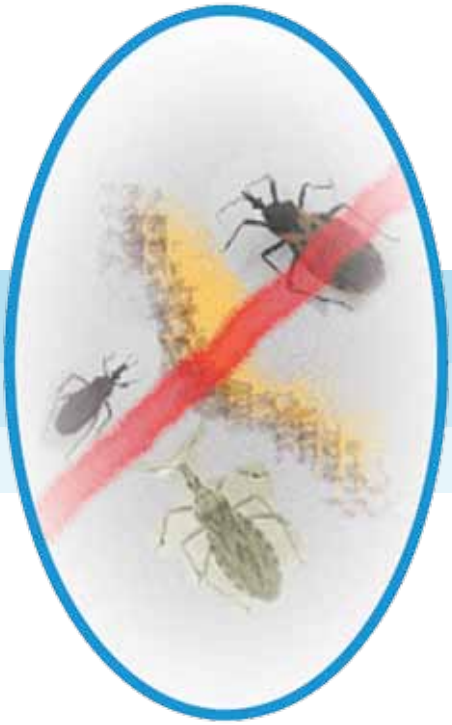
Meeting Report

参考資料2

Informal Consultation on Chagas Disease in the Western Pacific



Nagasaki, Japan
29–30 June 2011

World Health Organization
Western Pacific Region

REPORT

INFORMAL CONSULTATION ON CHAGAS DISEASE IN THE WESTERN PACIFIC

Convened by:

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NOTE

The views expressed in this report are those of the participants in the Informal Consultation on Chagas Disease in the Western Pacific and do not necessarily reflect the policies of the Organization.

This report has been prepared by the World Health Organization Regional Office for the Western Pacific for governments of Members States in the Region and for those who participated in the Informal Consultation on Chagas Disease in the Western Pacific, which was held in Nagasaki, Japan, from 29 to 30 June 2011.

Acknowledgement

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CONTENTS

LIST OF ACRONYMS

DNDi	Drugs for Neglected Diseases initiative
ECLAT	European Community Latin America Triatominae research network
ELISA	Enzyme-linked immunosorbent assay
ER	Expected result
FDA	Food and Drug Administration
HLA	Human Leukocyte Antigen
IFAT	Indirect Immunofluorescence Antibody Test
IVC	Integrated Vector Control
MCH	Maternal and Child Health
MDGs	Millennium Development Goals
MVP	Malaria, Other Vector-borne and Other Parasitic Diseases Unit of WHO
NGO	Nongovernmental organization
NTDs	Neglected tropical diseases
PCR	Polymerase chain reaction
SOP	Standard Operating Procedures
TGA	Therapeutic Goods Administration,
TDR	Special Programme for Research and Training in Tropical Diseases

SUMMARY

Chagas disease used to be a public health problem specific to Latin America but has evolved into a global issue. Because migrants' and travellers" movements are continuously increasing, Chagas disease cases have been reported in 19 nonendemic countries outside Latin America, including Japan and Australia.

A meeting to review the global management of Chagas disease in 2007 recommended establishing an initiative of controlling it in nonendemic countries. Sessions and consultations have been organized in different parts of the world on ways to address this issue.

In the Western Pacific Region, an informal consultation held in Nagasaki, Japan, was the first opportunity to revise intensively the evolving situation with regard to Chagas disease. This consultation was organized jointly by WHO's Department of Control of Neglected Tropical Diseases, the Western Pacific Regional Office and the Institute of Tropical Medicine of Nagasaki University.

A total of 10 advisers and seven observers from Australia, China, Japan, Viet Nam and Thailand participated. Their expertise varies from health care to blood transfusion, epidemiology, medical entomology, drug development and international cooperation. Participants were from governments, Red Cross Blood Services, the research centre and universities.

The objectives of the informal consultation were to update and analyse the epidemiological situation of Chagas disease, to discuss the risk of transmission in nonendemic countries and to plan for the next steps on how to address Chagas disease in the Western Pacific Region.

Information was shared through a series of presentations on the situations of the four participating countries as well as on Chagas disease vector in Asia, WHO recommendations on screening for transfusion transmissible infections, Japan's activities in drug development and vector control in Central America.

In the group discussion, three questions were raised: whether Chagas disease was becoming a public health problem, how to deal with the cases and what to do as the next steps. These questions were discussed extensively and answered in terms of case detection and health care, prevention of transmission and vector surveillance and control.

The following were the conclusions of the consultation:

(1) Chagas disease has a high potential of becoming a public health problem in the Western Pacific Region.

(2) Sufficient data is available to declare that Chagas disease is a high potential problem, which requires further investigations and actions.

(3) Participants agree that the countries of the Western Pacific Region should actively participate in the Initiative of Chagas Disease Non-endemic Countries.

As a general recommendation, it is desirable to develop a network for information-sharing and improved coordination among governments, relevant stakeholders and partners working on blood services, organ transplantation centres, information and surveillance systems, travel medicine, health care systems and others.

1. INTRODUCTION

Chagas disease is caused by the protozoan parasite *Trypanosoma cruzi* and is mainly transmitted through contact with infected faeces of haematophagous triatomine insects of the genera *Triatoma*, *Rhodnius* and *Panstrongylus*. These insects typically live in the cracks of poorly-constructed homes in rural or suburban areas, hide during the day and become active at night. They usually bite an exposed area of skin, such as the face, and defecate close to the bite. The parasites enter the body when the person instinctively smears the faeces into the bite or into any other skin break of mucous membranes of the eyes or mouth. Transmission can also occur through contaminated food, blood transfusions, congenital (mother to child) route, organ transplantation and laboratory accidents.

Historically, Latin America has been the endemic region for Chagas disease, where it constitutes a major public health problem with serious economic impact. In 2006, it was estimated that about 8 million people were infected in Latin America. To control transmission through domiciliated vectors and contaminated blood in this region, several regional initiatives at the country and subregional levels were created in the 1990s. This led to several success stories, including significant reduction in transmission by triatomine insects in Brazil, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Paraguay and interruption of vector transmission in Chile and Uruguay.

Moreover, screening for *T. cruzi* in blood banks was implemented in 20 of 21 Latin American countries. Since 2000, *T. cruzi* infection transmission and Chagas disease cases have been increasingly detected in 19 nonendemic countries outside Latin America, mostly due to population movements, mainly migration. Between 2006 and 2010, the published estimated numbers of infected individuals were > 300 000 for the United States of America, > 100 000 for Europe and about 4500 in Western Pacific.

In the Western Pacific Region, Chagas cases have been reported in Australia and Japan and little is known about the situation in other countries in this Region. Specifically, it was estimated that there were over 1500 infected individuals in Australia and over 3000 in Japan. The majority of the reported cases were believed to have been imported from the Americas. But blood transfusion, organ transplants and congenital routes have not been adequately assessed in the Western Pacific Region and represent a potential risk for autochthonous transmission.

In addition, triatomine insect species-Chagas disease vectors have been reported in Viet Nam and could also pose a risk of transmission. Few studies have been conducted on the sporadic reports about the presence of such vectors in Africa, South-East Asia and Western Pacific since the 18th century, but it is assumed that the insects were introduced via maritime routes.

Chagas disease presents itself in two phases. The initial acute phase, with a high parasitaemia, lasts for about two months after infection. In most cases, symptoms are absent or mild, but can include fever, headache or enlarged lymph glands, among others. In < 50% of people bitten by a triatomine insect, characteristic first visible signs can be a skin lesion (chagoma) or a purplish swelling of the lids of one eye (Romaña sign).

During the chronic phase, the parasites are hidden mainly in the heart and digestive muscle and up to 30% of patients suffer from cardiac disorders and up to 10% suffer from digestive (typically enlargement of the oesophagus or colon), neurological or mixed alterations. In later years, the

infection can lead to sudden death or heart failure caused by progressive cardiomyopathy. The majority of Chagas disease patients encountered outside Latin America are chronic patients who may be suffering from clinical manifestations that need care. These patients also could transmit the disease through blood donations, organ transplants or mother to child. It is therefore critical that those affected by Chagas disease are diagnosed and treated accordingly.

In 2010, the World Health Assembly Resolution 63.20 on "Chagas disease: control and elimination" urged Member States to reduce the burden of Chagas disease in nonendemic countries. The resolution also called upon the Director-General to consider an initiative for the prevention and control of Chagas disease in nonendemic regions.

1.1 Objectives

(1) To update and analyse the epidemiological situation of Chagas disease in the Region.

(2) To discuss the risk of transmission of the disease in nonendemic countries of the Western Pacific Region.

(3) To discuss the next steps about how to address Chagas disease in the Region.

1.2 Opening remarks

Participants were welcomed by Dr Tsutomu Takeuchi, Dean of the Institute of Tropical Medicine of Nagasaki University, Japan, and Dr John Ehrenberg, Director of Combating Communicable Diseases (DCC), Western Pacific Regional Office, WHO (see Annexes 3 and 4). Dr Jean Jannin, Coordinator of the Innovative and Intensified Disease Management Unit, Department of Control of Neglected Tropical Diseases, WHO Headquarters, also provided background information about the informal consultation.

The idea of an initiative of Chagas disease control in nonendemic countries was suggested in the meeting "*Revisiting Chagas disease: from a Latin American health perspective to a global health perspective*", in Geneva (Switzerland), in July 2007. Faced with the epidemiological reality and spread of the disease outside Latin America, WHO Headquarters, the WHO Regional Office for the Americas and the Pan American Health Organization (AMRO/PAHO) jointly organized this meeting in order to move towards the goal of providing more support and to reinforce national and regional capacities for achieving the objective of interrupting transmission of *T. cruzi* and providing health care to infected patients.

During the meeting, participants from 28 countries proposed to establish the above-mentioned initiative and to increase networking for prevention, control and treatment of Chagas disease as part of WHO's renewed commitment to tackle neglected tropical diseases and to build on the successes in Latin America.

Since then, WHO has convened a series of meetings to assess the burden of Chagas disease in non-endemic countries and to formulate an appropriate response. In November 2007, the first meeting with European participants was held in Paris, France, with the following objectives: to define the first list of disease non-endemic countries; to identify problems and define priorities and following actions to be undertaken; and to set up working groups accordingly.

Another meeting was held in Barcelona, Spain, in February 2008 with a group of participants from the United States of America, Europe and Japan. The meeting's main goals were to discuss the objectives, structure and functioning of the non-endemic countries initiative and implement an initial

database with information on Chagas disease in non-endemic countries, including reference institutions and human focal points, as well as available epidemiological information and preventive and control measures implemented.

Further, discussion continued in the XVII International Congress for Tropical Medicine and Malaria in Jeju Island, the Republic of Korea, in September 2008, as well as at the 57th Annual Meeting of the American Society of Tropical Medicine and Hygiene in New Orleans, United States of America, in December 2008, and during the Sixth European Congress on Tropical Medicine and International Health in Verona, Italy, in September 2009.

The first informal consultation on the control and prevention of Chagas disease in Europe, held in Geneva, Switzerland, in December 2009, was jointly organized by WHO Headquarters and the WHO Regional Office for Europe and had participants from nine European countries.

Through the present meeting in the Western Pacific Region, a region-wide approach will be initiated.

2. PROCEEDINGS

2.1 Objectives and expected outcomes of the meeting

Dr John Ehrenberg
Director of Combating Communicable Diseases (DCC), WHO/WPRO

Dr Ehrenberg explained the objectives of the meeting to the participants and outlined the expected outcomes.

In the Americas, a vast amount of information is available on Chagas disease from research and control activities over the last seven to eight decades. In comparison, there is little information from other regions of the world. This time, our aim is to gather what is known in the Region, share it and to discuss the next steps. That is, how to address the issue in the Region and find whether there is a risk and any actions to be taken.

Australia and Japan will be presenting some updates on immigration. We will have a picture of China. Although China is a not a major recipient of immigrants, its growing economy may attract people from different parts of the world, including the Americas. There will be topics on blood transfusion, including technical updates and recommendations. Japan contributed to creating knowledge on the control of Chagas disease in the Americas and in reducing transmission risks by supporting the Central American intergovernmental initiative. In Viet Nam, potential vectors have been reported. Considering years of dynamics of vector biology, it will be important to draw a distribution map of the vectors.

2.2 Updates on the Control of Chagas disease

Dr Pedro Albajar, Programme on Control of Chagas Disease, Innovative and Intensified Disease Management Unit, Department of Control of Neglected Tropical Diseases, WHO Headquarters, provided updated information on the following four topics:

1. Chagas disease

a. six phylogenetic groups of *T. cruzi* have been found in the Americas;

b. *Triatoma rubrofaciata* is the most reported vector in the Western Pacific Region; and

c. Fully 75% of initial asymptomatic forms of the chronic cases remain undetected and untreated.

2. Progress on the disease's control in endemic countries

a. transmission by vector and blood transfusion has been widely interrupted in the Americas;

b. the regional initiatives technically and politically aided operation of the member countries;

c. since 1984, the estimated incidence and prevalence of Chagas disease has declined owing to successful control activities.

