ROLE OF LABORATORY IN ZOONOSES CONTROL PREPARADNESS AND RESPONSE

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Pertemuan Ilmiah Epidemiologi Nasional Ke-6
Solo, 9 September 2016

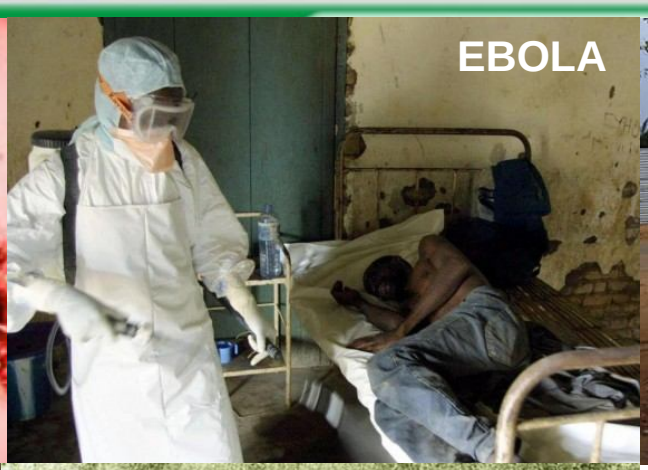
BALAI BESAR PENELITIAN DAN PENGEMBANGAN VEKTOR DAN RESERVOIR PENYAKIT
BADAN PENELITIAN DAN PENGEMBANGAN KESEHATAN
Kementerian Kesehatan RI

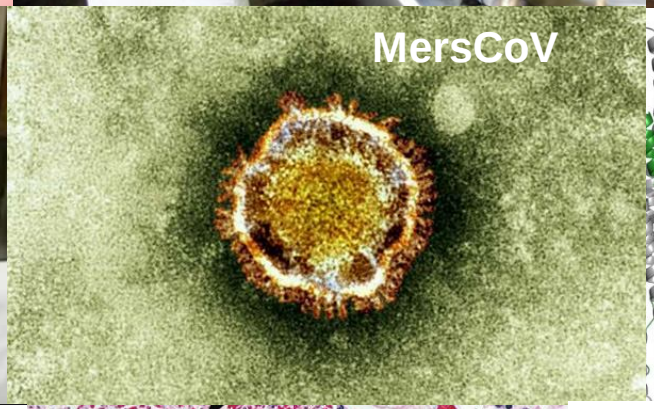
OUTLINE

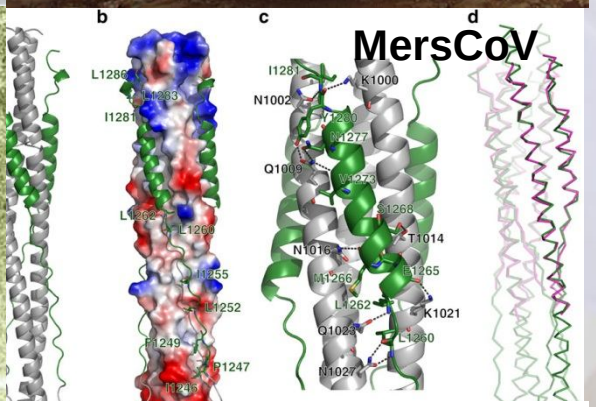
1. Overview of zoonotic diseases
2. Priority of zoonotic diseases prevention
3. Core capacity laboratory
4. Balai Besar Litbang VRP-Salatiga, Badan Litbang Kesehatan, Kementerian Kesehatan
5. Example of comprehensive studies
5. Resume

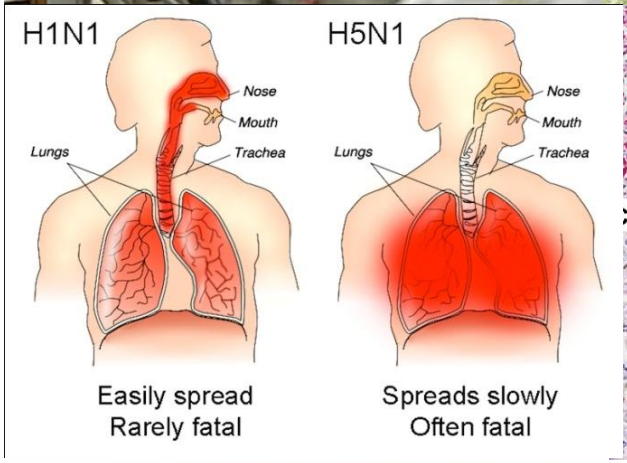
1. Overview of zoonotic diseases

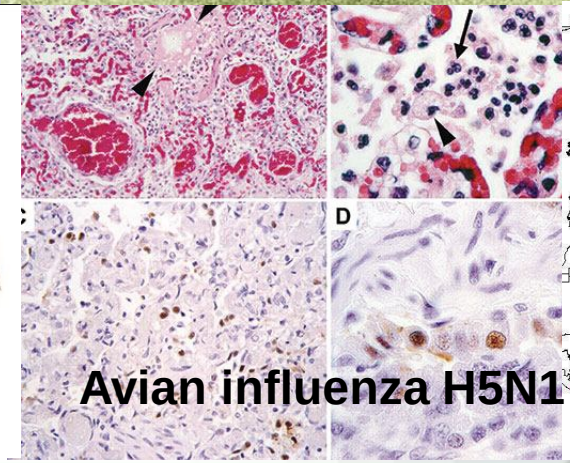
- The threat of zoonotic diseases globally and nationally is very high (> 70% of global EID is vector and reservoirs borne diseases);
- Bio-diversity of fauna in Indonesia is complex due to bio-geographical conditions (Oriental and Australian regions) cause local hot spot natural zoonosis;
- Baseline data related vectors and reservoirs of zoonotic is not quite complete;

