

# Vector surveillance and management at Points of Entry

7th Meeting - CASPCA-MIDDLE EAST PROJECT

(CAPSCA-MID/07)

*Cairo, Egypt*

*29-31 October, 2018*



World Health  
Organization

REGIONAL OFFICE FOR THE Eastern Mediterranean



# International Health Regulations (2005)



*“to **prevent, protect against, control and respond to an international spread of disease**, while avoiding **unnecessary interference with international traffic and trade** (Art. 2)”*



# International Health Regulations (2005)



- **Multi-hazard approach** (encompassing infectious, zoonotic, food safety, radio-nuclear and chemical causes)
- **Multisectoral nature** (health and non-health sectors)
- Emphasis on **national and international communication/coordination**





### 8 Areas of Work

- Legislation and Policy
- Coordination
- Surveillance
- Response
- Preparedness
- Risk Communications
- Human Resources
- Laboratories

### Potential Hazards

- Infections
- Zoonotic
- Food safety
- Chemical
- Radio nuclear

### Events at the Points of Entry

- Ports
- Airports
- Ground crossings

### Capacity Levels

- National
- Intermediate
- Local



# The International Health Regulations



## Annex 5

Para 1. WHO, shall publish, on a regular basis, a list of areas where disinsection or other vector control measures are recommended for conveyance arriving from these areas

Para 4. State Parties shall establish programmes to-control vectors that may transport an infectious agent that constitutes a public health risk to a minimum distance of 400 metres from those areas of point of entry facilities that are used by travellers, conveyances, containers, cargo and postal parcels



Arts. 22, 24, 27 and Annex 4, that PoEs are required to ensure that facilities used by travellers at points of entry are maintained in a sanitary condition and are kept free of source of infection and contamination, including vectors and reservoirs



Annex 3 and Annex 9 encompass technical requirements respectively on the vector surveillance and control with regard to ship inspection and those of disinsecting or sanitary treatment measures in aircrafts

## Vector and Vectorborne Diseases



# Vector Definition



- Article 1: “Definitions” - International Health Regulations (2005)
- Described as an *“insect or other animal which normally transports an infectious agent that constitutes a public health risk”*

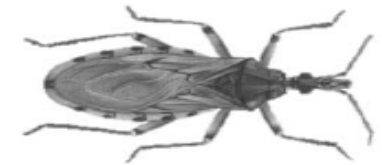
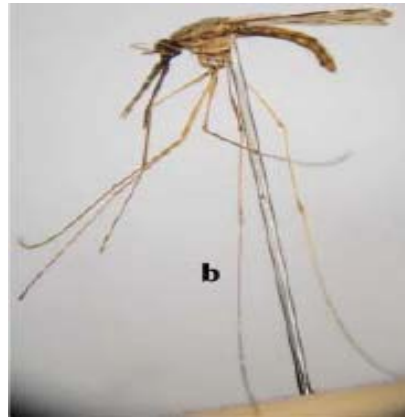
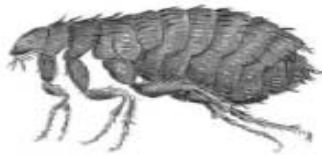


# Vectors of Note

- **Mosquitoes** - Malaria, Dengue, Chikungunya, Yellow fever, Plague, Leptospirosis
- **Fleas** – Plague, Murine typhus, Tularaemia
- **Sandflies** – Cutaneous & visceral leishmaniasis, bartonellosis, pappataci fever
- **Cockroaches** – mechanical vectors for diarrhoeal diseases, typhoid fever, dysentery and also cause asthma
- **Triatomines** – Chagas disease
- **Ticks** - Tick-borne encephalitis, Lyme Disease
- **Rodents**- Plague, Hantavirus, Rat-Bite Fever, murine typhus, leptospirosis



# Typical Vectors of Concern



*Control of disease vectors such as insects and rodents is necessary for the maintenance of health on board conveyances*

*Mosquitoes, rats, mice, cockroaches, flies, lice and rat fleas are all capable of transmitting disease*





# Public Health Risks posed by Vectors

- Large number of *vector borne* diseases
- Vary from mild symptoms to severe/fatal
- Can be directly spread (e.g. biting, faeces, urine)
- Could be indirectly spread (e.g. contamination of food by urine, faeces or mechanical action)



## PoE & Vector Surveillance in EMRO

- Joint External Evaluation (JEE): PoE.1 – Routine Capacities are established at Points of Entry, includes capacity of Vector Control Programme:
  - *“A functioning programme for the control of vectors and reservoirs in and near PoE exists (Annex 1b, Art. 1e)”*
- JEE Assessments done in 19/21 Member States – PoE 1 score ranges from 1-5, average is 3 due to a lack of a functioning programme vs control



