The Epidemiology of Imported Acute Infectious Diseases in Zhejiang Province, China, 2011–2016: Analysis of Surveillance Data

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Abstract. To explore epidemiological characteristics of imported acute infectious diseases between 2011 and 2016 in Zhejiang province, China. Data of imported infectious diseases from 2011 to 2016 was collected from the China Information System for Disease Control and Prevention in Zhejiang province, and subsequently analyzed for epidemiological characteristics. A survey was conducted to investigate clinicians' abilities to diagnose these diseases in Zhejiang province. From 2011 to 2016, 1,241 cases of imported acute infectious disease were reported in Zhejiang province, including 1,078 malaria cases, 156 dengue cases, three chikungunya fever cases and four Zika cases. Between 2011 and 2016, incidences of these diseases increased ($P < 0.001$). For malaria, male adults for labor export were the most affected group. Seasonal fluctuation was not obvious. *Plasmodium falciparum* was the main malaria type (822 cases) and most cases were acquired from African Region (791/822, 96.1%). *Plasmodium vivax* cases (194 cases) were mainly from African Region (78/194, 40.2%) and South-East Asia Region (51/194, 26.3%). Meanwhile, for dengue, adults and tourists were the most affected groups. The incidence of dengue was particularly high in August and October. The percent of correct clinician responses in the survey of diagnosis knowledge was 54.6% (standard deviation = 21.0%); this percentage was particularly low in general practitioners and clinicians from township hospitals. The capabilities of clinicians to diagnose these diseases were low and should be improved. Efforts should be made in improving and disseminating proper preventive measures of high-risk populations, surveillance of imported cases, and prevention and control of local epidemics.

INTRODUCTION

Rapid development of globalization and increases in population mobility have brought a global spread of infectious diseases, such as dengue, yellow fever, chikungunya, Ebola, Middle East respiratory syndrome (MERS), Zika virus and so on. Like several other countries, China is facing great pressure from the importation of acute infectious disease and their subsequent spreading. According to the data from the report of infectious disease surveillance in 2015 by the Chinese Center for Disease Control and Prevention, the number of imported dengue and malaria cases have gradually increased since the 1990s.¹ China also encountered the importation of MERS,² Zika virus disease,³ chikungunya,⁴ yellow fever,⁵ and Rift Valley fever,⁶ and is still facing risks of other imported emerging infectious diseases.

Zhejiang province, located in the southeastern coast of China, has many trade, tourist and cultural exchanges with foreign countries. The total import-export value and the number of foreign tourists are increasing every year and have almost doubled in the past 7 years.⁷ In this paper, we described epidemiological characteristics of imported acute infectious disease in Zhejiang province from 2011 to 2016, focusing on seasonal patterns and characteristics of population distribution. We also conducted a survey to understand clinicians' abilities to diagnose imported acute infectious diseases. We hope to give a better understanding of imported acute infectious diseases in Zhejiang province in recent years, and increase awareness regarding the challenge of disease control and indigenous transmission prevention, so as to help plan resource allocation in response to imported acute infectious diseases.

MATERIALS AND METHODS

Data collection. Disease data of imported infectious disease was acquired from the China Information System for Disease Control and Prevention (CISDCP) in Zhejiang province. The CISDCP⁸ is a national, network-based, real-time, passive disease reporting system established by the Chinese Center for Disease Control and Prevention in 2004. Information regarding infectious disease cases was entered into the National Notifiable Infectious Disease Reporting Information System – a subsystem of CISDCP – within 24 hours of diagnosis by doctors in medical institutions across the entire country. The information included demographic characteristics, diagnosis, laboratory confirmation, onset data and diagnosis data. More detailed epidemiological data, namely region of infection acquisition, purpose of going overseas and days staying overseas, was acquired from investigation data of a part of imported cases by local Centers for Disease Control and Prevention (CDC).

