

## Original Article

### Development of Travel Medicine in Taiwan, 2007-2012

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#### Abstract

In the era of global village, the WHO suggests that the travel planners should search the underlying hazard warning of destination, to understand the best way to protect their health, and minimize the risk of illness. Although the medical and travel industry have offered plenty amount of information and helpful warning, the travelers are responsible to take necessary prevention methods on relative risks. To prevent the importation and spread of diseases, the Centers for Disease Control in Taiwan (Taiwan CDC) has taken the initiatives to protect the health and safety of people while traveling abroad. At first, the "Travel Health Center" was founded to offer consultation and vaccination for international traveling in 2007, and then the "Travel Medicine Education and Training Center" was established with the collaboration of National Taiwan University Hospital in 2008, to expand the service scale, promote travel medicine, and to perform education and training on medical staffs, furthermore, it was extended to first-line staffs of travel industry in 2009. Till today, the "Training Center for Travel Medicine" is still conducting the education training and has made more professional, also, the outpatient clinic has become the model centre of travel medicine, with significant result. Besides, in order to provide more comprehensive service, the Taiwan CDC has signed the "International Traveling Integrated Service Contract Hospital (abbr. Contract Hospital)" successively since 2008 with 12 hospitals to offer international traveling outpatient clinics, not only to provide the public a convenient, comprehensive and accessible service, but also to enhance the effect of disease prevention and to ground the travel medicine in this country. This article describes the development in 2007-2012 and future expectation of travel medicine in Taiwan.

**Keywords:** Travel Medicine, Travel Medicine Education and Training Center ( Training Center for Travel Medicine )

## **Introduction**

According to WHO, there were over 8.8 billion people traveled internationally for working, recreation and other purposes globally in 2009, among them, 51% was for recreation, entertainment and vacation, 15% was for business and work, the other 27% was for special purpose, including visiting relatives and friends, religious reason, pilgrim and medical behavior, showing various purposes of travel. About transportation, more than half of travelers chose air transport (53%), other 47% used highway, railway, or sea route, people using air transportation is increasing recently. The risk of health by international travel was determined by the types of travel and the travelers' health needs, they might face sudden and major changes, including latitude, humidity, temperature, and exposure under infectious disease, which could lead to illness. Besides, poor accommodation quality and hygiene, inadequate toilet facilities, poor health care and lack of clean water all could lead to serious health risk. Though the most common reason of death and incidence of disease were from accidents, protect travelers against infectious diseases is now a more important issue. WHO predicts that there will be up to 16 billion international travelers in 2020, and the associated health issues will be much more complicated [1].

In recent years, people engaged in transnational activities and international tourism have increased sharply, and the destinations are more widespread, including areas with high incidence of tropical infectious diseases, like Africa, Central and South America, Southeast Asia and Oceania. As the result, risk of special infectious diseases infection is increasing, even diseases that have been eradicated or rare. All of these will definitely have impact on national public health, thus developing the travel medicine vigorously should become an extremely important policy.

