

# Comparison of Disaster Medical Assistant Team Training Before and After Severe Acute Respiratory Syndrome Era

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## Abstract

To understand the possible impact of severe acute respiratory syndrome (SARS) on DMAT training, we reviewed the training programs of 2 national and 10 local DMATs before and after SARS era. The requirements included (1) health needs assessment; (2) health surveillance; (3) medical care personnel; (4) medical equipment and supplies; (5) patient evacuation; (6) public health information; (7) vector control; (8) wastewater and solid waste disposal; (9) in-hospital care; (10) food/drug/medical device safety; (11) worker health and safety; (12) potable water; (13) mental health care; (14) victim identification/mortuary services; (15) veterinary services; (16) radiological/chemical/biologic hazard consultation; and new categories such as (1) understanding of biotechnology; (2) identification of a biological event, including surveillance system, environmental detection and laboratory diagnostics; (3) prophylaxis, post-exposure measures, and treatments; (4) system preparedness such as media and public education, communication and legislative activity; and (5) new development such as cytokines and pre-clinical diagnostics, antimicrobial use and immunomodulators. The average categories included in national DMATs training were significantly higher than those of local DMATs ( $14.5 \pm 0.5$  vs.  $11.0 \pm 2.0$ ,  $P < 0.05$ ). However, the national DMATs have not updated their programs after SARS, whereas most of local DMATs have revised their training programs ( $14.5 \pm 0.5$  vs.  $14.0 \pm 1.0$ ,  $P = \text{NS}$ ). There were also more emphasis on radiological/chemical/biologic hazard consultation (9/10 local DMATs) and veterinary services (8/10 DMATs). Neither the national DMATs nor local DMATs have updated their education to fulfill the 5 new requirements. This study demonstrates that there is no major revising of training programs for DMATs, especially for national DMATs. It still needs more improvements in promoting the education/training for DMATs in Taiwan. The continuous education/training programs such as NBC (nuclear, biological and chemical) training may provide resolution for this problem. (*Ann Disaster Med.* 2004;3:46-51)

**Key words:** DMAT; SARS; Bioterrorism; Training/ Education

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## Introduction

After the 2003 SARS response, related education and training figured prominently among the tools used to contain the outbreak.<sup>1</sup> The response to outbreaks and the threat of outbreaks necessitated extensive education and training activities. Emerging infectious diseases and bioterrorism have become hot topics in health professional education since then in Taiwan. The major challenges from emerging infectious diseases are the threatening of innocence and subsequent difficulties in finding the proper methods of isolation, treatment and prevention. Bioterrorism bring more psychological stress. A domestic bioterrorist attack is unprecedented in differing from conventional military or terrorist actions, because the first responders are likely to be physicians and not law enforcement personnel.<sup>2</sup> Hospital-based personnel are important, because acutely ill patients representing the earliest cases after a covert attack will likely seek care in the emergency departments. Physicians, nurses, and physician extenders must therefore be trained in recognition and early treatment to biological casualties, and must understand and be able to carry out their roles and responsibilities in the event of a terrorist attack. In Taipei City, the government has also prepared to implement so-called "Emerging Infectious Disease Surveillance and Control Team" (EIDSCT) to act as the one of the major teams for response to such biological events. Education of civilians in the medical and public health field is thus essential for an appropriate response. However, whether the hospital-based and primary care medical personnel have received sufficient preparedness training deserves investigation.

Taiwan has set up national and local di-

saster medical assistance team (DMAT) since 2000 shortly after the occurrence of 921 Chi-Chi earthquake. The training programs were almost modified from those of National Disaster Medical System (NDMS) in the United States.<sup>3,4</sup> However, the initial programs have not emphasized the importance of bioterrorism response. If the EIDSCT mentioned above is a special form of DMAT, we urged to know if the new training has introduced and practiced in such teams. We then designed the following survey to understand the training programs of national and local DMAT and EIDSCT, and the relative importance of bioterrorism in the education contents.

