

Full Length Research Paper

Challenge of notifiable infectious diseases reporting system in China

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Notifiable infectious diseases reporting system is vital for infectious diseases surveillance and basis for infectious disease prevention and control strategy. Well formulated notifiable disease reporting system is a vital tool for public health surveillance. A qualitative survey was conducted among senior professional staffs who work on notifiable infectious diseases surveillance at provincial city, and county level Center for Disease Control and Prevention (CDC) in China via e-mail questionnaire. Informed consent was guaranteed. There were a total of 39 participants who returned questionnaires of the 42 submitted. Most participants (79.5%) agreed that case definition of hand, foot and mouth disease (HFMD) is not so clear, and 82.1% participants thought adjustment of HFMD case definition is needed. There was no statistical significance for X^2 test. Most participants (76.9%) agreed that case definition of infectious diarrhea is not so clear, X^2 test showed statistical significant (odds ratio (OR) = 6.88, $p < 0.05$) 89.7%; participants thought adjustment of infectious diarrhea case definition is needed. There were 48.7% participants who thought there was an underreporting of infectious diarrhea, X^2 test showed statistical significant (OR = 9.96, $p < 0.01$). Most participants demonstrated that confirmed clinical laboratory reporting is more valuable than symptom case report for infectious disease surveillance. Adjustment of HFMD and infectious diarrhoea of notifiable infectious diseases should clarify the case definition and strengthen sentinel surveillance. A quality-assured infectious disease surveillance system should integrate results from clinical laboratories and epidemiological data.

Key words: Notifiable infectious disease, surveillance, hand foot and mouth disease (HFMD), infectious diarrhea.

INTRODUCTION

Notifiable infectious diseases reporting system is an important tool for infectious diseases surveillance (Overhage et al., 2008; Azar et al., 2010). On May 2, 2008, the Ministry of Health, China officially noted hand foot and

mouth disease (HFMD) as notifiable infectious disease and categorized it into the "C" group of infectious diseases (Ministry of Health, provide year of publication). In 2009, the number of reported cases increased to 1.15

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million cases, accounting for 9.28% of 39 notifiable infectious diseases of reported cases listed second place of all reported cases. At the end of August 2010, the national reported case of HFMD reached 1.4 million and was listed first place of all reported cases (Ministry of Health, 2010). However, the large amount of reported cases did not provide useful information for prevention and control.

Concerns were raised as more cases were reported: (1) diagnosis of HFMD is mainly based on symptoms, laboratory confirmed that the test is only for a small part of severe cases and death cases, the focus is how to detect severe cases early and reduce mortality; (2) there is no effective prevention and control measures for HFMD for now, even though a large amount of HFMD cases was reported, so that this kind of report was not helpful for prevention and control of HFMD; (3) the current reporting mechanism increased the workload for grass-root Center for Disease Control and Prevention (CDC) staff, it also impacts the operation of national notifiable infectious disease reporting system.

Infectious diarrhea is caused by a wide range of pathogens; the current report of infectious diarrhea is a symptom report and the lack of a laboratory confirmed test made the reporting incomplete, the overall reports of infectious diarrhea integrity is poor, particularly, it is inconsistent between the number of reported and the actual geographical distribution, it does not reflect the infectious diarrhea's distribution and epidemic trend, it is of little importance for providing prevention and control strategy (Tang et al., 2009; Yin et al., 2007).

Therefore, a well formulated notifiable disease reporting working mechanism is a vital tool for public health surveillance. To standardize the working mechanism of notifiable infectious diseases reporting system is important for infectious diseases prevention and control.

METHODOLOGY

Study sample

This investigation involved the CDCs at provincial, city and county level. Samples were selected using simple sampling method, a qualitative survey conducted among senior professional staff who works on notifiable infectious diseases surveillance at provincial, city, and county level CDC. Selecting criteria is:

1. Academic degree is associate professor or above;
2. Over 10 years working experiences on infectious disease surveillance;
3. Be familiar with regulation of notifiable infectious disease reporting in "Law of the Peoples Republic of China on the Prevention and Treatment of Infectious Diseases";
4. Be familiar with national notifiable infectious disease reporting system.

The survey was conducted from 12 August to 30 August, 2010. A self-reported questionnaire was used to collect needed information via e-mail questionnaire, and the cover page is an informed consent form signed by participants who were willing to participate in the

survey and this was returned to the sender within one week. Anonymity and confidentiality were guaranteed under the approval of China CDC ethical committee (Institutional Review Board). The questions covered the following categories: demographic information, experience with notifiable infectious diseases, attitudes towards current notifiable infectious disease reporting system, experiences with HFMD prevention and control since it enrolled into category "C" notifiable infectious disease, assessment of HFMD surveillance, need of adjustment of HFMD case definition, experiences with infectious diarrhea prevention and control since implementation of real-time notifiable infectious disease reporting system in 2004, assessment of infectious diarrhea surveillance, need of adjustment of infectious diarrhea case definition, open-end questions and comments on notifiable infectious disease reporting system.

