PUBLIC HEALTH INTERVENTION

The Three Networks Framework to Deal with Public Health Emergencies in Guangxi, China

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ABSTRACT

Objective: To improve the detection and control of infectious diseases in Guangxi, China.

Setting/Participants: Guangxi province in southwest China has almost 50 million people, of whom approximately 30% reside in urban and 70% in rural areas. There are 12 minority nationality groups living in the region.

Intervention: A village doctor reports any infectious disease outbreak to the Reporting Network, which notifies the Service Network to organize the clinical response. This is supported by the Government Network that coordinates the response among the multiple layers of local governments.

Outcomes: Since 2002 when the Three Networks system was first started, the time from incidence to report has been shortened on average from 30.6 to 7.6 days and the number of cases has increased from slightly less than 5,000 cases/year (4,965) to almost 10,000 cases/year (9,873). Average mortality has decreased from 3.23% to 0.74%. The Three Networks system has been successful in controlling measles outbreaks; and during SARS, when 11 cases came to Guangxi from the neighbouring Guangdong province, there were only 11 additional new cases with no community spread and no spread to medical staff.

Conclusion: The Three Networks system has played an important role in infectious disease prevention and control in Guangxi province, and may be applicable to other areas with a similar situation.

MeSH terms: Public Health; community network; emergency; China

La traduction du résumé se trouve à la fin de l'article.

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Grant support and disclaimer: This project is funded by World Bank, Project No. SARS200504. The views expressed in this paper are those of the authors and do not necessarily reflect those of Public Health College, Guangxi Medical University , Guangxi Center for Disease Control and Prevention, Health Department of Guangxi or Guangxi Health Technology and Education Management Association.

Acknowledgements: We express our appreciation to Dr. Patricia Huston for her comments and suggestions on the paper.

Guangxi Zhuang Autonomous Region is a mountainous province in the southwest of China. It has a total population of almost 50 million people with about 30% of the population in urban areas and almost 70% in rural areas. There are 12 minority nationality groups living in the region.

Public health emergencies are unexpected events and include such things as a serious infectious disease, unidentifiable disease, mass food and occupational poisoning or contamination of the water supply.[1] Public health emergencies are typically widespread and complicated and pose a serious threat to people's health and safety. Public health emergencies have occurred frequently in Guangxi in recent years. To increase our preparedness and response capacity, we developed a public health emergency network in 2001. This included a government network, a reporting network, and a service network.[2]

The "Three Networks" system

To understand the framework, it is important to understand that in China, multiple villages form a county; multiple counties form a township; multiple townships form a city; and multiple cities form a province. Thus, there are multiple layers of local government, starting at the county level. Most villages in Guangxi, one province in China, have a village doctor who visits each family once a month.

The Government Network

This network includes the local governments of the province, cities, townships, and counties. It includes departments of health, finance, public security, industry and commerce, agriculture, civil affairs, and broadcast and television. It determines the responsibilities and roles of governments and departments during a public health emergency. Different levels of local governments are responsible to lead the public health emergency in their administrative territories, to establish a leadership team of the "Three Networks", and to ensure sufficient resources for the emergency. As a base, the provincial government should invest at least 1 million RMB yuan (CAN $144 thousand) each year. Moreover, it is also responsible for organizing meetings using video and telecommunication technology, making policies, taking measures, coordinating different

departments, and coordinating the emergency management in the province. The government of the city, the county and the township should invest at least 100,000 RMB yuan (CAN $14.4 thousand), 50,000 RMB yuan (CAN $7.2 thousand), and 10,000 RMB yuan (CAN $1.4 thousand) respectively. The leaders of county and township governments should command the emergency management on the spot and take measures to control the emergency and minimize the spread. In the case of a disease outbreak, the government should segregate the area and organize different departments together to deal with the emergency. The administrative departments of health at different levels are responsible for the emergency management in their territory. They are also responsible for organizing the medical institutions to provide medical aid and control the outbreak.[2]

The Reporting Network

This network is made up of village doctors, county doctors, and the doctors in polyclinics and wards of the hospital. The Reporting Network has standardized forms and procedures to establish a system of delivering information on public health emergencies rapidly and accurately. It is based on a "first doctor" responsibility system. This means that the village doctor who makes the diagnosis first should be responsible for case reporting to the epidemiology department of the local hospital. Each doctor keeps a polyclinic diary and fills in the epidemic report card punctually and faithfully. Then an epidemic prevention doctor checks the polyclinic diary of the hospital and the report cards every day. Usually, the outbreak is reported through the Internet from the local level to its higher level (Figure 1). However, Guangxi is a poor and mountainous area. It is such an underdeveloped western province that some doctors in remote areas report the outbreak orally, either by telephone or by riding bicycles or motorcycles to deliver the message personally. As the rural areas have a high incidence of epidemic and food toxicosis, reporting at village and county levels is paid close attention to by the government. The village clinic is the source of epidemic information. The county clinic collects information and makes the epidemic report to