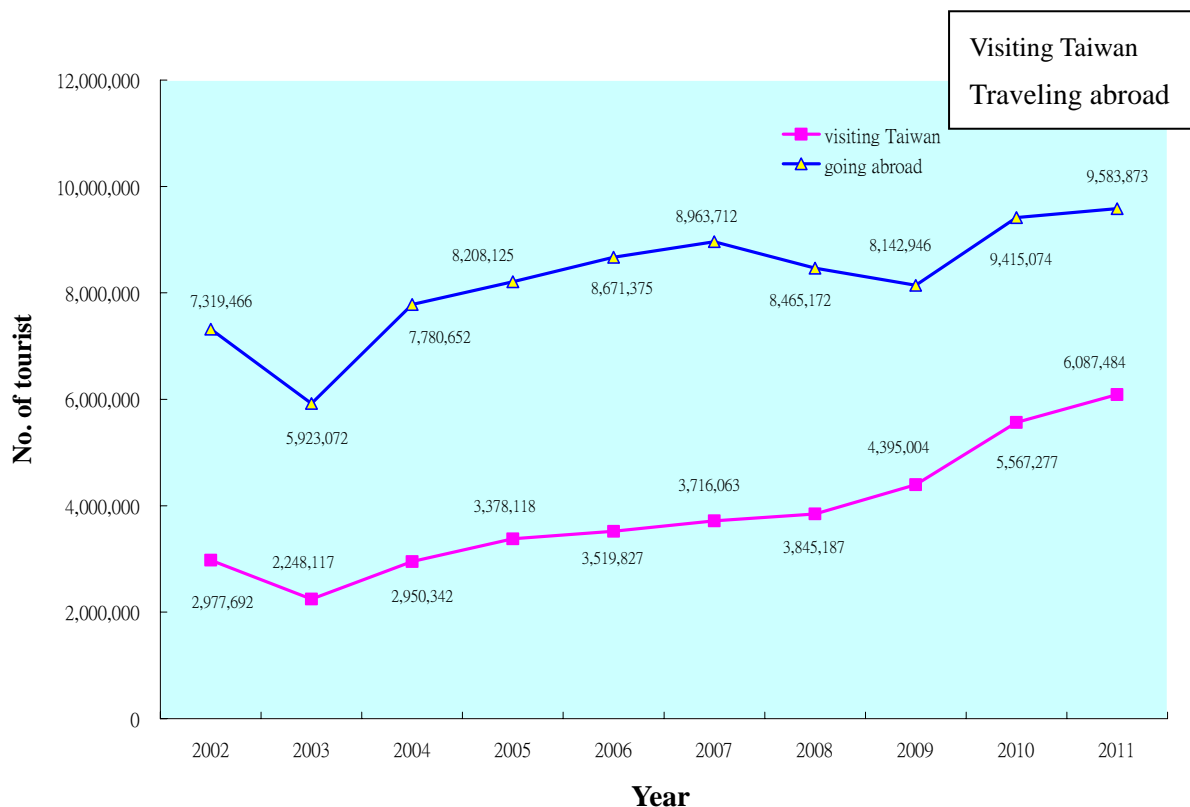
## **Background**

According to Tourism Bureau, the number of tourists visiting Taiwan from 2002 to 2011 has grown about 104.44%, and number of travelers going abroad has grown about 30.94% in recent 10 years (Figure), both showed significant growth [2]. The purpose of going abroad also showed diverse purposes, tourism being the top (61.1%), followed by business (24.0%), visiting relatives and friends (13.5%), short-term study abroad (1.2%) [3], and religious activities, medical service, humanitarian rescue, or academic research. Majority of the destinations were in Asia, comprising 88%, and others included America, Europe, Oceania, Africa, and Central South America [3]. Because the frequent international travel, the threat of getting infectious diseases was raised. Take the first SARS case in Taiwan in March 2003 as an example; it was an imported case caused by a Taiwanese who went to Guangdong, China for business [4]; and the first confirmed case of H1N1 influenza in Taiwan in 2007 was a foreigner who flew from the U.S. through Hong Kong to Taiwan and detected by the airport quarantine [5].

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Due to the climate change caused by greenhouse effect, not only the ecological environment was changed, the distribution area and density of disease-transmitting rodents and insect vectors were also altered, and thus the epidemiology of infectious disease was no longer the same. The rose temperature and transformed raining pattern have caused significant influence on diseases transmission through insect vectors and polluted water. The insect vectors were more active under higher temperature, and so was the water-borne infectious disease [6]. Take dengue fever for example, warm environments can raise the activity of vectors, after the rains especially, the breeding location was increased and the amount of the adult mosquitoes increased, the ability of disease transmission became higher [7]. The epidemiology of dengue fever in Southeast Asia is getting more severe in the last 10 years, the situation was noted in Singapore, Philippines, Indonesia, Thailand and Vietnam. Moreover, the distribution of malaria vectors was spreading to higher altitude area, leading to increased Malaria distribution [8].

According the surveillance by Taiwan CDC from 2009 to 2011, the accumulated case number of imported acute infectious diseases in each year was 538, 635, and 560 respectively; the most 3 imported acute infectious diseases in 2011 were dengue fever (157 cases), shigellosis (139 cases), and amoebiasis (135 cases) (Table 1). All of cases came from 33 countries, Indonesia accounted for the most (226 cases), followed by Vietnam (68 cases), and 61 cases from the Philippines [9].



