

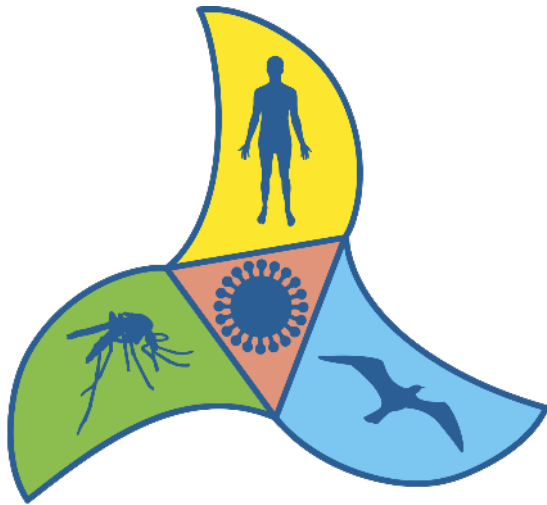


Funded by the  
European Union

10  
YEARS



CBRN  
Centres  
of Excellence  
An initiative of the European Union



**Medi<sup>2</sup>LabSecure**

OIE Regional meeting on  
Vector-borne diseases in  
North Africa (December 3<sup>rd</sup> 2020)

*P75 Preventing biological risks increased by environmental and climate change in the Mediterranean, Black Sea, and Sahel regions by strengthening institutional capacities in the context of One Health*



- Mitigation of Chemical, Biological, Radiological and Nuclear risks
- Initiative launched in response to the need to strengthen the institutional capacity of countries outside the European Union to mitigate biological risks related to arbovirus and their vectors
- MediLabSecure participates in promoting health security, peace and stability by addressing biological threats

<http://www.cbrn-coe.eu/>



Vector borne diseases,  
Climate change & Globalisation

Advocacy for the  
adoption of a  
One Health approach

Institutional  
Networking

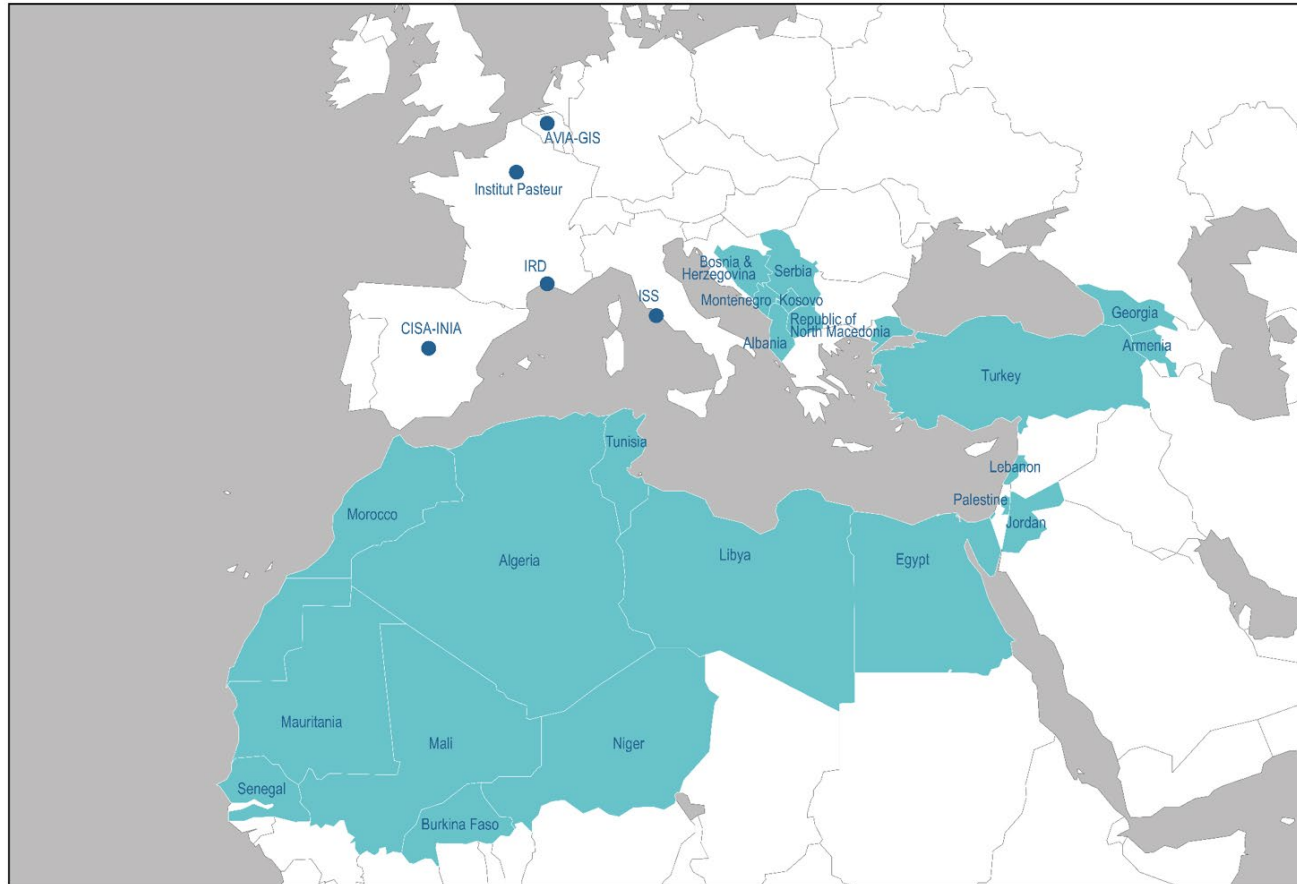
Preventing vector-borne diseases around the Mediterranean and Sahel regions by reinforcing an **international network of laboratories and public health institutions**