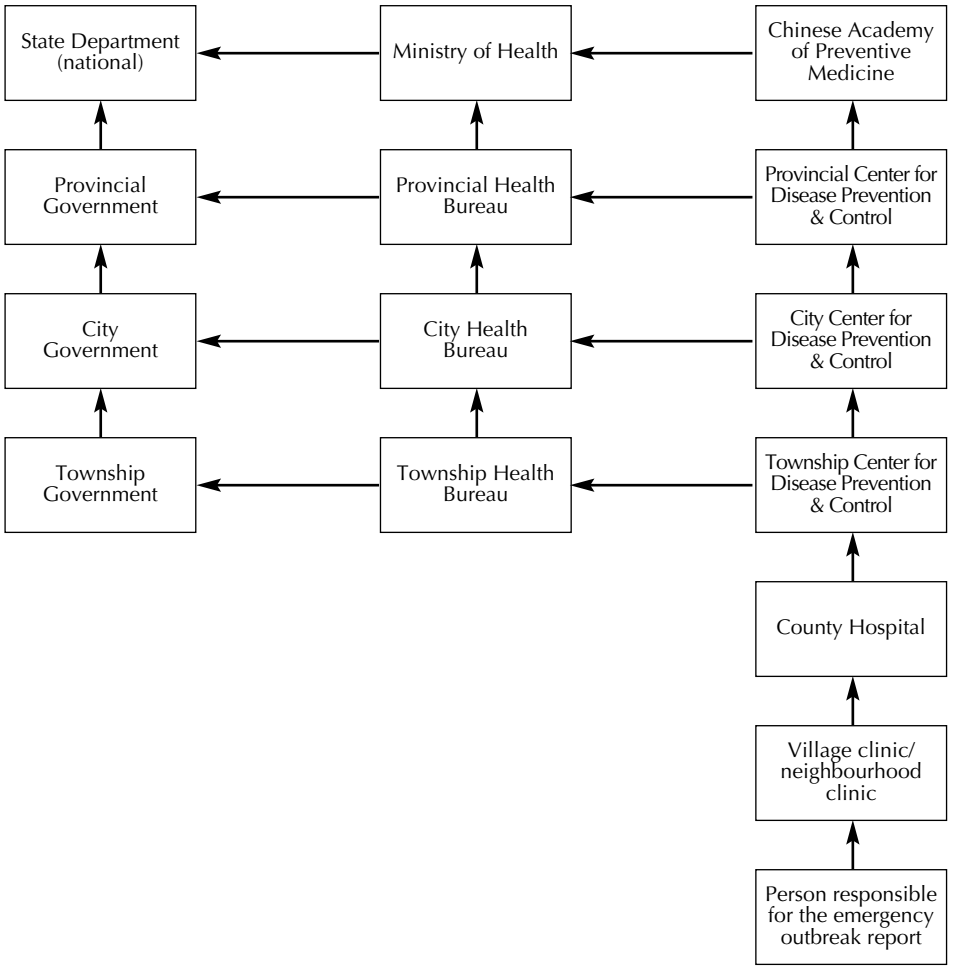

Figure 1. Reporting system for a public health emergency
Note: In China, a province is composed of multiple cities; a city is composed of multiple townships;and a township is made up of multiple counties.

CDC (part of the Service Network) and administrative department of health. The responsibilities of the county and village doctor in finding out and reporting the emergency are also specific in the system. The epidemic prevention doctor in the county clinic should contact all the village doctors in his/her territory at least once a month, finding out whether there is an outbreak in that area. In remote villages, the village doctor should visit the village at least once a month and report the outbreak status on a weekly basis. The Three Networks hold routine meetings in which local epidemic information is shared.