**Figure. The number of tourists visiting Taiwan and traveling abroad in the last 10 years**

**Table 1. Statistics of the number of imported acute infectious diseases from 2009 to 2011**

Year	Dengue fever	Amoebiasis	Shigellosis
2009	204	68	52
2010	304	139	82
2011	157	135	139

### History and current situation

In order to improve and guarantee the health and safety on traveling abroad, Taiwan CDC established the “Traveling Health Center” on June 11, 2007, to offer the public advices on international infectious disease vaccination and prophylactic medication, and served 2300 people by January 18, 2008. Since Taiwan CDC is not a medical institution and the ability to provide thorough health evaluation, medication, and treatment on infected travelers after returning to Taiwan were limited; with the collaboration of National Taiwan University Hospital, the “Training Center for Travel Medicine” was founded on January 25, 2008, and set up the travel medicine special outpatient clinic, offers integrated health consultation and medical service. Besides, in order to extend the service area, Taiwan CDC signed the “International Traveling Integrated Service Contract” with 8 hospitals in Taiwan synchronously to provide travel medicine outpatient service, since then the clinic at Traveling Health Center was discontinued on February 1, 2008 [10]. Till today, there are 12 hospitals providing the convenient, professional travel medicine clinic and consultation service.

The tasks and goals of “Training Center for Travel Medicine” and “International Traveling Integrated Service Contract Hospital” are:

**A. Training Center for Travel Medicine: In accordance with the mission of Taiwan CDC, developing as the demonstration and training center for travel medicine, heading to leadership of travel medicine in Taiwan and Asia-Pacific region, the goals including:**

1. Responsible for training instructors for travel medicine, and offer in-service travel medicine training to national doctors.
2. Hold continuing education trainings for medical personnel, health education for travel guides and team leaders and associated seminars.
3. Provide integrated service on international travel health consultation and medical care.
4. Develop professional national travel medicine, and improve researches on international travel medicine.
5. Offer basic knowledge and skills for medical personnel; gather domestic experts of related field to write a reference book for domestic training.
6. Release “Travel Medicine Bulletin” quarterly, allow Contract Hospitals to communicate on professional knowledge, discuss cases and share experiences.
7. Publish health education pamphlets like “Travel with a doctor in your pocket” to help the public to perform general evaluation before the trip and information about self-care during the trip.

**B. International Traveling Integrated Service Contract Hospital: appointed 12 Contract Hospitals to give travel medicine outpatient clinic, help the public to get travel health consultation and health evaluation before going abroad. The services including:**

1. Provide vaccination of Yellow fever and meningococcal meningitis, and give international vaccination certifications.
2. Offer preventive medication for malaria.
3. Provide rabies vaccination and other specific inoculation, traveling disease prevention, and health consultation.
4. Outpatient medical service and back-home follow-up
5. Health check-up and consultation for students studying abroad
6. Group health education service

Based on previous study, there was only few people would ask for health consultation before traveling abroad, the importance of professional medical consultation was closely related to their health during trips.

**Aims of development**

Other than providing prophylaxis vaccination and malaria preventive medication to the 12 Contract Hospitals, to prevent the importation and spread of infectious diseases, the cooperation with travel medicine service providers and travel industries is also needed. We aim to enhance the epidemic prevention by accomplish the next 3 major tasks:

**A. By diverse cooperation and unimpeded communication, actively construct a complete cooperation network.**

1. Actively construct diverse cooperation relationships: work with Tourism Bureau, Training Center for Travel Medicine and 12 Contract Hospitals to build a horizontal working platform with different working patterns:
  - a. Work with Tourism Bureau, Ministry of Transportation and Communications, include the “Professional knowledge of travel infectious disease” into the course and the examination of pre-vocational education of tour guides and team leaders, to promote the awareness on disease importation prevention.
  - b. Work with Training Center for Travel Medicine to carry out training among medical personnel and travel personnel, and enhance the professional travel medicine knowledge of tour guides and team leaders.
  - c. Work with Contract Hospitals to offer complete travel medicine outpatient clinics, including pre-travel consultation, vaccination, preventive medication, and medical care after return.
2. Built the official website of “International traveling information” in 2008, (<http://www.cdc.gov.tw>) to offer multifunctional services, including:
  - a. International travel epidemic: including daily released important international epidemic and information on different epidemic levels, give travel risk and advice on prevention measures.

