EpiSouth

Network for the Control of Public Health Threats
in the Mediterranean Region and South East Europe

EPISOUTH PLUS REPORT 6/2013

THE EPISOUTH PLUS PROJECT

THE MEDITERRANEAN REGIONAL LABORATORY NETWORK

Training on Dengue and Biosafety in the Laboratory 2-6 July 2012, Institut Pasteur, Paris, France

Kathleen Victoir with Sabah Boufkhed

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and the WP4 Steering Team

on behalf of the EpiSouth Network

JANUARY 2013

Institut Pasteur

ISTITUTO SUPERIORE DI SANITÀ

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THE EPISOUTH NETWORK

EPISOUTH PROJECT (2006-10)

In occasion of the Year of the Mediterranean (2005), a number of countries that share the Mediterranean ecosystem and therefore have common public health problems, agreed to develop the project "EpiSouth", whose aim was to create a framework of collaboration on epidemiological issues in order to improve communicable diseases surveillance, communication and training in the Mediterranean region and South-East Europe.

The Project "EpiSouth" started in October 2006 with the financial support of the EU DG-SANCO together with the Italian Ministry of Health and has been closed in June 2010.
As per June 2010, EpiSouth is a Network of 27 countries (9 EU and 17 non-EU countries plus 1 candidate to enlargement country). It is therefore the biggest inter-country collaborative effort in the Mediterranean region.

EPISOUTH PLUS PROJECT (2010-13)

A new phase of the EpiSouth Network activities has been approved and started on 15 October 2010 and is expected to last until 15 April 2013.

The new phase implies a shift of the Network's activities to a wider approach. Building on the knowledge of regional gaps and needs identified during the first EpiSouth implementation in the fields of Epidemic Intelligence, Vaccine Preventable Diseases and Migrants, Cross Border Emerging Zoonoses and Training in field/applied epidemiology, the new EpiSouth Plus Project aims at contributing to the control of public health threats and other bio-security risks in the Mediterranean region and South-East Europe.

OBJECTIVE AND ORGANIZATION

The EpiSouth Plus project is aimed at increasing the health security in the Mediterranean area and South-East Europe by enhancing and strengthening the preparedness to common health threats and bio-security risks at national and regional levels in the countries of the EpiSouth Network in the framework of the International Health Regulations (IHR) implementation. The reinforcement of relations of trust in the region is an objective and an instrument in the scope of Project's implementation.

Ensuring a successful response to this challenge requires a solid framework of collaboration and information exchange among the 27 participating Countries. To this purpose, Focal Points from each participating country have been appointed and asked for active involvement and collaboration in the project's activities.

The project is organized in seven Work Packages (WP), jointly co-led by EU and non-EU countries. WP leaders work in strict contact with the corresponding WP Steering Team, while a Steering Committee, constituted by all WP leaders, and the Project General Assembly, constituted by all participants, are responsible for the general strategic decisions. Finally, an Advisory Board, constituted by representatives of

the collaborating institutions and external experts, provide support for the revision of relevant documents and recommendations.

ACTIVITIES

Apart from three transversal WPs (i.e., WP1-Coordination; WP2-Dissemination; WP3- Evaluation) the project's activities are articulated in four WPs:

1) Establishment of a Mediterranean Regional Laboratories Network to facilitate common threats detection in the countries involved (WP4).

2) Promotion of common procedures in Generic Preparedness and Risk Management Plans among the countries involved (WP5).

3) Enhancing Mediterranean Early Warning Systems (EWS) and cross-border Epidemic Intelligence allowing alerts and Epidemic Intelligence information sharing among EpiSouth countries and developing interoperability with other European EW platform, especially EWRS, as forecast by the current EU legislation (WP6).

4) Facilitating IHR implementation through the production of a strategic document, with guidelines based on specific assessments for describing how national plans/legislations can interact with IHR requirements (WP7).

PLAN

INTRODUCTION

The first EpiSouth plus laboratory training session took place at the Training centre of the Institut Pasteur, Paris (France) from 02 to 06 July 2012. It has been organised with the help of Philippe Dubois previously WHO Biosafety and Quality trainer and member of the Urgent Response to Biological Threats (CIBU, IP) and Philippe Desprès with the POLARBO structure hosted in the Flavivirus-Host Molecular Interaction (FHMI, IP).

1.1. Objectives of the training

The objectives of this training are to improve the diagnosis of dengue and biosafety in the laboratories of the EpiSouth MRLN and enhance networking among participating laboratories. By enhancing laboratory capacities, exchanges and collaboration, the MRLN will support diagnosis and promote the use of the safest laboratory practices to improve the preparedness to face a Public Health threat.