3. Progress, key issues and strategies in non-endemic countries

a. triatominae insects have been extensively reported, mostly in the Americas, but also in the African, South-East Asian and Western Pacific Regions;

b. today, human migration flows continue among Latin America, North America, Europe and the Western Pacific;

c. especially, immigrants from Latin America to Europe have increased since 2000;

d. for travel medicine, Chagas disease has become a relevant issue;

4. Global and regional initiatives and policies:

a. Chagas disease control is related to four of the eight Millennium Development Goals targeted for 2015;

b. The two-pillar strategy to reduce the Chagas disease burden in non-endemic countries consists of:

- "interruption of transmission" by blood transfusion and organ transplant; and

- "patient care" in terms of diagnosis and treatment of congenital transmission cases and other acute and chronic cases.

c. At the 63rd World Health Assembly in 2010, United Nations Member States agreed on a resolution to reinforce control and elimination of Chagas disease

d. In Europe and/or the United States of America, Chagas disease cases by congenital transmission, blood transfusion, home nationals infected during a trip to Latin America, laboratory accidents and immigrants developing chronic symptoms have been documented; and

e. Updates of latest research findings and operational guidelines (on drug usage, diagnostic tools, strategies for vertical transmission, etc.) are available.

Having presented basic knowledge on Chagas disease and progress in the reduction of infected populations and health care provision, Dr Albajar discussed challenges on a global scale. The dynamics of disease transmission are changing on the planet, where one in every six world inhabitants is a migrant, inside or outside his country. Notably, immigration from Latin America has been on the rise due to economic hardship and tight restrictions for obtaining a visa to the United States of America. Even with these restrictions, Chagas disease cases have been documented in Europe, the United States of America, Canada and the Western Pacific.

Discussion:

It would be important to know the prevalence of Chagas disease by age groups in each Latin American country in order to identify at-risk immigrants. However, such data do not exist. Attention should be paid to the individual's all historical exposure to the infection risk. Additionally, the current prevalence map is important with respect to travel medicine. Changes of exposure levels should be analysed in terms of time and space.

Data suggest lower infection prevalence and morbidity, probably related to *T. cruzi* (genotype) in Central America, which might result in less effective transmission. Normally, the lower the parasitaemia level, the better the prognosis. Parasitaemia in Central America (e.g. Honduras and Guatemala) tends to be lower than that in South America (e.g. Bolivia). But the seroconversion rate in treated and cured populations is higher and happens faster in Central America than in South America. Nevertheless, not everything is explained by the *T.cruzi* genotypes. The infectivity and morbidity of *T. cruzi* also depends largely on nutritional and immunological status and other environmental factors of the infected individuals.

The Institute of Tropical Medicine of San Paulo, Brazil, started to investigate Chagas disease among Bolivian and Japanese groups living in Sao Paulo to analyse the effects of the population movement on Chagas disease prevalence and transmission.

The issue was raised that there could be differences in the social status of immigrants from Latin America living in Japan, Australia and the rest of the world. In Japan, many of them are Japanese Brazilians (migrant descendants). In Australia, they tend to be farm workers.

There was a question about the applicability of polymerase chain reaction (PCR) in the diagnosis of Chagas disease in comparison with serological tests. Reactive results from two distinct serological tests confirm positivity of the suspected cases. But the sensitivity of PCR is about 60%. Also, the sensitivity of PCR would vary depending on the genotypes of *T. cruzi* and on the immunological status of the suspected cases.

2.3 Chagas disease: an issue to be concerned about in the Western Pacific Region

Dr Jun Nakagawa, Technical Officer of Malaria, other Vector-borne and Parasitic Diseases (MVP), the Western Pacific Regional Office WHO, presented general information related to Chagas disease in the Western Pacific Region, focusing on the following three areas as a brief introduction of the country's and invitee's presentations:

1. Migrants movement of Chagas disease-endemic countries

(a) The number of migrants from Latin America was 115 606 in Japan in 2007 and 80 522 in Australia in 2006.

(b) Chagas disease cases have been reported in Japan and Australia.

2. Characteristics of Chagas disease in the Western Pacific Region.

(a) Chagas disease in the Region seems to be primarily an issue affecting people from endemic countries.

(b) Currently, reports of Chagas disease seem to be limited to Australia and Japan in the Region.

(c) The situation among nationals from the Region visiting Chagas disease-endemic countries is unknown.

(d) Chagas disease vectors have been found in the Region.

3. Issues to be considered and discussed in the group work

(a) Case detection and health care, including congenital Chagas disease cases; and epidemiological information and surveillance;

(b) Prevention of transmission (by transfusion, organ transplants, lab accidents); and

(c) Vector surveillance and control.

2.4 Countries and adviser's presentations

2.4.1 Australia

Dr Helen Faddy, Research Fellow of Research Development, Australian Red Cross Blood Service, presented the Australian context of Chagas disease with explanations on the following points:

1. Australian Government international aid in the health sector

(a) The Government's approach is to help strengthen primary health care services for "neglected tropical diseases" in countries in the Region.

(b) The Australian Government provides core funding to multilateral health organizations, including WHO.

2. Epidemiological situation in Australia

(a) Chagas disease is not endemic and not notifiable in humans.

(b) There have been no Chagas disease cases in Australia reported in the literature.

(c) Little is known of potential vectors for T. cruzi if it were introduced into Australia; Triatoma leopoldi is thought to occur in northern Australia.

(d) Native wildlife can be infected with species of *Trypsanosoma*, some of which are genetically closely related to *T. cruzi.*

3. Availability of laboratory diagnostic tests in Australia

(a) Some laboratories have the diagnostic capability for serological testing.

4. Research on Chagas disease at Murdoch University

(a) Drug discovery research is being undertaken, which aims to develop more effective and less toxic treatments.

(b) Wildlife surveillance, including testing for vectors of Triatoma species in native wildlife, is being performed.

5. Relevant Australian organizations and associations

(a) There is no nationally funded or Government-recognised programme or body that highlights Chagas disease in Australia.

(b) Relevant activities may be organised by the Australian Chagas Disease Association (http://australianchagasassociation.org/).

6. Latin American immigrants

(a) The estimated number of Latin American immigrants in 2010 was 94 605, among them 25.6% Chileans, 12.0% Brazilians, 12.0% Argentineans, 9.9% Salvadorans, 9.9% Uruguayans, 8.5% Colombians, 8.1% Peruvians, 1.9% Mexicans, 1.6% Venezuelans, 1.6% Ecuadorians and 8.8% others.

(b) Although no official figure is published, the estimated potentially parasitaemic individuals is 3 507 (94 605 immigrants x 3.71%).

7. Managing the risk of transfusion transmission in Australia

(a) The Australian Red Cross Blood Service (Blood Service) manages the supply of blood within Australia.

(b) The Blood Service complies with the requirements of the Council of Europe, “Guide to the preparation of blood components” (14th Edition).

- A mandatory donor questionnaire identifies at risk donors: individuals with any history of known *T. cruzi* infection are permanently excluded from donation; donations from individuals born in an endemic area or transfused with fresh components in an endemic area are permanently restricted to plasma for fractionation only.

Discussion:

There was a request on the sharing of information on studies of pathogen reduction techniques and costing of screening in Australia. The Blood Service in Australia is aware of pathogen reduction technology systems that are being developed by commercial parties and has active research activities in this area.

A question was raised if the potentially at risk donors had knowledge on Chagas disease. No information was available in Australia to demonstrate their knowledge level; however, the Blood Service has procedures in place for counseling donors.

Inquiry was made if Australia deferred the donors from Chagas disease endemic countries. In Australia, individuals diagnosed with Chagas disease are permanently excluded from donating and those born or transfused in Chagas disease endemic countries are permanently restricted to donating plasma for fractionation only.

It was pointed out that the estimated at risk population in Dr Faddy's presentation might be worth revising, because the figure could be distorted due to different levels of infection risks between Latin American countries. Further, some people from Chagas disease endemic countries stay less than a year in Australia, and in this case they are unlikely to be counted as immigrants. Reliability of donor selection methodology is questionable when it is based on self-declaration by the donors.

There was a question on whether the four tests for detection of *T. cruzi* antibodies mentioned in the presentation were approved by the Therapeutic Goods Administration (TGA) in Australia and/or regulated with standard operating procedures (SOP) for uniform criteria. Dr Faddy clarified that the Blood Service is aware of four commercially available test kits for the detection of *T. cruzi* antibodies, none of which were regulated for blood screening in Australia at the time of the presentation.

The first case was detected in Australia in 2008. Blood banks would be an entry point to obtain information on Chagas disease infection and *T. cruzi* positive individuals through questionnaires and laboratory tests. Accordingly, it is important to consider how to integrate data collecting mechanisms into the existing national health system in the country.

There was an inquiry if any data were available on illegal immigrants from Chagas disease endemic countries in Australia. Dr Faddy was not aware of any publically available information on the number of illegal immigrants in Australia.

2.4.2 China

Dr Wang Jun-Yun, Professor at the National Institute of Parasitic Diseases, Chinese Center for Diseases Control and Prevention presented the current situation in China related to Chagas disease and Leishmaniasis.

1. Chagas disease

   (a) No data were available about the number of Latin American immigrants in China. Consequently, the number of population at risk cannot be estimated.

   (b) China neither has systems to detect transfusion and congenital transmission of Chagas disease nor capacities to diagnose T. cruzi infection at a laboratory with parasitological, molecular and serological methods.

2. Leishmaniasis

   (a) Between 2005 and 2010, a total of 2 450 visceral Leishmaniasis cases were notified through the web-based National Diseases Reporting Information System (NDRIS) operated by the Chinese Centre for Disease Control and Prevention.

(b) Although the notified cases are distributed over 179 counties and cities in 18 provinces, municipalities and autonomous regions, the highest concentration of reported cases was in Xinjiang (49.7%), followed by Gansu Province (33.7%) and Sichuan Province (14.3%).

Discussion:

There was a question about possibilities of the cross-reactivity between Leishmaniasis and Chagas disease in any areas to which Latin Americans might have immigrated. However, there is no available data on the cross-reactivity of Leishmaniasis and Chagas disease in China.

Chagas disease could be an issue in the future, because the economic growth of the country can create opportunities for Latin Americans to travel to China and for Chinese nationals to travel to Latin American countries.

China is the only country with Leishmaniasis in the Western Pacific Region. The Korean International Cooperation Agency (KOICA) is helping China to support Leishmaniasis control activities. WHO might be able to support the coordination of expert or specialist groups working on Leishmaniasis. Collaboration with Japanese researchers with experience in Leishmaniasis also was suggested.

2.4.3 Chagas disease in Japan

Dr Sachio Miura, former Assistant Professor in the Department of Tropical Medicine and Parasitology School of Medicine, Keio University, focused on the following three components in his presentation:

1. Recent migratory flows from Latin America to Japan

   (a) In 2009, the number of Latin American immigrants in Japan was 300 000, among them 76.6% Brazilians, 16.6% Peruvians, 1.7% Bolivians, 1.3% Argentineans, 0.3% Paraguayans and 3.3% others.

   (b) Latin American communities are concentrated in 10 prefectures in Japan (Miyagi, Kanagawa, Nagano, Shizuoka, Aichi, Gifu, Mie, Shiga, Osaka and Okinawa).

2. Prevalence among Japanese immigrants in Latin America

   (a) Since the end of the 19th century, Japanese started migrating to Chagas disease-endemic areas in Brazil (e.g. Sao Paulo) and Bolivia (e.g. Santa Cruz).

   (b) A survey (N=80) in Okinawa (a Japanese immigrants' community) in Bolivia in 2000, where Japanese migrants are concentrated, showed that 24.5% was positive to anti-T. cruzi IgG and 13.5% showed parasitaemia.

   (c) Santa Cruz, Bolivia, adjacent to Okinawa, is also endemic, where 35% of blood donors were found positive to anti-T. cruzi IgG during the period 1991-1993.

3. Prevalence among Latin Americans in Japan

   (a) Since the first confirmed case of an expatriate, who visited Japan from Brazil for a short stay in 1976, 16 more cases (11 from Brazil and five from Bolivia) have been reported among the immigrants.

(b) Of the 42 cases with cardiac problems among Latin American immigrants, 16 (38.1%) were found positive with anti-T. cruzi IgG.

(c) In a Brazilian community (N=330) in Gunma Prefecture, 72% were within the age range of 41-60 years in 2011. Considering that seroprevalence in South America during the period 1970-1980s varied from 2.9% to 51.1%, more Chagas disease cases can be expected among Latin American immigrants in Japan.

(d) According to a study in the Brazilian community in Japan during the period 2008-2010, 20 of 1 048 (1.9%) participants were found positive to anti-T. cruzi.

Discussion:

There has been no study conducted on congenital transmission in Japan. However, one test was performed for a case in which a mother who was diagnosed positive in Brazil and asked that her daughter be examined. The result was negative.

A question was asked if cardiologists in Japan tested their patients for Chagas disease infections. Dr Miura replied that suspected cases were referred to his laboratory at the Japanese Red Cross.

Dr Miura and Dr Takeuchi mentioned their experiences of finding a number of false negative results in evaluating blood samples by PCR. Updates showed that standardised techniques for qualitative and quantitative PCR for Chagas disease were documented and soon would be published by WHO.

Regarding a referral system of Chagas disease-suspected cases, there was consensus among the Japanese participants that such a mechanism was yet to be established.

There was a question about where the drugs for Chagas disease were kept in Japan. Dr Takeuchi explained that his team had some nifurtimox under research supported by a grant from the Ministry of Health, Labour and Welfare to deal principally with laboratory accidents but also supplied them to other institutes upon request. A small portion of nifurtimox is stocked at WHO Headquarters for emergencies and can be delivered within 48 hours of a request.

Side-effects such as insomnia and anorexia have been reported more with nifurtimox than with the first-line treatment, benznidazole. Original benznidazole, produced by Roche, was virtually unobtainable because of a production interruption. Despite such disadvantages, it is important that at least one institution possess the drugs as risk management for laboratory accidents, when patients generally need be treated between seven and 10 days.