- b. Information of traveling infectious diseases: introduce common traveling infectious diseases and the prevention measures.
  - c. Vaccination: the inoculation before trip was divided into three categories, including routine, compulsory and recommended vaccination; give suggestion on type of vaccine should have or could have to avoid the potential infection before the trip, and information about the timing of vaccination to ensure the effect.
  - d. Medication: help to prepare anti-malaria medication before the trip.
  - e. Statistics of confirm case of each notifiable imported infectious diseases.
  - f. Training course of travel medicine for tour guides and team leaders: the latest annual course list.
  - g. Information of global epidemic and importation statistics: latest weekly data.
  - h. Associated information of travel medicine outpatient clinic: time table of international vaccination.
  - i. Health advice: additional prevention methods people can do during the trip to protect their health.
  - j. Health education and advocacy: multiple health educational materials about traveling and propaganda video produced by Taiwan CDC, which can also be downloaded.
  - k. Recommended international travel epidemic websites: offer official websites linking to Ministry of Health of other countries.
  - l. Wandering with health – Tips on travel medicine for tour guides and team leaders: edit the handbook for tour guides and team leaders.
  - m. Related links: important, useful, and common domestic/abroad travel medicine websites.
3. Set up the free and 24hr “1992” phone line for epidemic consultation and notification, with which the public can search the related travel information anytime and notify the infection condition, or seek for medical help.
  4. Border quarantine: Set up fever-screening stations at international ports to screen people having fever or being not well, and to receive notification from returning tour guides, and take relative management and monitoring immediately.

#### **B. Expanding the integrated service and service center of travel medicine outpatient clinic**

With the organization of “Training Center for Travel Medicine” and “Contract Hospital”, a convenient, complete, and accessible travel medicine service was established:

1. Travel medicine outpatient department: Offer travel medicine clinic and high quality medical care, the service contains preventive vaccination for travel, medication prescription, and correct related health education.
2. Pre-traveling consultation: Offer the public professional medical knowledge about the destination, individual consultation, illness prevention methods, and preventive medication.

3. Health education advocacy: Give personal or group health education according to the destination, time, and seasonal differences following the references of published information of WHO and US CDC.
4. Follow-up on arriving passengers: If a passenger feels uncomfortable after returning, tracking the travel history will be performed for early diagnosis of infection and to eliminate the risk of spreading.
5. Educational training and seminar: Offer educational training to domestic clinicians, relative medical personnel, tour guides and the public; perform teaching observation and cultivate teachers for travel medicine, and hold related education, training, and researches.
6. Increase the service spots: This provides the public an increasing accessibility to visit the of travel medicine clinic. Presently, most of the 12 Contract Hospitals are located in northern and western metropolitan area, and only one contract hospital is in the east. (the locations are shown in Table 2)
7. Websites and newsletter: The professional travel medicine website built by “Training Center for Travel Medicine” (<http://travelmedicine.org.tw/>) offers professional information and health education materials, people can subscribe the newsletter to get periodical travel medicine information.

**Table 2. International Traveling Integrated Service Contract Hospital (abbr. Contract Hospital)**

No.	Contract hospitals
1	Keelung Hospital, Department of Health, Executive Yuan
2	National Taiwan University Hospital
3	Mackay Memorial Hospital
4	Tri-Service General Hospital
5	Taoyuan International Airport Clinic, Landseed Hospital
6	National Taiwan University Hospital Hsin-Chu Branch
7	Taichung Hospital, Department of Health, Executive Yuan
8	Wuchi Branch, Hospital Tungs' Taichung MetroHarbor Hospital
9	National Cheng Kung University Hospital
10	Kaohsiung Municipal Hsiao-Kang Hospital
11	Kaohsiung Municipal United Hospital
12	Hualien Hospital, Department of Health, Executive Yuan

### C. Strengthen the important role and the responsibility of tour guides

Among the abroad travelers in 2009 and 2010, people joined the programs offered by travel agencies accounted for 88% [2], which showed the importance of tour leaders and tour guides. Especially in the prevention of disease importation and spreading, tour guides and team leaders not only acted as important roles, but also were given with high responsibilities.