For the Agenda, see Annex 1.

1.2. Participants

Trainees were chosen by the heads of laboratories involved in the MRLN according to the criteria proposed during the WP4 Expert committee meeting (Paris, January 2012) and validated during the meeting with the Heads of laboratory (Ankara, March 2012).

Nineteen laboratories (over the 21 of the MRLN) have proposed a candidate for this training, but only 17 could participate (7 EU and 10 non-EU). Due to administrative reason (obtaining of a visa for France), 2 could not come (Lybia and Turkey).

Countries from which a trainee have participated:

Albania	Greece	Palestine
Algeria	Italy (ass. lab*)	Romania
Bosnia & Herzegovina	Jordan	Serbia
Bulgaria	Lebanon	Spain
Croatia	Kosovo	Tunisia
FYROM	Malta	

** The Italian laboratory member of the core group could not propose a trainee for the training, so one from the associated laboratory "Lazzaro Spallanzani" has been proposed to participate with the agreement of the EpiSouth coordination and the Italian lab part of the core group.*

For an optimal interaction between other networks and experts, three members of the Expert committee were invited as lecturers during this training (ENIVD, EBSA, Greek expert). ECDC members were invited, but could not be present.
For the list of participants see Annex 2.

2. THE TRAINING

The training combined theoretical and practical courses concerning biosafety and laboratory diagnosis of dengue.
Trainees worked in pairs during theoretical and practical courses. They have also compared results from different available commercial diagnostic kits for dengue diagnosis in order to address limits and differences of the methods. This, in order to have the most complete overview of the dengue diagnosis possibilities and to allow the trainees to implement in their home situation the most adapted testing.

2.1. Theoretical part

The global context of dengue has been set by different experts; lectures on entomology, epidemiology, diagnostics and clinical dengue aspects have been presented. *(See Annex 2)*

The biosafety modules addressed regulations and regulatory practices that should be in place in the laboratory: special focus was laid on quality management, transport and reception of samples and waste management.

As a general closing session case studies have been presented based on real situations. Interpretation of the results and the need for further testing was discussed.

WHO INTERNATIONAL SHIPPING OF INFECTIOUS SUBSTANCES TRAINING (ISST)

International regulations on the transport of dangerous goods require that every person in charge of sending across the borders specimens known to contain infectious material, or dangerous material on a larger scope must provide evidence of appropriate training. The corresponding IATA training was given during the course in order that participating MRLN

laboratories “comply with international and national requirements, so that these goods are transported safely, timely, efficiently and legally”[1]if needed.
All trainees passed an official examination and consequently 100% got the ISST certification.

2.2. Practical part

The objective of the practical course was to correctly perform a dengue diagnosis (molecular biology and serology).
Trainees had a simulation exercise for the reception of possibly infected samples under appropriate safety conditions (Personal Protective Equipment such as gloves, face masks or goggles, biosafety cabinet level II, etc.). The simulation concerned reception of samples, unique labelling of specimens and correct storage before analysis.

Standard laboratory procedures used were developed in the POLARBO structure (IP).

REAL-TIME RT-PCR

It allows the detection of dengue DNA in acute phase samples and real-time RT-PCR has become the most used molecular tool to detect virus early in the course of dengue disease. Identification with this technique can go up to the serotype lever. An “in house” protocol and primers have been used and shared with the trainees.

IGG AND IGM IN-HOUSE ELISA

An IP (POLARBO) “in-house ELISA” protocol was used. The procedure for capturing IgM and IgG is based on the use of viral antigens. Additionally a variety of different commercial serological kits have been compared for their sensitivity and specificity, with POLARBO’s ELISA assays, using a panel of well characterised sera from patients.