Capacity building

Enhancing **laboratory preparedness** and response capacities to arboviruses and their vectors

Enhancing awareness of the added value of **integrated surveillance, risk assessment and early warning** to prevent and control epidemics and epizootics





22 beneficiary countries

# IMPLEMENTATION



Project coordination

## Purpose 1

Enhancing laboratory preparedness and response capacities to common health threats related to arboviruses and their vectors

- 1 Human virology laboratories
- 2 Animal virology laboratories
- 3 Medical entomology laboratories



MediLabSecure

## Purpose 2

Enhancing awareness of the added value of integrated surveillance, risk assessment and early warning to prevent and control epidemics and epizootics.

- 4 Public health & veterinary services
- 5 Early warning tool modelling
- 6 Promotion of the network



## 7 Response to COVID-19

Supporting preparedness and diagnostics



[www.medilabsecure.com](http://www.medilabsecure.com)



[medilabsecure@pasteur.fr](mailto:medilabsecure@pasteur.fr)




Newsletters



Centres of Excellence  
AN INTERIM OF THE LABORATORY GROUP



Laboratory preparedness  
and response capacities  
to arboviruses and their vectors

-  Human Virology
-  Animal Virology
-  Medical Entomology



**Trainings**  
Tailored/Tot approach



**External Quality  
Assesment (EQA)**



**Tools**

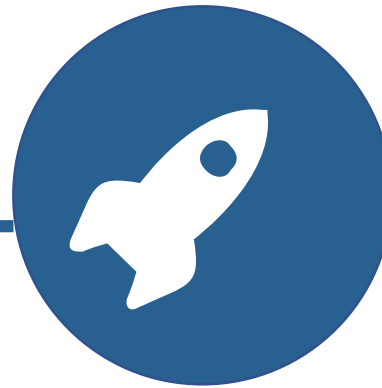


**Tailored Support**



**Trainings**  
Tailored/Tot approach

Laboratory preparedness  
and response capacities  
to arboviruses and their vectors



Human Virology

Animal Virology



Medical Entomology



Molecular and serological diagnostics of arboviral infections, molecular analyses, bio-informatics analyses, biosafety practices, biorisk management, vector identification, vector monitoring and control

## Past trainings



### **Training on seroneutralization of WNV**

ToT approach

Expertise exchange between IP Algiers and IP Tunis

*Institut Pasteur d'Algérie, July 15-26, 2019*

### **Next Generation Sequencing Analysis**

*Institut Pasteur, October 7-11, 2019*



### **Workshop « introduction to mapping & modelling »**

*Institut Pasteur d'Algérie, October 13-17, 2019*

### **Medical entomology seminar in Sahel**

*Ouagadougou, October 29-30, 2019*





## Upcoming 2021-2022



**Workshop** Outbreak investigations: New molecular Tools for the identification of viral pathogen-*May 2021*

### **Biological Outbreak Investigation Training**

Exercise in the mobile BSL-3 EUWAM-LAB  
*Improve field diagnostic capacities and response to a viral outbreak/hands-on training in a mobile BSL-3 conditions*



**Workshop “WNV & RVFV diagnostic for Sahel countries”**  
*Online/May 2021*

**Workshop “CCHFV DIAGNOSTICS in ANIMAL SAMPLES and TICKS”**  
INTERSECTORAL approach: open to entomologists & human virologists  
*Online/October 2021*