1. Taiwan CDC and Tourism Bureau have set regulations to request tour guides and team leaders the responsibility of notification, as well as the incentives, which are as following:
    - a. the regulations demand that notification on “arriving passengers with aberrant health” is mandatory;
      - (1) Pursuant to Article 42, Paragraph One, Subparagraph Six of the Communicable Disease Control Act: When the travel service representatives, tour guides or tour leaders discover suspected patients or the remains that they consider to have been affected by communicable disease but are not yet diagnosed or examined by physicians, they shall notify the competent authorities of the locality of such cases within 24 hours. When failing to notify in accordance with the regulations outlined in Article 42, they shall be fined NT\$ 10,000 up to NT\$ 150,000 pursuant to Article 69, Paragraph One of the abovementioned law; when necessary, a deadline shall be given for correction, and, if however, correction is not made in due time, fines will be levied successively
      - (2) Pursuant to Article 18, Paragraph One of the “The regulation governing the approval of people of the Mainland area visiting Taiwan for purpose of tourism”: If, after entering Taiwan, any person from Mainland Area is discovered unwell or infected with a suspected infectious disease, the responsible person of the travel agent or tour guide shall notify the local health authority to assist treatment and, additionally, the Tourism Bureau shall also be notified. If violation of the regulation was found, he or she shall be recorded point pursuant to Article 26 of the abovementioned law.
    - b. Awarding regulation: Pursuant to Article 3, Paragraph One and Article 6, Paragraph 2 of the “Regulations governing awards for the control of communicable diseases”, person other than medical personnel who reports on own initiative the detection of cases of communicable diseases (sources), and confirmed by the central competent authority shall be issued a reporting bonus of NT\$ 2,500 per case. Article 26 of the “Regulations governing tour guides” by the Tourism Bureau has also set awarding regulation.
  2. Besides cooperating with Tourism Bureau of Ministry of Transportation & Communications, Taiwan CDC included the professional knowledge of travel communicable diseases into the pre-vocational education training for tour leaders and guides, made teachers subsume in lecture and pre-vocational question bank, and wish to combine it with the licensure examination and renewal in the future.
  3. The important responsibility of disease prevention on the tour guides and leaders before, during the trip, and after returning:
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- a. Before the trip:
  - i. Pre-activity environmental evaluation, and offer departure passengers the associated travel medicine knowledge and inform the risk of diseases.
  - ii. Assisting the tour members with professional consultation at travel medicine clinics, and preventive inoculation and medication.
- b. During the trip:
  - i. Assisting the ill travelers seeking medical help
  - ii. Taking care of the tour members' health and assisting protection measurements
- c. After returning:
  - i. Taking appropriate measurement when in abnormal situation, and notifying the quarantine personnel immediately while arriving.
  - ii. Offering the member list and tour schedule if necessary to help with epidemic investigation and follow-up.

### Achievements

Taiwan CDC established "Training Center for Travel Medicine" with the collaboration of National Taiwan University Hospital in 2008 to popularize travel medicine, and signed up "Contract Hospitals" succeedingly, till now there are 12 hospitals holding the travel medicine outpatient clinics. Multiple achievements have been accomplished, the relative service item of travel medicine is not only diverse, but also professional. In the mean time, the power is extended gradually and towards the internationalization development:

#### A. The accumulated numbers of travel medicine training and attending people

Except from routine medical personnel education training and national seminars, Taiwan CDC and "Training Center for Travel Medicine" started to hold tour leader and tour guide education and training under collaboration with Tourism Bureau since 2009. From 2008 to 2010, there were 42 events with 4,587 medical members and 16 events with 2,461 tour guides and team leaders attended (Table 3)

#### B. The accumulation of patients visited travel medicine outpatient clinic

The patients visited travel medicine outpatient clinic, from 2009 to 2011, increased from 8,206 to 10,992, the year growth rate was 11.87% and 19.74% respectively (Table 4), indicating there are more and more people visiting travel medicine clinics, and the busy season is from May to August.