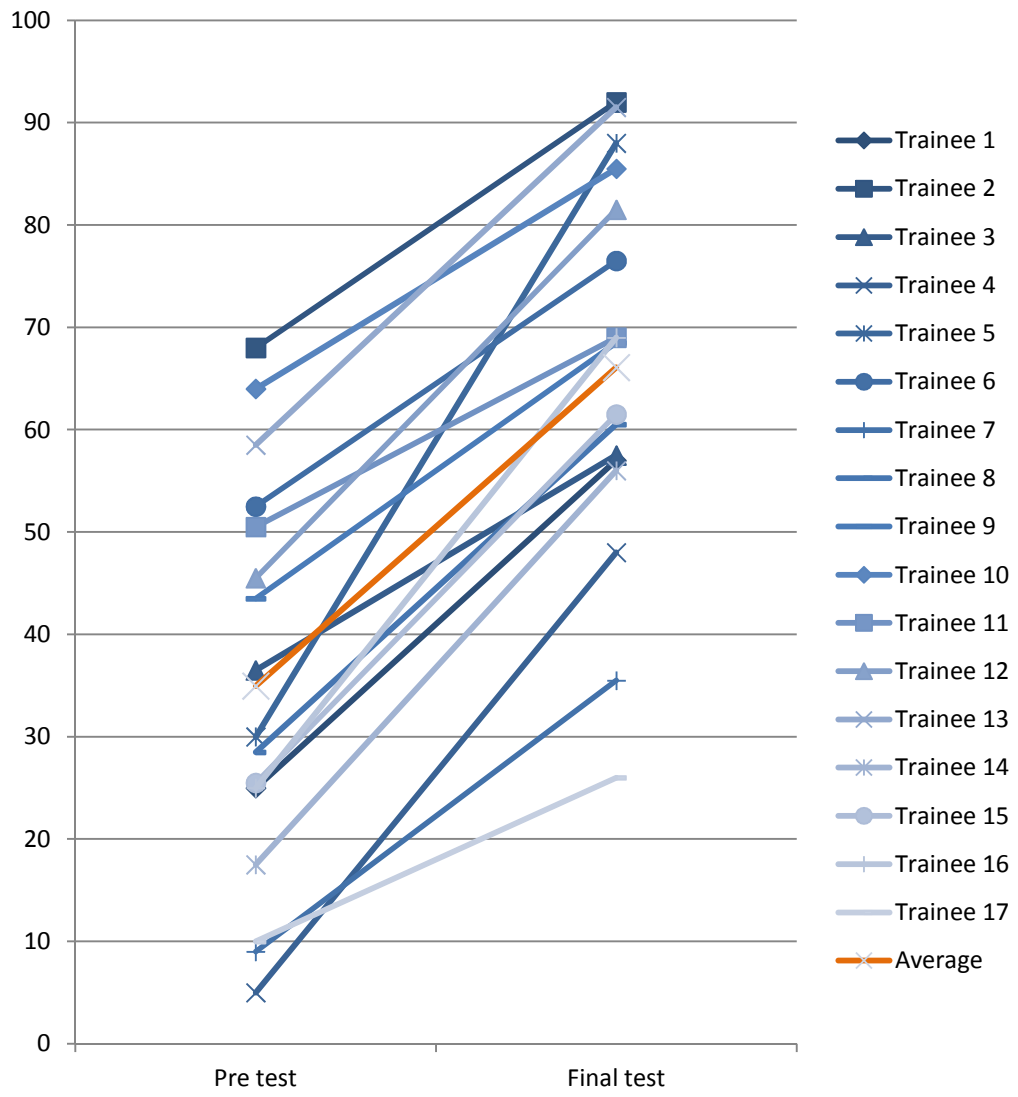
Results from different kits and trainees have been discussed and analysed collectively, more specifically to address differences in sensitivity and specificity between several commercially available diagnostic kits.

[1] Website of WHO - IHR News - What's new in IHR coordination and support - ISST: Revised and updated course http://www.who.int/ihr/ihrnews/ihrnewsissue16/en/index1.html