**2 Webinars** ‘Hot topics on vector surveillance, vector control and vector-borne diseases’/ *Summer 2021; Feb 2022*

Laboratory preparedness  
and response capacities  
to arboviruses and their vectors



External Quality  
Assessment (EQA)



Human Virology

Animal Virology



Medical Entomology



## OBJECTIVES

- ▶ Evaluate the laboratory capacity to correctly apply molecular and serological diagnostic techniques for arbovirus detection in biological samples
- ▶ Assess the capacity of the laboratories to properly interpret the results of the various diagnostic techniques to make a final diagnosis.
- ▶ Evaluate the capacity of the laboratories to correctly identify vector species
- ▶ Diagnostic harmonization between labs and countries



*Spring 2022  
Dematerialized  
format*

EQA on mosquito  
identification






Follow up Webinar



Laboratory preparedness  
and response capacities  
to arboviruses and their vectors



-  Human Virology
-  Animal Virology
-  Medical Entomology



Tools



## Interactive identification keys for vector

### MosKeyTool

The screenshot shows the MosKeyTool interface with the following elements:

- Left Panel:** Descriptors: 10. Filter by group: All groups. Descriptors include: HEAD - THORAX: Anopheles or not [5/6], WING: general ornamentation of the wing [4/5], ABDOMEN: colour of the scales on the tergite [4/5], LEG III: colour of tarsomere I [3/5], LEG II: colour of tarsomere I [3/5], WING: wing length from insertion to apex [3/5], SAMPLING AREA: East of Mediterranean Sea [2/5], SAMPLING AREA: South of Mediterranean Sea [2/5], SAMPLING AREA: North of Mediterranean Sea [2/5].
- Center Panel:** Definition: HEAD - THORAX: Anopheles or not. States: 4. State 2 and 4 correspond to Anopheles genus.
- Right Panel:** Remaining items: 128. List of species including *Anopheles argenti* (F), *Anopheles albimanus* (F), *Anopheles atropisus* (F), *Anopheles annulipes* (F), *Anopheles atropisus* (F), *Anopheles behringi* (F), *Anopheles cantans* (F), *Anopheles caspius* (F), *Anopheles cathartes* (F), *Anopheles crenatus* (F), *Anopheles coluzzi* (F), *Anopheles communis* (F), *Anopheles cretinus* (F), *Anopheles daniellus* (F), *Anopheles doriae* (F), *Anopheles drosopis* (F), *Anopheles egyptus* (F), *Anopheles egypticus* (F), *Anopheles euclyptus* (F), *Anopheles flavescens* (F), *Anopheles geminus* (F), *Anopheles gennadius* (F).
- Bottom Panel:** States: 4. 1. maxillary palpus clearly shorter than proboscis (100), 2. maxillary palpus nearly equal to proboscis (23), 3. scutellum clearly striolate (105), 4. scutellum without conspicuous lobes (23).

- ▶ Eng, French
- ▶ Sahel region (fall 2021)

<https://www.medilabsecure.com/moskeytool.html>

### PhlebKeyTool

Interactive identification key for Euro-Mediterranean phlebotomine sandflies

▶ Release for Spring 2021



Vol. 37

JOURNAL OF THE EUROPEAN MOSQUITO CONTROL ASSOCIATION

1

Distribution chart for Euro-Mediterranean mosquitoes (western Palaearctic region)

Vincent Robert<sup>1</sup>, Filiz Günay<sup>2</sup>, Gilbert Le Goff<sup>1</sup>, Philippe Bousès<sup>1</sup>, Tatiana Sulesco<sup>3</sup>, Alexei Khalin<sup>4</sup>, Jolyon M. Medlock<sup>5</sup>, Helge Kampen<sup>6</sup>, Dušan Petrić<sup>7</sup>, Francis Schaffner<sup>8</sup>

2019, 37:1-28.



## 10 mosquito factsheets freely downloadable

### Aedes albopictus

Family Culicidae  
Subfamily Culicinae

Aedes albopictus is currently the most invasive mosquito in the world. This mosquito can adapt to wide-ranging circumstances and is associated with human-made habitats, allowing it to spread in populated, urban areas. Its eggs are transported via the global trade of goods, particularly used tyres (cars, trucks, heavy vehicles, etc.) and 'lucky bamboo' plants. Aedes albopictus is already widespread and abundant in the Mediterranean basin where it is causing biting nuisance and has been implicated as a vector in the local transmission of dengue and chikungunya. In temperate populations, exposure to short-day lengths causes the female to produce diapausing eggs.