**Table 3. Numbers of travel medicine training and attending people from 2008 to 2010**

		2008	2009	2010	2011	Total
Medical personnel	No. of event	6	6	21	11	42
	No. of people	429	1,435	1,369	1,354	4,587
Tour guide and team leader	No. of event	0	1	7	8	16
	No. of people	0	233	1,148	1,080	2,461

**Table 4. Number of patients visiting travel medicine outpatient clinic**

year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	total	Growth rate %
2009	415	501	426	491	612	1,359	1,442	793	577	516	493	581	8,206	
2010	582	416	495	552	754	1,268	1,656	1,092	621	687	461	596	9,180	11.87
2011	651	546	717	644	1,084	1,616	1,734	1,195	657	694	656	728	10,992	19.74

### C. The accumulation of the use of vaccine and malaria prevention medication in Contract Hospitals

The use of vaccine and malaria prevention medication in Contract Hospitals (Table 5), except hydroxychloroquine, increased from 2009 to 2011; so did Yellow fever vaccine, rabies vaccine, and poliovaccine

**Table 5. Number of used vaccine and malaria prevention medication at contract hospitals from 2009 to 2011**

year (dose)	Yellow fever vaccine	meningococcal meningitis vaccine	Rabies vaccine	JEV vaccine	Poliomyelitis vaccine	Hydroxy Chloroquine	Mefloquine (atovaquone/proquanil)	Malarone
2009	3,654	2,693	209	58	36	1,431	12,958	1,251
2010	3,947	2,614	231	44	63	566	15,072	5,682
2011	5,446	2,784	271	85	113	773	18,300	9,469

### D. Offer E-learning course of “International travel information”

In order to facilitate a convenient online learning to contract hospitals, tour guides, tour leaders and the public, Taiwan CDC, Training Center for Travel Medicine and Tourism Bureau of Ministry of Transportation & Communications have built up E-learning course on its own website.

### E. Publication of health education materials

There were dozens kinds of publications and books about health education and avocation co-published by Taiwan CDC and Training Center for Travel Medicine, participated by many domestic specialists of travel medicine, which offer medical personnel, tour guides, tour leaders, and the public with professional travel medicine knowledge. These are diverse, lively and easy understandable, and had received plenty of positive responses and compliments.

### F. Research of travel medicine

From 2008-2011, research results published including: Analysis of characteristics and satisfaction of people visiting Travel Medicine Outpatient clinic, Investigation of tour guides and leaders' knowledge, attitude and behavior on Travel Medicine (Survey of knowledge, attitude and behavior toward meningitis, mosquito vectoring diseases, and rabies vaccine). Also, study of “Travel-related mosquito-transmitted disease questionnaire survey among health professionals in Taiwan” published on Journal of Travel Medicine pointed out how to improve the international travel medicine and future development goals [11]. The above articles offered good references for policy making.

### G. Medical doctors in Taiwan CDC acquired the international certification, the travel medicine connected to the world

Two doctors from Taiwan CDC have passed the annual congress certification exam, which held by International Society of Travel Medicine (ISTM) in Budapest, Hungary in 2009, awarded certification of international travel medicine and become domestic training seed teachers.

## **H. Build up communication data base between contract hospitals, tour guides and leaders**

Taiwan CDC actively offered the major international epidemic information, important travel health care and travel warning to tour guides and leaders, to remind them important notes and to keep in close touch.

## **Visions**

WHO advised that, due to the rapid change of infectious diseases, the drug resistance issue is getting more serious, the wide differences between travelers' health situation, the increasing of chronic disease, the importance of travel medicine has been ascertained, and it is more important to carry out the pre-travel evaluation, preventive preparation, and management after returning [1]. Although WHO has suggested the travelers should search for the underlying warning of their destinations, Taiwan CDC should still take initiative in offering the service and information. The business of prevention inoculation in international travel medicine clinics is the result of integration of "Training Center for Travel Medicine" and "Contract Hospitals". In the future, we also hope to enhance the policy outcome of international travel medicine, to set developmental goals, to protect our compatriots' travel health and safety, and moreover, to eliminate the impact on public health by introduction of infectious diseases.

Taiwan CDC has planned to achieve six goals to develop international travel medicine, including:

### **A. Improve the capacity and quality of travel medicine contract hospitals**

Continue project of "International Traveling Integrated Service Contract Hospital", but to develop toward free market mechanism to fulfill missions. Depends on the demands of future international travel medicine and capacity of hospital service, using an equitable, open, and clear competing market mechanism to overtly seek for "Contract Hospital", and select the hospital that meeting the standards, then to improve the service quality and capacity.