3. EVALUATION

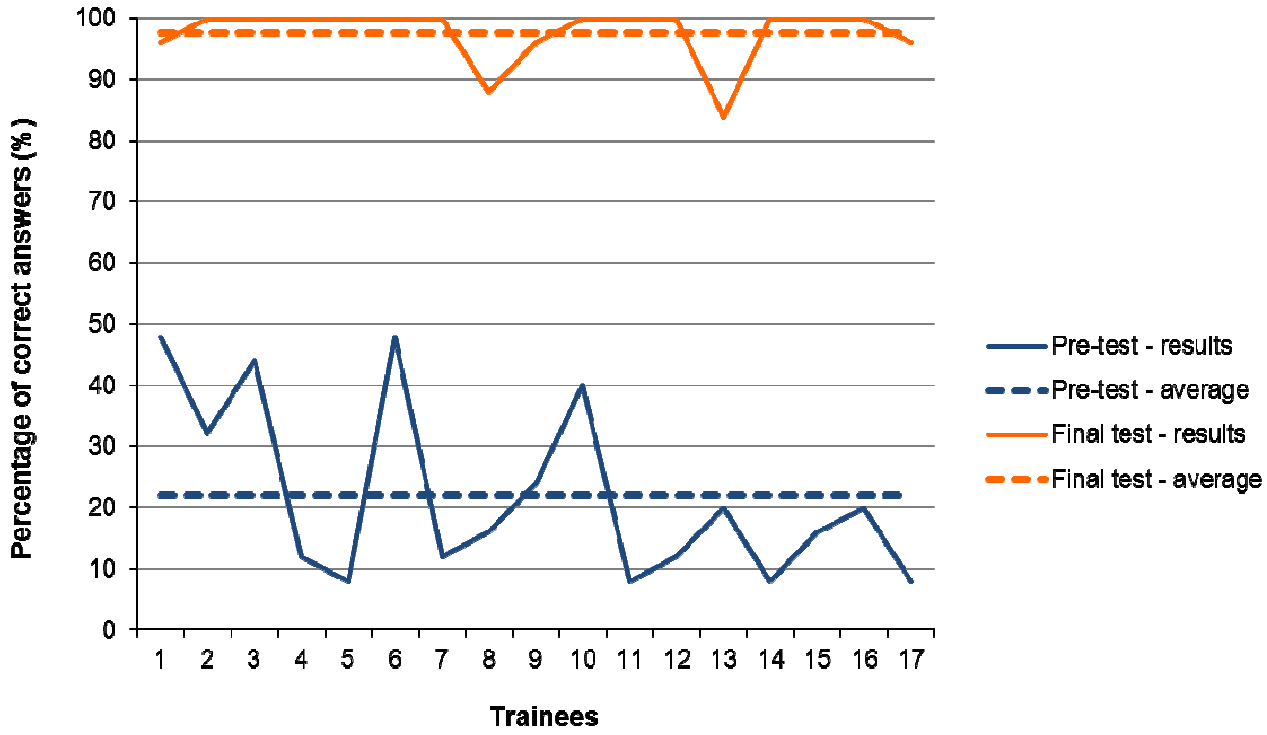
3.1. Evaluation of the trainees

In order to evaluate the efficiency of the training, a short test (about basic biosafety and quality issues) was taken by the trainees on the first day and again on the last day. *(See Annex 4)*. The comparison of the answers before and after the training has shown that all gained knowledge (see *Graph 1*). At the beginning of the training, the average score of trainees was 35% (of good answers). At the end, it was 66%, but 3 trainees still have a score under 50% after the training. We assume that these 3 results are mainly due to a language (English) problem. However, the EpiSouth plus WP4 training helped at refreshing and/or upgrading the level of the trainees from the MRLN.



Graph 1: Improvement of the level of knowledge of the trainees on biosafety and quality before and after the training.

Concerning the ISST, *Graph 2* shows the improvement of the level of knowledge concerning shipping of samples. It shows that the level of the trainees before the training was heterogeneous: from 8 to 48% of good answers. This difference can be explained since some trainees had already passed the ISST certification more than 2 years ago and some never had such training. After the ISST, all trainees had the required level of knowledge to get the corresponding certificate: from 88 to 100% of good answers (12 trainees over 17 had 100% of correct answers).



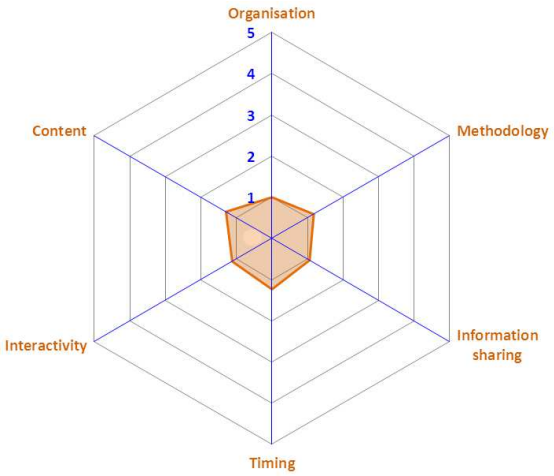
Graph 2: Assessment of the level of knowledge of the trainees on international shipping of dangerous goods before and after the training.