Case definition. Infectious diseases were all diagnosed on the basis of diagnostic criteria enacted by the Ministry of Health of the People's Republic of China. Malaria cases were diagnosed according to the Diagnostic criteria for malaria (WS 259-2006, used before May 2016)⁹ or Diagnosis of Malaria (WS 259-2015, used after June 2016).¹⁰ Laboratory-confirmed cases were those with epidemiologic exposure and clinical manifestations, the presence of parasites in microscopic examination of a blood smear, positive *Plasmodium* antigen test, or positive *Plasmodium* DNA test (only for WS 259-2015). Dengue cases were diagnosed according to the Diagnostic criteria for dengue fever (WS 216-2008).¹¹ Laboratory-confirmed cases were diagnosed according to epidemiologic exposure and clinical manifestations, and with any of the following laboratory results: positive dengue virus isolation in acute phase, 4-fold or greater increase of dengue virus-specific immunoglobulin G antibody titer in paired serum samples, or positive dengue virus RNA detection by polymerase chain reaction. Zika cases and chikungunya fever

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cases were diagnosed according to Diagnosis and treatment of Zika virus disease (2016 edition)¹² and Diagnosis and Treatment of Chikungunya fever.¹³ Confirmed cases were those with epidemiological exposure and clinical manifestations in combination with a positive result nucleic acid test, or positive virus isolation, or great increase of antibody titer in paired serum samples.

Inclusion and exclusion criteria. Imported acute infectious disease in this study was defined as acute infectious disease imported from other countries or provinces, which was not previously endemic in local areas. An imported case was defined as an infected person who can be traced back to an origin in an endemic area of one kind of imported acute infectious disease outside Zhejiang province within the previous month. Cases of imported infectious disease which notified the CISDCP between 2011 and 2016 were screened, and those with laboratory diagnosis were included. Suspected cases, clinically diagnosed cases, pathogen carriers, autochthonous cases, and relapse or recurrence cases were excluded.

Survey of imported acute infectious disease diagnosis knowledge. A survey was conducted in all 11 prefecture-level cities in Zhejiang province to investigate clinicians' abilities to diagnose imported acute infectious disease. One county was randomly selected in each city. Two medical institutions, including general hospitals, community hospitals, and township hospitals, were randomly selected in each prefecture-level city and each county. In each hospital, two clinicians were randomly selected and invited to participate in the survey. If a selected clinician was not on duty or was too busy, another one was randomly selected from the remaining clinicians. In all, 88 clinicians in 22 general hospitals and 22 community/township hospitals were invited. Clinicians were asked to complete the questionnaire independently and anonymously. Only department information was acquired in the questionnaire, without any other personal information. The questionnaire contained five multiple choices (one or more than one choice) about clinical manifestation and diagnostic criteria of

imported acute infectious disease, including malaria, dengue, MERS, yellow fever, Zika, and chikungunya fever. For each multiple choice, it was defined as correct only if all the correct answers were chosen. Data were double-entered into Excel 2007.

Statistical analysis. Characteristics of imported acute infectious diseases were described by temporal distribution, age, gender and occupation composition, country of infection, and purpose for going overseas. The Cochran–Armitage trend test was used to test the trend of reported incidence. Seasonal index¹⁴ was used to observe seasonal fluctuation of infectious disease. The index for a given month was calculated by the average case number of that month divided by the average monthly cases during the 6 years (2011–2016). Seasonal fluctuation was less obvious when the seasonal indices in each month were closer to 1. In the survey of diagnosis knowledge, accuracy rate of five multiple choices for each clinician was calculated. Clinicians were divided into three groups—general practitioners, clinicians from infectious disease department, and clinicians from other departments. Differences among hospital types and clinical departments were assessed with Kruskal–Wallis *H* test. Statistical analyses were performed by using SAS 9.2 software.

RESULTS

Epidemiologic profile of imported acute infectious diseases. During the 6 years from 2011 to 2016, 1,241 cases of imported acute infectious disease were reported in Zhejiang province, including 1,078 malaria cases, 156 dengue cases, three chikungunya fever cases, and four Zika cases. An increase trend of standardized incidence (per 100,000 population) existed from 2011 to 2016: 0.2487, 0.2522, 0.4119, 0.3965, 0.3750, and 0.4958, respectively ($P < 0.001$). Two falciparum malaria deaths were reported within the 6 years (Figure 1).

Epidemiological characteristics of imported malaria. Malaria cases took up a large proportion of imported cases. A

FIGURE 1. Case numbers of imported acute infectious diseases in Zhejiang province, China, 2011–2016. The dashed, dotted, and solid line showed the trend of malaria, dengue, and all imported cases, respectively.

total of 1,078 malaria cases were reported within the 6 years. There were 822 cases of *Plasmodium falciparum* malaria, 194 cases of *Plasmodium vivax* malaria, 38 cases of *Plasmodium ovale* malaria, 14 cases of *Plasmodium malariae* malaria, and 10 cases of mixed infection. The proportion of *P. falciparum* cases showed a rising trend, which peaked at 82.84% in 2014, whereas the proportion of *P. vivax* cases presented a decreasing trend, dropping to the lowest point in 2016. The proportion of *P. ovale*, *P. malariae*, and mixed infection increased during the latter 3 years of the study (Table 1).

