diseases reported from 1970 to 2007.

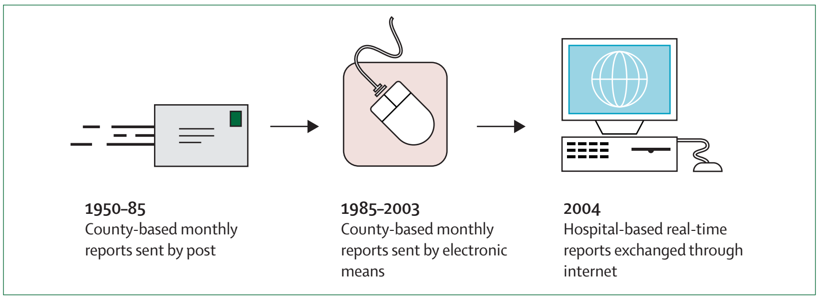

Figure 1: **Development of a reporting system of notifiable diseases in China**

to control the spread of the epidemic. After successful containment in June, 2003, three other laboratory-related outbreaks occurred in Beijing, Singapore, and Taiwan.[19] The origin of the virus was never identified, but studies suggest that bats might serve as the animal reservoir[20–23] and that civet cats might have been the immediate source of the virus that infected people.[24]

Highly pathogenic avian influenza (H5N1)

The first human cases of avian influenza caused by the H5N1 strain were reported in Hong Kong in 1997, but the initial outbreak was contained by the rapid public-health response.[25] Since then, outbreaks have occurred in poultry or wild birds, or both, in at least 55 countries. By April, 2008, 382 human avian influenza cases (241 fatal) were documented in 14 countries.[26,27] Mainland China has had 88 avian influenza outbreaks in poultry and birds in 23 provinces, and it reported its first human avian influenza case in November, 2003. By the end of April, 2008, a total of 30 human cases and 20 deaths had been reported.[28]

Streptococcus suis

S suis (a microbe that occurs in pigs) caused the largest ever reported outbreak of infection in people in Sichuan province, China in 2005.[29,30] The pathogen identified as causing human disease was a highly virulent clone.[31,32] A total of 215 human cases were reported, with 38 deaths.[29,33] Most cases were previously healthy adult male farmers who had been in contact with sick pigs or their products. No person-to-person transmission was noted.[32] Cases have also been reported in Vietnam, Thailand, the Netherlands, and other countries with intensive pig rearing.[33,34]

Zoonoses and infectious disease emergence

Zoonoses—infections transmitted from animals to people—such as, SARS and avian influenza, are prominent in emerging infections in China and worldwide. Domestic and wild animals are sources of well characterised and new microbial threats to people. The increasing size and density of populations with the expanding interface between people and animals provide increased opportunities for previously unknown microbes to enter the human population.

As wealth has increased in China, consumption of animal protein has increased and the number of animals raised for food, especially pigs and poultry, has expanded rapidly. Between 1968 and 2005, the increase in the human population was less than two-fold (790 million to 1·3 billion), whereas it was almost 100-fold (5·2 million to 508 million) in the pig population and more than 1000-fold (12·3 million to 13 billion) in the poultry population.[35] In China, as in most other developing countries, these animals are raised in close association with people, increasing the risk of transmission from animal to people.

The interest of the Chinese people in exotic food further increases the risk of transmission of infection from animals to people. Animals that previously were not used for food consumption are readily available in Chinese markets, in which live animals of diverse species might have contact with people and each other. People can come into contact with the microbial flora of animals through raising, collection, transportation, trade, slaughter, preparation, and consumption of animals and their products.[36]

Movement of live animals and trade across borders are the other routes by which pathogens can reach new animal and human populations. Animals and birds that migrate or fly and are not confined in closed spaces share their microbial flora with other species. For example, studies show viruses that infect bats can cause disease and death in other species, including people.[37] Other examples include the SARS coronavirus and the Nipah virus, which have caused outbreaks in other Asian countries.[37,38] Other microbes not yet characterised but which might be pathogenic to people exist in animal populations. A related concern is that the increased use of antimicrobial drugs (including antiviral drugs) in animal populations could affect resistance profiles of bacteria and viruses that infect people. The *S suis* strains implicated in the outbreaks in China have acquired tetracycline resistance.[39]