3.2. Evaluation of the training

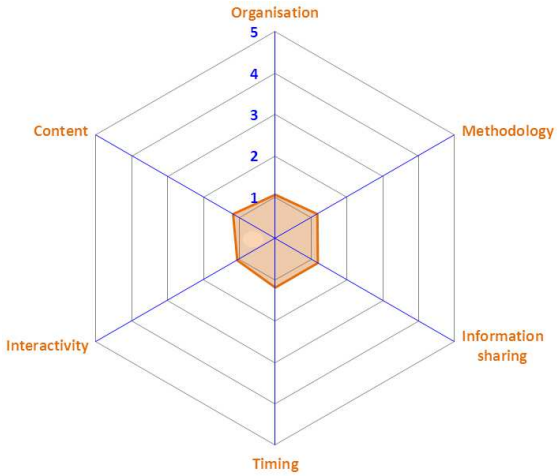
On the last day, a discussion took place in order to evaluate with the trainees, trainers and organizers the good and bad points of the training. Additionally, an evaluation survey (see *Annex 5*) has been addressed to the participants for both theoretical and practical parts (see *Graphs 2 and 3*) as well as to assess their expectations for the second training.

Globally, trainees were very satisfied of the training and 94% have declared that the training met their expectations (16/17).

However, they would have liked more practical exercises and laboratory training. *Table 1* describes the items that trainees would like to discuss for the second training. Those items are similar/complementary to those addressed during the first training. Additionally, training on viral culture in BSL3 conditions are a demand, but due to the expected number of participants for the second training, it would not be possible to practice in real BSL3 condition. However, organisers would assess the feasibility of organising simulation exercises.



Graph 2: Evaluation of the theoretical part of the training.
(1: very good → 5: very bad)



Graph 3: Evaluation of the practical part of the training.
(1: very good → 5: very bad)

Table 1: Perspectives and expectations of the 17 trainees after the first lab training.

Items of the questionnaire	n
How would you apply what you have learnt within the next 6 months?	
Change / adapt methods already in place in the lab	10
Share / transfer knowledge to lab colleagues	7
Apply what have been learnt during the training	6
Introduce / implement methods in the lab	6
Other	2
What do you expect for the second training "West Nile and Biosafety II"	
For the theoretical part on:	
- West Nile	
Diagnosis	10
Epidemiology	6
Updated information on WN	5
Vectors	4
Interpretation of results	3
Viral culture	3
Virus structure	3
Comparison in-house / commercial tests	3
Other (genetics, clinical, case study, protocol)	7
- Biosafety	
BSL3 management and maintenance	3
Detailed rules / Good practices BSL	3
How to work in BSL2 / WN	2
Biosafety and biorisk management	2
Other	4
For the practical part on:	
- West Nile	
PCR	7
Serology	7
Culture / isolation (+ neutralisation)	4
Sequencing / Genotyping	2
- Biosafety	
Demonstration of the rules	3
BLS3 practices	1
How to work in BSL2 / WN	1
Set-up of biosecurity policy in the lab	1
Discussion group / case study	1

CONCLUSION AND WRAP-UP

This first EpiSouth laboratory training has joined laboratory staff from the whole Mediterranean and Balkans region and has succeeded in improving laboratory capacity by training staff on Biosafety level II and Dengue diagnosis.
After the Meeting with the Heads of Laboratory, it has been the second step in building up and strengthening links between laboratories within the EpiSouth MRLN, especially through the creation of working pairs during the training. One of the aims of bringing the concerned people into contact is to facilitate the contact amongst the concerned labs in case of an outbreak in the Region.

For the second training, the Heads of lab would be asked to send the same people in order to continue the trust and cooperation building. Other working pairs will be created to allow people to better know each other.
According to the request of trainees, the WP4 will have a special focus on planning more time for practical exercises and laboratory techniques.

ANNEXES

Agenda of the Episouth plus WP4 Training on Dengue and Biosafety in the lab

02-06 July 2012 – Training Centre, Institut Pasteur, Paris (France)

