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Original Article

Assessment of Sensitivity of Screening for Imported Notifiable Diseases at Port of Entry, Taiwan, 2012–2015

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Abstract

Border quarantine is the frontline to prevent the importation of communicable diseases. In order to detect inbound symptomatic passengers and to prevent introduction of imported diseases, since SARS epidemic in 2003, Taiwan has set up remote-sensing infrared thermography at ports of entry for screening and tracing of febrile passengers. Previous studies did not consider that thermography could not capture those who developed symptoms when entering the border, which led to inadequate assessment of screening sensitivity. We aimed at evaluating the sensitivity of screening for inbound symptomatic passengers.

We collected data of notifiable disease cases and inbound passengers from Notifiable Disease Surveillance System, Symptom Surveillance System, Foreign Labor Health Management Information System, Notifiable Disease Questionnaire System and official website for National Immigration Agency for 2012–2015. We calculated and compared corrected screening sensitivity by year, passenger identity, disease category, and country of origin.

The number of inbound passengers was increasing while the corrected screening sensitivity remained at about 60% in 2012–2015. The sensitivity was higher among foreigners (82%) and foreign labors (65%). In the study period the major imported notifiable disease was dengue fever, with the general screening sensitivity of 70% and >85% among foreigners and foreign labors. The screening sensitivity for shigellosis decreased from 63% to 11%.

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Using infrared thermography, we could detect 60% of inbound symptomatic passengers with notifiable diseases. To further improve the sensitivity, we recommend that travel agencies to enhance health education and health authorities to raise awareness and willingness in active reporting of illness. We also recommend further cost-effectiveness analysis on fever screening at port of entry for refining our policies in disease prevention, control and quarantine.

Keywords: Border quarantine, Fever screening, Imported diseases, Dengue fever

The Impacts on Acute Communicable Diseases after the Implementation of Mini-Three-Links at Kinmen, 2001–2015

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Abstract

Since the implementation of "Mini-Three-Links" in Kinmen 15 years ago, the number of inbound passengers has increased speedily from about 10,000 to 870,000 per year. In terms of the number of inbound passengers, Port of Kinmen has become the largest seaport and the fourth largest port of entry in Taiwan. During this period, several communicable disease outbreaks, including H5N1 and H7N9, occurred in some coastal cities near Taiwan, such as Xiamen City and Quanzhou City. The epidemics brought intense pressure to the local health department. Because of the cooperation between the central and local government, no severe outbreak occurred in Kinmen. Besides, the risk of acute communicable diseases did not increase according to the surveillance data.

The number and type of passengers who arrive at Taiwan via Kinmen is changing, and the task of the local communicable disease control becomes more complex and difficult. We suggest to continue the vector surveillance in portal area, and to allocate sufficient quarantine staff for epidemic prevention in Kinmen. In addition, the staff shall have backgrounds in medicine, nursing or public health, and reduce the risks of communicable diseases importation and to raise their own awareness of disease prevention and control through professional training.

Keywords: Kinmen, Mini-Three-Links, Quarantine, Fever screening

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Weekly Data of Notifiable Infectious Diseases（by week of diagnosis）