Outcomes of emerging infectious diseases

Although the emerging infectious diseases in China have not resulted in large epidemics, they are important because of their potential for swift national and international spread if not quickly detected and contained; The spread of SARS is perhaps the best example to date. With less than 8000 cases worldwide, the SARS outbreak clearly showed how a new infectious disease can cause social instability and economic disruption with repercussions worldwide. The outbreak is estimated to have resulted in a total loss of US$25·3 billion to China's economy and a 1–2% drop in China's gross domestic product growth rate for 2003.[40] Although the circulating H5N1 avian influenza virus does not transmit well from person to person, it could undergo genetic change that would affect transmissibility, or another influenza virus with pandemic potential could emerge.[41]

Because of the potential for quick national and international spread of emerging infectious diseases, rapid detection and containment will be needed to prevent an epidemic or pandemic. Unusual and new

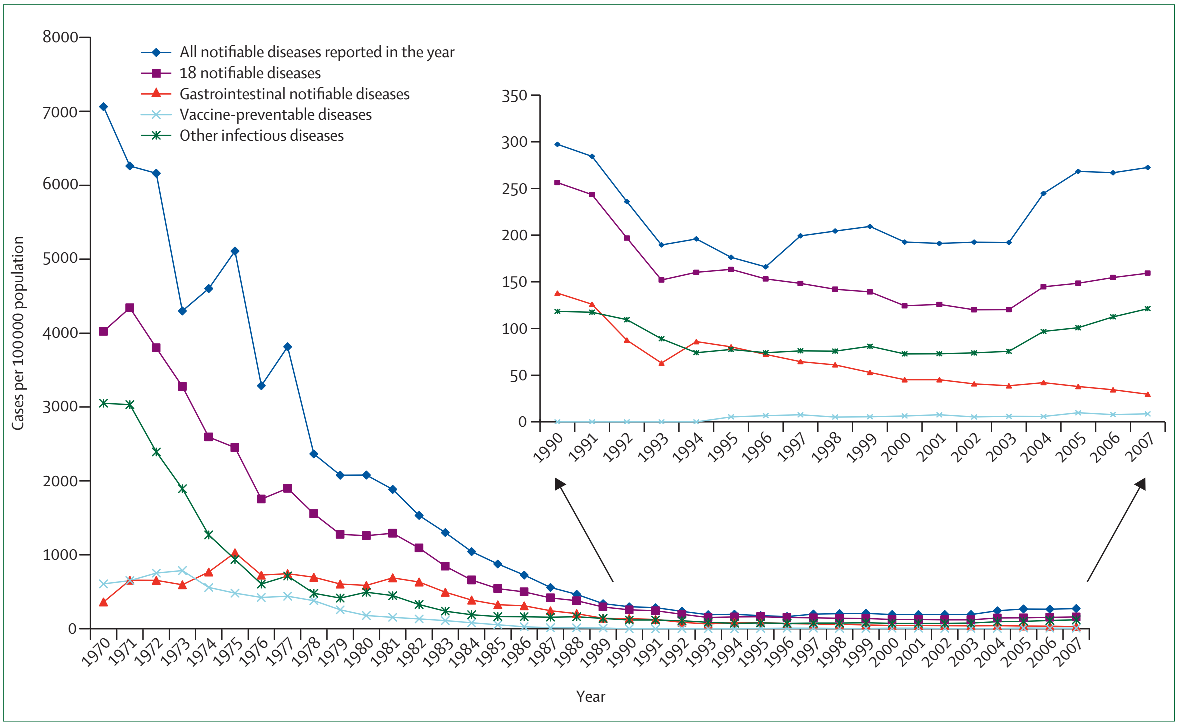

Figure 2: **Trends in incidence (cases per 100 000 population per year) of notifiable infectious diseases in China during 1970–2007**
Vaccine-preventable diseases were pertussis, diphtheria, polio, and measles. Gastrointestinal infectious diseases were cholera, dysentery, typhoid, and paratyphoid.

infections might be highly visible, can provoke anxiety, disrupt travel and trade, and lead people to flee to try to avoid them. Resolution of these types of difficulties requires good science, surveillance, implementation of effective interventions; and an effective communication system to inform the at-risk communities and to educate them about the appropriate measures to be taken.