The seasonal characteristic of imported malaria cases was not obvious from 2011 to 2016 (Figure 2A). The numbers of *P. falciparum* cases were highest in May (86 cases) and July (83 cases), with respective seasonal indices of 1.36 and 1.32. *Plasmodium vivax* cases occurred most frequently in May (23 cases) and August (23 cases), with the seasonal index of 1.35. The incidence rate of malaria was low in February, March, November, and December. The median age of the 1,078 imported malaria cases was 39, with 864 cases (80.1%) being 20 to 49 years of age. Males accounted for most of the cases, showcased by male to female ratio of 8.89:1. Commercial service people and workers accounted for more than half of the cases when dividing by occupation (57.2%). A total of 488 cases (45.3%) provided purpose for going overseas. The vast majority cases (329/488, 67.4%) were for labor export, whereas 23.8% (116 cases) and 3.7% (18 cases) were for trade and study, respectively. Among the 304 cases (28.2%) with available information regarding their stay overseas, 52 cases (17.1%) stayed less than or equal to 30 days, 89 cases (29.3%) stayed 31 to 180 days, 60 cases (19.7%) stayed 181 to 365 days, 51 cases (16.8%) stayed 366 to 730 days, and the rest 52 cases (17.1%) stayed more than 730 days (Table 2).

Information regarding the region in which infection was acquired was obtained from all cases except five. Most *P. falciparum* cases (791/822, 96.1%) were acquired from African Region, with Nigeria, Angola, and Equatorial Guinea being the top three. The number of *P. falciparum* cases imported from Eastern Mediterranean Region, Western Pacific Region and South-East Asia Region was 10 (1.2%), 9 (1.1%) and 7 (0.9%), respectively. Two *P. falciparum* cases were from other provinces of China. As to *P. vivax* cases, African Region was also the main imported area, with 40.2% (78/194) infections, and the top three countries were Angola, Equatorial Guinea, and Ghana. South-East Asia Region also accounted for a large proportion (51/194, 26.3%). The number of *P. vivax* cases from the Eastern Mediterranean Region and Western Pacific Region were 28 and 25, respectively. Ten *P. vivax* cases were imported from other provinces of China. Among the *P. ovale* cases, *P. malariae* cases and mixed infection,

93.5% (58/62), were acquired from the African Region (Table 3).

Epidemiological characteristics of imported dengue.

During the study period, a total of 156 dengue cases were reported in Zhejiang province. The median age of all the imported cases was 34.5, and those between 20 and 49 years of age accounted for 72.4% (113/156) of all cases. Among imported cases, the male to female ratio was 1.74:1. About 30.1% (47/156) cases worked in commercial service. Among the 66 cases (42.3%) that provided purpose for going overseas, 59.1% (39/66) traveled for tourism, and 15.2% (10/66) and 13.6% (9/66) for trade and labor export, respectively. A total of 48 cases provided information of their length of staying overseas: 31 cases (64.6%) stayed overseas less than or equal to 30 days, and seven cases (14.6%) stayed more than 730 days (Table 2).

During the study period, 61.9% of cases were imported between July and October. The seasonal index was particularly high in August (2.23) and October (2.38) (Figure 2B). A total of 153 cases provided country information. Most cases were imported from South-East Asia Region (61 cases) and Western Pacific Region (55 cases). Within these regions, the most imported cases came from Indonesia and Malaysia, respectively. The number of dengue cases imported from African Region, Region of the Americas, and Eastern Mediterranean Region was 19, 2 and 2, respectively. The remaining 14 cases were imported from other provinces within China (Guangdong, Yunnan, and Guangxi) (Table 3).

Other imported acute infectious diseases. Besides malaria and dengue, the Chinese information system for disease control and prevention (CISDCP) also notified three cases of chikungunya fever and four Zika cases between 2011 and 2016. Three cases of chikungunya fever were imported from India, Angola, and the Philippines. Four Zika cases were imported from Samoa (3/4) and Suriname (1/4).

