

Full Length Research Paper

Challenge of notifiable infectious diseases reporting system in China

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Accepted 30 September, 2013

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 χ^2 test. Most participants (76.9%) agreed that case definition of infectious diarrhea is not so clear, χ^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, χ^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) | | Num answ |
|---|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|-------------|
| | Number answered | Proportion (%) | Number answered | Proportion (%) | Number answered | Proportion (%) | |
| Comments on current HFMD surveillance | | | | | | | |
| Case definition too broad | 13 | 76.5 | 13 | 81.3 | 5 | 83.3 | 3 |
| EV71 infected HFMD need to be reported | 10 | 58.8 | 8 | 50.0 | 3 | 50.0 | 2 |
| Other enteric virus infected HFMD need not report | 4 | 23.5 | 2 | 12.5 | 1 | 16.7 | 7 |
| Only report viral encephalitis | 4 | 23.5 | 4 | 25.0 | 1 | 16.7 | 9 |
| Mild case with fever do not need to report | 13 | 76.5 | 12 | 75.0 | 5 | 83.3 | 3 |
| Mild case do not need to report | 8 | 47.1 | 9 | 56.3 | 5 | 83.3 | 2 |
| Maintain current HFMD reporting standard | 0 | 0.0 | 3 | 18.8 | 0 | 0.0 | 3 |
| Others (open-end) | 3 | 17.6 | 0 | 0.0 | 0 | 0.0 | 3 |
| Current case definition should be adjusted | 15 | 88.2 | 13 | 81.3 | 4 | 66.7 | 3 |
| HFMD reporting based on the clinical severity | 13 | 76.5 | 11 | 68.8 | 5 | 83.3 | 2 |
| What kind of patients should include in surveillance network | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| Fever with rash on hand, food, mouth and buttock, fever (AT \geq 38°C) | 7 | 41.2 | 3 | 18.8 | 2 | 33.3 | 1 |
| Fever with rash on hand, food, mouth and buttock, fever (AT \geq 37.5°C and last for one day or over) | 2 | 11.8 | 3 | 18.8 | 2 | 33.3 | 7 |
| Severe case with potential CNS complication | 10 | 58.8 | 9 | 56.3 | 5 | 83.3 | 2 |
| Severe case | 17 | 100.0 | 13 | 81.3 | 6 | 100.0 | 3 |
| Cluster | 13 | 76.5 | 8 | 50.0 | 4 | 66.7 | 2 |
| Other (open-end) | 3 | 17.6 | 3 | 18.8 | 0 | 0.0 | 6 |

*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, χ^2 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, χ^2 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

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Table 2. Questions associated with infectious diarrhea.

| Questions associated with infectious diarrhea | Provincial (n=17) | | City (n=16) | | County (n=6) | | Total |
|---|-------------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
| | Number answered | Proportion (%) | Number answered | Proportion (%) | Number answered | Proportion (%) | Number answered |
| Concern about current infectious diarrhea reporting | | | | | | | |
| The lack of definitiveness of case definition | 15 | 88.2 | 9 | 56.3 | 6 | 100.0 | 30 |
| Different reporting criteria in different regions | 14 | 82.4 | 14 | 87.5 | 6 | 100.0 | 34 |
| Underreporting | 13 | 76.5 | 5 | 31.3 | 1 | 16.7 | 19 |
| Over reporting | 10 | 58.8 | 6 | 37.5 | 3 | 50.0 | 19 |
| Only severe infectious diarrhea was reported | 7 | 41.2 | 6 | 37.5 | 2 | 33.3 | 15 |
| Only infectious diarrhea with severe complications was reported | 4 | 23.5 | 2 | 12.5 | 1 | 16.7 | 7 |
| Only report severe cases with poor prognosis, like O157:H7 | 7 | 41.2 | 7 | 43.8 | 2 | 33.3 | 16 |
| Others (open-end) | 3 | 17.6 | 0 | 0.0 | 0 | 0.0 | 3 |
| Current case definition should be adjusted | 17 | 100.0 | 13 | 81.3 | 5 | 83.3 | 35 |
| Reporting based on the clinical severity | 14 | 82.4 | 3 | 20.0 | 6 | 100.0 | 23 |

*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 through disease surveillance systems. Brabazon et al. (2005) reported that otherwise, only reported cases could be reported through cluster reporting. The current laboratory setting for symptomatic reporting is not professional and scarce medical staff lack of professional identification in laboratory settings. The current reporting is less useful for professional staff (Nguyen et al., 2005). Etiological surveillance in hospitals and on

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.

ACKNOWLEDGEMENT

This study was supported by the Scientific Research Foundation for the Returned Overseas Chinese Scholars (SRF for ROCS) 20101561, State Education Ministry. The author gratefully acknowledges the support of K. C. Wong Education Foundation and DAAD.

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