#### Distribution around the Mediterranean Basin

Originated from Asia, *Ae. albopictus* has succeeded in colonising most continents in the past 30-40 years. The species was recorded for the first time in Europe in Albania in 1979, then in Italy in 1990 and is now present in some 20 European countries. Today, it is established in most countries of the Mediterranean Sea, including Lebanon, Syria, Jordan and Israel. Also recently observed in new localities in Morocco, Algeria and Tunisia.

Legend:  
● Present  
■ Established  
■ Absent  
■ No data  
■ Susceptible

Current known distribution of *Aedes albopictus*  
January 2019 / VectorNet

#### Vector surveillance

European map available by ECDC/VectorNet.

#### Vector control

- Source reduction: elimination of stagnant water that is of stagnant water that is propitious for larvae
- Spraying of chemical or organic pesticides
- Use of repellents to reduce bites

#### Transmission

**Proved vector of:**  
Dengue virus  
Chikungunya virus  
Dirofilaria

**Potential vector of:**  
Zika virus  
Yellow fever virus

#### References, tools

ECDC Factsheet *Aedes albopictus*:  
<http://ecdc.europa.eu/en/realtopics/vec/mosquitoes/pages/aedes-albopictus.aspx>

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### Aedes (Stegomyia) albopictus

Common name: Asian Tiger mosquito  
Synonyms: Stegomyia albopicta

#### MORPHOLOGICAL DESCRIPTION

Mainly black, white stripes on legs and dorsal abdomen. A tyre-shaped pattern on the thorax. Existence of morphological variants form (formosa) and scabra (egypti).

Body length: 5 mm

**Biting behaviour:** Adult females bite aggressively, usually during the day and preferably outdoors.

**Nature habitats:** Natural and artificial habitats, some of which include tyres, barrels, water gully catch basins and drinking troughs. Preference for suburban habitat with gardens; urban habitats.

**Prevalence:** Opportunistic feeder. Hosts include humans, domestic and wild animals.

#### EASILY CONFUSED SPECIES

*Aedes albopictus* vs *Aedes unilineatus*

### Aedes (Hulecoetomyia) japonicus

Common names: Asian bush, rock pool mosquito  
Synonyms: Ochlerotatus japonicus, Hulecoetomyia japonica

#### MORPHOLOGICAL DESCRIPTION

Adults are relatively large and show a dark and light pattern due to the presence of white scale patches on a black background on the legs and other parts of the body.

Abdominal tergite with lateral and median pale basal patches, that do not form complete basal bands.

Prasoma of several lines of yellowish scales on a dark/brown background on the scutum.

Body length: 6 mm

**Biting behaviour:** Adults are often found in forested areas. Active during the daytime and crepuscular hours. This species is an aggressive biter and will readily bite humans outside and occasionally inside houses.

**Immature habitats:** *Ae. japonicus* larvae prefer shady rock holes but can develop in a large range of both natural and artificial aquatic container habitats including tree holes, tyres, bird baths, and all breeding sites rich in organic matter.

**Host preference:** This species preferentially feeds on mammalian hosts, including humans.

#### EASILY CONFUSED SPECIES

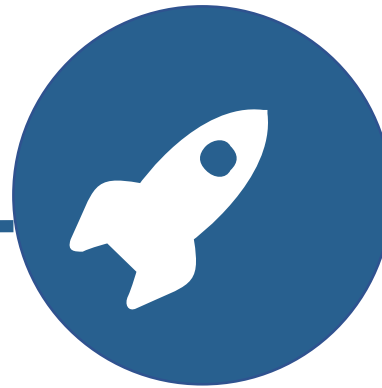
**Aedes koreicus**  
Presence of a complete basal band on hindtarsomers 4 & 5, unlike *Ae. japonicus*.




**Subgenus Stegomyia**  
*Aedes albopictus*, *Aedes crevus*, *Aedes aegypti*  
Specific pattern of black and white scales on the scutum.