	MONDAY 02/07	TUESDAY 03/07	WEDNESDAY 04/07	THURSDAY 05/07	FRIDAY 06/07
08h30-09h00	Arrival / Welcome	Debriefing	Debriefing	Debriefing	Debriefing
09h00-10h45	**Presentation of the training** *Philippe Dubois and Philippe Desprès (30 mn)* **The Episouth network** *Kathleen Victoir* (15 mn) **Presentation of participants** (30 mn) **Pre-test** (30 mn)	**Introduction to Biosafety** **+ Waste management** *Ingegerd Kallings* (1h) **Quality management Sample management** *Philippe Dubois* (45 mn)	**Interpretation of PCR data** **« In house » ELISA (*continued*)**	**ISST Module 1 Shipping terms** **ISST Module 2 Categorization** *Philippe Dubois (2h)*	**ISST Final test** **Quality Management** Documents and records International Health Regulations *Philippe Dubois* (2h)
10h45-11h00	Break	Break	Break	Break	Break
11h00-13h00	**Introduction to arbo-viruses and dengue: Surveillance in the Mediterranean area and Viral diagnosis** *Matthias Niedrig* (1h30)	**Database** **Problems to be solved** **Tube reception** **Treatment of samples**	**"In-house" ELISA (*continued*)**	**5 ISST Module 3 Packaging** **5 ISST Module 4 Marking** *Philippe Dubois (2h)*	**Final test** *Philippe Dubois* **Open discussion** (1h)
13h00-14h00	Lunch	Lunch	Lunch	Lunch	Lunch
14h00-15h30	**Medical entomology** *Valérie Choumet* (1h) **Emergence of arboviruses in the Mediterranean Region** *Anna Papa* (1h)	**Laboratory diagnosis of dengue** **qRT-PCR**	**"In-house" ELISA (*continued*)**	**ISST Module 5 Documentation** **ISST Module 6 Refrigeration** *Philippe Dubois (2h)*	**Case study** **Projection on the case management in the participating countries, according to their means and legislation**
15h30-16h00	Break	Break	Break	Break	Break
16h00-19h00	**International Shipping of dangerous Substances - ISST** Introduction - Pretest (45 mn)	**"In-house" ELISA (*starting*)**	**Commercial kits assays** **Interpretation of ELISA data**	**Dengue virus: Medical aspects / epidemiology** *Anna Papa (1h)*	**General conclusion of the training** (30 mn)
				Working dinner	

ANNEX 2: Participating countries and institutions

Participating countries and institutions to the
EpiSouth Plus WP4 training on Dengue and Biosafety in the lab
Institut Pasteur - Training Centre, 02-06 July 2012

Organisation: Kathleen Victoir and Sabah Boufkhed (International Division)
with: Philippe Desprès and the POLARBO team (Unit of Flavivirus-Host Molecular Interactions)
Philippe Dubois (CIBU)

TRAINEES

COUNTRY	Name of the Institute, Name of the Laboratory
ALBANIA	Institute of Public Health, Laboratory of Virology
ALGERIA	Institut Pasteur d'Algérie - Sidi-Fredj Annex, Virology Department
BOSNIA-HERZEGOVINA	Clinical Center University of Sarajevo, Institute for Clinical Microbiology
BULGARIA	National Center of Infectious and Parasitic Diseases, NRL on tick-borne infections
CROATIA	Croatian national institute of public health, Department of virology, NRL for arboviruses and rickettsia
FYROM	Institute of Public Health of R.Macedonia, Laboratory for Virology and molecular diagnostics
GREECE	Aristotle University of Thessaloniki, Medical School, Department of Microbiology
ITALY	Azienda Ospedaliera di Padova (Padova University Hospital), U.O.C. Microbiologia e Virologia
JORDAN	Central Public Health Laboratory
KOSOVO	National Institute of Public Health of Kosovo, Department of Microbiology
LEBANON	Rafik Hariri University Hospital, Department of laboratory medicine
MALTA	Mater Dei Hospital, Pathology Department, Virology Laboratory
PALESTINE	Central Laboratory of Ministry of Health
ROMANIA	National institute for research & development in microbiolagy & immunology "Cantacuzino", Laboratory for vector-borne infections
SERBIA	Institute of Virology Vaccines and sera "Torlak", National Reference Laboratory for Arboviruses
SPAIN	Institute of Health "Carlos III", Arbovirus and imported viriasis
TUNISIA	Institut Pasteur de Tunis, Laboratory of Clinical Virology

TRAINERS

Lecturers

GERMANY	ENIVD network / Robert Koch Institute
GREECE	Aristotle University of Thessaloniki, Medical School, Department of Microbiology
SWEDEN	EBSA / Swedish Institute for Communicable Disease Control

Organising lab

FRANCE - IP CIBU	Institut Pasteur, CIBU
FRANCE - IP POLARBO	Institut Pasteur, POLARBO
FRANCE - IP Training centre	Institut Pasteur, Education

EPISOUTH PLUS WP4 TEAM

FRANCE - IP ID	Institut Pasteur, International Division
TURKEY	Turkish Public Health Institution

ANNEX 3: Abstracts of the presentations made during the training

Introduction to Arboviruses including Dengue virus: Surveillance of diseases and viral diagnosis. Matthias Niedrig, Robert Koch Institute (Germany)

Arthropod-borne viruses (Arbo) including the Dengue virus are presenting a rather large group of human pathogenic viruses. Togaviridae (Chikungunya-Virus (CHIKV), Flaviviridae (Tick-borne encephalitis virus (TBEV), West Nile virus (WNV), Dengue (DENV) etc.), Bunyaviridae (Toscana virus (TOSV), Rift Valley fever virus (RVFV), etc.) are contributing to this group. The transmissions of these viruses occur by ticks, mosquitoes or sandflies linked with the presence of the vector in the region. Several factors are affecting the transmission of the pathogenic viruses from vectors to humans. Except for Dengue humans are not essential part of the transmission cycle as a dead end host.