# Vector Surveillance Programme

- International travel and transport contribute to dissemination & spread of vector borne diseases to countries & populations previously not at risk
- Surveillance Programs:
  - Reduce transmission risk of pathogens imported with vectors/reservoirs
  - Prevent dispersal of local vectors to other countries
- Plan should be adopted to specific POE parameters, considers epidemiological situation/risks at PoE, includes routine surveillance and control measures for response, trained staff & equipment



# PoE Surveillance



## VECTOR SURVEILLANCE AND CONTROL AT POE



# Example Mosquito Surveillance Record Form

## A7.2. Record format for surveillance of adult mosquitoes

Name of the port/airport/ground crossing:  
Type of collection: hand catch/spray sheet collection/CDC traps  
Time of collection:  
Date:

S. No.	Location where sample collected	Random or fixed station	Species with numbers								Remarks List species
			Anopheles		Culex		Aedes		Others (specify)		
			M	F	M	F	M	F	M	F	

M, Male; F, Female.

Average density per working hour (hand catch):  
Per room density (spray sheet collection):  
Per trap per night density (CDC trap collection):  
Total no. of containers found positive:

Actions taken: IRS/thermal/cold fogging/insecticide-treated materials used

Give details:

Signatures of field worker:

Signatures of field supervisor:

Signatures of port health officer:



Handbook

## Vector Surveillance and Control at Ports, Airports, and Ground Crossings



World Health  
Organization

International Health Regulations (2016)

- Provides **technical guidance** to state parties with a view to meeting obligations of IHR (2005).
- Contains **technical advice** for developing a comprehensive programme for **systemic monitoring** of vectors and for integrated vector control at PoE.
- Reference material by Port Health Officers, Regulators, Port Operators and other competent authorities implementing these provisions under IHR (2005).

# Vector Surveillance Plans

- Depend on the current epidemiological situation and risk of importation/exportation of vectors and their associated pathogens at PoE
- Situation in and around PoE will continually evolve with respect to disease vectors, and seasonal variability may also influence disease transmission risk
- Establish a **routine surveillance plan**
- Establish an **emergency surveillance plan** for rapid action



# Essential Elements of Vector Surveillance

- Professionally **trained staff** for laboratory and field services with required knowledge and skills
- **Access to laboratory** with infrastructure, equipment, and recurring requirements of chemicals, reagents, glassware, and plastic-ware;
- **Methods of surveillance** of mosquitoes (immature and adult), sandflies, rodents, etc. and also shipboard surveillance if necessary for mosquitoes, flies, sandflies, cockroaches, and rodents;
- **Surveillance methodology SOPs** for each type, piece of equipment used and time intervals, etc;
- **PPE** to be available at all times (Annex 1).





# Field Operations for Surveillance

- identification of target vector and extent of public health threat
- assessment of the extent of invasion, adaptation, breeding, and capacity to become established within local ecosystem
- geographical spread in the local environment
- collection of field samples
- preservation of samples
- transportation of samples to the laboratory



# Field Operations for Surveillance

- identification of sample in local laboratory or transportation of sample to a designated referral laboratory within the country or overseas
- follow-up plan for re-surveillance/recurrent surveillance and its frequency
- preparation of surveillance report
- discussion on surveillance report and initiation of routine control action in normal circumstances or rapid action/response in case of an emergency.



# The Global Strategic Framework for IVM

- Advocacy, social mobilization, regulatory control for public health and empowerment of communities.
- Collaboration within the health sector and with other sectors through the optimal use of resources, planning, monitoring and decision-making.
- Integration of non-chemical and chemical vector control methods, and integration with other disease control measures.
- Evidence-based decision making guided by operational research and entomological and epidemiological surveillance and evaluation.
- Development of adequate human resources, training and career structures at national and local level to promote capacity building and manage IVM programmes



# Integrated Vector Management

- A rational decision-making process for the optimal use of resources for vector control» and includes five key elements:
  1. evidence-based decision-making
  2. integrated approaches
  3. collaboration within the health sector and with other sectors
  4. advocacy, social mobilization, and legislation
  5. capacity-building



# Vector Control Methods

- **Mechanical**

- Rat Guards
- Clock-face holes drilled in tires
- Covering of standing water locations
- Traps (e.g. Cockroaches, Flies, rats)
- Screening of portholes/doors