## Methods

### *Study targets*

We attempted to set up a standard guideline for EIDSCT training under the concept of FEMA-based general management model. According to the model, there should be 12 emergency support functions even if biological events occur, that is, transportation, communications, public works and engineering, firefighting, information and planning, mass care, resource support, health and medical services, urban search and rescue, hazardous materials, food and energy. Among them, Department of Health (comparable to the Department of Health and Human Service in the U.S.) has the lead national responsibility for the health and medical service resulting from bioterrorism or other infectious diseases. This function can be categorized as (1) health needs assessment; (2) health surveillance; (3) medical care personnel; (4) medical equipment and supplies; (5) patient evacuation; (6) public health information; (7) vector control; (8) wastewater and solid waste

disposal; (9) in-hospital care; (10) food/drug/medical device safety; (11) worker health and safety; (12) potable water; (13) mental health care; (14) victim identification/mortuary services; (15) veterinary services; (16) radiological/chemical/biologic hazard consultation.<sup>5</sup>

<sup>6</sup>All of these categories should be included in the training programs for DMATs.

We tried to collect training programs from 2 national DMATs and 10 local DMATs. The programs before and after SARS were collected and compared.

In addition, we also analyzed the training protocols (including their e-learning programs) for EIDSCT according to the same criteria. However, because of the EIDSCT belonging to specific DMAT, we also analyzed if the advanced programs such as (1) understanding of biotechnology; (2) identification of a biological event, including surveillance system, environ-

mental detection and laboratory diagnostics; (3) prophylaxis, post-exposure measures, and treatments; (4) system preparedness such as media and public education, communication and legislative activity; and (5) new development such as cytokines and pre-clinical diagnostics, antimicrobial use and immunomodulators.<sup>5</sup>

### **Statistic analysis**

All the data were processed and analyzed with Microsoft Excel 2000 for Windows. The techniques applied to data analysis included descriptive statistics generating and independent samples by *t*-test and chi-square test.

## **Results**

### **DMAT training program**

The training program of 2 national DMATs and 10 local DMATs before and after SARS era

**Table.** Analysis of different category coverage in local DMAT training before SARS

	Before SARS	After SARS
(1) health needs assessment	8/10 (80%)	8/10 (80%)
(2) health surveillance	7/10 (70%)	8/10 (80%)
(3) medical care personnel	10/10 (100%)	10/10 (100%)
(4) medical equipment and supplies	8/10 (80%)	8/10 (80%)
(5) patient evacuation	8/10 (80%)	8/10 (80%)
(6) public health information	8/10 (80%)	8/10 (80%)
(7) vector control	5/10 (50%)	10/10 (100%)
(8) wastewater and solid waste disposal	8/10 (80%)	8/10 (80%)
(9) in-hospital care	8/10 (80%)	10/10 (100%)
(10) food/drug/medical device safety	6/10 (60%)	7/10 (70%)
(11) worker health and safety	8/10 (80%)	8/10 (80%)
(12) portable water	8/10 (80%)	8/10 (80%)
(13) mental health care	5/10 (50%)	7/10 (70%)
(14) victim identification/mortuary services	2/10 (20%)	4/10 (40%)
(15) veterinary services	5/10 (50%)	7/10 (70%)
(16) radiological/chemical/biologic hazard	8/10 (80%)	8/10 (80%)

were collected and reviewed. Both national DMATs could cover most of 16 categories in their training programs including basic and advanced programs before SARS era. In contrast, local DMATs had various insufficiencies in their education/training protocols (Table). Specifically, the average categories included in national DMAT training were significantly higher than those of local DMATs ( $14.5 \pm 0.5$  vs.  $11.0 \pm 2.0$ ,  $P < 0.05$ ). The least categories included were radiological/chemical/biologic hazard consultation (5/10 local DMATs) and veterinary services (6/10 DMATs). The national DMATs have not updated their programs after SARS, whereas most of local DMATs have revised their training programs. There are no definite differences in categories included between national DMATs and local DMATs ( $14.5 \pm 0.5$  vs.  $14.0 \pm 1.0$ ,  $P = \text{NS}$ ). There were also more emphasis on radiological/chemical/biologic hazard consultation (9/10 local DMATs) and veterinary services (8/10 DMATs).

Judged by the criteria of 5 new categories related to biological events, neither the national DMATs nor local DMATs have updated their education to fulfill the requirements.

### ***EIDSCT training protocol***

The training protocol of Taipei EIDSCT has fulfilled most of 16 requirements mentioned above. The program also included 5 new advanced categories in preparedness of biological events and bioterrorism. However, to our knowledge, the text of learning is still lacking whereas the teaching slides may be available. The new learning modules such as different modes of e-learning have been constructing but not completed. The authorities responsible for forum or on-line learning are also lacking.