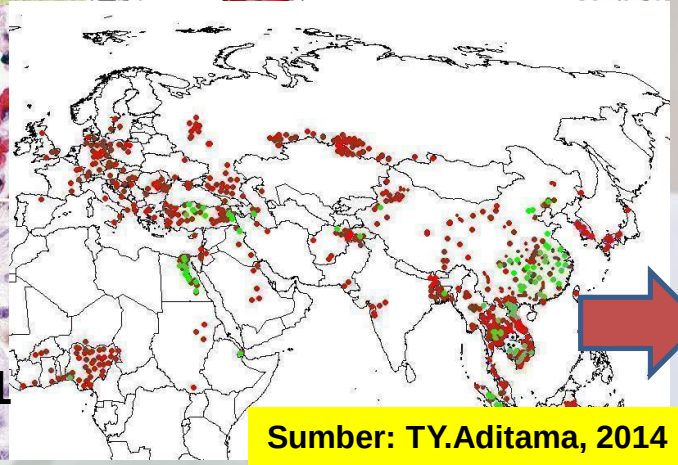






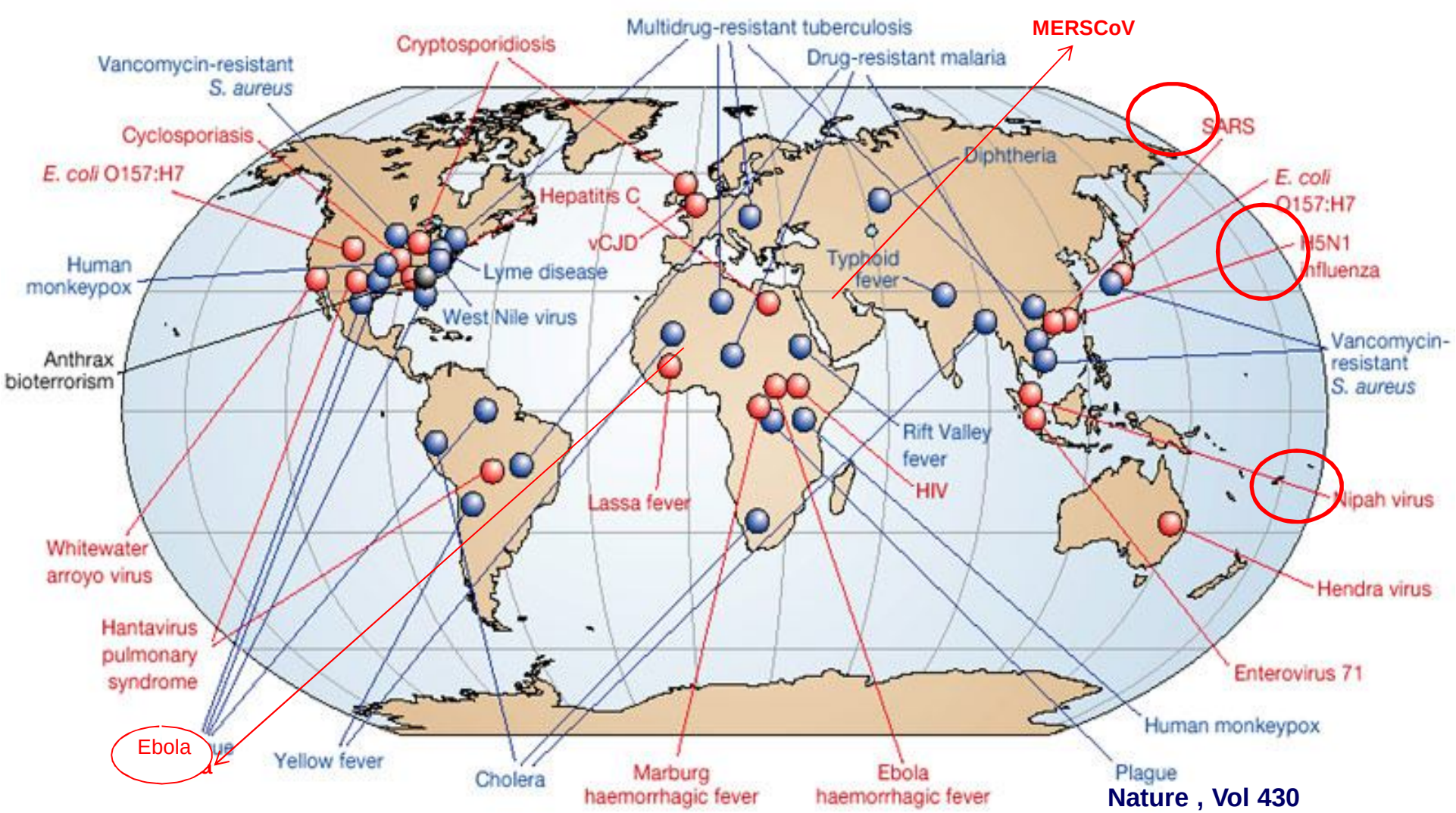




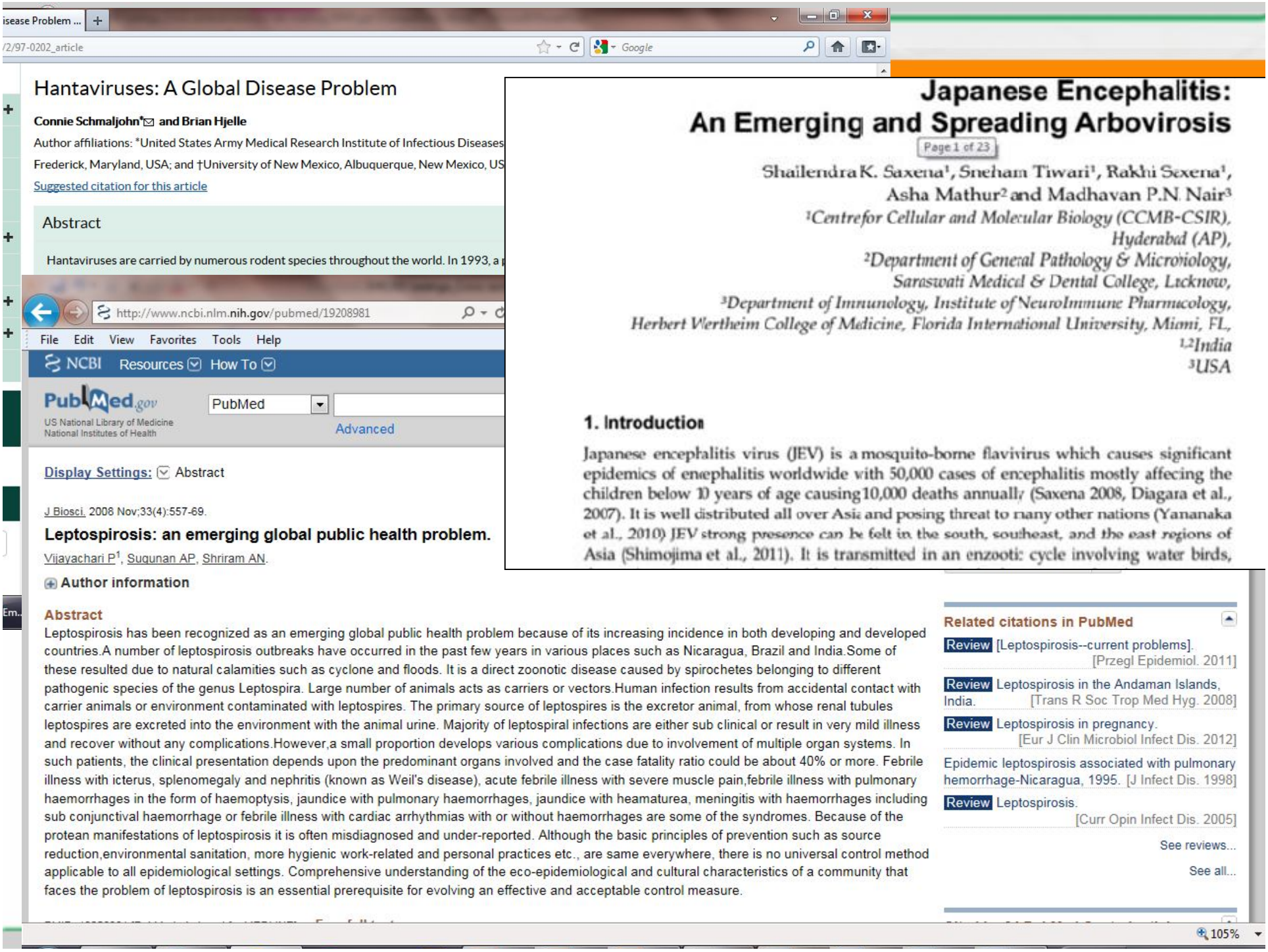


Sumber: TY.Aditama, 2014

Recent Emerging Infectious Diseases



Nature , Vol 430 ,2004



Hantaviruses: A Global Disease Problem

Connie Schmaljohn*✉ and Brian Hjelle

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Frederick, Maryland, USA; and †University of New Mexico, Albuquerque, New Mexico, US

Suggested citation for this article

Abstract

Hantaviruses are carried by numerous rodent species throughout the world. In 1993, a

Japanese Encephalitis:
An Emerging and Spreading Arbovirosis

Page 1 of 23

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[3]USA

1. Introduction

Japanese encephalitis virus (JEV) is a mosquito-borne flavivirus which causes significant epidemics of encephalitis worldwide with 50,000 cases of encephalitis mostly affecting the children below 10 years of age causing 10,000 deaths annually (Saxena 2008, Diagara et al., 2007). It is well distributed all over Asia and posing threat to many other nations (Yananaka et al., 2010) JEV strong presence can be felt in the south, southeast, and the east regions of Asia (Shimojima et al., 2011). It is transmitted in an enzootic cycle involving water birds,

http://www.ncbi.nlm.nih.gov/pubmed/19208981

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Display Settings: Abstract

J Biosci. 2008 Nov;33(4):557-69.

Leptospirosis: an emerging global public health problem.

Vijayachari P[1], Sugunan AP, Shriram AN.