Data analysis

Epi Data 3.1 (Epi Data for Windows; Epi Data Association, Odense, Denmark) was used to establish a database by double entry. First, data cleaning was conducted and logic errors were not considered into the data analysis. Statistical package for social sciences (SPSS) software (version 14.0 for Windows; SPSS Inc., Chicago, IL) was used to analyze the dataset. Descriptive statistics were used to describe attitudes and comments on notifiable infectious disease reporting system. χ^2 statistics with P-values were used to compare attitude of attitudes towards current notifiable infectious disease reporting system associated with different CDC levels.

RESULTS

Basic information

There were total 39 participants' returned questionnaires out of the 42 submitted. There were a total of 13 provinces (autonomous regions, Metropolis), 13 cities, 6 counties which participated in the survey. There were 17 experts from provincial CDC, 16 experts from city CDC, 6 experts from county CDC; there were 17 who had professor title, 23 males and 16 females.

Assessments and comments on HFMD surveillance

Most participants (79.5%) thought the case definition is too broad, it is hard to command the diagnose standard for clinician, and 82.1% participants thought adjustment of HFMD case definition is needed. There is a gross influence from political will and social pressure, so that it impacts the true report. The current report did not reflect the real scenario of HFMD epidemic for a frequently occurring, multi-pathogen disease. Providing information for prevention and control strategy is of little importance. Most mild cases were reported to have diverted the focus on severe and death cases, and it also increased the workload on grass root county CDC. There was no statistical significance for χ^2 test between variables (Table 1). The experts suggested that sentinel surveillance for HFMD should be established like flu surveillance and only severe and death HFMD cases would be reported. For the

Table 1. Questions associated with HFMD.

Questions associated with HFMD	Provincial (n=17)		City (n=16)		County (n=6)		Total (n=39)		X ² Test	
	Number answered	Proportion (%)	Number answered	Proportion (%)	Number answered	Proportion (%)	Number answered	Proportion (%)	OR	p*
Comments on current HFMD surveillance										
Case definition too broad	13	76.5	13	81.3	5	83.3	31	79.5	0.18	0.914
EV71 infected HFMD need to be reported	10	58.8	8	50.0	3	50.0	21	53.8	0.3	0.861
Other enteric virus infected HFMD need not report	4	23.5	2	12.5	1	16.7	7	17.9	0.689	0.709
Only report viral encephalitis	4	23.5	4	25.0	1	16.7	9	23.1	0.174	0.917
Mild case with fever do not need to report	13	76.5	12	75.0	5	83.3	30	76.9	0.34	0.844
Mild case do not need to report	8	47.1	9	56.3	5	83.3	22	56.4	2.373	0.305
Maintain current HFMD reporting standard	0	0.0	3	18.8	0	0.0	3	7.7	4.672	0.097
Others (open-end)	3	17.6	0	0.0	0	0.0	3	7.7	-	-
Current case definition should be adjusted	15	88.2	13	81.3	4	66.7	32	82.1	1.413	0.493
HFMD reporting based on the clinical severity	13	76.5	11	68.8	5	83.3	29	74.4	0.557	0.757
What kind of patients should include in surveillance network	0	0.0	0	0.0	0	0.0	0	0.0	-	-
Fever with rash on hand, food, mouth and buttock, fever (AT≥38°C)	7	41.2	3	18.8	2	33.3	12	30.8	1.968	0.374
Fever with rash on hand, food, mouth and buttock, fever (AT≥37.5°C and last for one day or over)	2	11.8	3	18.8	2	33.3	7	17.9	1.413	0.493
Severe case with potential CNS complication	10	58.8	9	56.3	5	83.3	24	61.5	1.446	0.485
Severe case	17	100.0	13	81.3	6	100.0	36	92.3	0.557	0.757
Cluster	13	76.5	8	50.0	4	66.7	25	64.1	2.53	0.282
Other (open-end)	3	17.6	3	18.8	0	0.0	6	15.4	-	-

*Pearson Chi-Square.

cluster outbreak, cases reported could refer to the influenza like illness (ILI) cluster reporting standard. Etiological surveillance should set in sentinel hospitals; only laboratory confirmed cases would be reported.

Assessments and comments on infectious diarrhea surveillance

Infectious diarrhea is a group of clinical symptoms, most participants (76.9%) thought the case definition is too broad, X² test showed statistical significant (OR = 6.88, p < 0.05); most participants (89.7%) commented that different regions use different reporting standard in reality. It is difficult to conduct laboratory test for grass root CDC staff. There is a gross influence from political will and social pressure, so that it impacts the true report.

The current report did not reflect the real scenario of infectious diarrhea. Providing information for prevention and control strategy is of little importance. Most mild cases were reported to have diverted the focus on severe cases. There were 48.7% participants who thought there was an under-reporting, X² test showed statistical significance of (OR = 9.96, p < 0.01) (Table 2). The experts suggested that sentinel surveillance for infectious diarrhea should be established, only severe cases with poor prognosis would be reported, like O157:H7. Etiological surveillance should be set in sentinel hospitals and only laboratory confirmed cases should be reported.

