

An investigation into local government plans for public health emergencies in China

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Objectives A cross-sectional investigation was designed to assess the quality of local government plans for public health emergencies and to determine whether relevant regulations for emergency plans are in place.

Methods Sixty-six municipalities were selected randomly using stratified sampling, and a questionnaire investigation on emergency plans was conducted in these municipalities.

Results The findings show that approximately 50% of emergency plans omitted important content; less than 50% of municipalities had established three regulations for emergency plans.

Conclusions Based on the analysis, the quality of existing public health emergency plans is not sufficient. More than 50% of municipalities lack regulations for emergency plans. Suggestions regarding the responsibility of government at different levels are made. First, central government should draw up a set of standard development procedures and a standard template for emergency plans. Secondly, local governments should revise their plans. Thirdly, local governments should establish regulations for emergency plans as soon as possible.

Keywords Public health practice, emergency planning, local government

KEY MESSAGES

- We conducted this investigation in four representative provinces of China to assess the quality of existing public health emergency plans and the availability of relevant regulations for emergency plans.
- Some important contents for emergency response were omitted by approximately 50% of emergency plans, and more than 50% of municipalities lacked regulations for emergency plans.
- China's central government should draw up a set of standard development procedures and set up a standard template for emergency plans.
- Local governments should revise their plans and establish pertinent regulations for emergency plans as soon as possible.

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Introduction

As one of the most important components of crisis or emergency management, the emergency plan has begun to receive unprecedented attention in China since the SARS outbreak in 2003. In the past 3 years, most local governments in China have already developed their own emergency plans for managing public health emergencies according to the requirement of article 10 of the National Public Health Emergencies Statute (State Council of China 2003). However, the quality of

these plans is not convincing for the following two reasons. First, neither a standard development procedure nor a template for emergency plans, which would act as guides for local governments, exists yet in China. Article 11 of the National Public Health Emergencies Statute merely presents a brief requirement for emergency plan development; it does not act sufficiently as a guide (State Council of China 2003). Secondly, almost all the emergency plans were drafted hurriedly by local governments in response to the threats from SARS, avian flu and so on. Unfortunately, no relevant literature on the quality of emergency plans by Chinese local governments has been published so far, although the quality of such plans is an important research topic in the field of public health emergencies in China.

This article describes an investigation of the existing plans developed by local governments in China for managing public health emergencies. The investigation results will answer two questions: whether the existing emergency plans are adequate with respect to their quality, and whether relevant regulations for emergency plans are in place. The results are expected to benefit not only China but also other countries, given that most countries have recently begun to pay attention to managing public health emergencies.

Methods

Sample

Considering the critical role of municipal-level governments in managing public health emergencies within the Chinese five-level government system (central, provincial, municipal, county and town), this study selected emergency plans developed by all the municipal governments as its target population. Stratified sampling was used to obtain a representative sample. First, all the 31 provinces in China were classified into four categories using cluster analysis according to four indicators included in the China Statistical Yearbook 2004 (National Bureau of Statistics of China 2004) and the Chinese Health Statistics Yearbook in 2005 (Ministry of Health of China 2005), namely GDP person in 2003, population mortality in 2000, life expectancy in 2000 and child mortality in 2000. Then, one province was randomly selected from each of the four categories, respectively, and so four provinces were obtained. All public health emergency plans developed by the municipal governments of the four provinces formed the sample of this study. The four selected provinces—province A, province B, province C and province D—consist of 66 municipalities in total.

In the book edited by Liu (2004), emergency plans are classified into general emergency plans and specific emergency plans. Here, it must be pointed out that this study investigates only general emergency plans for public health emergencies, because general emergency plans are more widely applicable than specific emergency plans.

Investigation questionnaire

This study chose a checklist with 35 items advanced by Hu *et al.* (2005) as the basic content of the questionnaire. The 35-item checklist was developed based on the PPRR emergency

management model (prevention, preparedness, response and recovery) (Murray *et al.* 1999) and existing criteria or requirements for emergency plans (Natural Disasters Organization 1992; FEMA and NEMA 2000; Farazmand Ali 2001; Anonymous 2002; CDC 2002a,b; Anonymous 2003; State Council of China 2003). It includes the most important items within the whole process of emergency management and provides more details than existing criteria mentioned above.

Four other items were also contained in the questionnaire. One concerns whether a municipality has developed its own emergency plans, while the other three ask about relevant regulations for emergency plans. Expert reviews and a pilot investigation were conducted before the questionnaire was finalized. Five experts were invited to review the draft questionnaire and correct it. Then, a pilot investigation was conducted in three municipalities of Beijing to further refine it. At last, the final questionnaire was obtained with 39 items.