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Tailored Support

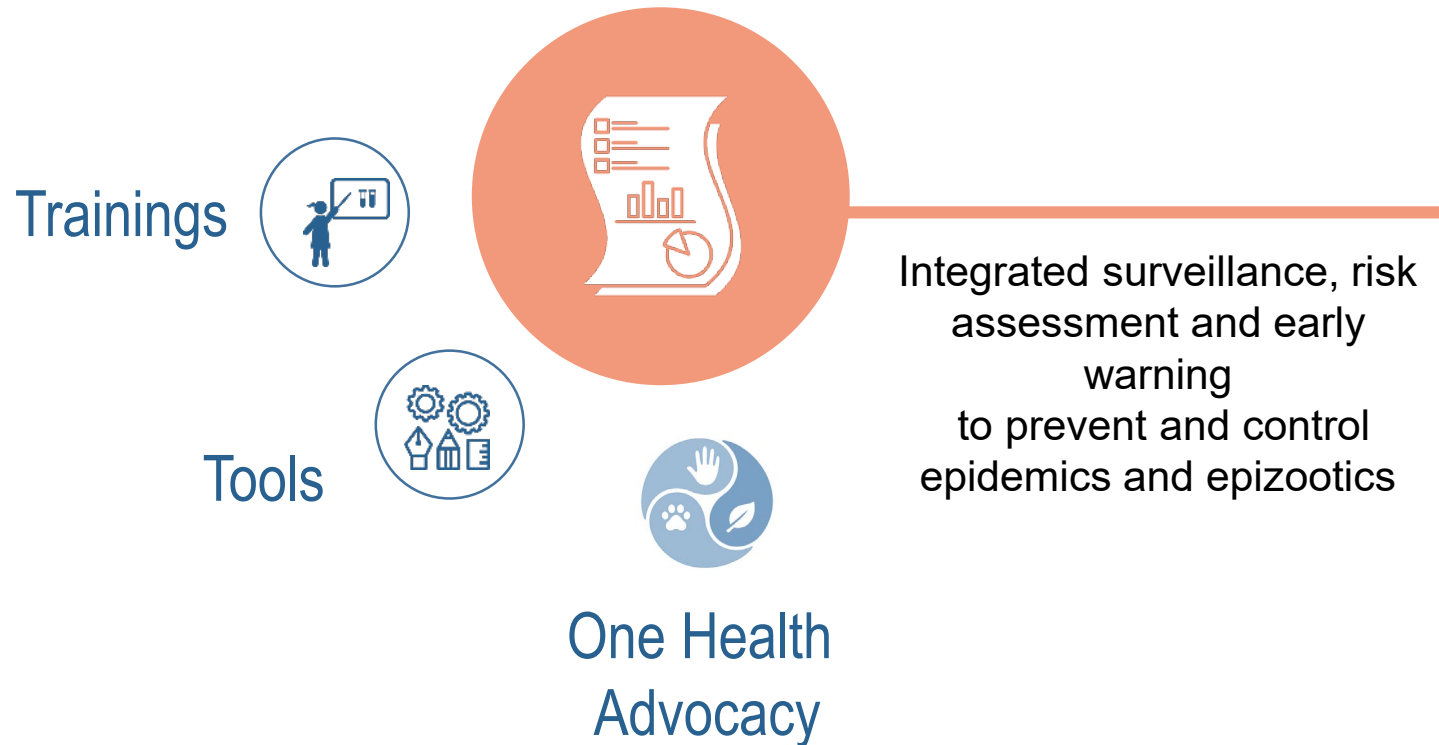


## Preparedness and response to the RVF epidemic in Mauritania

- One Health support with contribution from the different sectors
- Technical support for the implementation of diagnostic
- Providing of emergency reagents for RVF diagnostics
- Support for sequencing, modelling









**Oie** Collaborating Centre  
for Veterinary Training, Epidemiology,  
Food Safety and Animal Welfare

# MediLabSecure

**Work Package 4: Advocacy for One Health approach in the implementation of integrated surveillance and multisectorial risk assessment of arbovirus infections**

**Public Health and Veterinary Services**

**Under the coordination of Istituto Superiore di Sanità (Rome)**



Paolo Calistri



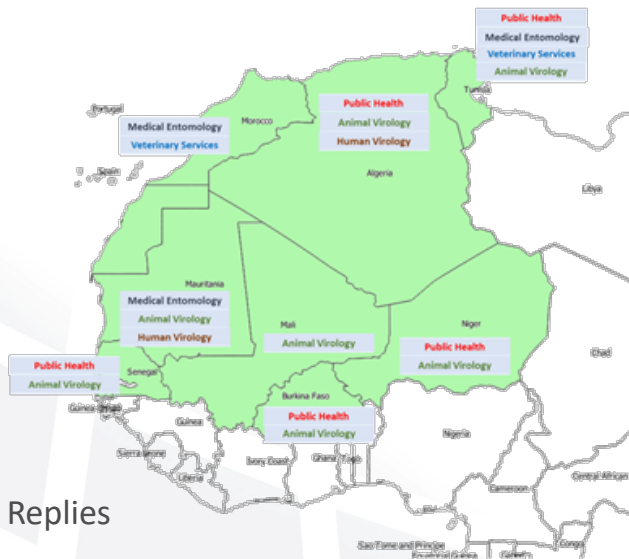
## Activity done<sup>1</sup>

- One Health Scientific Conference: “Strengthening One Health implementation for the prevention and control of arbovirus infections in the Mediterranean and Sahel Regions”, Rome (Italy), 26-27 November 2018
- Workshop on surveillance of emerging arboviruses in the Mediterranean region under a “One Health” approach, Teramo (Italy), 11 – 12 December 2018
- Regional Meeting, Dakar (Senegal) 20-24 January 2020:
  - Epidemiology training, including basic training on Rapid Risk Assessment (RRA) methods
  - Multidisciplinary Risk Assessment (MRA) based on RRA approach