The enactment of the International Health Regulation is designed to improve communication and coordination between countries so that early reporting and response to emerging infectious diseases can take place. China is committed to implementing this new regulation. The importance of China in addressing emerging infectious diseases and being part of the worldwide surveillance and response network is highlighted by evidence suggesting that H3N2 influenza viruses originating in east and southeast Asia each year subsequently seed influenza virus epidemics worldwide.[42]

Control of infectious diseases

In recognition of the changing challenges of infectious diseases, China's government is simultaneously undertaking two main approaches to deal with this issue. The first is to continue to reduce the burden of the infectious diseases that have the biggest effect on the health of the nation. The second is to build an effective disease surveillance and response system to rapidly identify newly emerging infectious diseases and to minimise their spread in China and the rest of the world.

Strategies to control infectious diseases

Various strategies have been used to control the spread of infectious diseases in China. Some strategies have been proven to be effective worldwide. These strategies include improvement of water supply and sanitation; improvement of the safety of blood collection; control of populations of mice, flies, mosquitoes, insects, and other vectors; and a change in relevant legal codes for infectious diseases (such as the 2004 revision of the Law of the People's Republic of China on the Prevention and Treatment of Infectious Diseases). These strategies have reduced the incidence of water-borne, food-borne, blood-borne, vector-borne, and other infectious diseases.

China has used specific strategies that have been especially helpful in the control of infectious diseases, including strong government commitment and leadership—eg, the state council AIDS working committee chaired by a vice premier with 29 ministers and seven local provincial governors, and free treatment for major infectious diseases (eg, tuberculosis, HIV/AIDS; panel 2). The use of these strategies is described in this Series.[15,43] In this paper, we draw attention to the use of these strategies in the control of the spread of tuberculosis.

Progress in the control of the spread of tuberculosis was slow before 2000, with only 30% of estimated new infectious cases detected and treated with the WHO-recommended directly observed treatment, short-course strategy.[44–46] Between 2000 and 2005, the state