Case diagnosis year		Week 23★		Week 1-23			
				2017		2016	
Classification	Disease Diagnosed	2017	2016	Total cases★	Imported cases	Total cases★	Imported cases
Category I	Plague	0	0	0	0	0	0
	Rabies	0	0	0	0	0	0
	SARS	0	0	0	0	0	0
	Smallpox	0	0	0	0	0	0
Category II	Acute Flaccid Paralysis	1	1	17	0	15	0
	Acute Viral Hepatitis type A	8	34	271	26	404	39
	Amoebiasis	3	1	152	87	119	57
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	2	5	5	6	6
	Cholera	0	0	0	0	0	0
	Dengue Fever	5	9	97	97	561	126
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	1	0	3	0
	Malaria	1	0	2	2	5	5
	Measles	0	0	5	5	4	3
	Meningococcal Meningitis	0	0	6	0	2	0
	Paratyphoid Fever	0	0	3	3	1	1
	Poliomyelitis	0	0	0	0	0	0
	Rubella	1	0	1	1	4	3
	Shigellosis	1	2	88	33	95	46
	Typhoid fever	0	0	11	10	2	1
	West Nile Fever	0	0	0	0	0	0
Category III	Acute Viral Hepatitis type B	5	2	69	3	43	1
	Acute Viral Hepatitis type C	12	2	112	1	91	2
	Acute Viral Hepatitis type D	0	0	1	0	1	0
	Acute Viral Hepatitis type E	0	0	9	2	8	3
	Acute Viral Hepatitis untype	0	0	0	0	0	0
	Congential Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	3	2	0	7	0
	Haemophilus Influenza type b Infection	0	1	2	0	6	0
	Japanese Encephalitis	1	1	2	0	2	0
	Legionellosis	4	0	62	7	43	0
	Mumps	8	10	301	3	251	3
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	2	1	14	0	8	0
	Tetanus	1	1	5	0	5	0
Category IV	Botulism	0	1	0	0	2	0
	Brucellosis	0	0	0	0	0	0
	Complicated Influenza	53	1	367	4	1832	2
	Complicated Varicella	0	1	9	1	20	0
	Endemic Typhus Fever	3	2	15	1	6	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	10	3	243	2	321	0
	Leptospirosis	1	1	28	0	26	2
	Lyme Disease	0	0	0	0	0	0
	Melioidosis	1	0	9	0	5	0
	Q Fever	0	1	8	0	19	3
	Scrub Typhus	13	13	135	0	163	2
	Toxoplasmosis	1	0	7	0	5	0
	Tularremia	0	0	0	0	0	0
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	1	1	0	0
	Lassa Fever	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0	0	0
	Yellow Fever	0	0	0	0	0	0
	Zika Virus Infection	0	1	1	1	3	3

1. ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
2. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
3. Numbers of mumps and tetanus cases are summed up by the week of report.
4. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

Suspected Clusters

●Sixty-eight clusters were reported, including 9 tuberculosis clusters, 12 diarrhea clusters, 27 upper respiratory tract infection clusters, 17 influenza-like illness clusters and 3 varicella clusters.

Imported Infectious Diseases

●10 confirmed cases were imported from 8 countries during Week 23 of 2017.

Country / Disease	Malaysia	Indonesia	Singapore	Thailand	Cote Divoire	China	Vietnam	Philippines	Total
DF	2		1	1			1		5
Amoebiasis		2							2
Malaria					1				1
Rubella								1	1
FluSC						1			1
Total	2	2	1	1	1	1	1	1	10

Note: The statistics listed in this table include imported cases that were either **confirmed** or **updated** in the previous week.

●A total of 292 confirmed cases were imported from 20 countries in 2017.

●Top 3 imported diseases：Dengue fever (97), Amoebiasis (87), Shigellosis (33).

●Top 3 countries responsible for most imported cases：Indonesia (122), Philippines (31), Malaysia (28).

Summary of Epidemic

●**Influenza**：Mild and severe influenza outbreaks in the community are expected to continue to persist.

●**Scrub Typhus**：The scrub typhus epidemic season has begun. The affected areas primarily include Hualien County and Taitung County.

●**Enterovirus**：Currently, mild enterovirus activity has been increasing continuously. EV71 is still circulating in the community.

●**Dengue Fever**：International epidemics are increasing gradually. As the rain has continued to occur across Taiwan, the risk of imported and indigenous epidemics is elevated.