The 39 items were arranged as: item1 (whether each municipality has developed its own emergency plan), item2-item36 (the 35-item checklist), item37-item39 (regulations for emergency plans). There are two types of questions in this questionnaire. The first is a two-choice question—'yes' or 'no'—which is the question format used by the 35-item checklist. Thirty-eight items (item2 to item39) used this format. The other is a three-choice question: 'yes', 'no' or 'being developed'. Item1 was the only item to use this format.

Data collection

This investigation was organized by the National Statistical and Information Center of the Ministry of Health of China. Provincial Health Bureaux in the four selected provinces were asked to provide assistance in distributing and collecting the questionnaires. The principals of public health emergency offices under the Municipal Health Bureaux of the 66 selected municipalities were designated to answer the questionnaire as they are familiar with the local situation on public health emergencies. To assuage any worries that the investigation results might get them into trouble since the questionnaire may disclose their job performance, they were promised that the results would only be used for research purposes and the real names of their agencies would not be mentioned.

Training was held for the representatives from the Provincial Health Bureau in each province; these persons assisted us in distributing and collecting questionnaires. The questionnaires were first brought to each province and then mailed by the researchers to the designated respondents in each Municipal Health Bureau with help from the Provincial Health Bureau. Each respondent's contact information was included on the questionnaire so the quality of completed questionnaires could be checked. Questions from respondents during the investigation were replied to in a timely manner by the researchers by phone or email. The assistants in each province mailed the questionnaires back to the researchers once they were all collected. The researchers then checked the questionnaires to ensure none were missing. Ambiguous questionnaires were identified where conflicting answers were given; for example, if the answer for item1 was 'No' (meaning that a municipality had not developed its emergency plan before the investigation), but answers for items dealing with

Table 1 Questionnaire response rate

Province	Questionnaires completed (n)	Questionnaires expected (n)	Response rate (%)
A	14	18	77.8
B	11	11	100.0
C	19	21	90.5
D	16	16	100.0
Total	60	66	90.9

Table 2 Number of municipalities that have developed their own emergency plans (item1)

Province	Yes		No		Being developed	
	n	%	n	%	n	%
A	14	100.0	0	0	0	0
B	10	90.9	0	0	1	9.1
C	17	89.5	0	0	2	10.5
D	12	75.0	0	0	4	25.0
Total	53	88.3	0	0	7	11.7

emergency plans (item2-item36) were also given. When a missing value or an ambiguous answer was detected, researchers would contact the respondent and check the questionnaire again with him. The investigation began on 19 October 2005 and ended on 31 December 2005.

Data analysis

SPSS Version 10.0 was used for data analysis. Descriptive statistical indicators (frequency and percentage) were calculated to portray the investigation results.

Results

Questionnaire response rate

Sixty completed questionnaires were collected (90.9%). In Province A and Province C, questionnaires were not collected as planned; their response rates were 77.8% and 90.5%, respectively (Table 1).

Quality of existing emergency plans

Of 60 municipalities that completed the investigation, 53 had developed their own emergency plans, and the rest were writing their plans (Table 2).

As Table 3 shows:

1. Twenty-two items in the 35-item checklist are included by more than 70.0% of emergency plans in this investigation, these being items 2, 4–6, 12–16, 18–26, 31, 33, 35 and 36 (Table 3).
2. Item3 (planning process) is omitted by 47.2% of emergency plans.
3. Four important items for the pre-emergency phase are left out by a number of plans: item8 (risk identification and risk

Table 3 Quality analysis of plans for public health emergencies developed by municipal governments