DISCUSSION

The purpose of public health surveillance is to

detect and monitor newly emerging infectious diseases and identify suspect agents effectively and timely (Kaufman, 2008; Wang et al., 2008). "Law of the People's Republic of China on the Prevention and Treatment of Infectious Diseases" requires that reporting institutions should report notifiable infectious diseases timely to understand the epidemic trend and distribution, and to formulate effective prevention and control measures. Currently, there are 39 notifiable infectious diseases in China categorized into A, B, and C, based on the severity and social economic impact (State Council, 1989).

Category A refers to the diseases which are highly infectious and can cause large epidemics in very short time, it includes plague and cholera. Category B refers to the diseases which might cause epidemics, it includes severe acute respiratory syndrome (SARS), AIDS, hepatitis

Table 2. Questions associated with infectious diarrhea.

Questions associated with infectious diarrhea	Provincial (n=17)		City (n=16)		County (n=6)		Total(n=39)		X ² Test	
	Number answered	Proportion (%)	Number answered	Proportion (%)	Number answered	Proportion (%)	Number answered	Proportion (%)	OR	p*
Concern about current infectious diarrhea reporting										
The lack of definitiveness of case definition	15	88.2	9	56.3	6	100.0	30	76.9	6.878	0.032
Different reporting criteria in different regions	14	82.4	14	87.5	6	100.0	34	87.2	1.238	0.538
Underreporting	13	76.5	5	31.3	1	16.7	19	48.7	9.662	0.008
Over reporting	10	58.8	6	37.5	3	50.0	19	48.7	1.505	0.471
Only severe infectious diarrhea was reported	7	41.2	6	37.5	2	33.3	15	38.5	0.689	0.709
Only infectious diarrhea with severe complications was reported	4	23.5	2	12.5	1	16.7	7	17.9	0.689	0.709
Only report severe cases with poor prognosis, like O157:H7	7	41.2	7	43.8	2	33.3	16	41.0	0.196	0.907
Others (open-end)	3	17.6	0	0.0	0	0.0	3	7.7	—	
Current case definition should be adjusted	17	100.0	13	81.3	5	83.3	35	89.7	3.465	0.177
Reporting based on the clinical severity	14	82.4	3	20.0	6	100.0	23	60.5	8.164	0.086

*Pearson chi-square.

(A, B, C, E, etc), poliomyelitis, human avian influenza, measles, epidemic haemorrhagic fever, rabies, epidemic encephalitis B (Japanese encephalitis), dengue fever, anthrax, dysentery, amebic dysentery, tuberculosis, typhoid and paratyphoid, epidemic cerebrospinal meningitis (mainly meningococcal meningitis), pertussis, diphtheria, tetanus neonatorum, scarlet fever, brucellosis, gonorrhoea, syphilis, hook-worm diseases, malaria, schistosomiasis, and H1N1 influenza. Category C refers to the diseases under general surveillance, it includes influenza, mumps, rubella, acute hemorrhagic conjunctivitis, leprosy, epidemic typhus and endemic typhus, leishmaniasis, echinococcosis, filariasis, dysentery (exclusive cholera, bacillary and amoebic), HFMD, and infectious diarrhea (exclusive typhoid and paratyphoid) (State Council, 1989).

The current infectious diseases surveillance system in China is a web-based, real-time, daily notifiable disease case reporting system. The

grassroot unit is county CDC (State Council, 1989; Li et al., 2009; Yang et al., 1997). Among the 39 notifiable infectious diseases, there are 37 notifiable infectious diseases of single pathogen with clear case definition; exclusive HFMD and infectious diarrhea are syndromes caused by a variety of pathogens (State Council, 1989). For a common disease caused by a variety of pathogens like HFMD and infectious diarrhea, the current reporting mechanism does not reflect the real scenario of the diseases. Providing information for prevention and control strategy is of a little importance (Li et al., 2009; Deng et al., 2005; Zhao and Ni, 2007). A large amount of mild cases were reported to have diverted the focus on severe and death cases, and it also increased the workload on grass root county CDC.

To establish standardized sentinel HFMD, surveillance according to the flu surveillance framework is an alternative for HFMD from sentinel sites, and results from clinical laboratories

could be acquired, and it is more valuable in disease surveillance (Overhage et al., 2008; Brabazon et al., 2008; Nguyen et al., 2007). Otherwise, only severe and death HFMD cases would be reported. For the cluster outbreak, cases reported could refer to the influenza like illness (ILI) cluster reporting standard. Etiological surveillance should be set in sentinel hospitals, and only laboratory confirmed cases would be reported. The current infectious diarrhea report is only symptomatic report; the medical resource and professional staff are imbalanced in China, the scarce medical resource and financial support and lack of professional personnel leads to low quality and inability of pathogen detection and identification in some Western and remote regions, lack of laboratory confirmation makes this report less useful for prevention and control measures (Nguyen et al., 2007; Liang and Xue, 2004). Etiological surveillance should be set in sentinel hospitals and only laboratory confirmed cases

should be reported (Nguyen et al., 2007).

Adjustment of HFMD and infectious diarrhoea of notifiable infectious diseases should clarify the case definition and strengthen sentinel surveillance. A quality-assured infectious disease surveillance system should integrate results from clinical laboratories and epidemiological data.

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