2.4.4 Japan's contribution to Chagas disease control (JICA)

Mr Keizo Uno, Health Division 4, Human Development Department, Japan International Cooperation Agency (JICA), explained JICA’s involvement with regard to international aid in Chagas disease control in Central America.

1. Overview

(a) JICA is committed to taking countermeasures against neglected tropical diseases (NTDs).

(b) In Chagas disease, the strategic focus was on research in the 1990s and has been in operation since the 2000s.

2. JICA's approach

(a) Vector control projects have been implemented in Guatemala, Honduras, El Salvador and Nicaragua since 2000, dispatching JICA experts and volunteers. JICA volunteers also were sent to Belize and Panama.

(b) Each project consisted of attack and maintenance phases.

- The attack phase is intended to reduce the vector infestation by reinforcing institutional management.

- The maintenance phase aims to maintain the transmission interrupted by developing administrative capacity in establishing community-based surveillance.

3. Achievements

(a) Certification of interruption of transmission by the principal vector, Rhodnius prolixus, was given to Guatemala in 2008 and to be awarded to Honduras and Nicaragua in 2011.

(b) Elimination of Rhodnius prolixus was certified in El Salvador in 2010.

4. Way forward

(a) JICA will be strengthening partnerships with other development organisms to make the utmost use of limited resources to interrupt Chagas disease.

(b) JICA started a project for capacity-building in the development of new therapeutic compounds for Chagas disease in El Salvador.

Discussion:

Gratitude was expressed to JICA for the contribution on Chagas disease control in Central America and requested continuous efforts against NTDs.

An inquiry was made about further information on "capacity-building for development of new therapeutic compounds" in El Salvador. It was explained that this was a new capacity- building approach for JICA and the Japanese Ministry of Education to improve the ability to perform basic research on Chagas disease. The young scientists in El Salvador are to be trained in the techniques during the process of clinical trials of new drugs.

There was a question about whether the vector control campaign focused on *Rhodnius prolixus* had an impact on the reduction of other vectors. It was explained that the insecticide spray campaign with residual effect took place against the two principal vectors, *R. prolixus* and *Triatoma dimidiata*. In Guatemala, for example, the rate of infested houses by *T. dimidiata* decreased from 10.2% to 2.7% during the attack phase by up to three cycles of insecticide spraying. Yet, re-infestation by *T. dimidiata* also was observed in certain areas and further analysis is needed.

A comment was made that *T. dimidiata* tends to have different habitats, some being more domestic and others being more peri-domestic, indicating more exposure in certain populations than

others. Further, four types of *T. dimidiata* have been found. The one in the Yucatan area is known to be more silvatic and peri-domestic than the others. In addition, exposure levels may be affected by housing conditions and human population density of the areas.

2.4.5 Research on Chagas disease in Japan

Dr Kiyoshi Kita, Professor, Department of Biochemistry, School of International Health, University of Tokyo, presented the recent finding on research and development of new drugs for *T. cruzi* in Japan.

1. Research on T. cruzi

   (a) No difference was found between the lineages of *T. cruzi* in clinical forms of indeterminate, cardiopathy and megacolon.

   (b) The same lineage or sub-lineage produced different clinical forms, indicating the location of possible determinants on the host side.

   (c) According to an analysis on HLA (Human Leukocyte Antigen), A*01, B*14 and DRB1*01 were associated with megacolon.

   (d) A study on *T. cruzi*-infected cells showed that *T. cruzi* up-regulates and exploits host apoptosis with c-FLIP by inhibiting death receptor signaling.

2. Drug development

   (a) Ravuconazole/E1224 has been developed in collaboration with Eisai and the Drugs for Neglected Diseases initiative (DNDi) since 2009 and is in the second clinical trial phase.

   (b) Characteristics of ravuconazole include:

      (i) broad spectrum antifungal activity;

      (ii) sterol biosynthesis inhibitor;

      (iii) growth inhibition of *T. cruzi*;

      (iv) long half-life in humans (T1/2: 7-10 days); and

      (v) effective against fungus in Phase II.

   (c) E1224 is ravuconazole prodrug with:

      (i) high solubility;

      (ii) rapid conversion to ravuconazole after administration;

      (iii) several times higher blood concentration than ravuconazole after an oral dose;

(iv) low interaction with other drugs; and

(v) no side-effects.

(d) As a fundamental component of drug design, the latest research is targeted on understanding the crystal structure of dihydroorotate dehydrogenase (DHOD) from T. cruzi and the reaction mechanism.

Discussion:

An issue was raised about how two types of information could be explained together, referring to Dr Albajar's presentation which related different clinical manifestations to distinct predominance of *T. cruzi* strains and Dr Kita's explanations on the latest research finding where the same lineage or sub-lineage produced different clinical forms. One possible explanation is that Dr Kita's study focused on certain types of *T. cruzi* in the Andean region of Bolivia. Even *T. cruzi* in the Amazon in Bolivia is different and is being investigated. These differences partially may be attributed to the environmental factors such as altitude and atmospheric pressure.

A question was asked whether there had been changes in the lack of correlation between the strains of *T. cruzi*. It was explained that two large groups of *T. cruzi* had been identified; Group I, predominant in the Amazon basin and areas north of the Amazon River, and Group II, predominant south of the Amazon. Between the two territories, there are clear differences in the clinical manifestations and response to treatment, among others. Although subgroups are found in each type, it is not recommended to attempt to find correlations between them but to conceive of the two large groups as two main different territories.

A point was made that the distinctiveness between the two groups of *T. cruzi* may not be attributable to pathogenesis, because no differences were found between a variety of *T. cruzi* on the pathogenic processes, including infectivity to mice.

It was argued that, according to extensive research on the heterogeneity of *T. cruzi* using more than 500 isolated crones, some samples tested on mice were highly pathogenic and others were not pathogenic at all. Therefore, this issue may be more complex than it appears.

Information on two new pharmaceutical components was shared. One is posaconazole (Noxafil®), commercialised, but costs about US$ 800 per bottle and more than one bottle is required per treatment. The other is ravuconazole and is in the second phase of clinical study.

2.4.6 Chagas disease vectors in the Asia Pacific

Dr Jean-Pierre Dujardin, Directeur de Recherches IRD, Faculty of Sciences and Faculty of Tropical Medicine, Mahidol University, Thailand, spoke about entomological aspects focusing on domesticity of vectors.

1. Biology, ecology and control

(a) Because an adult triatominae suck 0.205 ml of blood at a time, the victim of repeated insect bites could suffer from anaemia.

(b) Triatominae could be carriers of different parasites, including *T. cruzi*, *T. rangeli*, *T. conorhini*, *T. lewisi*, *Blastocrithidia*, and *Gregarines*.

(c) Triatoma species tend to live around rocks and piled woods in peri-domestic areas.

(d) Triatominae could be controlled by insecticide sprayed on walls and roofs of houses and by slow-release insecticidal paints.

2. Historical distribution of triatominae

(a) Chagas disease might have expanded from a local to a regional endemic disease.

(b) *Triatoma infestans*, the principal vector in South America, which originates around Bolivia, spread all over the continent.

(c) *Rhodnius prolixus* in Central America originates from Venezuela, was accidentally brought to El Salvador by people and expanded throughout the neighbouring countries.

(d) Of 140 known species of triatominae, 13 have been found in Asia.

(e) The most commonly reported species is *Triatoma rubrofasciata*, an Old World species also distributed in the American and African continents.

3. Potential risks

(a) To date, a total of four human cases of *Trypanosoma lewsi* infection have been reported in Malaysia, India and Thailand. *T. lewisi*, usually found in the bloodstream of rats and vectored by fleas, can also be transmitted by *Triatoma rubrofasciata*.

(b) Immigration of triatominae may occur through increasing international travel and urbanization of vectors in Latin America.

(c) As contact with autochthonous triatominae becomes frequent, humans will be more exposed to infected dejections.

Discussion:

Apparently, in recent years, a network for research on a variety of trypanosomiasis was established and has been studying infected human cases around the world, including in Egypt and India. Considering the presence of case reports in Thailand, countries in the Western Pacific Region should be incorporated in the network.

It was clarified that the reported human cases in India were transmitted by fleas, not by triatominae. Nevertheless, the long-term consequences must be taken into account since potential vectors such as *T. rubrofasciata* are found in the country.

2.4.7 Report on triatominae vectors in Viet Nam

Dr Pham Thi Khoa, National Institute of Malariology, Parasitology and Entomology, Ministry of Health, Viet Nam, presented about entomological situations regarding the triatominae species and their epidemiological implication in Viet Nam.

1. Vector distribution

   (a) Two triatominae have been found in Viet Nam; *Triatoma rubrofasciata* and *Triatoma bouvieri*.

   (b) *T. rubrofasciata* is distributed over 16 provinces in Viet Nam: Vinh Phuc, Hai Phong, Hai Duong, Lang Son, Hoa Binh, Moc Chau, Son La, Nghe An, Hue, Can Tho, Quang Nam, Quang Ngai, Binh Dinh, Ben Tre, Thanh pho Ho Chi Minh, Da Nang and Yen Bai.

   (c) *T. rubrofasciata* is found in 17 of 29 districts in Ha Noi.

   (d) In a study, a total of 1 342 specimens of *T. rubrofasciata* (26.5% adults and nymphs 73.5% nymphs) were collected in piled wood in a peri-domestic area of a house in Ha Noi in 2010.

2. Immigration and potential risks of Chagas disease transmission

   (a) Although 3 000 Latin Americans are estimated to immigrate to Viet Nam every year, no epidemiological or clinical information is available regarding *T. cruzi* infection among the immigrants.

   (b) Currently, there are no polices to prevent Chagas disease transmission through transfusion, organ transplants and congenital infection or to promote early diagnosis and treatment.

3. Currently observed damages by the vector

   (a) Bites by *T. rubrofasciata* cause considerable pain and swelling. This is a public health issue.

   (b) In 2010, the number of reported outpatients for the bites was 500 in Ha Noi, 37 in Ho Chi Minh City, 32 in Da Nang and 29 in other provinces.

   (c) Triatominae in Viet Nam are identified as vectors of *Trypanosoma evansi*, which has caused diseases in herbivores such as cattle and goats, in particular between the 1960s and 1970s, resulting in economic losses in the livestock industry.

   (d) Further studies are required to investigate the prevalence and characteristics of Trypanosoma species in the vectors and the hosts.

Discussion:

It seems that the vectors bites in Viet Nam were much more painful than the domiciliated triatomines in the Americas. Also, from the public health viewpoint, those insects should not be inside the house.

In Viet Nam, so far no systematic studies on triatomines had been carried out and no studies on human infection of *T. cruzi* have been conducted. Current control of triatomine is based on application of pyrethroid insecticide, deltamethrine, using the protocol of the malaria control programme.

It was explained that although *T. rubrofasciata* is not recognized as an efficient vector, it is capable of flying several stories up buildings and adapting to different environments.

Studies were suggested on the significance and magnitude of the problem, including human immunological reactivity to *T. cruzi* in Viet Nam. Perhaps, research institutions such as the Institute of Tropical Medicine, Nagasaki University, could collaborate on these studies.

2.4.8 Screening for transfusion-transmissible infections: WHO recommendations

Mr Paul Rogers, Technical Officer, Health Technologies and Laboratory, Division for Health Sector Development (DHS), WHO Western Pacific Regional Office, explained the WHO recommendations on blood donor selection and blood donation screening for Chagas disease.

1. Basic and latest information on transfusion

   (a) The true number of cases of transfusion-transmitted Chagas disease is underestimated since no more than 350 have been published.

   (b) Fully 20% of infected recipients are completely asymptomatic and this rate might be higher in disease-non-endemic countries because of a lack of medical expertise and awareness in identifying symptoms.

   (c) Transmission through transfusion depends at least on:

      - level of parasitaemia;

      - number and volume of transfusions; and

      - immunological status of the recipient.

   (d) The risk of transmission by a 500ml unit of whole blood varies from 12% to 20% (note; 47% reported in a separate study).

   (e) Transmission can also occur via transfusion of red cells and plasma.

   (f) Platelets may be the most infectious component, especially in relation to oncology patients.

   (g) Epidemiological data shows greater transmission from blood sellers (usually called paid donors) than voluntary blood donors.

   (h) The “Safety Tripod” concept to minimize risk of transfusion transmission is based on three components:

      - selection of appropriate low-risk donors;

      - testing for a relevant infection marker; and

      - elimination of residual pathogens.

2. The WHO draft (to be finalised during 2011) guidance, “Blood Donor Selection: Recommendations on Assessing Suitability for Blood Donation”, states the following:

(a) “In nonendemic countries, individuals are identified as having been exposed to risk of infection if:

- they or their mother or maternal grandmother were born in South or Central America (including southern Mexico); or

- they have had a blood transfusion in these areas or have lived and/or worked in rural communities for a continuous period (arbitrarily four weeks or more)”.

(b) “These individuals should be permanently excluded from blood donations unless a validated test for T. cruzi antibody is available, in which case they may be accepted six months after the last exposure is sero-negative.”

3. WHO guidance "Screening Donated Blood for Transfusion-transmissible Infections" sates the following for disease Non-endemic countries:

(a) All donors with a history of Chagas disease should be permanently deferred.

(b) If screening tests are not available, all donors with an identified risk of Chagas disease should be identified and permanently deferred.

(c) If screening tests are available, all donors with an identified risk of Chagas disease initially should be deferred for six months since their last return from an endemic area. Their subsequent donations should be screened for evidence of infection using a highly sensitive Chagas disease antibody enzyme immunoassay.