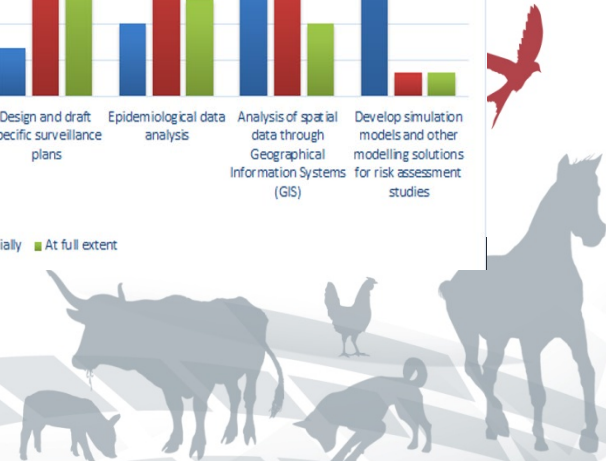
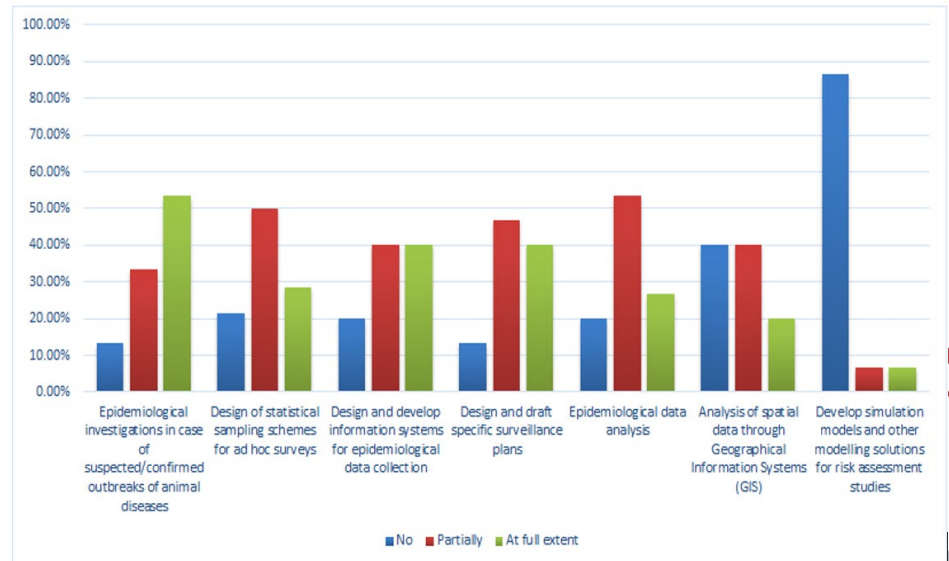


# Activity done<sup>2</sup>

**Training need assessment (TNA) web survey** through an on-line questionnaire sent to all MLS2 focal persons of all sectors (human virology, animal virology, medical entomology, public health, veterinary services) of 8 Countries which participated to the 1<sup>st</sup> Regional Meeting in Senegal (Algeria, Mali, Senegal, Tunisia, Mauritania, Niger, Morocco, Burkina Faso).



Replies



## Planned activities

- MediLabSecure2 situational analysis (MESAPLUS) with study visits in 3 selected countries (currently Armenia, Lebanon and Senegal) aimed at reinforcing integrated early warning through analysis of the surveillance system and training needs assessment
- Elaboration of a Strategic document reporting, discussing and recommending on enhancing early warning for arbovirus infections with One Health approach
- Further capacity-building activities (Epi-trainings with focus on MRA) originally planned during Regional Meetings





### What do we do?

#### Building a solid baseline GIS in epidemiology capacity in all MediLabSecure countries

- Development quantified approach for (historical) country disease status maps
- Provide BL-GIS course to all MLS countries:
  - Face-to-face start-up workshops
  - Distance learning course