Even suitable mosquito vectors are present Dengue and Chikungunya do not belong to viruses present in Europe and the Mediterranean countries so far. Therefore, the risk of importation of such viruses by viremic travelers coming for example from Dengue endemic countries causing a local autochthone outbreak is real. A recent outbreak caused by Chikungunya in the Emilia Romagna in Italy in 2007 and two autochthone Dengue cases in Croatia and 2 Dengue cases in Marseille, France demonstrate the constant risk for such event. Because these events are rather rare and physicians are not familiar with the clinical picture of these diseases an efficient surveillance is essential for an early detection of these “new” diseases.

Beside the clinical diagnostic the laboratory diagnostic is the most important part to confirm the infection in a patient and/or presence of the virus in the vector or the animal reservoir. For the detection of virus the analysis for the viral genome by PCR is the prominent method because the cultivation on cells is laborious and time consuming. However, the cultivation is necessary for further analysis of the virus strain and pathogenesis. Since most of these viruses require biosafety level 3 laboratory facilities these kind of investigation takes place in specialized laboratories. The further diagnostic confirmation in a diseased patient is performed by different serological assays like ELISA, Immunofluorescence (IFA), Immunoblot (IB) or Neutralization assays. The quality regarding sensitivity and specificity is a critical issue for a good diagnostic of arboviruses also because commercial assays are not available for all of them. Therefore, external quality assurance studies play an important role for the evaluation of the laboratory diagnostic profile.

Emergence of Arboviruses in the Mediterranean region, Anna Papa, Aristotle University of Thessaloniki, Greece

Global warming contributes to the spread of arboviruses, especially those transmitted by mosquitoes. Recently, in summer 2010, a large West Nile virus (WNV) outbreak occurred in Greece, resulting in thousands of human infections. Apart the asymptomatic and the mild febrile cases, 197 neuroinvasive cases were observed, most of them (88%) encephalitis cases, and 33 (17%) had a fatal outcome. The patients with neuroinvasive disease were elderly persons with an underlying disease. The incidence of the neurological disease was 15 per 100,000 population. Molecular testing of mosquitoes collected at the sites where the cases were observed showed that the strain belonged to WNV lineage 2, genetically close to a WNV strain detected in 2004 in birds in Hungary, carrying the mutation H249P in NS3 gene, which has been previously associated with increased pathogenicity in WNV lineage 1 strains. Identical sequences were recovered from blood donors, as well as in additional mosquito pools, in wild birds and, later, in spring 2011, in sentinel chickens. WNV outbreak occurred for a second consecutive year, in 2011. Apart the mild cases, 76 neuroinvasive cases have been reported, 8 of them fatal. This year the incidence was lower (0.68/100,000), the cases were more dispersed (North and Central Greece), and the fatality rate was lower (10.5%). During 2010-2011, WNV outbreaks occurred also in Romania, Russia, Israel, and less cases in other European countries.

A large outbreak of Chikungunya virus (CHIKV) infections occur in 2007 in Italy, while autochthonous, 2 each, dengue virus (DENV) and CHIKV infections occurred in France in 2010. The same year, a cluster of dengue fever cases was observed in Croatia, in regions where *Aedes albopictus* mosquitoes predominated. The recent emergence and establishment of many “tropical” viruses in Europe, constitute a warning signal for public health authorities to enhance surveillance and design prevention and control measures.

Dengue virus: Medical aspects / epidemiology, Anna Papa, Aristotle University of Thessaloniki, Greece

Dengue virus (DENV) is the most widely distributed arbovirus with estimated 50-100 million infections annually, 500,000 of them being severe and life-threatening. It is endemic in tropical areas of Asia, Oceania, Africa, Australia, and the Americas. The incidence of dengue has increased dramatically after World War II with increasing severity of cases. The virus is transmitted in a cycle involving humans and mosquitoes. The anthropophilic mosquito *Aedes aegypti* is the main virus vector.