4. WHO guidance on test kit selection “Anti-Trypanosoma cruzi ASSAYS: Operational Characteristics”:

(a) Direct detection of the parasite in blood is technically and operationally demanding and lacks sensitivity in the chronic stage of disease.

(b) Detection of antibodies to T. cruzi is therefore the usual method of diagnosis.

(c) An extensive study was performed to examine a reference panel of positive and negative plasma units from 10 blood banks in Central and South America using 23 commercially available test kits belonging to enzyme immunoassays, agglutination assays, rapid assays or confirmatory assays.

(d) The results of sensitivity ranged from 88%-100% between the test kits.

(e) WHO has completed development of international reference tools which will be released in 2011 and provide a mechanism for comparison of performance of different assays.

5. The varying practises of the European Union, FDA (Food and Drug Administration), Spain, Italy, France, the United Kingdom of Great Britain and Northern Ireland and the United States of America on minimizing the risk of transfusion transmitted Chagas disease were described.

6. The WHO technical report Series 905, Control of Chagas Disease, 2002, provides some guidance on selection criteria for donor organs.

(a) Guidance, recommendations and operational practices vary widely for:

- donor selection;
- donation screening; and
- test kits used.

(b) There is no universal solution: Each Member State needs to perform its own risk assessment.

(c) The minimum criteria recommended by WHO is to adopt a systematic approach to transmission prevention with consideration of necessary technical factors.

(d) Associated health system strengthening also will be needed to achieve sustainable change and therefore requires consideration of:

- policies, strategies and governance issues; and
- resource allocation, planning, implementation, monitoring and evaluation.

(e) Policy-making should include all relevant stakeholders and in addition to epidemiological, technical and clinical factors, consider the following:

- constitutional issues;
- legal requirements to protect donors, patients and staff;
- standards of professional practice; and
- ethical considerations.

Discussion:

A question was raised about how close a revised WHO document on blood donor selection would be to the Council of Europe's guideline. Rogers commented that he did not expect the two to be significantly different. WHO recently reopened the discussion to adjust complementary components of Chagas disease.

A comment was made about the limitations on the currently available screening techniques, whereby detection of anti-*T. cruzi* antibody did not determine with certainty whether the donor was a Chagas disease patient without further confirmatory testing of *T. cruzi* in the blood. Thus, a positive result from initial screening should be handled with caution so as not to generate stigmatization of such donors with the risk of associated social and ethical concerns. Other comments on this issue were that, even in the absence of ideal test sensitivity and specificity, rules are still ethically necessary to minimize the risks to patients of transfusion transmission. Also, disruption of the blood supply is unlikely to be significant by such risk minimization rules.

There was a comment that serological reactivity could last for years even after treatment. This indicates a need for improvement of screening and case detection techniques, including the development or assessment or cure markers.

It was asked whether the WHO guideline on blood donor selection would include plasma- only transfusion, as does the Council of Europe guideline. As a recommendation for disease- non-endemic countries, the issue is yet to be discussed within the WHO Headquarters team.

A critical issue was raised: No one believed that there were Chagas disease patients in Switzerland until an individual died as a consequence of organ transplant procedures. As more medical research institutions became aware of immigrant cases and congenital transmission, it was estimated that between 1 500 and 2 000 people are infected with *T. cruzi* in Geneva.

2.5 Working groups

Participants were divided into three groups to discuss one of the following three issues:

Group	Discussion issue
1	Case detection and health care, including congenital cases, epidemiological information and surveillance
2	Prevention of transmission (transfusional and organ transmission, travel medicine, laboratory accidents, etc.)
3	Vector surveillance and control.

In each group, the discussion framework consisted of the three fundamental questions:

1. Is Chagas disease becoming a public health problem?
2. How do you handle the cases?
3. What are the next steps?

To facilitate the group discussions, the following guidelines were provided to each group. Further, the participants were allowed to add more questions and issues to be discussed in each group.

Tasks: Based on the available data and information:

- Discuss risk of Chagas disease presence and transmission in the Western Pacific Region.
- Identify gaps regarding information, programmes and operational research.
- Identify key actions necessary to move forward.
- Draw proposed conclusions and recommendations.

Because there was only one participant each from Australia, China and Viet Nam and many from Japan, each group was organized to analyse the situation in Japan and one of the other three countries. Information on health care in Australia was further complemented by the participant in the later date.

2.5.1 Working Group 1: Case detection and health care, including congenital cases, epidemiological information and surveillance

Chair: Dr Kita
Rapporteur: Dr Wang (and Dr Hashimoto)
Presenter: Dr Miura

Background:

According to the resolution of the 63rd World Health Assembly held in May 2010 (WHA63.20, Agenda item 11.14), the Member States agreed to provide continuous collaboration and assistance in control and elimination of Chagas disease, in particular the following three aspects.

1. URGES Member States

   (a) "to strengthen and harmonize public health policies to reduce the burden of Chagas disease, particularly in countries where the disease is not endemic";

   (b) "to promote the development of public health measures in disease-endemic and non-endemic countries, with special focus on endemic areas, for the prevention of transmission through blood transfusion and organ transplantation, early diagnosis of congenital transmission and management of cases";

2. REQUESTS the Director-General

   (a) "to provide support to the countries of the Americas in order to strengthen intergovernmental initiatives and the technical secretariat of the Pan American Sanitary Bureau as a successful form of technical cooperation among countries, and to consider an initiative for the prevention and control of Chagas disease in non-endemic regions."

Results of Group Discussion:

Question	*(1) Is Chagas disease becoming a public health problem?*		
	Situations in		
	Japan	**Australia**	**China**
Who are the target groups? A. Home nationals travelling overseas and returning for whatever reasons	Travellers from Japan to disease-endemic countries for business and/or other purposes. The actual number is not known.	Travellers from Australia to disease-endemic countries for business and/or other purposes. The exact number is not known.	Labourers in country (interior) of disease-endemic Latin American countries. The actual number is not known.
Who are the target groups? B. Foreign residents from disease-endemic areas travelling to the Western Pacific Region for whatever reasons	Japanese migrants and families, 300 000 in total. 230 000 from Brazil (infection rate among Japanese-Brazilian blood donors in Brazil 0.9%). 50 000 from Peru 6 000 from Bolivia (about 15% confirmed cases in Europe, up to 35% in blood donors from Bolivia in Japan, most from Okinawa/Bolivia)	Latin American immigrants residing in Australia. Estimates from the last national census (2006) adjusted for 2010 suggest that ~94 600 Latin American immigrants were living in Australia in 2010.	No data
Where do they come from and where do they become established?	Originating from Brazil (Sao Paulo, Santa Catarina, Mato Grosso, Para, etc.) Originating from Bolivia (Okinawa, Santa Cruz, San Juan, Department of Santa Cruz) Where do they go (confirmed cases in Miyagi, Kanagawa, Nagano, Shizuoka, Aichi, Mie, Gifu, Shiga, Osaka, Okinawa). Annex 5 identifies districts with >10 000 Japanese-Brazilian residents	People living in Australia who were born in Latin America assumed to be predominantly from Chile followed by Brazil, Argentina, El Salvador, Uruguay and Peru (taken from 2006 census).	No data
What has been the trend in people's movement in the last 10 years?	Steady increase with possible plateau (requires verification) for Brazilian immigrants.	Detailed information not available.	No data, but trends are believed to change in the future.

Question	*(1) Is Chagas disease becoming a public health problem?*		
	Situations in		
	Japan	**Australia**	**China**
How are Chagas disease cases detected (e.g. mother child health (MCH) clinics)?	Increased capacity of clinicians to identify suspect cases and request test. Increased requests (rapid test, InBios, Stat-Pack). If positive, ELISA (Ortho) and indirect immunofluorescence antibody test, IFAT (home kit). Any suspect case arriving at general practitioner's (GP) clinics is referred to Dr Miura's laboratory at the Japanese Red Cross	Unable to provide this information.	No system for detection
When are Chagas disease cases detected (e.g. when they manifest clinical symptoms, when they become donors)?	Majority of immigrants tend to work in the small industries sectors, where health check-ups are not routine. Cases usually will be detected when they have some symptoms and suggestive ECG suspect findings. Active surveillance is still limited.	Unable to provide this information.	No system in place yet.
Is information reliable/official?	Annual assembly of research with involvement of the Ministry of Health, Labour and Welfare. Data are shared and endorsed by the ministry, which publishes annual reports with distribution, including the national library.	Unable to provide this information.	No system in place for reporting

Question	*(2) How do you deal with the cases? How are cases managed within the health system?*		
	Situations in		
	Japan	**Australia**	**China**
Hospital referral, prenatal care, acute and chronic cases, etc.	Cases picked up by GP are generally referred to university hospitals (tertiary facilities). Doubts regarding anti- and pre-natal detection and management (no records of congenital cases to date). All detected cases are chronic. Capacity-building (training of clinicians) tends to focus around areas of major concentration of immigrants. Clinicians in other areas tend to refer suspected cases to clinicians with expertise. No formal referral system in place. Clinicians will often rely on the Parasitology Network. Transmission by transfusion; to date this is not an issue. No system in place to date. Establishment of a central laboratory is being explored by the Red Cross in association with blood transfusion	Unable to provide this information.	For now not applicable
Drug procurement: How do you procure where and how do you estimate the needs?	Drug procurement is a problem. No benznidazole stocks. Nifurtimox stock maintained by the research groups. Headquarters keeps stock of nifurtimox and benznidazole but future procurement of benznidazole poses a challenge due to production interruption/world shortage. Urgent action required.	Unable to provide this information.	For now not applicable
How do you monitor the drug efficacy?	This is a challenge. Treatment monitoring and drug efficacy surveillance system should be in place. WHO is working on implementation of a global mechanism for this.	Unable to provide this information.	For now, not applicable

Question	*(3) What are the next steps?*		
	Situations in		
	Japan	**Australia**	**China**
Do we need to reassess the epidemiological situations?	Yes. Discussions on active surveillance being considered. Update information in Bolivia (current data 2000)	Current and historical prevalence data for Latin America is needed.	Yes. Active surveillance is needed.
Agreeing on tools and systems: How can they be integrated in the existing surveillance systems?	Health insurance system should be applied for financial aspects, information sharing, etc. Red Cross centralized for case detection system in Tokyo. National and regional data collection system is required.	Unable to provide this information.	National and regional data collection system is required.
Agreeing on tools and systems: What are the requirements for licensing of diagnostic testing and drugs (e.g. Therapeutic Goods Administration, TGA, in Australia)?	Drugs for Chagas disease are not registered for temporary importation authorization provided by the Ministry of Health, Labour and Welfare. In case of emergency, medical doctors in Japan are allowed to use diagnostic kits and drugs under their responsibility.	Unable to provide this information.	Drugs for Chagas disease are not registered for temporary importation authorization provided by the Ministry of Health.
Agreeing on tools and systems: Set up a national monitoring system for drug efficacy?	This is a challenge. Treatment monitoring and drug efficacy surveillance system should be in place.	Unable to provide this information.	This is a challenge. Treatment monitoring and drug efficacy surveillance system should be in place.
Operational research?	This is a challenge.	Unable to provide this information.	This is a challenge.
What skills: Training on case detection and management?	Red Cross provides lectures on case detection and treatment for GP clinicians, nurses, laboratory technicians, local health staffs, etc.	Unable to provide this information.	Positive perspective for training on Chagas disease in Chinese CDC.
What skills: Training on information management/ surveillance?	Can be covered by Field Epidemiological Training Program (FETP) of National Institute of Infectious Diseases (NIID).	Unable to provide this information.	Can be covered by Chinese CDC.

2.5.2 Working Group 2: Prevention of transmission (transfusional and organ transmission, travel medicine, laboratory accidents, etc.)

Chair: Dr Tadokoro
Rapporteur: Dr Faddy
Presenter: Dr Faddy

Results of Group Discussion:

(1) Is transfusion/organ/tissue transmitted Chagas disease becoming a public health problem?		
Question	**Situations in**	
	Australia/Japan	**Others**
Who are the at-risk donor groups? A. Home nationals travelling overseas and returning for whatever reasons	The risk of travellers to Latin American countries where there is a current risk of *T. cruzi* transmission should be considered. WHAT IS NEEDED: List of Latin American countries with current *T. cruzi* transmission	Data required from other countries (South Korea, Viet Nam, the Philippines, China, New Zealand, Malaysia, Singapore)
Who are the target groups? B. Foreign residents from disease-endemic areas travelling to the Region for whatever reasons	The risk of donors (assumed higher risk wherever exposure to active transmission?) from Latin American countries (and from certain areas within countries for travel medicine) with a high prevalence should be considered. WHAT IS NEEDED: Current and historical prevalence data for Latin America, including risk/time/location profile; revised definition of disease-endemic area	Data required from other countries (South Korea, Viet Nam, the Philippines, China, New Zealand, Malaysia, Singapore)

(1) Is transfusion/organ/tissue transmitted Chagas disease becoming a public health problem?		
Question	**Situations in**	
	Australia/Japan	**Others**
Where do they come from?	Japanese donors with a history of residence in Latin America known to be predominantly from Brazil (majority less than 40 years old), followed by Mexico, Peru, Argentina and Chile. Australian donors born in Latin America assumed to be predominantly from Chile followed by Argentina, El Salvador, Uruguay and Peru. Further information required on destination countries for travellers (both travel medicine and for blood services)	Data required from other countries (South Korea, Viet Nam, the Philippines, China, New Zealand, Malaysia, Singapore)
What has been the trend in people's movements in the last 10 years?	Australia: Detailed information not available.	Unknown
	Japan: The number of Latin American migrants initially increased; however, assumed to be on the decline within the last five years. Probable increase in travellers visiting at-risk areas (eco/adventure tourism). Work-related travel needs to be better assessed (all countries).	