### **B. Build safe inventory of anti-malaria medication and vaccine and plan the preceding working schedule**

Build sufficient safe inventory and plan a suitable preceding work schedule to avoid lacking of stockpile or other accidental factors.

1. Build up the safe inventory standard of each vaccine and anti-malaria medication by periodical counting the demands of the medication, and analyze the demands of different hospitals. Plan a complete preceding purchasing schedule, and add a "warning" function to maintain the flexibility of management, and control the correct, immediate inventory data.
2. Encourage the project pharmaceutical importers to obtain license approval for imported vaccine and anti-malaria medication; encourage contract hospital to purchase the medication at actual demand. Taiwan CDC shall periodically check the safe inventory and follow up.

### **C. Build up a sharing platform and a feedback mechanism of travel medicine**

The Training Center for Travel Medicine held the first education training for tour guides and leaders in 2009, and started to collaborate with Taiwan Association of Family Medicine in 2010, expanded the training attendees from medical personnel to tour guides and team leaders, and enlarged the scale of seminars, improved the quality of professional travel medicine training. Besides, the sharing platform and feedback mechanism of travel medicine was built, by which people can share their experience.

1. Currently, the vaccine and malaria prevention medication in the outpatient department of the contract hospitals are offered by Taiwan CDC. Working together with the Training Center for Travel Medicine, special training and seminar are designed according to the territories and travel tendency of the contract hospitals, to build communication and feedback mechanism of the important cases, and to share the professional information or special experience.
2. Except periodically renew of the “Information of International Travel”, a new Q&A column was added according to different subjects, offering an in time searching service of vaccination and anti-malaria drugs and improve the convenience and popularity of the data base.
3. Send related medical information about each vaccine and anti-malaria drug, warning information and situation of international travel to medical personnel of contract hospitals and tour guides and leaders related association.
4. Increase e-learning course of tour guides and leaders and give them the learning points after finishing the course, which will be taken into consideration as the learning hour of pre-vocational and in-service training in the future after coordinating with Tourism Bureau.

### **D. Encourage the travel personnel to notify arriving passengers with aberrant health**

Although, according to the “Communicable Disease Control Act” and “The Regulation governing the approval of people of the Mainland area visiting Taiwan for purpose of tourism”, the notification of the “arriving passengers with aberrant health” is mandatory responsibility of tour guides and leaders, we still would like to add a flexible award method to enhance the effect of notification.

1. Increase incentive praises to award travel personnel who followed the rules, and commend publicly in seminars or relative course of travel medicine education and training, to promote the notification on arriving passengers with aberrant health.
2. According to “Regulations governing awards for the control of communicable diseases” and Article 26 of the “Regulations governing tour guides” by Tourism Bureau, the regulation of award and praise was set, but the threshold is still too high, so we suggest the related authority to award leniently.

### **E. Build an audit system and evaluation on contract hospitals**

Till the end of 2011, Taiwan CDC has signed with 12 contract hospitals. To ensure the service quality, they build up a rational system by equitable, open and clear evaluation, to maintain the benign competition between hospitals.

1. Arrange education training of safe stockpile management of anti-malaria drugs and cold-transportation and cold-storage of vaccines; maintain the safe management of vaccine and drugs.
2. Conduct evaluation of the contract hospitals; award the excellence, and to take those with poor scores into renewal consideration or keep them in counseling list, the evaluation includes:
  - a. Inspect the contract hospitals on the management of vaccine cold storages equipment and anti-malaria drugs inventory
  - b. Inspect the working situation of contract hospitals following the signed contract

### **F. Improve the capacity of travel medicine research**

It has been 5 years since the project of “Training Center for Travel Medicine” was established in 2008, we will use the capacity of “Training Center for Travel Medicine” and contract hospitals to develop research on travel medicine, to evaluate the efficacy of travel medicine policy, as the future goal of internationalization.

1. Because the research of “Training Center for Travel Medicine” from 2008 to 2012 was restricted to people visiting the single hospital, we suggest to extend the research field to cover all contract hospitals; due to lacking of satisfaction data on outpatient service quality of other contract hospitals, it could offer ideas for adjusting the cooperation content with contract hospitals in the future if research covers all.
2. Research on the opinion of public, tour guides and team leaders, about the satisfaction and service methods of contract hospitals and Taiwan CDC’s policy, to evaluate the efficacy and future direction of policy development.