Author information

Abstract

Leptospirosis has been recognized as an emerging global public health problem because of its increasing incidence in both developing and developed countries.A number of leptospirosis outbreaks have occurred in the past few years in various places such as Nicaragua, Brazil and India.Some of these resulted due to natural calamities such as cyclone and floods. It is a direct zoonotic disease caused by spirochetes belonging to different pathogenic species of the genus Leptospira. Large number of animals acts as carriers or vectors.Human infection results from accidental contact with carrier animals or environment contaminated with leptospires. The primary source of leptospires is the excretor animal, from whose renal tubules leptospires are excreted into the environment with the animal urine. Majority of leptospiral infections are either sub clinical or result in very mild illness and recover without any complications.However,a small proportion develops various complications due to involvement of multiple organ systems. In such patients, the clinical presentation depends upon the predominant organs involved and the case fatality ratio could be about 40% or more. Febrile illness with icterus, splenomegaly and nephritis (known as Weil's disease), acute febrile illness with severe muscle pain,febrile illness with pulmonary haemorrhages in the form of haemoptysis, jaundice with pulmonary haemorrhages, jaundice with heamaturea, meningitis with haemorrhages including sub conjunctival haemorrhage or febrile illness with cardiac arrhythmias with or without haemorrhages are some of the syndromes. Because of the protean manifestations of leptospirosis it is often misdiagnosed and under-reported. Although the basic principles of prevention such as source reduction,environmental sanitation, more hygienic work-related and personal practices etc., are same everywhere, there is no universal control method applicable to all epidemiological settings. Comprehensive understanding of the eco-epidemiological and cultural characteristics of a community that faces the problem of leptospirosis is an essential prerequisite for evolving an effective and acceptable control measure.

Related citations in PubMed

Review [Leptospirosis--current problems]. [Przegl Epidemiol. 2011]

Review Leptospirosis in the Andaman Islands, India. [Trans R Soc Trop Med Hyg. 2008]

Review Leptospirosis in pregnancy. [Eur J Clin Microbiol Infect Dis. 2012]

Epidemic leptospirosis associated with pulmonary hemorrhage-Nicaragua, 1995. [J Infect Dis. 1998]

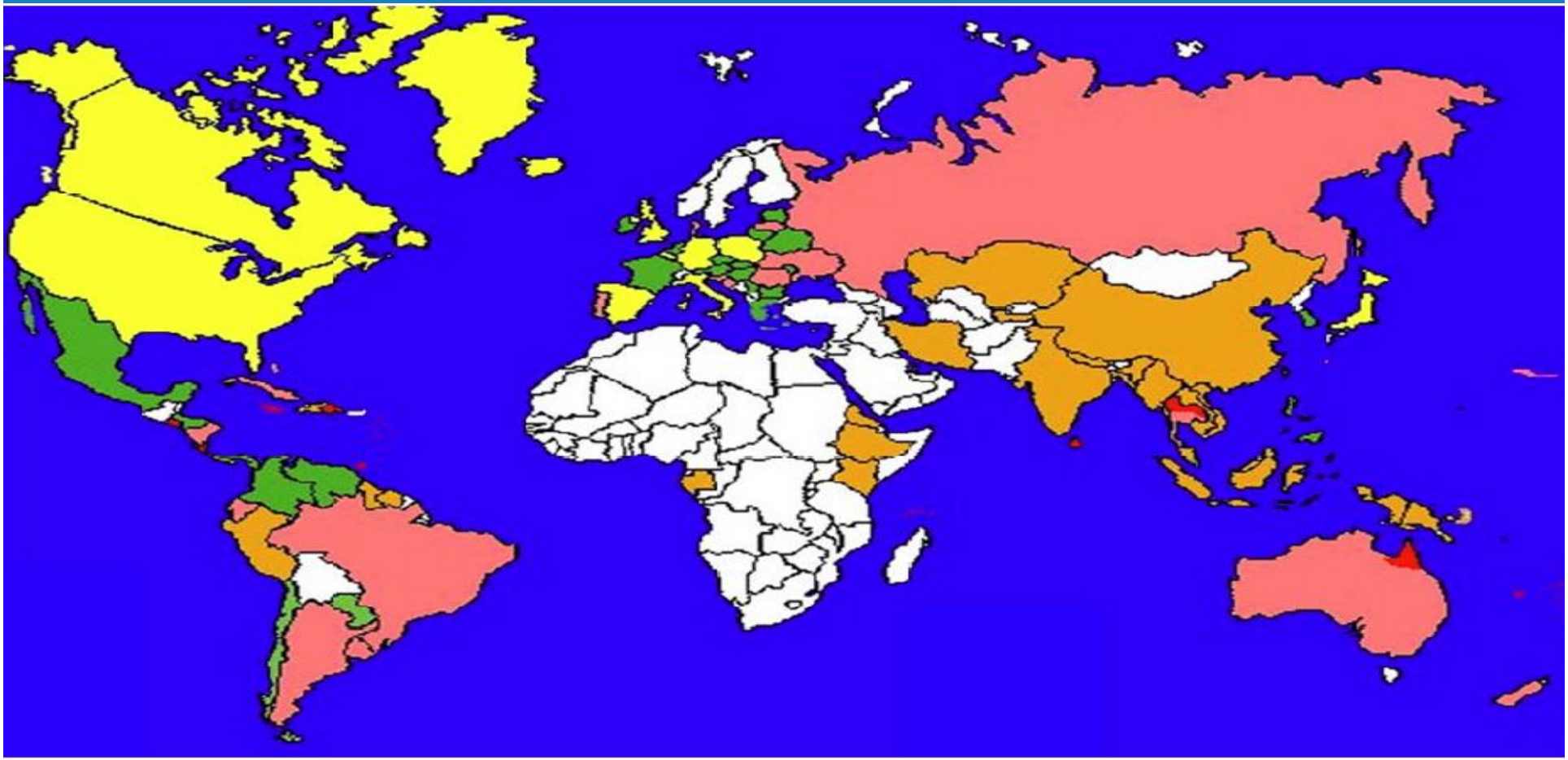
Review Leptospirosis. [Curr Opin Infect Dis. 2005]

See reviews...