(1) Is transfusion/organ/tissue transmitted Chagas disease becoming a public health problem?		
Question	**Situations in**	
	Australia/Japan	**Others**
How are the at-risk donors detected? Donor selection (criteria for acceptance and temporary and permanent deferral)	In Australia, a mandatory donor questionnaire identifies at risk donors: individuals with any history of known infection are permanently excluded from donation and donations from individuals born in an endemic area or transfused with fresh components in an endemic area are permanently restricts to donating plasma for fractionation only. In Japan, donors with a history of known infection are permanently deferred.	Not known
How are the at-risk donors detected? Donation screening (testing algorithm)	No routine donation screening for *T. cruzi*; only mandatory donor questionnaire.	No testing; no questionnaire?
Is laboratory safety, with regard to handling of Chagas disease potentially positive samples, sufficiently assured?	Highly likely given quality systems in place.	Unknown

(2) How do you deal with the cases? How are cases managed within the health system?		
Question	**Situations in**	
	Australia	**Japan**
Is donor counselling offered?	The Blood Service has procedures in place for donor counselling.	No formal system in place for counselling.
How is donor referral managed?	No formal system in place for Chagas disease. Re: case management: A few laboratories have the capacity to test for *T. cruzi* upon request (most suspects referred).	No formal system in place for Chagas disease. Re: case management: Formal referral system to be established.
How is the issue of informed consent for organ/tissue donation dealt with? (regarding risk factors)	It is understood that history of Chagas disease is questioned.	For blood and bone marrow history of Chagas disease. Recipient: Chagas disease-specific at-risk issues not currently questioned as part of informed consent Specific risk criteria issues as per blood donation
Others?		Three potential options for handling at-risk donors: 1. Complete exclusion based on at-risk criteria 2. Conditional acceptance (partial use; i.e. plasma for fractionation only) 3. Acceptance upon negative screening result (no countries in Region)

(3) What are the next steps?		
Question	**Situations in**	
	Australia/Japan	**Others**
Do we need to reassess the risk of blood transfusion/ organ/tissue transmission?	Risk of blood transfusion transmission is constantly being assessed and reassessed. Reassess for organ/tissues transplantation? Still a requirement for more detailed data (prevalence and current risk of transmission as highlighted in Question 1.	Risk of blood transfusion transmission is constantly being assessed and reassessed. Risk criteria being reassessed – pilot study of the risk of Chagas disease in Latin American donors. Reassess for organ/tissues transplant? Still a requirement for more detailed data (prevalence and current risk of transmission as highlighted in Question 1.)
What strategies should be implemented to reduce the risk of blood transfusion/ organ/tissue transplant transmission?	Comply/following with Council of Europe.	Further data being gathered to understand the situation. Other countries: no data available; no cognizance of issue.
Agreeing on tools and systems: Selection and use of screening kits (sensitivity and specificity, ease of use and cost)	No assays regulated for use in Australia for blood screening purposes.	No routine screening.
Agreeing on tools and systems: What is the availability of kits and reagents for Chagas disease screening/diagnosis?	No *T. cruzi* assays regulated for use in Australia for blood screening purposes.	License required for importation of kits; validation at blood service required for tests for blood screening. Tests for diagnosis used for research purposes – may require regulatory approval in the future.
Agreeing on tools and systems: What are the requirements for quality assurance (including SOPs) and licensing of test kits (e.g. TGA in Australia)?	It is understood that all assays for blood screening purposes would need to be regulated with the TGA.	No regulation required. Validation of kits within Blood Service required. SOPs would need to be worked out.

(3) What are the next steps?		
Question	**Situations in**	
	Australia/Japan	**Others**
Agreeing on tools and systems: How do you integrate the data from blood screening/ organ/tissue transplantation into the existing surveillance system?	Not a notifiable disease. System triggered if the number of cases gets to a certain level?	Not a notifiable disease. System triggered if the number of cases gets to a certain level?
Agreeing on tools and systems: Which organizations will be responsible for routine screening and reference testing? (Do they have expertise and capacity?)	If mandated, routine blood donor screening would likely be performed at the Australian Red Cross Blood Service. Reference testing likely at laboratories with current capacity for *T. cruzi* testing.	Routine blood donor screening would need to be performed at the Japanese Red Cross Blood Services. References testing capacity at two locations.
What skills: Training on donor counselling, donation screening and reference testing (labs)?	Appropriate training would be required.	Training would be required for analytical testing and also for consultation/counselling.
What information provision?	For travel medicine: • Ensure adequate information is given to travellers before departure; • Ensure an adequate system is in place to manage suspect cases; and • Upon return from travel, include Chagas disease in the differential diagnosis.	For travel medicine: • Ensure adequate information is given to travellers before departure; • Ensure an adequate system is in place to manage suspect cases; and • Upon return from travel, include Chagas disease in the differential diagnosis.

2.5.3 Working Group 3: Vector surveillance and control

Chair: Dr Dujardin
Rapporteur: Dr Pham
Presenter: Dr Pham

Results of Group Discussion:

(1) Are there risks of vectorial transmission of Chagas disease?		
Question	**Situations in**	
	Viet Nam	**Others**
Regional and national geographic distribution of vectors	*T. rubrofasciata*: observed and expected distribution is near major port installations. Hai Phong, Ho Chi Minh, Ha Noi, Khan Hoa Reported in 17/29 districts of Hanoi *T. bouvieri*: Southern Viet Nam (1924, 1951)	*T. rubrofasciata* have been reported in most coastal areas of Asian countries except Australia. However, these reports are old (before 1950s) *T. leopoldi* in Australia In total 7 species of triatomines have been reported in this Region. 6 species of Linshcosteus in India
Area: urban, rural, ports of entries	Vector was reported in urban areas near major port installations	Most reports are in coastal area near major port installations
Infestation: domestic, peri-domestic, sylvatic	Vector was found both in domestic (sleeping room) and peri-domestic area. Eggs, nymphs and adults were found inside the houses. Vector in sylvatic area is not reported.	Vector was found both in domestic and peri-domestic area. Vector in sylvatic area is reported.
Human habitation characteristics	Houses and apartments with standard quality (walls and floors with concrete, bricks, buildings). Vector was reported up to the 13th floor. Houses were built very close together (30cm) and wood piled up in there; rodents were found.	In Bangkok, vector was reported in urban area with similar housing structure.

(1) Are there risks of vectorial transmission of Chagas disease?		
Question	**Situations in**	
	Viet Nam	**Others**
Presence of domestic animals	Some infested houses have cats and dogs, but no other domestic animals are kept. Rodents are observed.	Some infested houses have cats and dogs, but no animal husbandry practice was observed.
Any positive insects found to date?	*T. cruzi* not observed (because of a lack of active search and investigation). *Trypanosoma* species was found in Ha Noi	*T. cruzi* was not observed in this Region.
What have the affected countries done about the vectors (surveillance and control)?	Identification was done according to morphological keys. TV news and newspapers reported on the insects and then insects were brought to community health centres, districts and to malaria institutes (NIMPE). Malaria institute sent staff to the infested house for collection. House spraying was not performed.	In Thailand, the Ministry of Health received complaints about the insects, and it seems that they sprayed the house.
Others	Residents in the infested house showed concerns about the insects. Information from the media on insects and disease might be misleading.	

(2) How do you deal with the vectors?		
Question	**Situations in**	
	Australia/Japan	**Others**
Entomological surveillance in place and sharing of information	It depends on spontaneous reporting from the residents. National malaria institute (NIMPE) manages the information and entomological survey. Information is shared with the district health sector.	Not known
Methods for vector control insecticides (according to the WHO Pesticide Evaluation Scheme (WHOPES)	No protocols or guidelines are available. Spraying for dengue vector control (which is less effective against triatominaes) is performed in the urban area every 2 months. No residual spraying was done in the infested houses.	Not known
Vigilance of insecticide resistance	A variety of insecticides are available and some insecticides on the market are of poor quality. (Insecticide resistance is not a major issue for triatomine control. Residual spraying in Brazil against *T. rubrofasciata* was effective)	Not known
Integrated vector management (IVM) • Vector control • Community involvement • Changing animal husbandry practises • Changing human habitation (house improvement) • Intersectoral collaboration among ministries (health, education, agriculture, etc.)	Dengue control is running but spraying cannot be combined with triatomine control (different spraying techniques) No rodents control programme exists. Cleaning inter-house space (piled up with wood) may be effective. Rodent control should be undertaken after the residual spraying, otherwise may increase migration of insects from rats to humans. Intersectoral collaboration is a challenge	Not known

(3) What are the next steps?		
Question	**Situations in**	
	Australia/Japan	**Others**
Do we need to assess the entomological situations?	Yes. Identify the trypanosoma species found in the vector. Updated map of distribution of *T. rubrofasciata* and other species *(T. bouvieri*). Draw up a map of the distribution of rodents. Need to link with research network on triatomine (e.g. ECLAT: European Community Latin America Triatominae research network) and on rodents Community Ecology of Rodents and their Pathogens in South-East Asia. (CEROPATH) for helping mapping of distribution, dispersing behaviour and population structure To identify the origin of the intestinal contents of the insects	Yes.
What skills: Training?	Protocols, guidelines and training on: • Taxonomy • Characterization technique, genetics and morphometrics • Entomological survey technique and indicators • Evaluation of efficacy of insecticides • Standard vector control method (residual spraying on triatomine insects) • Mapping and database management	
Piggy-backing on existing insecticide resistance monitoring and vector control actions (e.g. malaria, dengue, etc.)	Residual spraying against malaria (which is effective against triatomines) is not performed in urban areas. Trained malaria control personnel can be used for triatomine control. Control method for dengue is not effective against triatomine.	

2.6 Closing remarks

Before the closing remarks, Dr Ehrenberg reflected on how information gaps on Chagas disease in the Region were filled through the informal consultation, achieving the principal objectives. Yet remaining gaps need to be filled. Having identified the next steps, each country will have to negotiate to allocate limited resources, according to necessity. Dr Ehrenberg thanked those present for attending the meeting and expressed his wish to continue working with all the participants in the future.

Dr Takeuchi, before the closing remarks, suggested building a communication network for information-sharing and improved coordination among the participants of the informal consultation. A group mailing list would facilitate an information exchange on specific areas and countries. The Institute of Tropical Medicine, Nagasaki University, would take the initiative to send the first group e-mail.

Dr Takeuchi concluded the meeting by presenting an outline of what had been achieved over the two days and expressed his happiness with the outcomes of the meeting. He thanked WHO for the help given in organizing the meeting and thanked all the participants for attending.

3. CONCLUSIONS

3.1 Conclusions

3.1.1 General

(1) Chagas disease has a high potential of becoming a public health problem in the Western Pacific Region;

(2) sufficient data is available to declare that it is a major potential problem, which requires further investigation and action; and

(3) participants agree that the countries of the Western Pacific Region should actively participate in the Chagas disease Non-endemic Country Initiative.

3.1.2 Specific

(1) Case detection and health care, including congenital Chagas disease cases, and epidemiological information and surveillance.

   (a) Chronic cases have been detected among Latin American immigrants in Japan and Australia but not in other countries in the Western Pacific Region.

   (b) In Japan, cases usually will be detected when they have some symptoms and suggestive Electrocardiography suspect findings in areas with a high concentration of Latin American immigrants.

   (c) At the moment, no country in the Region has established comprehensive mechanisms for case detection, case management, drug procurement, active surveillance, information management, training and monitoring.

(2) Prevention of transmission (by transfusion, organ transplantation, lab accidents, etc.)

(a) Considerable information is available in relation to the origin of at-risk populations in both Japan and Australia; however, there are some information gaps.

- In Australia and Japan, there is a need for a more accurate definition of the actual prevalence or estimated prevalence of potential donors from at-risk groups.

- In Japan, while the number of Peruvian immigrants is far larger than that of Mexicans, the number of Mexican blood donors exceeds that of Peruvians.

- In Australia, information on the country of origin of blood donors is asked during an interview but is not retained electronically.

(b) In Japan, informal systems for referrals are in place; however, there is a need to formalize these systems.

(c) In Australia, there is an informal system in place for referring samples for Chagas disease testing (at least two laboratories).

(d) In Australia, no test kits are licensed for blood screening (a regulatory requirement). In Japan, no test kits that are licensed for diagnostics exist (also a regulatory requirement).

(e) At present, it is undecided whether routine blood donation testing is required.

(f) In Japan and Australia, donor exclusion policies exist. But the definition of at-risk groups subject to donor deferral requires review in Japan and preferably informed by the use of aforementioned improved prevalence data.

(g) Vector surveillance and control

(h) Potential vectors, triatominae, have been reported throughout the Region. In particular, there is a need to take action against domestication of the insects in Viet Nam.

(i) What is known about the distribution of the vectors in this Region is outdated.

(j) Even if not infected with T. cruzi, the domestic insects must be eliminated, from a public health point of view.

3.2 Recommendations

3.2.1 General

A network should be created for information-sharing and improved coordination among government, relevant stakeholders and partners working in blood services, organ transplant centres, information and surveillance systems, travel medicine, health care systems and others.

3.2.2 Specific

(1) Case detection and health care, including congenital Chagas disease cases, and epidemiological information and surveillance.

(a) Improve assessment of epidemiological situations in the Region.

(b) Improve case detection and management with access to adequate diagnostic tests and drugs.

(c) Establish data collection procedures at the national level and data-sharing at the regional and global levels with a common set of data.