Hope that we can accomplish the aforementioned six tasks, integrate the function of “Training Center for Travel Medicine” and contract hospitals more completely, enlarge the capacity of travel medicine, build more complete horizontal connection and feedback mechanism. Improve quality of contract hospitals and by encouraging the notification and promote the efficacy of epidemic prevention policy, we could develop travel medicine up to the international level.

### **Discussion**

While facing the era of global village, the convenient transportation not only shorten the distance between countries, but also speed the disease transmission, to prevent the spread and importation of infectious diseases, Taiwan CDC has built multiple epidemic prevention networks.

The first item is “oversea epidemic prevention”. Timely obtain the epidemic of infectious diseases over the world and provide important information and prevention methods to medical personals, travel industries and the public. Establish the “Training Center for Travel Medicine” with National Taiwan University Hospital and keep holding travel medicine education and training for medical personnel, tour guides and leaders.

The second item is “border quarantine”. With cooperation with Council of Agriculture, Customs Office, Immigration Agency, Harbor (Aviation) Police Office and Coast Guard Administration, to people, animals or goods suspected to carry infectious disease, we implement Customs, Immigration, Quarantine and Security measures at international airports and harbors to keep monitoring, management, and prevention.

The third item is “internal epidemic prevention”. We prevent and control the internal spreading through domestic complete medical care and service system, and requesting the hotel and travel industry to notify any passenger who suspected to have infectious disease, also, a 24-hour free phone service (1922) is offered [12].

Although there have certain achievements at the border quarantine, the ability of which is still limited, and there still are some cases entering into communities. Take H1N1 Influenza for example, from April 27, 2009 to June 19, 2009, the fever-screening at airports and follow up of index cases confirmed 32 cases during that 54 days, the detection rate of importation cases was 54.2% [13]. In order to prevent the introduction of disease, the completion of the epidemic prevention network is an important part of the travel medicine policy in developing “internal epidemic prevention”. Again, the assistance from Tourism Bureau and tour guides/leaders is needed to build a more meticulous epidemic prevention system. Of course, in the part of “internal epidemic prevention”, the notification from domestic travel industry also plays an important role. In the meantime, the knowledge about travel health in the public shall be enhanced, thus a more complete and better quality of travel medicine is achievable.

Referring to the research by Huang HL et al., to continue improving the medical personnel’s knowledge on travel medicine, we recommend the domestic specialists to attend ISTM actively, not only to maintain the professional level of medical service, but also to improve the international development of travel medicine [11]. ISTM is the biggest association in travel medicine field with over 2300 members among 75 countries globally. We encourage our contract doctors to join the ISTM and acquire the travel medicine certification, also, to join the related international seminars and associations, to understand the latest travel infectious disease and the prevention, to share experience, and to develop a internationalized travel medicine.

In the future, Taiwan CDC will keep pushing travel medicine and ensure the public health and travel safety with “Training Center for Travel Medicine” and contract hospitals, fullfill the capacity of travel medicine, block disease at the border, aiming at establishing a more convenient, complete, and feasible travel health service, and gradually catch up with the international societies, to accomplish the idea of borderless epidemic prevention.

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## Outbreak Investigation Express

### Epidemiologic Investigation of Food-poisoning Outbreak at X Ranch Restaurant in Yilan County

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#### Abstract

On August 10, 2013, several members of different groups started to show gastrointestinal symptoms after consuming dinner food at X Ranch restaurant and were sent to several hospitals or clinics for medical care. We conducted a case-control investigation on one marathon association members. The results from 59 questionnaire data showed 40 persons fitted to the case definition with an attack rate of 67.8%. The figure of case onset date distribution indicates this cluster event is a food poisoning outbreak. The dish of the chopped garlic chicken shows statistically responsible for this food poisoning outbreak ( $P < 0.05$ ). According to the laboratory results, the characteristics of patients' symptoms and incubation period, the etiologic pathogen of this outbreak can be determined to be Salmonella, group O7.

**Keywords:** cluster, food poisoning, case-control study

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