See all...

105%

Geographical Distribution of Leptospirosis



Global annual incidence of human leptospirosis. Colors reflect incidence, in declining order: red, pink, green, yellow. Gold reflects areas with probable, but not estimated, high incidence. White reflects absence of data.

Source : http://www.ijidonline.com/article/S1201-9712%2807%2900195-6/fulltext (Ioana univ-USA)- International journal of infectious diseases

Geographical distribution JEV

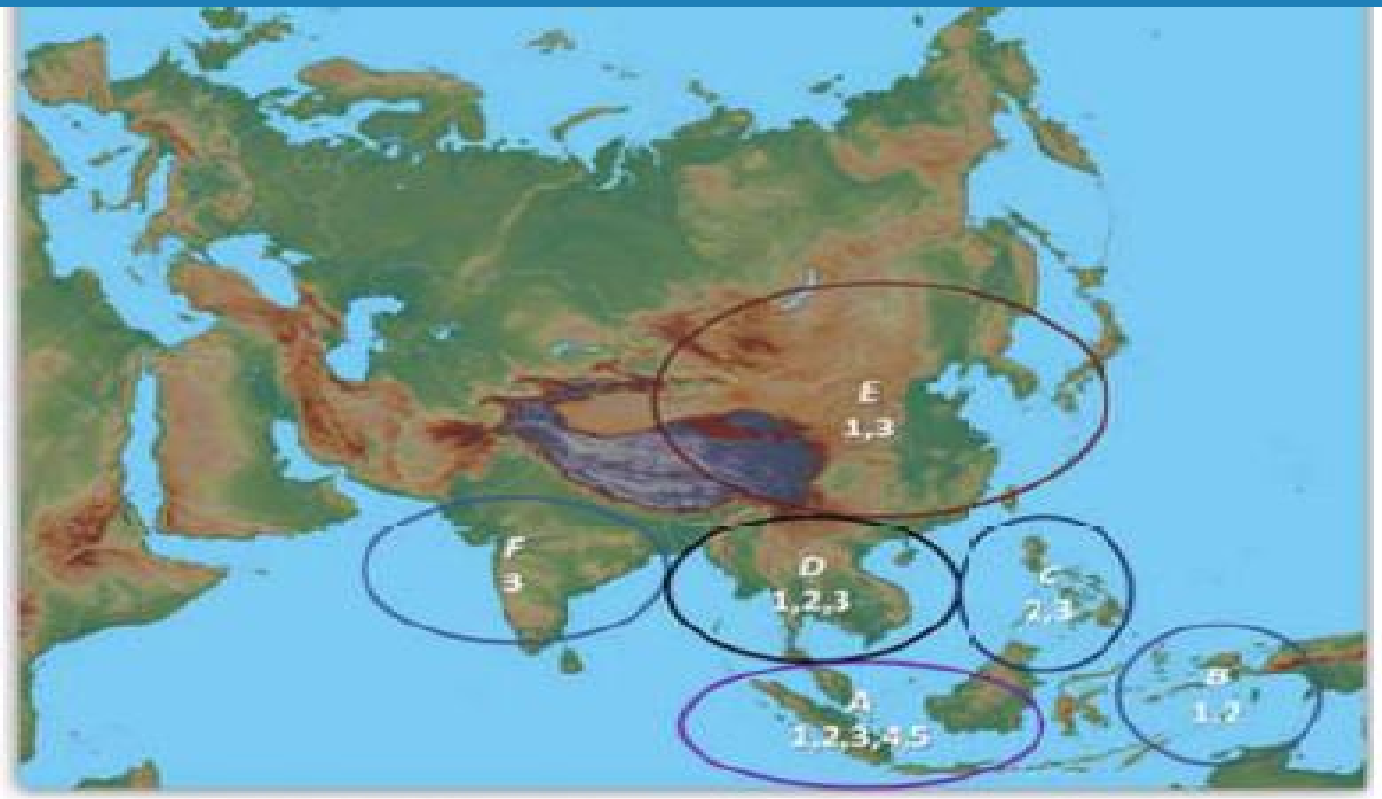
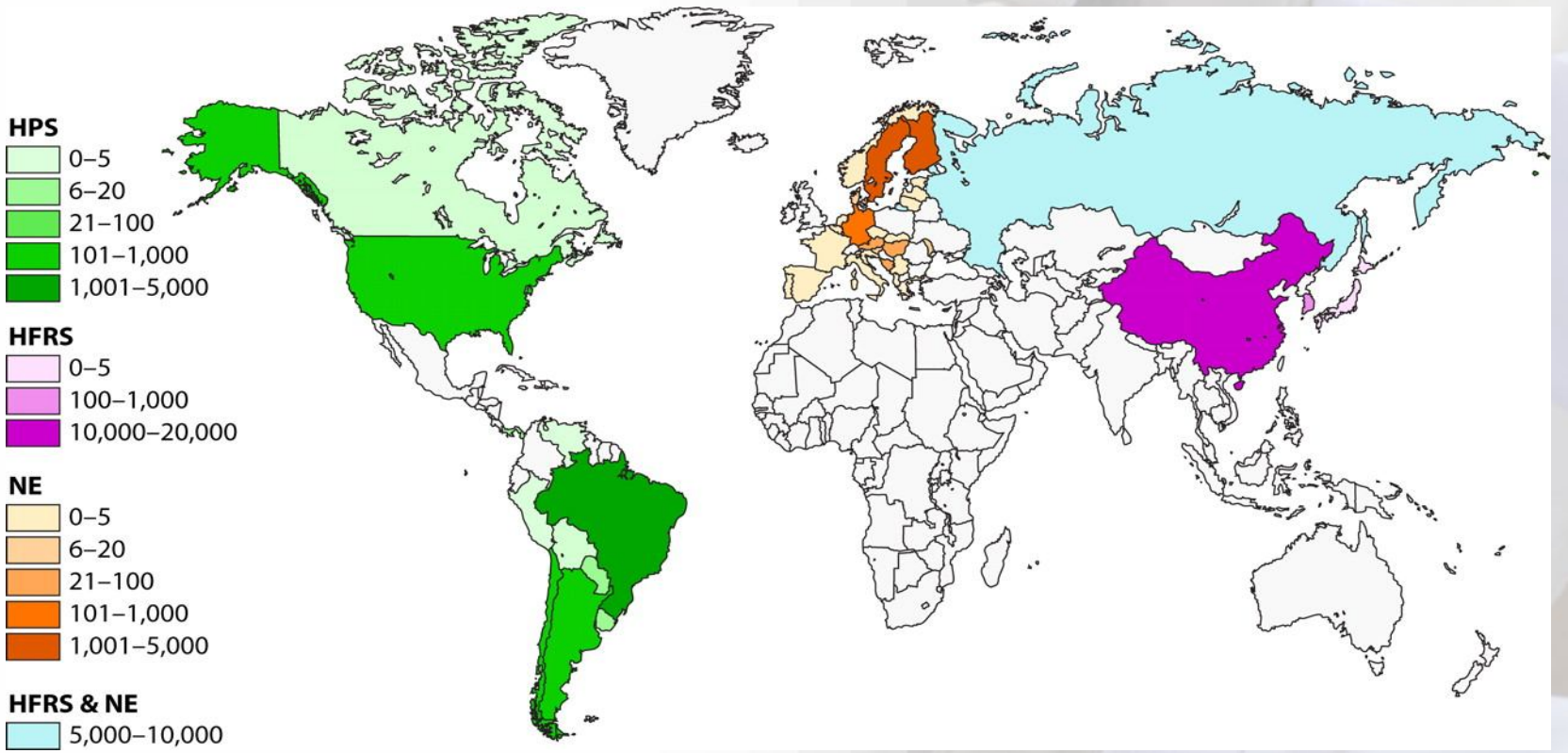