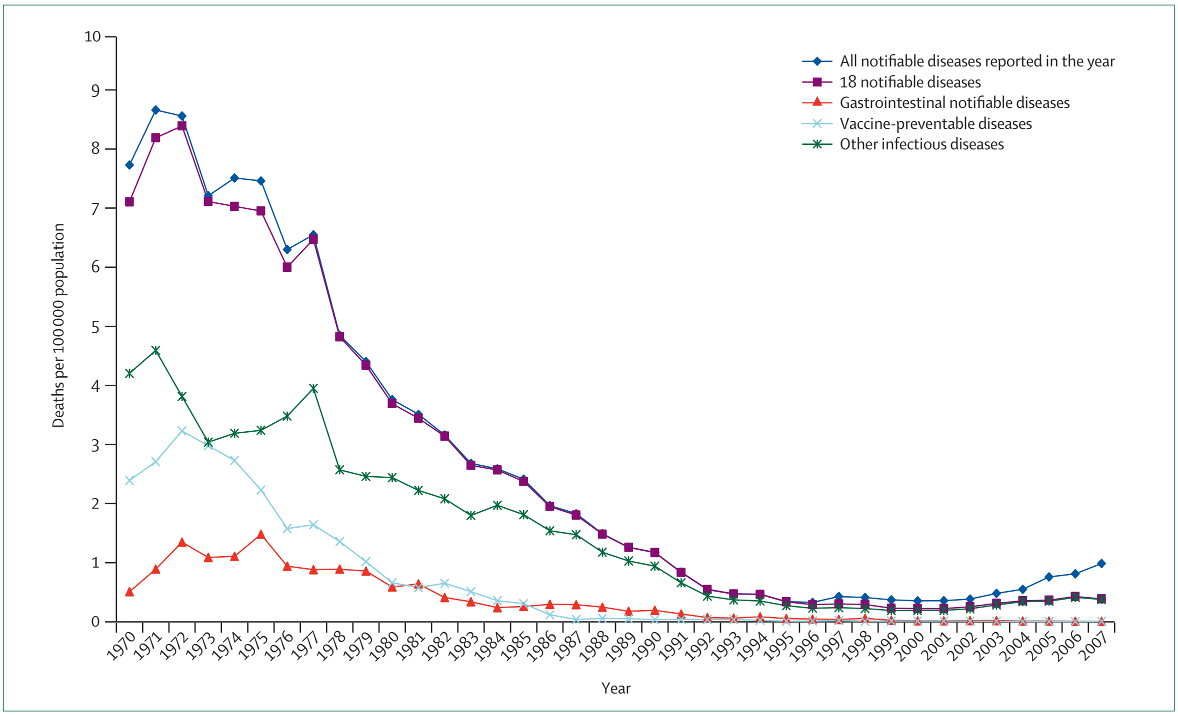

***Figure 3:* Trends in deaths (per 100 000 population per year) from notifiable infectious diseases in China during 1970–2007**
Vaccine-preventable diseases were pertussis, diphtheria, polio, and measles. Gastrointestinal infectious diseases were cholera, dysentery, typhoid, and paratyphoid.

***Panel 2:* Specific strategies for infectious disease control in China**

Central government leadership is essential for local governmental response
The amount of central government attention to infectious diseases largely determines the amount of local governmental response.

Local governments are accountable for achieving disease control targets
Local government officials will support and prioritise control of infectious diseases when they are given specific disease control targets and know they will be held accountable for achieving them.

Central government increases local government funding for control of infectious diseases
Such funding provides local government with the necessary resources to implement disease control programmes, and serves as an example and incentive to increase local funding.

Innovative technologies and approaches to improve disease control
Perhaps the best example is the use of the new internet-based disease reporting system to improve the reporting and follow-up of infectious diseases.

Pilot or demonstration projects to develop national disease control policies
These projects help develop the best approach within the Chinese context, including the adaptation of international best practices; frequently needed to convince policy makers of the feasibility and effect of specific approaches.

Contribution of international collaboration
International collaborative projects have provided the needed funding to implement disease control programmes. More importantly, they have trained many health professionals in international best practices and management approaches.

council held three video-teleconferences with provincial government leaders to encourage an accelerated plan to control the spread of tuberculosis. Clear targets for case detection and treatment success were disseminated to every county and district in China, and progress was vigorously monitored.[45] The Chinese ministry of health and the WHO regional office in Asia and the Pacific jointly held a special meeting with the governors of the 12 provinces in which the targets were not met to further encourage them to achieve their goal.

The central government increased provision of resources to the local government by increasing the tuberculosis budget more than seven-fold. International collaborative projects provided additional support to the national tuberculosis control programme. The ministry of health provided widespread technical assistance and training, and monitored the implementation of quality-control programmes. With the new internet-based disease reporting system, specific efforts were taken to ensure that all suspected and confirmed cases of tuberculosis seen in China's vast hospital system would be immediately reported to the local Centre for Disease Control and Prevention (CDC). In turn, CDC staff actively follow-up these reported cases. This approach, which linked the hospital and the public-health services, played an important part in increasing the detection of tuberculosis cases.[45] By the end of 2005, the detection of infectious cases had increased to 80% and treatment was successful for 92% of these cases, surpassing the 2005 worldwide tuberculosis control targets set by the WHO. China was one of only four countries with a high tuberculosis burden to achieve this target.[45]

Improvement in the disease reporting system

Present strategies for the control of emerging infectious diseases focus on early detection and response. The SARS epidemic drew attention to substantial weaknesses in the infectious diseases surveillance and response system. A robust system should enable identification of old diseases, and rapid recognition of and response to new ones.