(d) Improve social and ethical approaches.

(2) Prevention of transmission (by blood and plasma transfusion, organ transplants, lab accidents, etc.).

(a) WHO to consider aligning its own guidance with the Council of Europe guidelines, especially in relation to the possible use of unscreened plasma for fractionation and clinical fresh frozen plasma (cFFP) from at-risk donors.

(b) Document current and historical prevalence data from Latin American countries, including transmission risk, time and location profile.

(c) Update the definition of "endemic" territories.

(d) Draw up information and guidance for travellers visiting high-risk areas.

(3) Vector surveillance and control.

(a) Update the map of geographical distribution of the vectors.

(b) Medical long-term follow-up should be conducted on residents who have been bitten by the vector (can be a simple medical consultation).

(c) Correct information on the medical importance of the vector should be shared with the community.

(d) The known biology (e.g. lapse of time between feeding and defecation) of the *Triatoma rubrofasciata* should be verified *in situ*.

(e) Quality evaluation of available insecticide should be carried out before using it for vector control.

(f) Rodent control should be in place after the residual spraying. Otherwise, there may be an increased migration of insects from rats to humans.

(g) Provide existing protocols and guidelines on triatomine control for countries with intradomiciliary vector.

(h) Initiate collaborative works with existing research networks on triatominae and rodents (e.g. to identify Trypanosoma species found in the vector).

ANNEX 1

WHO-WPRO Informal Consultation on Chagas Disease in the Western Pacific
Nagasaki, Japan
June 29-30, 2011

AGENDA

June 29 (Day 1)

08:30-09:00	Registration	Nagasaki Univ
09:00-09:15	Opening remarks	Nagasaki Univ WHO

09:15 -12:30 AM Session: Chair: Dr T Takeuchi Co-chair: Dr J Jannin

9:15 – 9:30	Overview of the agenda - Objectives and expected outcomes of the consultation	Dr J. Ehrenberg
09:30 -10:15	Updates on the Control of Chagas disease - Chagas disease: lifecycle, prevention, diagnostics and treatment - Progress of the disease control in endemic countries - Progress, key issues and strategies in non-endemic countries - Global and regional initiatives and policies	Dr J. Jannin Dr P. Albajar
10:15 - 10:30	Discussion	
10:30 – 10:45	*Coffee/Tea break*	
10:45 – 11:00	Chagas disease: Chagas disease: an issue to be concerned about in the Western Pacific Region?	Dr J. Nakagawa Dr J. Ehrenberg
11:00 – 11:20	Country presentation : **Australia** - Epidemiological information - Prevention of transmission - Case detection and health care	Dr H. Faddy
11:20 – 11:40	Discussions	
11:40 – 12:00	Country presentation: **China** - Risk of transmission - Prevention of transmission - Case detection and health care	Dr J. Wang
12:00 – 12:20	Discussions	
12:20 – 13:30	*Lunch*	

13:30 – 17:30 PM Session Chair: Dr H. Endo Co-Chair: Dr J. Ehrenberg

13:30 – 14:00	Country presentation: **Japan** - Epidemiological information - Prevention of transmission - Diagnosis and treatment	Dr S. Miura Dr K. Tadokoro Dr Y. Okada
14:00 – 14:20	Discussion	
14:20 – 14:40	Japan's contribution to Chagas disease control (JICA)	Mr K. Uno
14:40 – 14:50	Discussion	
14:50 – 15:10	Research on Chagas disease in Japan	Dr K. Kita
15:10 – 15:30	Discussion	

15:30 – 16:00	*Coffee/Tea break*	
16:00 – 16:20	Chagas disease vector in Asia Pacific	Dr J-P Dujardin
16:20 – 16:40	Report on triatomine vector in Viet Nam	Dr Pham Thi Khoa
16:40 – 17:00	Discussion	
17:00 – 17:20	Screening for transfusion-transmissible infections: WHO recommendations	Mr P. Rogers
17:20 – 17:30	Discussion	

June 30 (Day 2)

9:00 – 12:00 AM Session: Chair: Dr T. Takeuchi, Co-Chair: J. Ehrenberg

9:00 – 10:30	Working group The groups work on technical recommendations, and review the draft meeting report Group 1: Case detection and health care, including congenital cases, epidemiological information and surveillance Chair: Dr K. Kita Rapporteur: TBD Group 2: Prevention of transmission (transfusional and organ transmission, travel medicine, laboratory accidents, etc) Chair: Dr K. Tadokoro Rapporteur: TBD Group 3: Vector surveillance and control Chair: Dr JP Dujardin Rapporteur: TBD	All participants
10:30- 11:00	*Coffee break*	
11:00 – 12:00	Working group (continuation)	
12:00-13:30	*Lunch*	

13:30 – 17:00 PM Session Chair: Dr T. Takeuchi Co-Chair: Dr J. Jannin

13:30 – 14:30	Presentation by each working group	Rapporteurs of the working groups
14:30 – 15:00	Discussion	
15:00 – 15:30	*Coffee break*	
15:30 – 16:45	Review of conclusions and recommendations	Dr J. Ehrenberg Nagasaki Univ. WHO WPRO
16:40-17:00	Closure	

ANNEX 2

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ANNEX 3

Welcome Remarks by: Dr Tsutomu Takeuchi
Dean of the Institute of Tropical Medicine of Nagasaki University, Japan

This is an informal meeting on Chagas disease in non-endemic countries. Pedro, Jean and I got together in Barcelona to attend an informal meeting on Chagas disease in non-endemic European countries. I bought some Japanese there because at that moment I was at Keio University School of Medicine in Tokyo. Chagas disease in South America was one of the major research topics. Dr Miura here and I worked together in Bolivia. Dr Horio here was also with us. We also enjoyed Bolivian beer made by Andeans. I have to say, Bolivian beer is terrific.

Anyway, at the conference in Barcelona, I was one of the shocked by the situations of Chagas disease, *T. cruzi* infections, in some European countries there. At that moment, I did not expect at all Chagas disease in Asian pacific. Five years or two years are too short. Anyway, the situations have been changing dramatically. I guess someone will make a presentation on Japanese situations. Not all cases of *T. cruzi* infections have been increasing. So that might be the case for some Asian pacific countries. It is brilliant to make information sharing, to make consensus about *T. cruzi* infections in the Asian pacific region. I hope you enjoy staying in Nagasaki.

ANNEX 4

Opening Remarks by: Dr John Ehrenberg, Director,

Combating Communicable Diseases (DCC), WPRO/WHO

Dr Tsutomu Takeuchi, Dean of Institute of Tropical Medicine, Nagasaki University, Representative from Ministry of Health, Labour and Welfare of Japan, guests; colleagues; ladies and gentleman.

I would like to extend my warmest welcome to you to this informal consultation on Chagas disease in the Western Pacific. I wish to thank Nagasaki University for hosting this meeting. Dr Shin Young-soo, WHO Regional Director for the Western Pacific, regrets that he could not join us today, as he is preparing to leave for Solomon Islands to participate in the upcoming Ninth Meeting of Ministers of Health for the Pacific Island Countries. He has asked me to deliver these remarks on his behalf.

Chagas disease is caused by the parasite Trypanosoma cruzi and is transmitted by triatomine insects. Historically, Latin America was considered the only endemic region for Chagas disease. Significant progress has been made to control Chagas disease in Latin America which led to the interruption of transmission in Brazil, Chile, Uruguay, and some parts of Argentina and Paraguay.

However, transmission of Chagas disease outside Latin America has emerged recently. *T. cruzi* infection has been detected in 22 non-endemic countries outside the Americas. In the Western Pacific Region, Chagas disease cases were reported in Australia and Japan. The majority of the detected cases are believed to have been imported from the Americas. Chagas disease can be transmitted through blood donation, organ transplant or from mother to child. In addition, Chagas disease vector species originated from Latin America have been reported in Viet Nam and may pose a risk of transmission.

In 2010, the World Health Assembly Resolution 63.30 urged Member States to reduce the burden of Chagas disease in non-endemic countries. The resolution also requested that the Director-General consider an initiative for the prevention and control of Chagas disease in non-endemic regions.

In collaboration with Member States, WHO is making efforts to prevent and control of neglected tropical diseases including Chagas disease outside the Americas. As part of this, WHO Headquarters and Western Pacific Regional Office are jointly organizing this informal consultation on Chagas disease to draw attention to this important public health problem in non-endemic countries. For the next two days, we will discuss topics such as the epidemiological situation, the risk of transmission, and next steps on how to address Chagas disease in the Region. With this, I would like to ask for your active participation in the discussion and working group sessions for the success of this workshop.

On this occasion, I also would like to mention Japan's contribution in combating parasitic diseases, including Chagas disease. Two global initiatives on parasitic diseases were initiated by the Government of Japan: the Hashimoto Initiative in 1998 and Okinawa Infectious Diseases Initiative in 2000. These important initiatives helped to draw more attention from the international community to support the prevention and control of neglected tropical diseases. Japan's cooperation in controlling Chagas disease in Central America reduced the risk of transmission significantly. It is also important

to mention that these Japanese initiatives are based on Japan's experiences in the control of these infections.

On behalf of the WHO Regional Office for the Western Pacific, I would like to express my deepest gratitude to all of you. I wish you a productive three days as you work to achieve your objectives. We all look forward to reading the outcomes of your deliberations.

Thank you.

ANNEX 5

Prefectures with more than 10,000 Brazilian population in Japan (2008)

Source: Ministry of Justice, Japan (2008, in Japanese) Report by the Immigration Bureau. http://www.moj.go.jp/TOUKEI/20HOMUNENKAN/04_no2_gyoumu_06.pdf

Prefecture	# Registered Brazilians
Aichi	79,156
Shizuoka	51,441
Mie	21,668
Gifu	20,481
Gunma	17,522
Nagano	14,612
Shiga	14,417
Kanagawa	14,248
Saitama	13,844
Ibaraki	11,430

ANNEX 6

Results of questionnaire on *Trypanosoma cruzi* infection/Chagas disease in the Western Pacific

Indicators	Australia	China	Japan	Rep Korea	Vietnam
Estimated number of Latin American immigrants	81,183 (2006)	ND	270,000 - 300,000 (Brazilian)	3,835 (2009)	3,000
Estimated number of cases of *T. cruzi* infection	1.6% of all Latin American immigrants (2005 to 2006)	ND	1.17% in a Brazilian community		ND
Number of laboratory confirmed cases	ND	ND	ND		ND
Estimated number of pregnant women with *T. cruzi* infection	ND	ND	ND		ND
Estimated number of cases of congenital transmission	ND	ND	ND		ND
Number of patients treated with benznidazol and nifurtimox	ND	ND	16		ND

Note: ND: Not determined

Issue	Australia	China	Japan	Vietnam
Pharmacovigilance	No data available	No system in place	No system in place	No system in place
Prevention of infection and early detection of congenital cases	No data available	No systematic detection system of congenital infection	No systematic detection system of congenital infection	No systematic detection system of congenital infection
Transfusional and organ, tissue and cell transplantation transmission	No data available	No system in place	Pre-donation questionaire on 1) Chagas disease infection 2) History of overseas travel Screening via RDT and ELISA in pilot area (community with large population from Latin America)	No system in place
Travel Medicine	No data available	No specific measures	No specific measures	No specific measures
Laboratory diagnosis	No data available	Not available	RDT, ELISA, PCR	Not available
Tests used for serological screening and confirmation in blood banks	No data available	Not available	ELISA IFA	Not available
Tests used for serological screening and diagnosis in hospitals (pregnant women)	No data available	Not available		Not available
Health Services	No data available	No system in place		No system in place
Drug Registration	No data available	No system in place		No system in place
Drug Distribution	No data available	Not available		Not available
Surveillance and Information System	No data available	No system in place		No system in place
Protocols/ Laws: screening and transfusion	No data available	No system in place		No system in place

Questionnaire on

Trypanosoma cruzi infection/Chagas disease in the Western Pacific

Estimated, diagnosed and treated cases

1) Estimated number of Latin American immigrants

   Note: It is important to consider both, legal and illegal immigrants, taking this information from National Institutes of Statistics/Migration. If possible, classified according to their country of origin.

2) Expected number of infected people

   Note: Taking into account known percentages of *Trypanosoma cruzi* infection prevalence among Latin American communities, by country of origin, and applying these percentages to the estimated number of immigrants from each nationality in your country, it is possible to calculate the expected number of infected people. Please, specify the country prevalence chosen/used to calculate requested estimated data.

3) Estimated number of infected pregnant women

   Note: Taking into account the estimated number of child-bearing age women among the estimated population at risk of being infected with *T. cruzi*, it is possible to estimate the number of infected pregnant women per year or the accumulated number of them in a specified period of time.

4) Estimated number of infected newborns

   Note: Taking into account the total or General Fertility rate of one country and a known or estimated maternal - fetal transmission rate in a population at risk of being infected with *T. cruzi* (such as the average 5%, according to Rev Soc Bras Med Trop 2003; 36(6): 767-771) it is possible to calculate the estimated number of infected newborns per year or the accumulated number of them in a specified period of time.

5) Number of already diagnosed cases

   Note: With key information about them: autochthonous/imported case, acute/chronic infection phase, clinical form (asymptomatic, cardiac, digestive, neurological, mixed forms), possible transmission route, immunocompetent/immunosuppressed patient, among others.

6) Number of already treated patients

   Note: With key information about them: age, supposed transmission route, supposed place of infection, place of birth, acute/chronic phase or reactivation due to immunosuppression.