Fig. 3. The geographical distribution and spread of JEV genotypes. Countries are grouped into geographical regions: A, Indonesia (excluding New Guinea) and Malaysia; B, Australia and New Guinea; C, Taiwan and the Philippines; D, Thailand, Cambodia, and Vietnam; E, Japan, Korea, and China; F, India, Sri Lanka, and Nepal. Region A contains all genotypes of JEV, including the oldest. The newer genotypes (I, II, and III) have subsequently spread to other geographical areas. (Source: Solomon et al., 2003)

Sources :
http://www.intechopen.com/books/flavivirus-encephalitis/japanese-encephalitis-an-emerging-and-spreading-arbovirosis

Geographical representation of approximate **hantaviral** disease incidence by country per year.



Source : http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2863364/

Courtesy of Douglas Goddin, Kansas State University


Wallace Line (after Huxley)
Luzon
Mindoro
Palawan
Mindanao
Wallace Line (after Mayr)
Weber Line
Lydekker Line
Orientalis
Wallacea
Borneo
Sumatra
New Guinea
Bali
Lombok
Sulawesi
Australia

ISSUES

COMMUNITY CASES	Vector / Reservoir (+)	Vector / Reservoir (-)
Diseases (+)	P	Q
Diseases (-)	R	S

IVRM Model

Surveillance Model

Source: Trihono, 2013

PRIORITY OF ZOONOTIC DISEASES PREVENTION

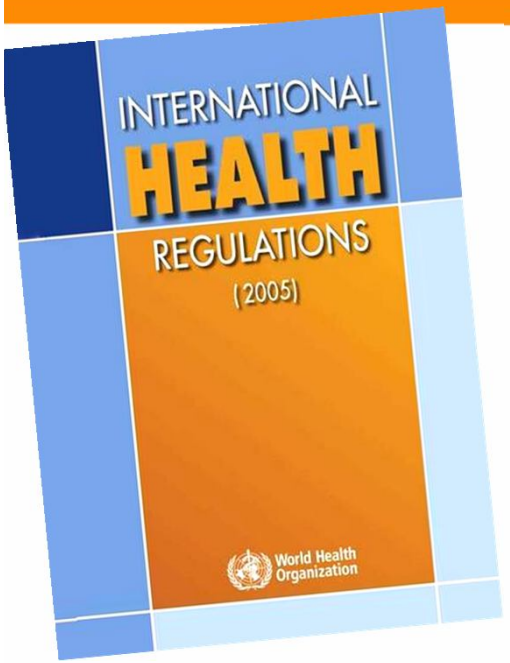
MINISTRY OF HEALTH:

1. **Avian Influenza**
2. DBD
3. Malaria
4. **Rabies**
5. **Japanesee encephalitis**
6. Filariasis
7. **Antraks**
8. **Leptospirosis**
9. **Pes**
10. Brucellosis

MINISTRY OF AGRICULTURE:

1. **Avian Influenza**
2. **Rabies**
3. **Antraks**
4. **Japanesee encephalitis**
5. Salmonellosis
6. **Leptospirosis**
7. Bovine Tuberculosis
8. **Pes**
9. Toxoplasmosis dan
10. Brucellosis

International public health security is the goal



*Came into force on 15 June 2007**

Ensuring maximum public health security
while minimizing interference with international transport and trade

Legally binding for WHO and the world's countries that have agreed to play by the same rules to secure international health.