#### Provide advanced GIS in epidemiology capacity building to the three pilot countries

- Provide à la carte advanced GIS-EWS to the three pilot countries Armenia, Lebanon & Senegal:
  - Jointly identify pilot topics for each country
  - Develop & implement adapted GIS approaches to support EWS

Permanent upon request ad hoc support on issues related to the use of GIS as part of daily disease monitoring and early warning activities



## Disease data:

- OIE
- WHO
- GIDEON
- ECDC



## Manual data extraction:

- spreadsheet/disease
- Before 2000: aggregated
- After 2000: annual

R-script

Uniform legend:

- YI: Vector present
- BI: Imported cases
- Or: Viral circulation
- Re: Outbreaks



Automated data summary /country /year



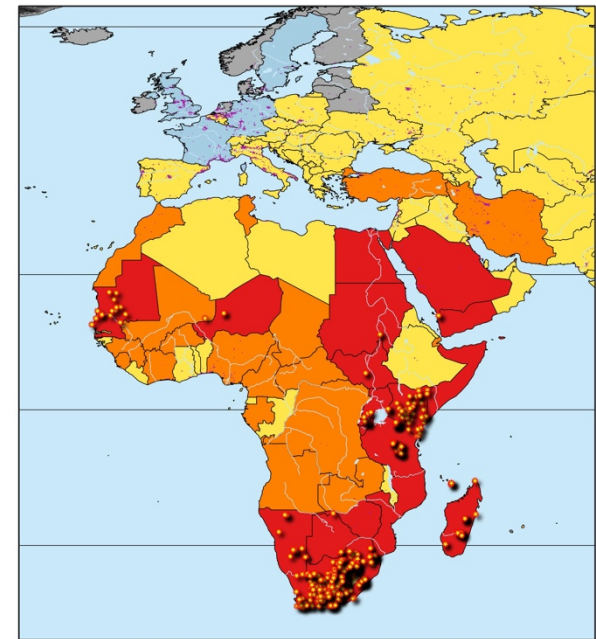
Automated shape file/ disease



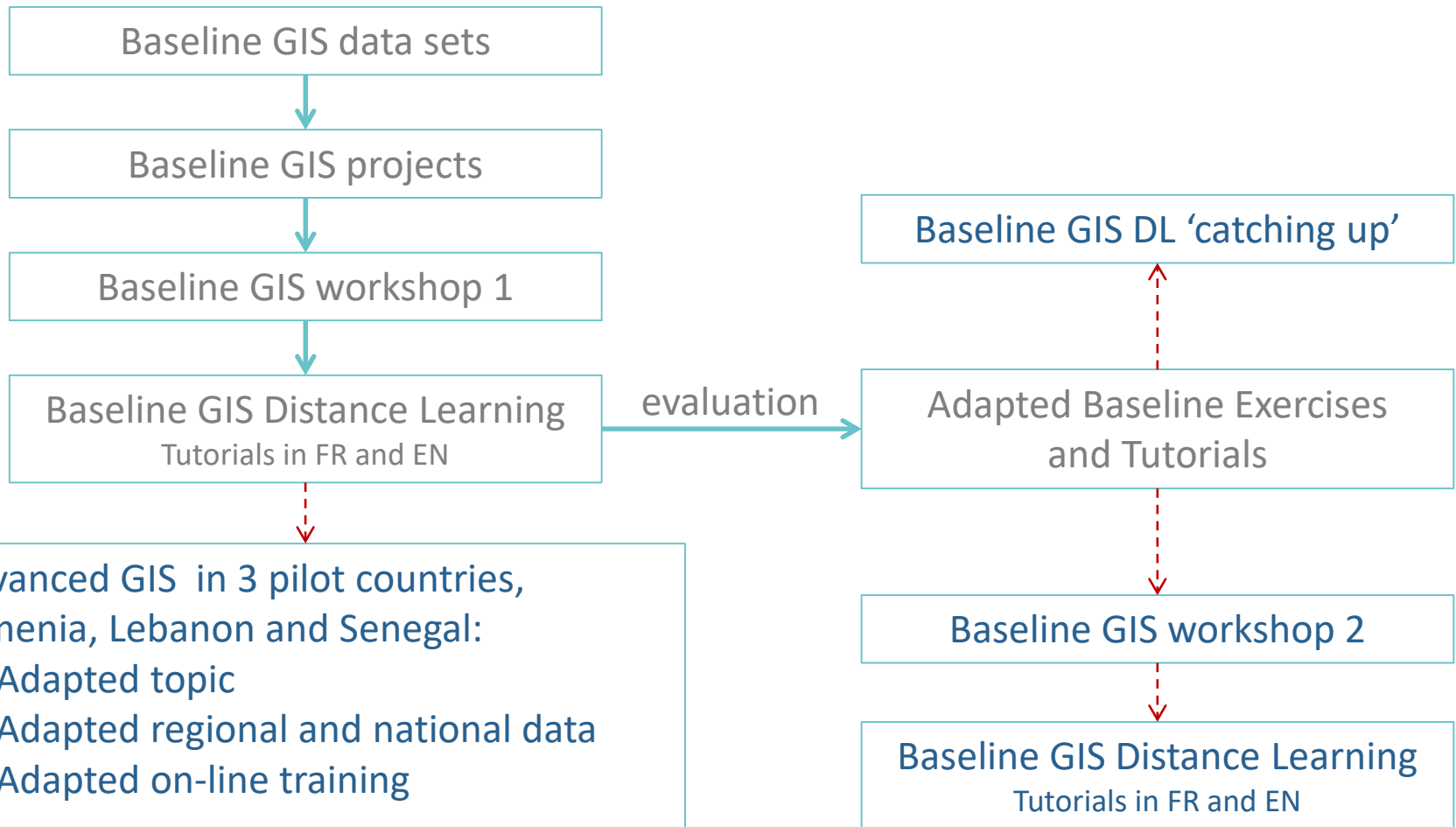
Next steps:

- Methodology/ data paper
- Further automation (a.o. through API's)

Country	Year	Animal	Pathogen	Observations	WHO Disease	Report Period	Notes	Status	Island	Species	Pathogen in country	Year of introduction	Surveillance	Cases	Deaths	Imported	Unreported	Prob. confirmed	Surveys	Climate	Surv.	Reported	Origin	Status
Madagascar	2000									Cattle														
Madagascar	2001									Sheep/Goats														
Madagascar	2002									Sheep/Goats														
Madagascar	2003									Sheep/Goats														
Madagascar	2004									Sheep/Goats														
Madagascar	2005									Sheep/Goats														
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Madagascar	2023									Sheep/Goats														
Madagascar	2024									Sheep/Goats														
Madagascar	2025									Sheep/Goats														



RVF: historical records



Advanced GIS in 3 pilot countries, Armenia, Lebanon and Senegal:

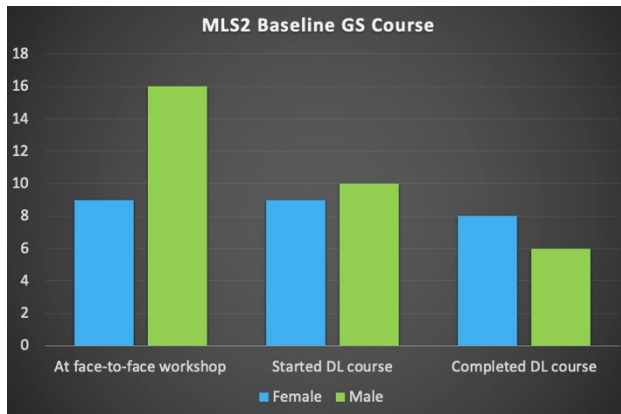
- Adapted topic
- Adapted regional and national data
- Adapted on-line training





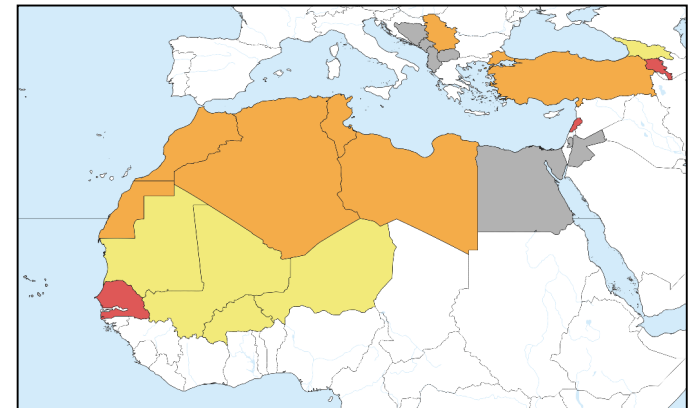


Building a solid baseline GIS in epidemiology capacity in all MediLabSecure countries



- 76% (19/25) participants continued with the e-distance learning (DL) training
- Of these, 74% (14/19) completed the DL
- Gender:
  - 89% (8/9) of the participating women completed the course
  - 60% (6/10) of the participating men completed the course
- All non-participants (6/25) are male and at a higher responsibility level: Director or Head of Department

MediLabSecure GIS status/country



- At least one participant completed the training
- No participant completed the training
- Pilot Countries
- Not yet had the opportunity to participate



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**THANK YOU!**