Does the emergency plan include the content covered by this item?	Yes	No
	n (%)	n (%)
Item2: legislation base for developing plans	53 (100.0)	0
Item3: description of the planning process	28 (52.8)	25 (47.2)
Item4: logical aim and application description	53 (100.0)	0
Item5: responsibility assignment	43 (81.1)	10 (18.9)
Item6: establishment of command centre	48 (90.6)	5 (9.4)
Item7: mutual aid agreements between adjacent regions	5 (9.4)	48 (90.6)
Item8: risk identification and risk assessment	23 (43.4)	30 (56.6)
Item9: vulnerability assessment	8 (15.1)	45 (84.9)
Item10: capacity assessment for preparedness and response	22 (41.5)	31 (58.5)
Item11: risk mitigation	16 (30.2)	37 (69.8)
Item12: criteria for activating and closing the plan	48 (90.6)	4 (9.4)
Item13: a list of emergency materials	39 (73.6)	14 (26.4)
Item14: storage and maintenance of emergency materials	38 (71.7)	15 (28.3)
Item15: storage and training of emergency workers	49 (92.5)	4 (7.5)
Item16: surveillance, notification and warning	52 (98.1)	1 (1.9)
Item17: rapid impact assessments and needs analysis	30 (56.6)	23 (43.4)
Item18: information communication and dissemination	51 (96.2)	2 (3.8)
Item19: public education	46 (86.8)	7 (13.2)
Item20: epidemiological investigation	52 (98.1)	1 (1.9)
Item21: mass casualty and materials transportation	44 (83.0)	9 (17.0)
Item22: patient isolation, vaccination and treatment	49 (92.5)	4 (7.5)
Item23: safe disposal of contaminated materials, wastes and human remains	50 (94.3)	3 (5.7)
Item24: tracking infected persons	50 (94.3)	3 (5.7)
Item25: safety and protection for individuals isolated, quarantined, vaccinated or treated	48 (90.6)	5 (9.4)
Item26: safety and protection for emergency workers	48 (90.6)	5 (9.4)
Item27: managing volunteers	13 (24.5)	40 (75.5)
Item28: managing donations	27 (50.9)	26 (49.1)
Item29: providing food and temporary lodging	23 (43.4)	30 (56.6)
Item30: psychological counselling for victims	24 (45.3)	29 (54.7)
Item31: seeking assistance from higher governments	46 (86.8)	7 (13.2)
Item32: damage assessment after an emergency	24 (45.3)	29 (54.7)
Item33: summarizing after an emergency	42 (79.2)	11 (20.8)
Item34: public infrastructure restoration	24 (45.3)	29 (54.7)
Item35: conforming to the plan written by higher governments	50 (94.3)	3 (5.7)
Item36: regular maintenance and update	43 (81.1)	10 (18.9)

Table 4 The establishment of regulations for emergency plans

Have the following regulations for emergency plans been established?	Yes	No
	<i>n</i> (%)	<i>n</i> (%)
Item37: regulation on popularization	25 (47.2)	28 (52.8)
Item38: regulation on regular updates	14 (26.4)	39 (73.6)
Item39: regulation on regular exercises	22 (41.5)	31 (58.5)

assessment) is included by 43.4% of plans, item9 (vulnerability assessment) by 15.1%, item10 (capacity assessment for preparedness and response) by 41.5%, and item11 (risk mitigation) by 30.2%.

- Five key items for the emergency phase are omitted from many plans: item17 (rapid impact assessments and needs analysis) is included by 56.6% of plans, item27 (managing volunteers) by 24.5%, item28 (managing donations) by 50.9%, item29 (providing food and temporary lodging) by 43.4%, and item30 (psychological counselling for victims) by 45.3%.
- Two important items for the post-emergency phase are not included in many plans: only 45.3% of plans include item32 (damage assessment after an emergency) and 45.3% of plans contain item34 (public infrastructure restoration).
- Only 9.4% of emergency plans contain item7 (mutual aid agreements between adjacent regions).

Establishment of regulations for emergency plans

Among the 53 municipalities that developed their own emergency plans, 25 municipal governments (47.2%) had established a popularization regulation for their emergency plan to ensure awareness of it; 14 municipal governments (26.4%) had a regulation stipulating regular updating of the emergency plan; and 22 municipal governments (41.5%) had a regulation requiring regular emergency plan exercises (Table 4).

Discussion

Questionnaire response rate

Six questionnaires were not collected in Province A and Province C. Of these six questionnaires, four were excluded due to lack of suitable respondents, because the four municipalities had not set up their public health emergency offices and had assigned the function of managing public health emergencies to other offices. The other two questionnaires were eliminated because the respondents had not received the mailed questionnaires before 20 December 2005 due to the long distance and sluggish post services. Thus, it can be inferred that as the six questionnaires were not intentionally missing, they would be unlikely to markedly affect the investigation results.

Quality of existing emergency plans

According to the above results, all the municipal governments have already realized the importance of plans in managing public health emergencies. The large majority (88.3%) of the municipalities in this investigation have already developed emergency plans; the rest are developing them (Table 2).