The majority of infections are asymptomatic, while the symptomatic form is presented either as Dengue fever (DF), or as the most severe Dengue hemorrhagic fever (DHF) or even Dengue shock syndrome (DSS). The incubation period is 5-8 days. Fever, severe (usually frontal) headache, retroorbital pain, nausea and vomiting, rash, accompanied by severe muscle pain and arthralgia are the main clinical symptoms of DF. DHF and DSS are usually biphasic; the first febrile phase is followed by hypotension, hemorrhagic manifestations and shock. Bleeding (initially petechiae, and in the severe form bleeding from the sites of injection and from the gastrointestinal system) is due to vascular injury and increased permeability. The severity of the disease has been graded by WHO from I (positive tourniquet test) to IV (shock). The phenomenon of antibody-mediated enhancement of infection is important: following re-infection with a DENV of different serotype, severe disease is linked to high levels of antibody-enhanced viral replication early in illness which is followed by a memory T-cell activation and a 'storm' of inflammatory cytokines and other chemical mediators which increase the vascular permeability. Although proper management can reduce the case-fatality rate, the disease has a substantial social and economic impact.

Medical entomology: Dengue virus transmission by *Aedes* mosquitoes, Valérie Choumet, FHMI, IP

Aedes aegypti is considered the primary vector of dengue virus. It has been incriminated in the dengue's emergence all over the world. The past three decades have seen a remarkable global expansion in the geographic distribution of *Aedes albopicus*. This mosquito is a potential vector of a great number of arthropod-borne viruses, including dengue virus, the most prevalent arboviral pathogen of humans. Results from the literature showed that in places where *Aedes albopictus* predominates over *Aedes aegypti*, explosive dengue epidemic with severe cases were not observed. Laboratory studies have shown that although *Aedes albopictus* mosquitoes were more susceptible to dengue infection, a lower rate of dissemination was observed, potentially explaining the lower competence of this species for dengue transmission. However, arboviruses were shown to be able to adapt to new vectors, like in chikungunya epidemic in La Reunion island. We will review the life cycles of both mosquitoes, as well as the known import pathways, biotic and abiotic constraints for establishment as well as control strategies.

Biosafety and Quality Management

- ***General introduction,*** *Philippe Dubois, CIBU, IP*

What is total Quality Management, how organization in laboratories according to the requirements of the norm ISO 15189 can ensure the quality of analyses performed and results given to the patients.

- ***Biosafety management: Introduction to Biosafety management, Introduction to Laboratory associated infections, Infectious waste management;*** *Ingegerd Kallings, Swedish Institute for Communicable Disease Control*

General introduction on biorisk in medical laboratories. How biosafety management will help avoiding exposure of technicians and laboratorians to pathogens, as well as mitigation procedures that can be taken to avoid dissemination of pathogens in the community environment. Emphasis will be made on waste management.

- ***Sample management,*** *Philippe Dubois, CIBU, IP*

According to ISO 15189, the laboratory is responsible for informing the clinicians or persons performing the sampling of the elements to be sampled and the conditions for transport and delivery to the laboratory. The laboratory will also indicate which elements of information are needed, and will ensure a proper numbering or identification process of each sample. Clinical information is also required in order to have relevant elements for biological validation of the results and epidemiological analyses. Long-term storage of specimens is also addressed.

- ***Documents and Records,*** *Philippe Dubois, CIBU, IP*

The session is intended to pinpoint the importance of keeping an accurate and precise documentation of all steps in the specimen path flow. Differences between documents and records will be addressed: documents such as Standard Operating Procedures, Quality Manual, and job descriptions are to be developed internally to guarantee the quality of analysis process but also the overall quality management system. External documents such as regulation must be regularly updated as well. Records must be organised in order to be able to track previous reports and analyses, as well as results of external quality assurance schemes or for example the decisions taken for process improvement after analysis of occurrences or errors.

This training session is extracted from a Total Quality Management training course developed and published by an international team of experts from WHO, USA CDC, CLSI, and ISO. The facilitator of this session was part of this team. The comprehensive training materials are also available on line: www.who.int/ihr/training/laboratory_quality

International Shipment of Dangerous Substances, *Philippe Dubois, CIBU, IP*

International regulations on the transport of dangerous goods have been set-up by ICAO (International Civil Aviation Organization), and they require that every person in charge of sending across the borders specimens known to contain infectious material, or dangerous material on a larger scope must provide evidence of appropriate training. The IATA association is organising such training, but is not the only one institution entitled to provide the required training and certificate: the trainer has got permission from WHO to utilize the training material and deliver certificate using the test and material put on line by WHO head Quarter. As can be seen on the site, the 6 modules include exercises and lectures, the present session will had a hands-on session, where participants will have to actually perform the packaging of a fake sample using real boxes and documentation.

Internet document: www.who.int/ihr/infectious_substances