## **Discussion**

This study demonstrates that there is no major revising of training programs for DMATs, especially for national DMATs. However, the training protocols for Taipei EIDSCT fulfill most of the requirements. According to the requirements we suppose, it still needs more improvements in promoting the education/training for DMATs in Taiwan. The continuous education/training programs such as NBC (nuclear, biological and chemical) training may provide resolution for this problem.

Management of a bioterrorism or a biological event will begin with early detection and intervention at the local level. Any large-scale event will require rapid local and national response. National initiatives targeting bioterrorism have increasingly become a complex web of executive and legislative actions, frequently initiated in reaction to specific events, and often unrelated to this threat. It is essential to develop predefined or clear and rapidly discernible criteria for deployment of local and national emergency resources.<sup>5</sup>

If bioterrorism occurs, medical response is provided primarily through deployment of DMATs followed by health and medical consequence management operations provided by Department of Health and Human Services and other partners. In the United States, DMATs are locally operated and supported voluntary teams of 100 people with varying medical skills. If local hospital capacity is exceeded, several approaches may be used, including activating the patient evacuation and definitive care elements of the NDMS, mobilizing local auxiliary care resources, or deploying treatment resources to the affected areas. And medical response,

patient evacuation, and definite medical care are three components of NDMS. In other words, DMAT is responsible for primary medical care component of NDMS, whereas NDMS are the partners of Department of Defense, Department of Health and Human Services and Veterans Affairs that are important agencies for emergency support functions. It is not clear, to our knowledge, that if the DMATs are also responsible for medical care when an epidemic or endemic emerging infectious disease occurs. However, because of the many similar aspects between bioterrorism and emerging biological events, we believe the deployment of DMATs when indicated may be a reasonable approach.

As mentioned above, Taipei City government has implemented the EIDSCT to respond to emerging infectious disease such as SARS. Although the teams are not attributed to the infrastructure of DMAT, they are really a specific form of DMAT. The current policy for such a team is to address the training in biological event responses. In the point of view, there should be continuous updating in education programs with the advances in this field. For example, besides syndrome surveillance,<sup>7-9</sup> high clinical suspicion index such as severe disease manifestations in previously healthy people, higher than normal number of patients with fever and respiratory/gastrointestinal complaints, multiple people with similar complaints from a common clues, an epidemic disease appearing during an unusual time of year, unusual number of rapidly fatal cases, greater number of ill or dead animals, rapidly rising and falling epidemic curve, and greater numbers of patients with pneumonia / sepsis / cagulopathy / fever and rash / diplopia with progressive weakness. Although the triage system for mass causality (such

as START system) can apply to the biological events, it still needs modification by the nature of the event. An expanded version of SIR analytic framework, referred to as SIERV, provides the basis for a triage tool to identify potential steps and avoid missteps in the course of management of a potential bio-agent: (1) Susceptible individuals; (2) Exposed individuals; (3) Infectious individuals; (4) Removed individuals; and (5) Vaccinated successfully. These are merely examples to show the importance of updating the training program for DMAT members, either general or special. Because most of the DMATs are short of professionals who are responsible for the updating of training programs, the advancement in the field is not manifested. In addition, there is still no professional department or authority that possesses a task force team implementing the golden rules or guidelines for preparedness. It also results in the lack of uniformity in education/training for disaster preparedness.

EIDSCT is a new trial for biological event response. We do believe that it may be a special DMAT. According to the planning, many new training protocols and modules may be included. Besides new categories included in the protocol, e-learning is also the goal to facilitate learning for all of the members. Whether the goal can be accomplished and the updating is continued deserve further follow-up.

The major limitation of this study is that we cannot review explicitly the details of the contents of different training programs. We also cannot approach the real circumstances during training or learning at each DMAT. In other words, the same topic may not mean the same training or the same achievements. In addition, the evaluation of students' performance is dif-

ferent for each DMAT. It is difficult for us to determine if the fulfillment of the categories included is equivalent to the accomplishment of the real learning objectives.

In summary, the original national DMATs should keep updating in their education whereas the local DMATs should continue to complete their training programs in Taiwan.

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