** A later date applies to States that have submitted reservations*

Source: WHO, 2014

IHR (2005) Core Capacities

Core Capacities :

- Policy and legislation
- Risk Communication
- Coordination
- **Surveillance**
- Human Resource
- **Laboratory**
- Response

- **Detection**
- Verification
- Investigation
- Report
- Response

Capacity for control of emerging diseases, food safety, zoonosis, chemical, radiology

Capacities at Point of Entry

Indonesia has declared not to require extension for IHR (2005) implementation -> capacity building for operational and maintenance of IHR 2005.

Source: WHO, 2014

Core Capacity Laboratory

- **Laboratory Services**
- **Sample collection and transport**
- **Data Management and reporting systems**
- **Biosafety and Biosecurity**
- **Quality Assurance**

Source: WHO, 2014

Role of Laboratory Services

Involving health decision intervention

Evidence based decision making

Integral part of public health

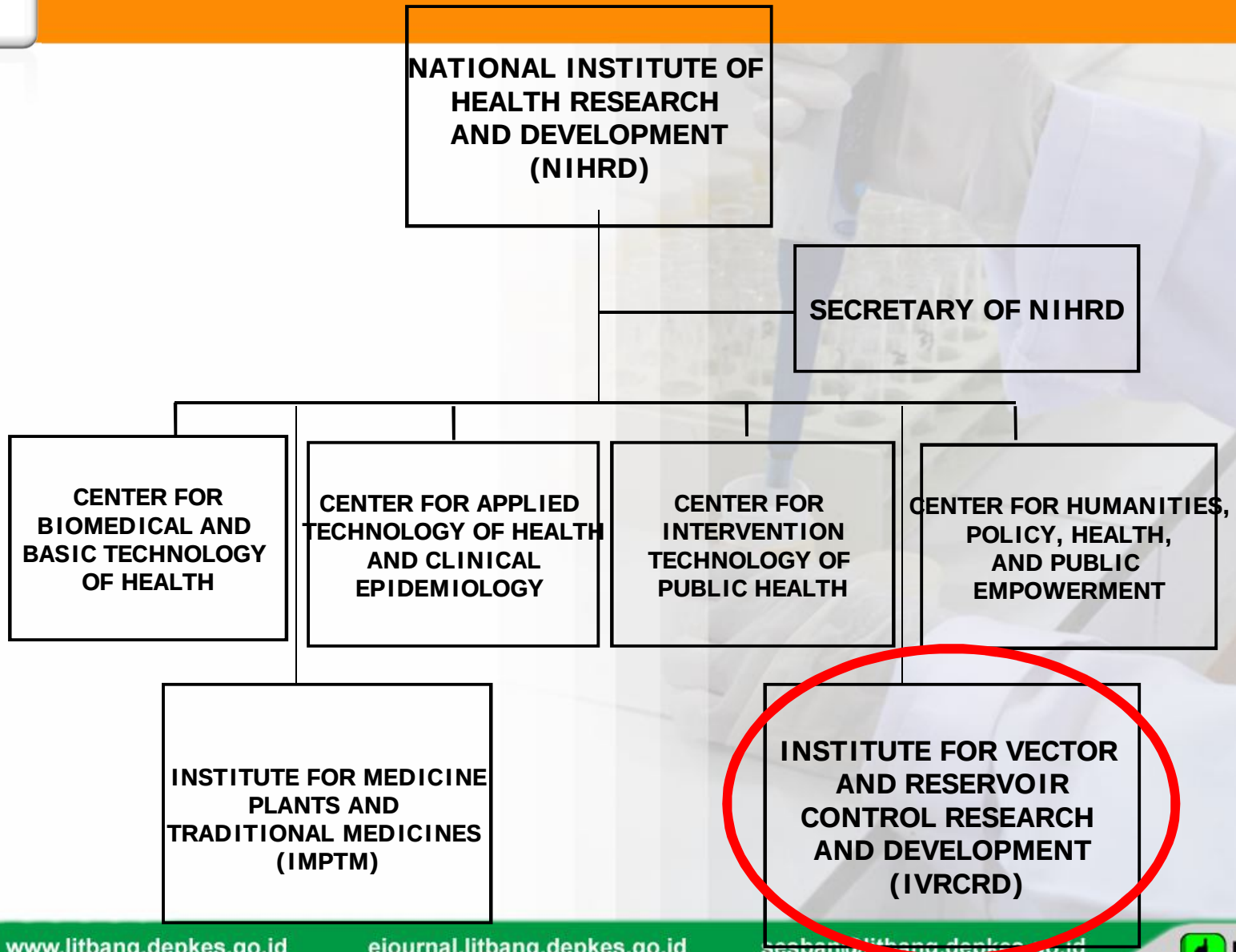
Clinical and public health function

Vital support and facilitate the initiation and monitoring of appropriate clinical and public health interventions.