The Service Network

This network includes medical institutions and centers for disease prevention and control (CDC). The CDC undertake the work of epidemic confirmation, on-the-spot epidemiological investigation, isolation of cases and disinfection. The network is made up of the lead emergency response team, the rescue center such as '999' emergency service, the general hospital (polyclinic), the traditional chinese medicine hospital, the women and children's hospital, the township hospital, the CDC, etc. It provides technical support and assistance for patients when emergency occurs. The lead emergency response team is made up of the directors of the administrative department of health, the experts in disease control and medical and health surveillance. The director of the administrative department of health is responsible for organizing the emergency rescue team and provides medical supplies. The expert is responsible for rescuing the patient and investigating the emergency. The investigation should be completed within 30 days of the onset of outbreak. The health organization at different levels should establish the emergency response team and rehearse once or twice each year. Specific medicine

TABLE I

Variables in Emergency Report (Before and After the "Three Networks" Construction)

	Average Annual Number of Emergency Issues (No.)	Average Annual Cases of Disease (No.)	Average Annual Deaths (No.)	Average Annual Mortality Rate (%)	Interval Time from Incidence to Report (Days)
Before (1999-2001)	172.7	4964.7	160.3	3.23	30.6
After (2002-2004)	353.3	9873.3	72.7	0.74	7.6

TABLE II

Variables of Measles Outbreak (Before and After the "Three Networks" Construction)

	Average Annual Number of Outbreaks (No.)	Average Annual Duration of Outbreak (Days)	Average Annual Cases of Disease (No.)	Average Annual Mortality Rate (‰) [# of cases per thousand]
Before (Jan 1999-July 2001)	23	29	1112	0.0272
After (Aug 2001-Dec 2003)	20	10	386	0.0080

should be stockpiled, such as antibiotics and antidotes. The province should spend at least 50,000 RMB yuan (CAN $7.2 thousand) on stockpiling of specific medicines for emergencies. The city should spend at least 20,000 RMB yuan (CAN $2.8 thousand), and the township should spend at least 5,000 RMB yuan (CAN $720). The emergency communication and rescue vehicles should be in good condition. Each medical institution, which is responsible for emergency response in a public health emergency, should be equipped with 1 or 2 mobile phones. The phone number should be available to the public.[2]

Initial evaluation of the "Three Networks" system

The "Three Networks" has been functioning since 2002. In the following paragraphs, the primary effect before and after the "Three Networks" construction is introduced. The data (from 1999 to 2004) are collected from Guangxi reporting network.

The Sense of Responsibility of the Government Authority Has Been Reinforced

After the completion of the "Three Networks" construction, all the 84 township governments established leadership teams of emergency management, the leadership team of emergency rescue, and the leadership team of rescue guidance. When the emergency occurs, the leadership team of emergency management informs the related hospital or units to choose the medical experts and staff for the emergency rescue team, the leadership team of emergency rescue organizes the emergency rescue teams to carry out the work of rescue on the spot, and the leadership team of rescue guidance is in charge of professional training of rescue staff and technical support. The leaders of the local government and the directors of local administrative departments of health can now handle greater than 95% of outbreaks. Approximately 98% of townships in Guangxi have established the "first doctor" responsibility system. The Three Networks routine meeting has been operative in approximately 90% of township clinics once every 2 months. About 94% of epidemic prevention doctors visit the village twice a month, and about 80% of village doctors make a timely report on the outbreak status of the emergency once a week and visit every village family once a month. Generally speaking, there is a village doctor living in each village.

The Health Emergency Report has Became More Accurate and Timely, and the Capability of Emergency Rescue Has Been Improved Significantly

Since the beginning of the Three Networks system, the interval time from incidence to report for the first case has been shortened from 30.6 to 7.6 days and the average annual reporting case has increased from less than 5,000 (4,965) to almost 10,000 (9,873) cases per year. It reflects the fact that the possibility of omitted reporting of emergency or concealed cases has decreased, and the sense of responsibility of the staffs in the network has increased. As a result of the "Three Networks" construction, the average annual mortality rate has decreased from 3.23% to 0.74% (Table I).

Three Networks Played a Great Role in Measles Prevention and Control

Measles outbreak occurs most often in some areas in Guangxi. With the application of the "Three Networks" construction, the number of outbreaks, the duration of outbreak, the number of cases of disease, and the mortality rate associated with the outbreaks have decreased greatly (Table II).

Three Networks Played an Important Role in SARS Prevention and Control

After the outbreak of SARS in early 2003, the number of rural workers who returned from neighbouring Guangdong province was 300,000. It was a hard task to prevent and control SARS in Guangxi at that time. Three Networks began to run in the middle of February to prevent SARS from spreading in the rural area. The village doctor was able to identify and report cases immediately, which helped to prevent and control the outbreak. They neither ignored nor concealed the cases. For example, in the event of unknown imported pneumonia occurring in Hechi city and Guigang city (found to be SARS on the basis of retrospective investigation), the village doctor reported the case following the specific procedure as soon as possible. Then, the case was treated as infectious disease under the order of Guangxi's Department of Health. The local CDC undertook the work of controlling the epidemic immediately. In February, a rural worker, who came back from Guangdong and was infected with SARS, was first found by a rural doctor and sent to a local clinic for isolation just less than an hour after his arriving in the village. Owing to the running of Three Networks and timely control and prevention, there were only 22 cases of SARS in Guangxi, including 11 cases from Guangdong province (which was one of the most serious epidemic areas in China during the SARS epidemic) according to the retrospective investigation; there was no community spread; and no medical staff got SARS.