Pharmacovigilance in Western Pacific

7) Use of the national pharmacovigilance system/centre to report adverse events with benznidazole and nifurtimox treatments (No/Yes. If yes, please specify which)

8) In case of the existence of adverse events reports with benznidazole and nifurtimox, please indicate the number of those reports and the type of these adverse events.

Early detection of congenital cases and Infection prevention

9) Existence of systematic detection of congenital infection (No/Yes. If yes, please specify which)

   Note: Screening and laboratory diagnosis confirmation of infected pregnant women and systematic detection (parasitological diagnosis at birth and serological diagnosis after eight month of age) of newborns at risk of being infected.

10) Existence of blood bank infection prevention for transfusional transmission (No/Yes. If yes, please specify which).

    Note: Prevention through a pre-donation questionnaire and screening tests.

11) Existence of infection prevention for organ, tissue and cell transplantation transmission (No/Yes. If yes, please specify which)

    Note: Prevention through a pre-donation questionnaire and screening tests.

12) Existence of any implemented prevention tool or differential diagnosis in Travel Medicine (No/Yes. If yes, please specify which)

    Note: Counselling prior to the trips to Latin America and inclusion of Chagas disease in the differential diagnosis in the consultations after these trips.

13) Existence of any implemented surveillance system to monitor and evaluate vector infestation and colonization rates and vector infection prevalence (No/Yes. If yes, please specify which and found results)

Laboratory diagnosis

14) Existence of laboratories for parasitological, molecular and serological diagnosis (No/Yes. If yes, please specify which)

    Note: Parasitological (direct blood test; through a centrifugation technique, i.e. micro-haematocrit or Strout technique; haemoculture or xenodiagnosis), molecular (quantitative and quantitative/real time polymerase chain reaction - PCR) and at least three different serological tests to confirm diagnosis and elucidate doubtful/inconclusive cases.

15) Existence of systematic laboratory internal and external quality control systems (No/Yes. If yes, please specify which)

    Note: Applied to all laboratories performing the infection screening and diagnosis.

16) Tests used for serological screening (and maybe confirmation) in blood banks

    Commercial kits: No/Yes (Please, specify name, methodology and manufacturer)
    In house tests: No/Yes (Please, specify methodology)

17) Tests used for the serological screening and diagnosis in hospitals (i.e. pregnant women)

Commercial kits: No/Yes (Please, specify name, methodology and manufacturer)
In house tests: No/Yes (Please, specify methodology)

18) Existence of a panel of well characterized sera available for evaluation of the serological tests in the reference laboratories (No/Yes. If yes, please, specify source and performance of the tests)

Health Services

19) Existence of health centres for patient medical care (No/Yes. If yes, please specify which)

Note: For medical assessment, clinical diagnosis and etiological and non-etiological treatment of asymptomatic and symptomatic (cardiac, digestive, neurological, mixed forms…) cases.

20) Existence of a referral system between blood banks and laboratory and clinical services (No/Yes)

Note: For diagnosis confirmation of all screened patients with positive results.

Other services

21) Existence of an etiological drug distribution system (No/Yes. If yes, please specify which)

Note: For benznidazole and nifurtimox.

22) Existence of an information and surveillance system (No/Yes. If yes, please specify which)

Note: For information collection of diagnosed cases.

23) Existence of any Information, Education and Communication activity (No/Yes. If yes, please specify which)

Note: Including health personnel training.

Protocols and laws

24) Existence of institutional, municipal, state/departmental/autonomic, national protocols (No/Yes. If yes, please specify which)

    Note: For transmission prevention and screening, diagnosis, treatment of patients.

25) Existence of local or national laws (No/Yes. If yes, please specify which)

    Note: About prevention (transfusional and organ, tissue and cell transplantation), control (secondary prevention with the early diagnosis of all cases) and health care of patients (including cardiologic, digestive, neurological, psychological, social, work aspects, among others).

Additional information

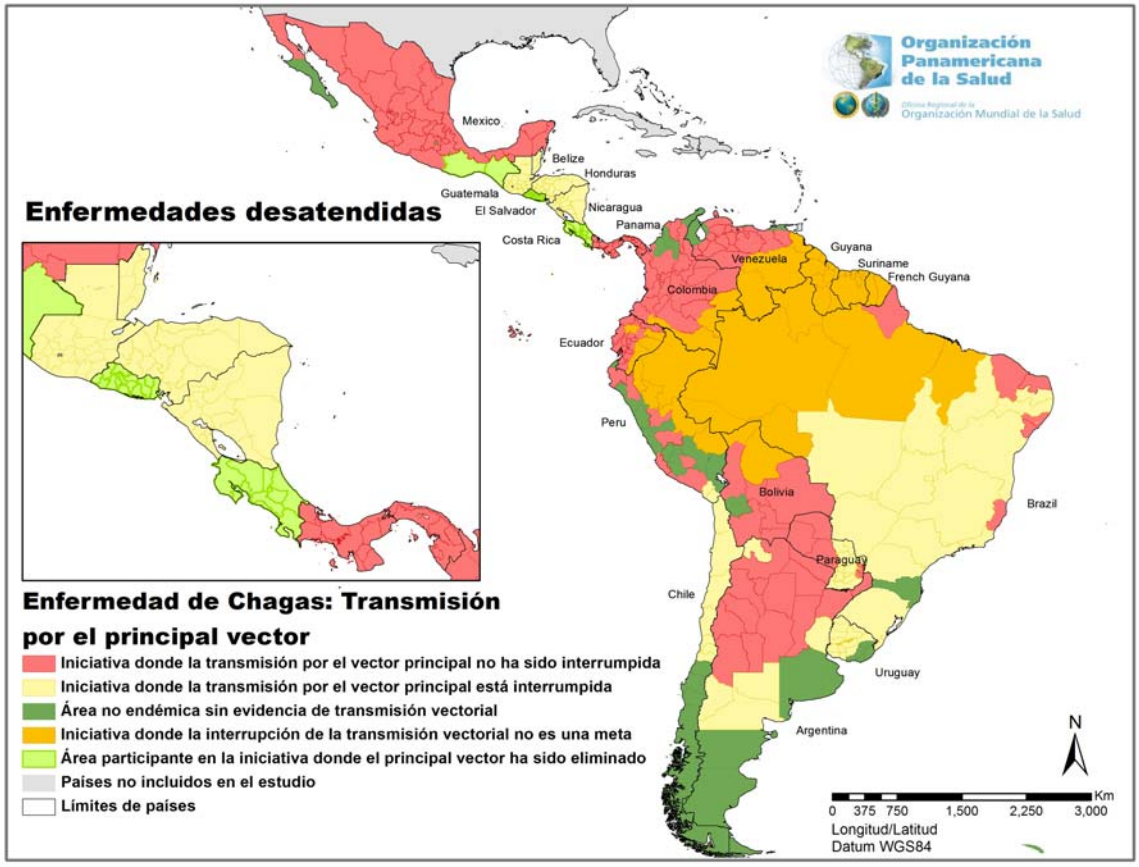
26) Existence of any association of Chagas disease patients (No/Yes. If yes, please specify which)

27) Additional/optional information

    - History information (first diagnosed cases…), others.
    - Short, medium and long term perspectives at political, scientific, other levels.
    - Others

Progress of Chagas disease vector control and transmission risks in Latin America

Source: PAHO (2011, in Spanish) Interruption of Vector Transmission.
http://new.paho.org/hq/images/stories/AD/HSD/CD/Chagas/int_trans_vector_chagas_800.jpg



- Transmission by the principal vector has not been interrupted
- Transmission by the principal vector has been interrupted
- No endemic with no evidence of vectorial transmission
- Interruption of vectorial transmission is not an objective
- The principal vector has been eliminated
- Not included in the study

Country	Department / Province	Presence of principal vector	Year certified	Transmission by principal vector	Year certified	Evidence of transmission by any vector
1 **Mexico**	Baja California Sur	No risk				No
	Oxaca	Eliminated (*R. prolixus*)		Interrupted		Yes
	Chiapas	Eliminated (*R. prolixus*)		Interrupted		Yes
	Mexico city D.F.	No risk				No
	Other states	Not eliminated (*R. prolixus*)		Not interrupted		Yes
2 **Guatemala**	All departments	Not eliminated (*R. prolixus*)		Interrupted	2009	Yes
3 **Belize**	All districts	Eliminated (*R. prolixus*)		Interrupted		Yes
4 **El Salvador**	All departments	Eliminated (*R. prolixus*)	2010	Interrupted		Yes
5 **Honduras**	All departments	Not eliminated (*R. prolixus*)		Interrupted	2011	Yes
6 **Nicaragua**	All departments	Not eliminated (*R. prolixus*)		Interrupted	2011	Yes
7 **Costa Rica**	All departments	Eliminated (*R. prolixus*)	1953	Interrupted		Yes
8 **Panama**	All departments	Not eliminated		Not interrupted		Yes

Country	Department / Province	Presence of principal vector	Year certified	Transmission by principal vector	Year certified	Evidence of transmission by any vector
9 **Colombia**	La Guajira	No risk				No
	Bolívar	No risk				No
	Sucre	No risk				No
	Córdoba	No risk				No
	Other departments	Not eliminated		Not interrupted		Yes
10 **Venezuela**	Zulia	No risk				No
	Sucre	No risk				No
	Other departments	Not eliminated		Not interrupted		Yes
11 **Guyana**	All departments	Not eliminated		Not interrupted		Yes
12 **Suriname**	All departments	Not eliminated		Not interrupted		Yes
13 **French Guyana**	All departments	Not eliminated		Not interrupted		Yes
14 **Brazil**	Piauí	Not eliminated (*T. infestans*)		Interrupted	2000	?
	Paraíba	Not eliminated (*T. infestans*)		Interrupted	2000	?
	Pemambuco	Not eliminated (*T. infestans*)		Interrupted	2000	?
	Bahia	Not eliminated (*T. infestans*)		Interrupted	2005	?
	Tocantins	Not eliminated (*T. infestans*)		Interrupted	2004	?
	Goiás	Not eliminated (*T. infestans*)		Interrupted	2000	?
	Minas Gerais	Not eliminated (*T. infestans*)		Interrupted	2000	?
	Rio de Janeiro	Not eliminated (*T. infestans*)		Interrupted	2000	?
	Sao Paulo	Not eliminated (*T. infestans*)		Interrupted	2000	?
	Mato Grosso	Not eliminated (*T. infestans*)		Interrupted	2000	?
	Mato Grosso do Sul	Not eliminated (*T. infestans*)		Interrupted	2000	?
	Paraná	Not eliminated (*T. infestans*)		Interrupted	2005	?
	Rio Grande do Sul	Not eliminated (*T. infestans*)		Interrupted	2004	?
	Santa Catarina	No risk				No
	Other states	Not eliminated		Not interrupted		Yes
15 **Ecuador**	All departments	Not eliminated		Not interrupted		Yes
16 **Peru**	Tumbes	No risk				No
	Lambayeque	No risk				No
	Ancash	No risk				No
	Pasco	No risk				No
	Lima	No risk				No
	Huanc Avelica	No risk				No
	Cusco	No risk				No
	Ayacucho	No risk				No
	Puno	No risk				No
	Moquegua	Not eliminated (*T. infestans*)		Interrupted	?	Yes
	Tacna	Not eliminated (*T. infestans*)		Interrupted	?	Yes
	Other departments	Not eliminated		Not interrupted		Yes
17 **Bolivia**	Oruro	No risk				No
	Other departments	Not eliminated		Not interrupted		Yes
18 **Chile**	Tarapacá	Not eliminated (*T. infestans*)		Interrupted	1999	?
	Antofagasta	Not eliminated (*T. infestans*)		Interrupted	1999	?
	Atacama	Not eliminated (*T. infestans*)		Interrupted	1999	?
	Coquimbo	Not eliminated (*T. infestans*)		Interrupted	1999	?
	Valparaíso	Not eliminated (*T. infestans*)		Interrupted	1999	?
	Santiago Metropolitan	Not eliminated (*T. infestans*)		Interrupted	1999	?
	O'Higgins	Not eliminated (*T. infestans*)		Interrupted	1999	?
	Other states	No risk				No

Country	Department / Province	Presence of principal vector	Year certified	Transmission by principal vector	Year certified	Evidence of transmission by any vector
19 **Paraguay**	Concepción	Not eliminated (*T. infestans*)		Interrupted	?	?
	Amambay	Not eliminated (*T. infestans*)		Interrupted	2002	?
	San Pedro	Not eliminated (*T. infestans*)		Interrupted	?	?
	Canindeyu	Not eliminated (*T. infestans*)		Interrupted	?	?
	Cordillera	Not eliminated (*T. infestans*)		Interrupted	?	?
	Caaguazu	Not eliminated (*T. infestans*)		Interrupted	?	?
	Central	Not eliminated (*T. infestans*)		Interrupted	?	?
	Paraguari	Not eliminated (*T. infestans*)		Interrupted	?	?
	Guaira	Not eliminated (*T. infestans*)		Interrupted	?	?
	Caazapa	Not eliminated (*T. infestans*)		Interrupted	?	?
	Neembucu	Not eliminated (*T. infestans*)		Interrupted	?	?
	Misiones	Not eliminated (*T. infestans*)		Interrupted	?	?
	Itapua	Not eliminated (*T. infestans*)		Interrupted	?	?
	Other departments	Not eliminated (*T. infestans*)		Not interrupted		Yes
20 **Uruguay**	Artigas	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Salto	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Paysandu	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Rio Negro	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Soriano	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Colonia	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Rivera	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Tacuarembo	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Durazno	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Flores	Not eliminated (*T. infestans*)		Interrupted	1997	?
	San Jose	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Florida	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Cerro Largo	Not eliminated (*T. infestans*)		Interrupted	1997	?
	Other departments	No risk				No
21 **Argentina**	Jujuy	Not eliminated (*T. infestans*)		Interrupted	2001	?
	Entre Ríos	Not eliminated (*T. infestans*)		Interrupted	?	?
	La Pampa	Not eliminated (*T. infestans*)		Interrupted	2001	?
	Neuquén	Not eliminated (*T. infestans*)		Interrupted	2001	?
	Río Negro	Not eliminated (*T. infestans*)		Interrupted	2001	?
	Buenos Aires	No risk				No
	Chubut	No risk				No
	Santa Cruz	No risk				No
	Other provinces	Not eliminated		Not interrupted		Yes