Capacity of imported acute infectious disease detection in clinicians. We invited 88 clinicians to participate in our survey of diagnosis knowledge, and 85 responded (response rate = 96.6%). Among these clinicians, there were 27 general practitioners, 27 clinicians from the infectious disease department, and the rest 31 from other departments. All of the doctors completed the questionnaire (effective rate = 100%). The percent of correct responses was 54.6% (standard deviation [SD] = 21.0%). The accuracy rate among general practitioners, clinicians from infectious disease department, and clinicians from other departments was 48.9% (SD = 19.5%), 64.4% (SD = 18.7%), and 51.0% (SD = 21.8%), respectively. The χ^2 value of Kruskal-Wallis *H* test was 7.38 ($P = 0.0250$). Once dividing the clinicians into hospital types,

TABLE 1
Plasmodium parasites of imported malaria cases in Zhejiang province, China, 2011–2016

Year	<i>Plasmodium falciparum</i>		<i>Plasmodium vivax</i>		Others*		Total
	Number of cases	Proportion (%)	Number of cases	Proportion (%)	Number of cases	Proportion (%)	
2011	81	67.50	37	30.83	2	0.00	120
2012	90	67.16	43	32.09	1	0.00	134
2013	150	76.14	43	21.83	4	0.00	197
2014	169	82.84	25	12.25	10	4.90	204
2015	141	77.47	23	12.64	18	9.89	182
2016	191	79.25	23	9.54	27	11.20	241

* Others included *Plasmodium ovale*, *Plasmodium malariae*, and mixed infection.

FIGURE 2. Seasonal distribution of malaria and dengue cases in Zhejiang province, China, 2011–2016. (A) The seasonal indices of *Plasmodium falciparum* malaria (dashed line), *Plasmodium vivax* malaria (dash-dotted line), and all types of malaria (solid line). (B) The seasonal indices of dengue. The index for a given month was calculated by the average case number of that month divided by monthly the average monthly cases during the 6 years (2011–2016).

there were 46 clinicians from general hospitals, 23 from community hospitals, and 16 from township hospitals; their respective accuracy rates were 62.6% (SD = 19.1%), 47.8% (SD = 19.8%), and 41.3% (SD = 18.6%), with a χ^2 value of Kruskal–Wallis H test of 13.35 ($P = 0.0013$).

DISCUSSION

Our study showed that the incidence of imported acute infectious diseases in Zhejiang province was increased between 2011 and 2016, with the most common diseases being malaria and dengue. No indigenous malaria in Zhejiang province has been reported since 2011,¹⁵ so work has mainly focused on surveillance and management of imported malaria cases in recent years. Imported dengue cases are still the risk of local outbreaks in summer–autumn seasons. In addition, other imported acute infectious diseases such as Zika virus disease and chikungunya fever also pose a threat to Zhejiang province.

Most of the imported malaria cases were males aged 20–49. Commercial service people and workers accounted for a large proportion. The main purpose of going overseas was labor export. It was different from the results from many developed countries such as the United States, the United Kingdom, and other European countries with most imported malaria cases going overseas for visiting friends and relatives in their families' country of origin.^{16–18} It may be due to a much smaller immigrant population from malaria epidemic countries in China than those in the U.S. or European countries. About 54% cases stayed overseas for more than half a year. Those young- and middle-aged males were especially susceptible to malaria—this may have been due to many working outdoors and having poor living conditions, as well as a general lack of knowledge about malaria and related risks in this subpopulation.^{19,20} Subpar pretravel prophylaxis among this group may have also contributed to their higher rates of malaria. Studies have indicated that only 40% of Chinese travelers sought pretravel medical advice, and only about 20% laborers chose to carry mosquito repellents, insecticides, and/or malaria tablets.²⁰ In addition, when travelers did receive medication, it was most often for treatment as opposed to prevention.²¹ All of these factors place male laborers at a high risk of mosquito bites and *Plasmodium* infection.