However, the quality of existing plans is not so satisfactory, although most of the important contents that a standard emergency plan should contain have been included in many plans. The existing emergency plans developed by municipal governments have four particular flaws (Table 3):

- The planning process is not clear enough. Twenty-eight of the 53 emergency plans studied do not include content on the planning process, indicating that the planning process is not given enough attention at present. A set of scientific development procedures and a standard template for emergency plans are the prerequisite to develop a competent plan. Unfortunately, almost all the emergency plans were written without such a set of procedures and a template, because these are not available in China. Usually, emergency plans are prepared based on article 11 of the National Public Health Emergencies Statute and the drafters' understanding. In essence, the lack of a standard procedure and template for emergency plans is the main reason why inadequate plans are developed. The Chinese central government urgently needs to develop a set of standard procedures and a standard template for emergency plan development, which would act as a guide for planning.
- Many plans omit key contents for the pre-emergency phase and the post-emergency phase. According to modern crisis or emergency management theory, pre-emergency, emergency and post-emergency are three inseparable phases of a complete emergency management cycle (Hensgen *et al.* 2003). A proper emergency plan should cover all the important activities that permeate the whole process of an emergency. The lack of these key contents indicates that tasks in the pre-emergency phase and post-emergency phase have been neglected, which will lead to poor efficiency in dealing with an emergency. The SARS event of 2003 is a good example of this. It is therefore important that local governments reconsider and revise their emergency plans.
- Some important contents for the emergency phase were also omitted from many plans, including rapid impact assessments and needs analysis, managing volunteers, managing donations, providing food and temporary lodging, and psychological counselling for victims. This implies that the importance of these activities has not yet been recognized by local governments. In fact, these tasks play a significant role in managing an emergency as epidemiological investigation. Social panic and chaos during an emergency are caused by their omission. Once an emergency occurs, if no standard procedure is available to guide these activities and they are not included in the emergency plan, no-one will be in place to carry them out. Commonly, decisions relating to these jobs have to be made quickly by the principal directors. Thus, it is important to add them to existing plans.
- In addition, just 9.4% of the plans contain mutual aid and cooperation between adjacent regions (item 7). This could be explained by the country's political system. China has a vertical governmental system, within which communication and cooperation between adjacent regions have been neglected for a long time. In this case, the political system inevitably affects communication and cooperation in public health emergency responses between adjacent regions.

Establishment of regulations for emergency plans

The establishment of regulations for emergency plans is also neglected in China. Because the National Public Health Emergencies Statute does not include articles for popularization, regular updating and practise of emergency plans, it is left to local governments to develop their own regulations on these activities. However, less than 50% of municipalities have developed the three required regulations for emergency plans: popularization (47.2%), regular updates (26.4%) and regular exercises (41.5%) (Table 4). Without a popularization regulation, all stakeholders may not be made aware of emergency plans; without a regulation requiring regular plan updates, emergency plans may not be renewed and improved in a timely fashion; without a regulation requiring regular plan exercises, emergency plans may not be tested before an emergency occurs. It is vital for local governments to establish these regulations.

Limitations of this study

First, the investigation results may be inevitably magnified to some extent, although a lot of quality control measures were undertaken in the study. Some officials are used to exaggerating the strengths and understating the weaknesses when they are required to report on their performance to superior agencies or the public in China. Thus, the actual situation for emergency plans should not be better than our investigation results indicate.

Secondly, we could not give an overall evaluation of the quality of each emergency plan because of the lack of a synthetic index for the 35-item checklist. As with other criteria or checklists, the 35-item checklist only provides information on whether a plan is complete in terms of the items detailed for emergency management. A plan was considered to be low quality if it left out too many of the 35 items listed.

Thirdly, the effectiveness of the regulations on popularization, regular updates and plan exercises could not be assessed. Items 37–39 gave information only on whether these regulations were in place. The absence of these regulations would certainly influence the application and update of emergency plans.

Conclusion

In general, current local government plans in China are not suitably qualified to deal with public health emergencies. More than 50% of municipalities have not set up the three regulations necessary for emergency plans. The following suggestions are made to improve this situation. First, the Chinese central government should develop a set of standard development procedures and a standard template for emergency plans. Local governments should then revise their emergency plans accordingly. Finally, local governments should establish

the relevant regulations for emergency plans as soon as possible.

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Appendix

Results of cluster analysis for 31 provinces in China using four indicators*

Provinces	Category
Beijing	1
Shanghai	1
Tianjin	2
Jiangsu	2
Zhejiang	2
Shandong	2
Hebei	3
Shanxi	3
Neimenggu	3
Liaoning	3
Jilin	3
Heilongjiang	3
Anhui	3
Fujian	3
Jinagxi	3
Henan	3
Hubei	3
Hunan	3
Guangdong	3
Guangxi	3
Hainan	3
Chongqing	3
Sichuang	3
Shanxi	3
Gansu	3
Ningxia	3
Guizhou	4
Yunnan	4
Xizang	4
Qinghai	4
Xinjiang	4

*GDP in 2003, population mortality in 2000, life expectancy in 2000 and child mortality in 2000.