Chagas Disease: Prevention and Control Strategies in European Countries (2009)

Systems in Place	Belgium	France	Germany	Italy	Netherlands	Portugal	Spain	Switzerland	UK
Pharmacovigilance	The national pharmacovigilance system has not been used to report adverse events associated with benznidazol or nifurtimox	Under the Agence francais de securite sanitaire des produits de sante. Side effects were reported for 11 patients treated with benznidazol	There is a national system to collect info on adverse events at the Paul-Ehrlich Institute that could be used to report any adverse events. No adverse effects reported in the last 10 years.	Sife effects are notifiable to the Italian agency of drugs. Of the 22 patients, 6 experienced adverse events furing treatment, mainly cutaneous.	No national pharmacovigilance system in place and on adverse events. No info available on adverse events associated with benznizadol and nitfurtimox	No information since benznidazol and nifurtimox have not been used to treat any chagas disease patients	Pharmacovigilance is not used for benznidazol or nifurtimox. Adverse reactions to benznidazol have been documented in a series of observations	- Swissmedics system has been informed of serious adverse efects in 3 cases (from nifurtimox)	No information since benznidazol and nitfurtimox have not been used to treat Chagas
Prevention of infection and early detection of congenital cases	No national system for systematic detection of congenital infection	No systematic detection of congenital infection.	- Pregnant women and newborns are not tested for T. cruzi infection	No systematic detection system at the national level for congenital infection. However, Negrar and Florence have an active sytem for detecting congenital infection.	No systematic detection system of congenital infection	No systematic detection system of congenital infection	No systematic detection system of congenital infection at the national level Only Valencian Community has introduced a regulation for the serological screening of pregnant women from endemic areas.	Systematic detection of congenital infection is carried out only at the materniaty unit of the Geneva University Hospitals	No detection system present but advocacy is carried out for antenatal screening of at-risk mothers
Transfusional and organ, tissue and cell transplantation transmission	- Exclusion of people at risk of Chagas disease (based on questionaire) - No systematic detection system of organ, tissu and cell tranplantation transmission	1) Questionnaire 2) screening for antibodies in at-risk donors - from endemic area - born to a mother from an endemic area - among travellers and residents 3) deferral of individual with history of Chagas	Pre-donation questionnaire on - chagas disease - travel to endemic countries within 6 months - country of origin No routine serological testing	No prevention system however completion of a pre-transfusion questionnaire is required of all potential donors - questions on previous diagnosed tropical disease and travel to tropical areas - person in whom with Chagas disease has ever been diagnosed is permanently excluded from donating blood	Only known Chagas disease patients are excluded from donating blood for transfusions or organs, tissue and cells for transplantation	Epidemiological screening through a pre-donation questionnaire is recommended but there are no standardized questions about Chagas disease	mandatory screening for donors - born in DEC - born to mothers from DEC - recipients of blood transfusion in DEC	A questionnaire is used to screen potential donors for T cruzi infection No measures taken for infection prevention for organ, tissue, cell transplantation transmission	Pre-screening No donation if: - born in S.C America - Mother was born in S.C America
Travel Medicine	- Counselling before travel to Latin America - Chagas is included in the differential diagnosis of consultations after such trips in most travel clinics	Recommendations on travel medicine are published every year in June in the Bulletin Epidemiologique hebdomadaire but the information about Chagas disease is limited	Pre-travel advice is given on an individual basis. For long term travellers to Latin America, the risk of Chagas disease is suually mentioned. Occasionally, the possible risk of oral transmission is mentioned to short-term travellers.	No specific prevention measures related to travel medicine	Travel clinics offer voluntary counselling to travellers prior to their trips to Latin America. Chagas disease is also included in the differential diagnosis in the consultations given by some specialized travel clinics after these trips	Most pre-travel medicine advisers mention the risk of T cruzi infection and Chags disease.	Counselling before the trip and differential diagnois and specific care after the trips (when needed) is done	No standardized counselling	No systematic counselling at the national velel before travel but individual travel clinics may include info on Chagas disease
Laboratory diagnosis	- Serological tests and PCR	- Direct parasitological diagnosis of T cruzi infection is available in all parasitology lab. - Serological diagnosis (ELISA biokit) and molecular biology diagnosis (PCR) is done in several cities	Diagnostic test of high quality (different serological tests and PCR) are done by 3 laboratories	Six labs perform parasitological, molecular and serological diagnosis	- Only one cetre offers serodiagnosis of Chagas using sero-diagnostic test	- ELISA - PCR	- Serological screening by rapid test - Commercial ELISA/IFA - Western blot - PCR	- Biokit ELISA chagas - Chagas stat pak rapid test - microscopic exam - in-house IFA - PCR	- In London, Liverpool, Glasgow: - IFA - ELISA - PCR - xenodiagnosis - culture
Tests used for serological screening and confirmation in blood banks	Serological screening and diagnosis have not been implemented	- All French blood banks use only commercial serological assays to perform screening. - Screening: ELISA CRUZI, bioMerieux Brazil, BIOELISA CHAGAS, Biokit (barcelona, Spain) - Confirmatory: T. cruzi ELISA test system, Ortho-Clinical Diagnostics, Inc and Immunofluor Chagas (Bioscientifica SA)	No routine screening in blood banks	No routine checks performed in blood banks	Blood banks do not screen for Chagas disease	No systematic blood screening of donors is performed	- ELISA - IFA - Western Blot - Immunoflour Chagas - Chagas ELISA - Ortho T cruzi ELISA test system - Certest ELISA, TEST ELISA PARA CHAGAS III - ABBOTT PRISM Chagas - bioelisa Chagas (toolkit) - Novagnost Chagas IgG - Chagatest ELISA recombinate v. 3.0 - Simple stick Chagas - Simple Chagas WB - OnSite Chagas Ab Combo Rapid Test	No tests present	- Sreening: Lab21 T. cruzi EIA - Confirmatory: PRL, SPDL, DPL

Systems in Place	Belgium	France	Germany	Italy	Netherlands	Portugal	Spain	Switzerland	UK
Tests used for serological screening and diagnosis in hospitals (pregnant women)	- IFA - ELISA - ID	- IFA slides Immunofluor Chagas, Bioscientifica SA, BioRad, Chagastest ELISA recombinant v 3.0	No routine screening in health centers or obstetric services	- recombinant ELISA (Biokit) - conventional ELISA - particle agglutination test - immune chromatografic test	No tests are currently in use	No information	Same as in blood banks	- Screening: commercial kits (Chagas Stat-Pak, Chembio, USA) - Diagnosis: Biokit ELISA, IFA	No antenatal screening For diagnosis: Commerical - PRL - Pathozyme Chagas - SPDL - CELISA - DPL (LSHTM) - CELISA In-house kits - PRL - IFA - DPL (LSHTM) - IFA - SPDL - IFA
Health Services	No specialized medical centers for Chags but some Belgian centers of internal medicine are able to provide medical care to patients with the disease	- Health service in France are able to provide medical assessment, clinical diagnosis, etiological and non-etiological treatment and follow-up of asymptomatic and symptomatic patients - No formal system of referral between blood banks and labs and clinical services but positive and suspect patients are referred to hospitals	No specialized centers for Chagas disease although reference tropical institutes are usually involved in the management of Chagas disease patients	There are two specific health centers for the medical care of patients: - Centre for Tropical Diseases, Ospedale Sacro Cuore, Negrar in Verona - Infectious and Tropical Diseases Unit, University of Florence	Academic Medical Centre provides multi-disciplinary care for patients with Chagas disease	Patients with Chagas disease are referred to hospitals No general referral system between blood banks and laboratory and clinical services	health centers for patient medical care are present Blood banks send positive serim samples to reference labs for confirmation	Several health centers provide medical care for Chagas disease patients but specialist care is only available at the Geneva Univ Hospital	- Hospitals for Tropical Diseases in London provides medical care in England and Walees - Patients in Northern Ireland and Scotland are seen in Edinburgh - No referral system between blood banks, laboratory and clinical services - Positive cases are referred to the hospital for tropical diseases
Drug Registration	No information	Benznidazol and nifurtimox are not registered in France	No information	No information	No information	No information	No information	Benznidazol and nifurtimox are not registered	No information
Drug Distribution	No drug distribution system for benznidazol and nifurtimox	Distribution of these 2 medicines is ensured through a centralized system managed	No drug distribution system for benznidazol and nifurtimox	There is no drug distribution system but medicines are available at the Centre for Tropical Diseases provided by WHO and Infectious and Tropical Disease Unit, AOU Careggi, Univesity of Florence	Information on benznidazol and nifurtimox has not been ascertained	No drug distribution system for benznidazol and nifurtimox	Benznidazol is provided by the MOH and Social Affairs	No drug distribution system for benznidazol and nifurtimox. Availability depends on WHO (nifurtimox) or direct importation by local institutions (benznidazol)	Nifurtimox and benznidazol can be obtained from WHO
Surveillance and Information System	No system for information and surveillance	Still in planning stage as of the time of survey	No system for information and surveillance	Chagas disease is notifiable as an infectious disease but notification is not mandatory	No system for information and surveillance	No system for information and surveillance	Still in planning stage as of the time of survey	No formal information and surveillance system. However, local monitoring is carried out in Geneva	Information on diagnosed cases is collected at the LSHTM and Hospitals for Tropical Diseases London, the Health Protection Agency and Health Protection Scotland
Screening at Blood bank **(data as of June 2011)***	Questionnaire of 6-month exclusion of people at risk of Chagas disease and after, if there are no symptoms, donation is accepted - Based on EC directives 2004/33 and 2006/17	1) Questionnaire 2) screening for antibodies (ELISA conventional + ELISA recombinant) in at-risk donors - from DEC* - born to a mother from a DEC - among travellers and residents 3) Four-month deferral after returning from DEC	Questionnaire on - chagas disease - travel to DEC within 6 months - country of origin No routine serological testing	In 2011 national recommendation are reviewed with a proposal of incorporating a questionnaire + serological test of high sensitivity	No screening	No systematic blood screening	Mandatory screening for donors (Royal Decree 1088/2005 of 16 September establishing the minimum technical requisites and conditions for blood donation and for blood transfusion centres and services), using questionnaire to exclude or questionnaire + serological test: - born in DEC (although not included in the Royal Decree, some blood banks have also screened individuals who have reside in DEC) - born to mothers from DEC - recipients of blood transfusion in DEC	Questionnaire	Pre-screening with questionnaire, since 1999. - No donation if: 1) Born in DEC; 2) Mother was born in DEC; 3) Received a blood donation in DEC; 4) Has lived/worked in rural subsistence farming communities of DEC 4 or more weeks. - Deferred if returned from a DEC <6 months ago. - Discretionary – 6 or more months after the last exposure and result of test for T. cruzi antibody is negative
Protocols/ Laws: screening and transfusion	No official policies and guidelines for the management of Chagas disease patients	National regulation exists for screening T. cruzi infection in at-risk groups in blood banks in France	No protocols. No local/national laws.	No information about protocols or laws on chagas disease	No protocols/ laws for chagas disease	No information	local and national laws on blood transfusion, transmission and tissue banks exist	No laws concerning chagas diseases in Switzerland	WHO guidelines followed. No other formal protocols are available locally and nationally

Source: Control and Prevention of Chagas Disease in Europe. A report of a WHO Informal Consultation (jointly organized by WHO headquarters and the WHO Rgional Office for Europe) 2009

** Note: Blood bank screening has not been implemented in Norway and Luxemburg. There is no information about Chagas disease cases in Greece and Ireland.*

No data for Austria, Croatia, Denmark, Romania and Sweden

Indicators	Austria	Belgium	Croatia	Denmark	France	Germany	Italy	Netherlands	Portugal	Romania	Spain	Sweden	Switzerland	UK
Estimated number of Latin American immigrants	7,552	38,133	ND	ND	208,395	58,000	440,000	35,211	83,000	ND	1,445,751	58,196	35,000	400,000
Estimated number of cases of *T. cruzi* infection	140-180	1,982	ND	ND	2,166	935	5,520 - 7,081	480	850	ND	39,985 - 65,258	1,118	3,000	14,000
Number of laboratory confirmed cases	2	19	1	1	111	2	114	7	8	1	3,617	1	180	28
Estimated number of pregnant women with *T. cruzi* infection	ND	16	ND	ND	ND	ND	30	18	50	ND	914 - 1,656	ND	30	50
Estimated number of cases of congenital transmission	ND	1	ND	ND	19	ND	2	2	2	ND	41- 121	1	5	5
Number of patients treated with benznidazol and nifurtimox	2	3	ND	ND	28	ND	22	ND	ND	ND	195	1	99	0

Source: Control and Prevention of Chagas Disease in Europe. A report of a WHO Informal Consultation (jointly organized by WHO headquarters and the WHO Rgional Office for Europe) 2009

Note: ND: Not determined