As SARS cases began to arise and increase in various parts of China, policy makers could not obtain timely and accurate information on the extent and distribution of the epidemic. Reports from hospitals to the public-health system were delayed and incomplete. On April 24, 2003, during the SARS epidemic, local CDCs were required by the ministry of health to report daily (through a secured website) the number of cases in their jurisdiction. A month later, on May 24, 2003, local hospitals were required to submit information on SARS cases with this same web-based system. This reporting system provided policy makers with essential and up-to-date information on the epidemic and it showed the usefulness of information technology in disease control.

After the 2003 SARS epidemic, the Chinese Government resolved to improve its disease surveillance system. The ministry of health took note of the successful use of modern information technology during the epidemic and built the world's largest internet-based disease reporting system, called the China Information System for Disease Control and Prevention (CISDCP). The CISDCP had two important improvements compared with the previous reporting system. The first is that diseases were reported in real time. In the past, hospitals and clinics would submit case-report forms to their county or district CDC; local CDCs would submit report summaries once a month up the chain to the national CDC. With the CISDCP, hospitals and clinics immediately and directly reported through the internet. This innovation allows public-health officials to have real-time information on diseases so they can immediately identify disease outbreaks and implement any needed containment strategies.

Reports of notifiable diseases from hospitals in real time with the passage of the new law on infectious disease reduced the under-reporting of infectious diseases. Before this, health-care providers and hospitals did not take disease reporting seriously.

The second improvement of this new reporting system included the availability of case-based reporting instead of aggregate reporting. With case-based information, health officials can immediately identify the nature and location of a particular disease outbreak, the characteristics of clusters of cases (eg, age, sex, occupation), and (with geographic-information-system technology) the precise geographic location of the outbreak down to specific villages and households.

Another benefit of the system is that in the build-up to the system being introduced, many ordinary public-health workers received improved comprehensive training in disease surveillance. Many health workers have developed an improved understanding of the principles and importance of disease surveillance by working with the system on a daily basis.

Early detection system for emerging infectious diseases

Improved reporting of known infectious diseases will not necessarily lead to earlier detection of and rapid response to a new disease. To address this difficulty, the Ministry of Health developed a surveillance and response system for pneumonia of unknown cause, in which reporting through the CISDCP is required. Pneumonia was selected because airborne pathogens, such as the SARS coronavirus, highly pathogenic avian influenza, or human influenza are most likely to cause a major rapid disease epidemic. Once a patient's profile meets the clinical, radiological, and laboratory criteria of pneumonia of unknown cause, hospitals are required to report the case within 24 h and, if necessary, take immediate action to contain the spread of the disease. Once the national CDC identifies a case of pneumonia of unknown cause through the CISDCP, active contact with the provincial and lower-level CDCs and hospitals ensures that the case is properly diagnosed and managed, and that appropriate measures are undertaken to contain the disease.

236 cases of pneumonia of unknown cause were reported during 2005 and 2006. After proper assessment and follow-up, 21 cases were confirmed human avian influenza (H5N1). Most of these cases were not linked to known avian influenza outbreaks in poultry or birds, so the surveillance system played a key part in their identification. For the 21 cases, the average time from symptom onset to report in the CISDCP system was 9·5 days and a further 10 days to confirm the presence of human avian influenza infection. Confirmation of a disease would lead to a reporting delay of at least 10 days, which could have led to further disease transmission. Although much more work is needed to further improve this surveillance system, initial results are encouraging. If an influenza pandemic were to begin in China, this surveillance system could identify clusters of pneumonia of unknown origin in real time, thereby providing Chinese health authorities and the rest of the world with early warning of the start of the pandemic.

Challenges

As China looks ahead to deal with existing and new infectious diseases, it is also important to address the challenges and weaknesses in the present infectious disease control efforts. We now have new and different challenges in this millennium. Continuation in the use of the old methods, even if they have been successful, will not be sufficient.