CONCLUSION

Great success has been achieved in the application of the "Three Networks" framework. Government authority has been reinforced. Reporting is more accurate and timely, and health services have improved significantly. Three Networks played an important role in the prevention and control of both measles and SARS.

The Three Networks framework may be useful to other countries that have similar situations to that of China, where an effective mechanism to control public health emergencies has not been established.

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Received: May 28, 2005
Revisions requested: November 2, 2005 and March 14, 2006
Revised mss: November 29, 2005 and April 16, 2006
Accepted: May 9, 2006

RÉSUMÉ

Objectifs : Améliorer le dépistage et le contrôle des maladies infectieuses au Guangxi, en Chine.

Lieu et participants : Le Guangxi est une région autonome du Sud-Ouest de la Chine qui compte près de 50 millions d'habitants, dont environ 30 % vivent en milieu urbain et 70 % en milieu rural. On y trouve 12 groupes nationaux minoritaires.

Intervention : Le médecin de village déclare toute éclosion de maladie infectieuse au Réseau de déclaration, lequel demande au Réseau de services d'orchestrer une intervention clinique. Au sommet, le Réseau gouvernemental coordonne l'intervention des multiples paliers administratifs locaux.

Résultats : Depuis l'inauguration du Système des trois réseaux en 2002, le délai de déclaration a diminué, passant de 30,6 jours à 7,6 jours en moyenne, et le nombre de cas déclarés est passé d'un peu moins de 5 000 par année (4 965) à près de 10 000 par année (9 873). La mortalité moyenne a baissé de 3,23 % à 0,74 %. Le Système des trois réseaux a réussi à contrôler les éclosions de rougeole, et pendant l'épisode du SRAS, lorsque 11 cas du Guangdong voisin sont entrés au Guangxi, on n'a recensé que 11 cas supplémentaires dans la région, sans aucune propagation dans la communauté ni au personnel médical.

Conclusion : Le Système des trois réseaux contribue beaucoup à la prévention et au contrôle des maladies infectieuses dans la région du Guangxi et pourrait être utile dans d'autres régions au profil similaire.

Book Reviews/Recension

Baby Boomer Health Dynamics: How Are We Aging?

Andrew V. Wister. Toronto, ON: University of Toronto Press Inc., 2005; 253 pp., Cdn$29.95

This detailed book provides a comparative analysis of the health of baby boomers (those born between 1946 and 1965) as they progress in age in order to answer the following key questions: Are baby boomers healthier or unhealthier than previous generations? And what are the implications of these patterns for the Canadian health care system? A 20-year age period was selected for analysis, and then the generation was further divided into two 10-year birth cohorts to reflect differences in "younger" and "older" baby boomers. The author examined four major lifestyle behaviours that influence health (i.e., smoking, physical activity, body mass/weight, and alcohol consumption) and their relationship to gender, education, income, and foreign-born status through the lens of the Social Change Model.

Chapter 1 defines the baby boomer generation and the social significance of their generation. Chapters 2 & 3 provide an overview of healthy lifestyle behaviours and their relationship to population health in addition to the theoretical underpinnings that guide the author's analysis. Chapter 4 provides a discussion of the lifestyle behaviours in relation to the health of the general population. Chapters 5-9 contain extensive information on data sources and analysis (both gender and age are taken into account). The presentation style is repetitive and the reader gets lost in the volume of information. The level of detail is, however, extremely useful for researchers and health promoters. The findings, summarized in Chapter 10, are not surprising: 1) smoking rates have declined in the last several decades; 2) there is a decline in unhealthy exercise patterns among baby boomers, although 40% of Canadians are considered to fall into the "unhealthy" exercise range; 3) obesity rates have risen faster among younger boomers, but remain a concern for the cohort as a whole regardless of gender or socio-economic status; and finally, 4) baby boomers consume less alcohol than the previous generation.

A lengthy discussion follows in Chapter 11, which reveals nothing new about suspect causal influences to explain the paradox of improved exercise rates and rising obesity rates. The book concludes with a superficial discussion of the relevance of the findings for health policy and a strong recommendation for further basic and applied research of this cohort. A reader working in health planning or gerontology would be left with many unanswered questions about the broader societal impacts of this rapidly aging generation and what nuances make this generation "different" from previous ones to determine what shifts in health programming and resources are required.

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