Malaria cases were mainly imported from African Region, more specifically from sub-Saharan Africa. It may be because that the increasing trade, investments, and aid between China and Africa increased Chinese travel to Africa. Cases from Nigeria, Angola, Equatorial Guinea, Ghana, Cameroon, Republic of the Congo, and Democratic Republic of the Congo accounted for about 70% of all cases from African Region. In comparison, most of the imported malaria cases of the

TABLE 2

Demographic characteristics of malaria and dengue cases in Zhejiang province, China, 2011–2016

	Malaria		Dengue	
	N	%	N	%
Sex	1,078		156	
Male	969	89.9	99	63.5
Female	109	10.1	57	36.5
Age	1,078		156	
< 20	20	1.9	15	9.6
20~	243	22.5	38	24.4
30~	283	26.3	52	33.3
40~	338	31.4	23	14.7
50~	165	15.3	20	12.8
60~	29	2.7	8	5.1
Occupation	1,078		156	
Farmer	224	20.8	15	9.6
Worker	288	26.7	28	17.9
Commercial service people	329	30.5	47	30.1
Businessman	32	3.0	3	1.9
Cadres	27	2.5	17	10.9
Student	20	1.9	16	10.3
Unemployed person	38	3.5	9	5.8
Other	120	11.1	21	13.5
Purpose of going overseas	488		66	
Labor export	329	67.4	9	13.6
Trade	116	23.8	10	15.2
On business	7	1.4	3	4.5
Tourism	2	0.4	39	59.1
Visiting relatives	6	1.2	3	4.5
Study	18	3.7	2	3.0
Other	10	2.0	0	0.0
Days staying overseas	304		48	
≤ 30	52	17.1	31	64.6
31–180	89	29.3	7	14.6
181–365	60	19.7	3	6.3
366–730	51	16.8	0	0.0
≥ 731	52	17.1	7	14.6

TABLE 3
Distribution of original countries of malaria and dengue cases

	Malaria			Dengue
	<i>Plasmodium falciparum</i>	<i>Plasmodium vivax</i>	Others*	
African region	791	78	58	19
Angola	98	3	10	9
Cameroon	59	2	6	1
Congo	34	8	2	0
Congo DR	26	1	1	0
Equatorial Guinea	87	10	4	0
Ethiopia	4	11	0	0
Gabon	18	1	1	0
Ghana	84	11	6	1
Guinea	20	0	0	0
Ivory Coast	18	0	2	0
Liberia	14	4	5	0
Mozambique	17	0	1	1
Nigeria	179	13	12	4
Tanzania	18	0	0	2
Others	115	14	8	1
Eastern Mediterranean region	10	28	1	2
Pakistan	0	23	1	1
Sudan	7	3	0	0
Others	3	2	0	1
Western Pacific region	9	25	1	55
Cambodia	3	18	0	14
Malaysia	0	0	0	17
Philippines	2	0	0	14
Others	4	7	1	10
South-East Asia region	7	51	2	61
India	0	18	1	11
Indonesia	0	11	0	16
Myanmar	6	22	1	5
Thailand	0	0	0	12
Others	1	0	0	17
Region of the Americas	0	0	0	2
Other Province in China	2	10	0	14

* Others included *Plasmodium ovale*, *Plasmodium malariae*, and mixed infection.

United States¹⁶ and the United Kingdom travelers¹⁷ were from West Africa. This was probably due to large numbers of exported Chinese laborers to these countries, especially Angola, Nigeria, and Equatorial Guinea.²² No obvious seasonal fluctuation in the incidence of imported *P. falciparum* malaria or *P. vivax* malaria was observed, with malaria cases imported year-round. There was a slight increase in imported cases between May and August, which might be explained by the fluctuating populations of Chinese travelers to these regions during that time. As well, this fluctuation may also be influenced by different original countries with different epidemic seasons.

Most cases infected with *P. falciparum* were imported from Africa Region, whereas most of the cases infected with *P. vivax* were imported from South-East Asia Region and Western Pacific Region. This was consistent with the global distribution estimated by World Health Organization—although *P. vivax* only accounts for 4% of malaria cases worldwide, this number jumps to 41% when only considering cases outside of Africa.²³ However, most domestic cases were infected with *P. vivax* because *P. vivax* has been predominant in local transmission in China, especially in the provinces of Anhui and Yunnan.^{24,25} The proportion of *P. falciparum* showed an increasing trend, whereas the proportion of *P. vivax* showed a decreasing trend among imported cases, which was also consistent with the estimated data.²³ This trend indicated that *P. falciparum* was becoming the predominant species

among imported malaria cases and that great efforts should be devoted to the surveillance and management of these cases.