Public-health and hospital systems

The public-health workforce in many areas remains poorly trained and unmotivated. Incentives for community-based health workers to undertake disease control activities is insufficient. A substantial amount of time will be needed to train a workforce capable of further controlling existing infectious diseases and dealing with new infectious diseases. This drawback is especially serious in the poor parts of China where the burden of infectious disease is the greatest.

Hospital staff have an insufficient understanding of the role they should have in disease control. They need to be better trained and motivated to participate in proper diagnosis, reporting, and management of infectious diseases. Hospitals should become part of the network to control and prevent epidemics of infectious diseases. An increased sense of professionalism and the idea and practice of life-long learning needs to be developed and inculcated in hospital staff. Development of education programmes to change the present treatment-focused mindset of hospital personnel will take time and creativity.

Strengthen collaboration between and within governmental sectors

As in many countries, responsibilities for health issues in China are separated into several different ministries and levels of government. The Chinese Government can clearly respond effectively and efficiently when confronted with a crisis (eg, SARS). The state council has the authority to enforce collaboration between ministries and between different levels of government. An improved leadership by the state council is needed to address infectious disease control through multisectoral involvement as part of routine work instead of as a part of crisis management.

Population mobility

More than 10% of China's population has moved away from their original residence, mainly from poor rural areas to urban centres in search of better economic opportunities. Migration promotes transmission of infectious diseases and creates major challenges for detection and control of epidemics of infectious diseases. The diagnosis and treatment of some infectious diseases like tuberculosis are already free for migrants in some areas; however, much more assistance is needed.

Inadequate access to health services

The high cost of health care severely restricts access to health-care services in China. In some of the poor rural areas, this difficulty is magnified by the absence of basic health-care coverage. Patients with infectious diseases who delay or do not seek treatment because of the cost or difficulty of accessing services will be at increased risk of developing more severe and chronic forms of the disease and will be much more likely to infect other people. Health-system and health-financing reforms are discussed in this Series.[47] These issues are an essential component of the effort to control infectious diseases in China.

Development of drug-resistant diseases

The increase in drug resistance for many types of infections in China (eg, bacterial, viral, parasitic) complicates the control strategies for these diseases. Drug-resistance is most common with sexually transmitted diseases, tuberculosis, and HIV/AIDS.[48,49] The resistance of HIV to first-line antiretroviral drugs is increasing among patients with HIV/AIDS in China.[49] About one in ten cases of tuberculosis identified in the 2000 national prevalence survey had multidrug-resistant disease. Several provinces have some of the highest rates of this form of tuberculosis in the world, and extensively drug-resistant tuberculosis has also been reported.[50,51]

Inappropriate prescribing of antimicrobial drugs by health-care providers and the incorrect intake of drugs by patients contribute to the development of drug-resistant microbes. Increased efforts will be needed to educate health-care providers, patients, and their family members to address these difficulties. Treatment of resistant infections typically requires drugs that are more toxic, and more expensive than those used to treat non-resistant infections, which makes the control of present and future infectious diseases difficult (and, in some cases, impossible). The drug-resistance patterns of specific diseases with time will need to be monitored by laboratories to decide on the most cost-effective treatment strategy for each locality and to make necessary changes in strategy as resistance patterns change.

Further innovation and collaboration

Effective new innovations and technologies, when appropriately applied, have the potential to greatly enhance our ability to control present and future infectious diseases. China should invest more in the development of innovative, cost-effective approaches that are compatible with the existing health-care system in both urban and rural areas—eg, rapid diagnostic tests that can be used widely and will allow early, appropriate treatment, and do targeted research.

The exponential increase in the number of Chinese travelling overseas and the number of visitors to China in the past decade is only one indicator of China's increased association with the rest of the world; Therefore, the risk of cross-national transmission of infectious diseases is increased. Control and prevention of these diseases is a worldwide effort; therefore, China and other countries sharing information, experiences, and technologies is essential for the health of all.

Conclusion

Preparation for a pandemic will require a high degree of coordination between ministries and agencies in all countries, and the financial and technical support of the worldwide community. China can lead in developing systems for surveillance and response that can serve as a model for other developing countries.

Conflict of interest statement

We declare that we have no conflict of interest.

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