- **Chemical:**

- Sprays
- Fumigation
- Poison bait

- **Environmental management**

- Source reduction
- Habitat modification & manipulation

- **Biological control**

- Biological larvicides
- Larvivorous fish

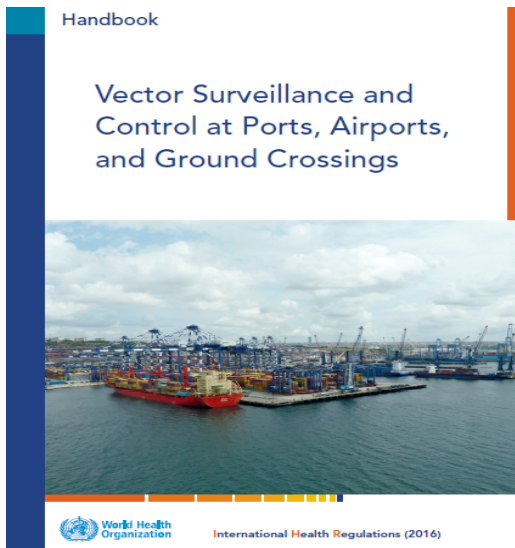


# Integrated Vector Management (IVM)

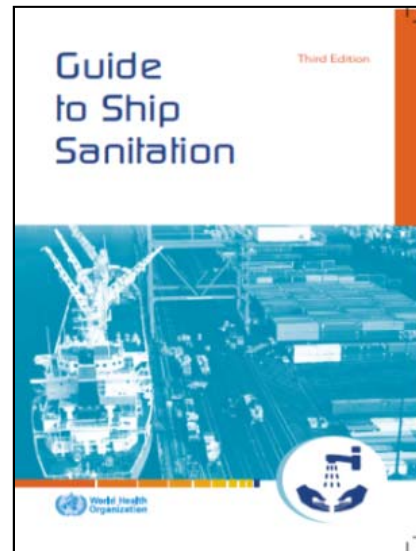
- Decision-making process for the optimal use of resources for vector control - improve the efficacy, cost-effectiveness, ecological soundness and sustainability of disease-vector control.
  - overcome challenges experienced with conventional single-intervention approaches
  - promoting multi-sectoral approaches to human health.
- EMRO project – advocacy and training for PoE HR



# Guidance

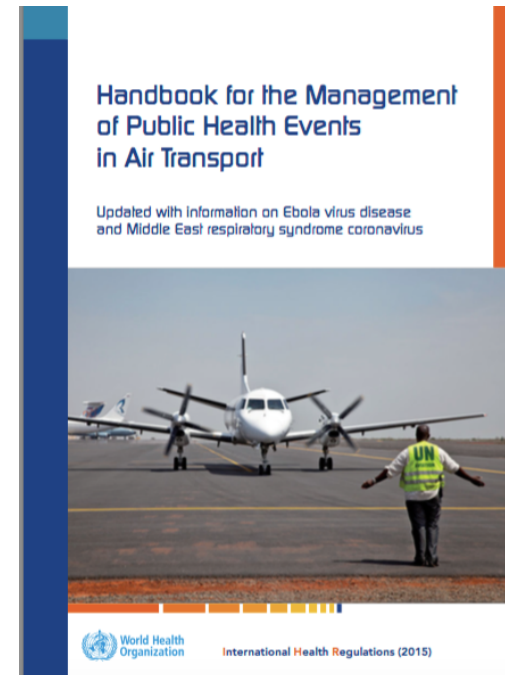


<http://www.who.int/ihr/publications/9789241549592/en/>



Chapter 7 Vector and reservoir control

[http://www.who.int/water\\_sanitation\\_health/publications/2011/ship\\_sanitation\\_guide/en/](http://www.who.int/water_sanitation_health/publications/2011/ship_sanitation_guide/en/)



[http://www.who.int/ihr/publications/9789241510165\\_eng/en/](http://www.who.int/ihr/publications/9789241510165_eng/en/)



# Further Resources and Learning

- PAGNet – Vector Identification Platform
- WHO open learning <https://openwho.org/courses>
- CDC (USA) Vector borne disease courses <https://www.cdc.gov/nceh/ehs/elearn/vcehp.html>

**PAGNet** Ports, Airports and Ground Crossings Network



Welcome to OpenWHO





# Vector Identification Platform

- Platform for PoE Vector Identification – uniquely addresses the needs of PoE to rapid identify vectors and initiate mitigation measures on board or within the vicinity.
- Essential tool for capacity building & ensuring IHR compliance – field tested across WHO Regions and further elaborated
- Users select unique features of the vector through a guided process to narrow down vector identity



# Platform Outcomes

- Help countries to rapidly identify disease vectors at PoE, track basic changes in local vector populations that may indicate the spread of potential vectors to new areas, and direct prevention vector control efforts at PoE to ensure the correct methods of vector control are used to stop the spread of vector borne disease
- Vectors Include:
  - Identification of relevant mosquito vectors of disease (malaria, dengue, Chikungunya, Zika, yellow fever, etc.)
  - identification of rats which may serve as reservoirs for plague and relevant flea vectors.
  - Identification of ticks and flies, important vectors of tick borne encephalitic diseases and haemorrhagic fevers, and flies which may transmit many bacterial pathogens.
- Link entomological data from PoE with other information on spread of disease, and to direct needed vector control interventions at PoE.