Weekly Data of Notifiable Infectious Diseases（by week of diagnosis）

Case diagnosis year		Week 24★		Week 1-24			
				2017		2016	
Classification	Disease Diagnosed	2017	2016	Total cases★	Imported cases	Total cases★	Imported cases
Category I	Plague	0	0	0	0	0	0
	Rabies	0	0	0	0	0	0
	SARS	0	0	0	0	0	0
	Smallpox	0	0	0	0	0	0
Category II	Acute Flaccid Paralysis	0	0	17	0	15	0
	Acute Viral Hepatitis type A	6	29	277	28	433	40
	Amoebiasis	12	7	164	90	126	60
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	1	5	5	7	7
	Cholera	0	0	0	0	0	0
	Dengue Fever	4	5	101	101	566	131
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	1	0	3	0
	Malaria	0	0	2	2	5	5
	Measles	0	0	5	5	4	3
	Meningococcal Meningitis	0	0	6	0	2	0
	Paratyphoid Fever	0	0	3	3	1	1
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	0	1	1	4	3
	Shigellosis	2	5	90	33	100	49
	Typhoid fever	0	0	11	10	2	1
	West Nile Fever	0	0	0	0	0	0
Category III	Acute Viral Hepatitis type B	1	1	70	3	44	1
	Acute Viral Hepatitis type C	9	7	121	1	98	2
	Acute Viral Hepatitis type D	0	0	1	0	1	0
	Acute Viral Hepatitis type E	0	1	9	2	9	4
	Acute Viral Hepatitis untype	0	0	0	0	0	0
	Congential Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	2	0	7	0
	Haemophilus Influenza type b Infection	0	1	2	0	7	0
	Japanese Encephalitis	1	1	3	0	3	0
	Legionellosis	8	6	70	7	49	1
	Mumps	12	9	313	4	260	3
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	2	0	16	0	8	0
	Tetanus	0	0	5	0	5	0
Category IV	Botulism	0	1	0	0	3	0
	Brucellosis	0	0	0	0	0	0
	Complicated Influenza	66	3	433	4	1835	2
	Complicated Varicella	1	0	10	1	20	0
	Endemic Typhus Fever	0	1	15	1	7	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	7	7	250	2	328	0
	Leptospirosis	2	2	30	1	28	2
	Lyme Disease	0	0	0	0	0	0
	Melioidosis	0	1	9	0	6	1
	Q Fever	1	0	9	0	19	3
	Scrub Typhus	12	20	147	0	183	2
	Toxoplasmosis	0	0	7	0	5	0
	Tularremia	0	0	0	0	0	0
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	1	1	0	0
	Lassa Fever	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0	0	0
	Yellow Fever	0	0	0	0	0	0
	Zika Virus Infection	0	0	1	1	3	3

1. ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
2. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
3. Numbers of mumps and tetanus cases are summed up by the week of report.
4. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

Suspected Clusters

●Seventy-three clusters were reported, including 5 tuberculosis clusters, 11 diarrhea clusters, 26 upper respiratory tract infection clusters, 27 influenza-like illness clusters, 2 fever of unknown origin clusters and 2 varicella clusters.

Imported Infectious Diseases

●10 confirmed cases were imported from 5 countries during Week 24 of 2017.

Country / Disease	Indonesia	Vietnam	Malaysia	Egypt	Philippines	Total
DF		3	1			4
Amoebiasis	3					3
Hepatitis A				1	1	2
Leptospirosis			1			1
Total	3	3	2	1	1	10

Note: The statistics listed in this table include imported cases that were either **confirmed** or **updated** in the previous week.

●A total of 302 confirmed cases were imported from 21 countries in 2017.

●Top 3 imported diseases：Dengue fever (101), Amoebiasis (90), Shigellosis (33).

●Top 3 countries responsible for most imported cases：Indonesia (125), Philippines (32), Malaysia (30), Vietnam (30).

Summary of Epidemic

●**Influenza**：Mild and severe influenza outbreaks in the community continue to persist.

●**Scrub Typhus**：The scrub typhus epidemic season has begun. The affected areas primarily include Hualien County, Taitung County and Kinmen County.

●**Enterovirus**：Currently, mild enterovirus activity has been increasing continuously. EV71 is still circulating in the community.

●**Dengue Fever**：Southeast Asia epidemics are increasing gradually. As the rain has continued to occur across Taiwan, the risk of imported and indigenous epidemics is elevated.

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