Most imported cases of dengue occurred in individuals aged 20–49 with no significant differences between gender. More than half of the cases went overseas for tourism and had short stays overseas. Most cases were imported from South-East Asia Region and Western Pacific Region, which may be due to the highly developed tourism industries of these two regions. This was consistent with the results in other studies from EuroTravNet,¹⁸ GeoSentinel Surveillance Network,²⁶ and Japan.²⁷ However, similar with Japan,²⁷ proportion of dengue cases returned from South America was much less than that of European¹⁸ or international travelers²⁶ because the number of Chinese travelers to South America was relatively low. The seasonal analysis unsurprisingly showed that the incidence of imported dengue was high in August and October, which coincide with the summer holiday and National Day, during which tourism spikes. The risk of dengue virus transmission from an imported case to an indigenous case was relatively high when the climate was suitable for the survival of mosquito vectors. Mosquito vector surveillance in Zhejiang province concluded that adult mosquito density peaked from June to August and that adult mosquitoes could be monitored until November.²⁸ According to the data from CISDCP in Zhejiang province, indigenous dengue cases occurred during September

and November in 2011–2016; in 2017, a local epidemic broke out as early as July. These data imply that surveillance and quarantine measures are important to prevent and control local transmission of dengue fever in summer–autumn seasons in Zhejiang province.

The number of chikungunya fever and Zika cases reported by CISDCP were very rare compared with malaria and dengue fever. The first Zika case in China was reported in February 2016 in Jiangxi province.³ China made quick responses to this newly imported disease and took measures to prevent and control disease transmission and spread. No outbreak was reported in China after the import of the first case. The first case of chikungunya fever in China was reported in March 2008 in Guangdong province.⁴ An outbreak of chikungunya fever came to public attention in Guangdong province in October 2010.²⁹ In Zhejiang province, there were no indigenous chikungunya cases until 2016. Although no cases have been notified in Zhejiang province, other acute infectious diseases such as yellow fever, MERS, Ebola virus disease, and Lassa fever should also be monitored closely as the capacity of clinical and laboratory diagnosis of these diseases remains low in many areas and the population continues to rise.

Clinicians in Zhejiang province lacked diagnostic capacity for imported acute infectious disease. Both clinicians from the infectious disease department and other departments did not possess a good knowledge of these diseases. Many of them were not familiar with clinical manifestations and diagnostic criteria, which may due to the scarcity in which these cases appear in hospital (especially community and township hospitals). In addition, the asymptomatic infected rate of malaria³⁰ and dengue³¹ was high, making it more difficult to diagnose these cases rapidly and accurately. As for yellow fever, chikungunya, Ebola, MERS, and Zika, diagnostic capacity was even more limited because most of the Chinese clinicians, especially those in basic medical institutions, had never met a real case and thus lacked knowledge and experience in diagnosing these diseases. Increasing awareness and diagnostic capabilities of these clinicians will be challenging but nonetheless important in the future.

Several limitations exist in this study. First, the disease information was acquired from the CISDCP—a passive monitoring system. Accordingly, the quality of the data was not immune to weaknesses of the system like underreporting and inaccuracy of data. Based on two surveys by China CDC in 2013 and 2015, both of which were based on a nationally representative sample of about 2,000 cases in CISDCP, the rate of underreporting for all notifiable infectious disease were less than 10% and for imported diseases such as malaria and dengue, the rate was zero.^{32,33} So we thought the quality of the data was acceptable. Second, investigative reports of some cases were either not available or lacked some epidemiological information, which may have led to selection bias. Third, because epidemiological investigations were retrospective, recall bias was unavoidable. However, the epidemiological information required was simple and easy to remember, so recall bias might have little influence on the results.

In summary, there was a rising trend in imported acute infectious disease cases in Zhejiang province between 2011 and 2016. Malaria and dengue were the most common diseases, although there were also a few cases of chikungunya fever and Zika. The group most affected by malaria was male

adults for labor export while most cases originated from African Region. Most dengue cases were adults and tourists, and August and October were the epidemical period. The diagnostic capabilities of clinicians, especially for general practitioners and those from township hospitals, should be improved. Efforts should be made in the preventive measures of high-risk populations, surveillance of imported cases, and prevention and control of local epidemics. With the globalization of disease, other imported acute infectious diseases such as yellow fever, MERS, Ebola virus disease, and Lassa fever should also be monitored closely.

Received April 6, 2017. Accepted for publication September 26, 2017.

Published online December 18, 2017.

Note: Supplemental information appears at www.ajtmh.org.

Acknowledgment: We thank Pedro Gallardo for helpful revision.

Financial support: This work was supported by the Medical Research Program of Zhejiang province (Grant Number: 2015RCB008, 2015ZHA003, 2017RC018).

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