Source: WHO, 2014


KEMENTERIAN KESEHATAN R.I.
BADAN PENELITIAN DAN PENGEMBANGAN KESEHATAN
BALAI BESAR PENELITIAN DAN PENGEMBANGAN
VEKTOR DAN RESERVOIR PENYAKIT

THE ORGANIZATIONAL STRUCTURE OF NATIONAL INSTITUTE OF HEALTH RESEARCH AND DEVELOPMENT



Vector borne diseases and zoonosis control

Plague
Leptospirosis
Hantavirus

Nipah
Rabies

Dengue

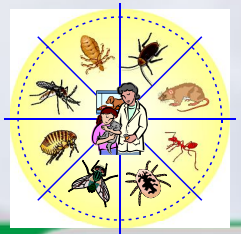
Malaria
Japanese encephalitis
Filariasis
Chikungunya

www.litbang.depkes.go.id

www.b2p2vrp.litbang.depkes.go.id

Laboratories

- MOLECULAR BIOLOGY AND IMMUNOLOGY
- PARASITOLOGY
- MICROBIOLOGY
- MAMALOGY
- BIOLOGICAL CONTROL
- ANIMAL LAB.
- BOTANICAL PESTICIDE
- EPIDEMIOLOGY AND GIS
- INSECTICIDE EVALUATION
- HEALTH PROMOTION
- COLLECTION AND REFFERENCE
- MOSQUITOES COLONY INSECTARIUM (SUSSCEPTIBLE AND RESISTENT)
- FLIES INSECTARIUM
- COCKROACH INSECTARIUM



Integrated Laboratory

IVRCRD SALATIGA

Institute for Vector and Reservoir Research and Development

NIHRD - Ministry of Health

a. Tupoksi B2P2VRP

Permenkes RI No.1353/ Menkes/Per/IX/2005 tentang SOTK B2P2VRP2

Melaksanakan perencanaan, koordinasi, pelaksanaan dan evaluasi **penelitian dan pengembangan** dalam penanggulangan penyakit tular vektor dan reservoir, yang baru dan yang akan timbul kembali.

b. Konsep

www.b2p2vrp.litbang.depkes.go.id

Research priority - IVRCRD/B2P2VRP

ATM Plus

- (Tuberkulosis)
- Malaria
- Dengue

NEGLECTED

- Hanta
- JE
- Cikungunya
- Filariasis
- Pes
- Leptospirosis

Others VRBDs

- Scrub thypus
- Murine thypus
- Meliodiosis

Laboratoy and Research Activities Results

1. Leptospirosis Studies (2004-2015)

- Leptospirosis Epidemiology
  - Reservoir
  - Agent of leptospirosis
  - Environmental Risk Factors
- Leptospirosis Control
- Rodent Control
- Molecullar Epidemiology
- Mollecullar Diagnosis

www.litbang.depkes.go.id www.b2p2vrp.litbang.depkes.go.id

Research sites:
Type of leptospirosis areas in Indonesia

Environment, Host-Reservoir and Risk Factors

Demak District

Risk Factor

Occupation related to the dirty places, wetlands and rivers;

Rat infestation

Reservoir

R.norvegicus, R. tanezumi dan R. exulans

Serovar

Autumnalis & L. Icterohaemorrhagiae dan Bataviaea

Klaten District

Risk Factor

Housewife and domestic workers (*EI*, 2005)

Sugar cane plantation farmer

Reservoir

R. tanezumi

Serovar

Autumnalis & Icterohaemorrhagiae dan Bataviaea

Purworejo

Risk Factor

Rice-field Farmers

Reservoir

R. tanezumi

Serovar

Autumnalis

Kulonprogo, DIY

Risk Factor

Farmers; coconut-palm plantation farmer

Reservoir

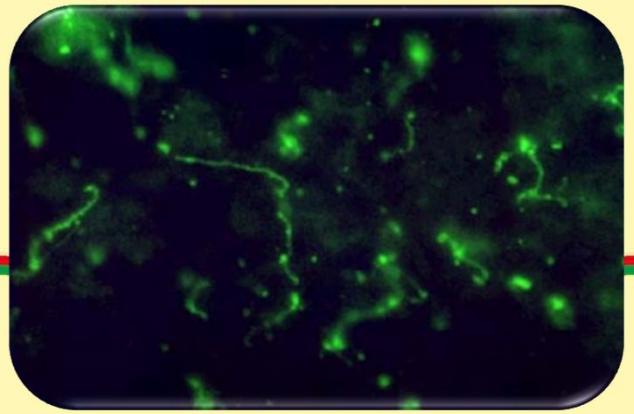
R. tiomanicus

Serovar

Icterohaemorrhagia dan Bataviaea

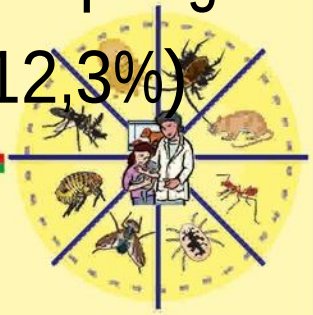
Leptospirosis Outbreak in Sampang District? (Madura-East Java)

Collaboration IVRCRD/B2P2VRP
National Institute of Health Research and Development
and
Sub-Directorate of Zoonoses
Directorate General of DC-EH

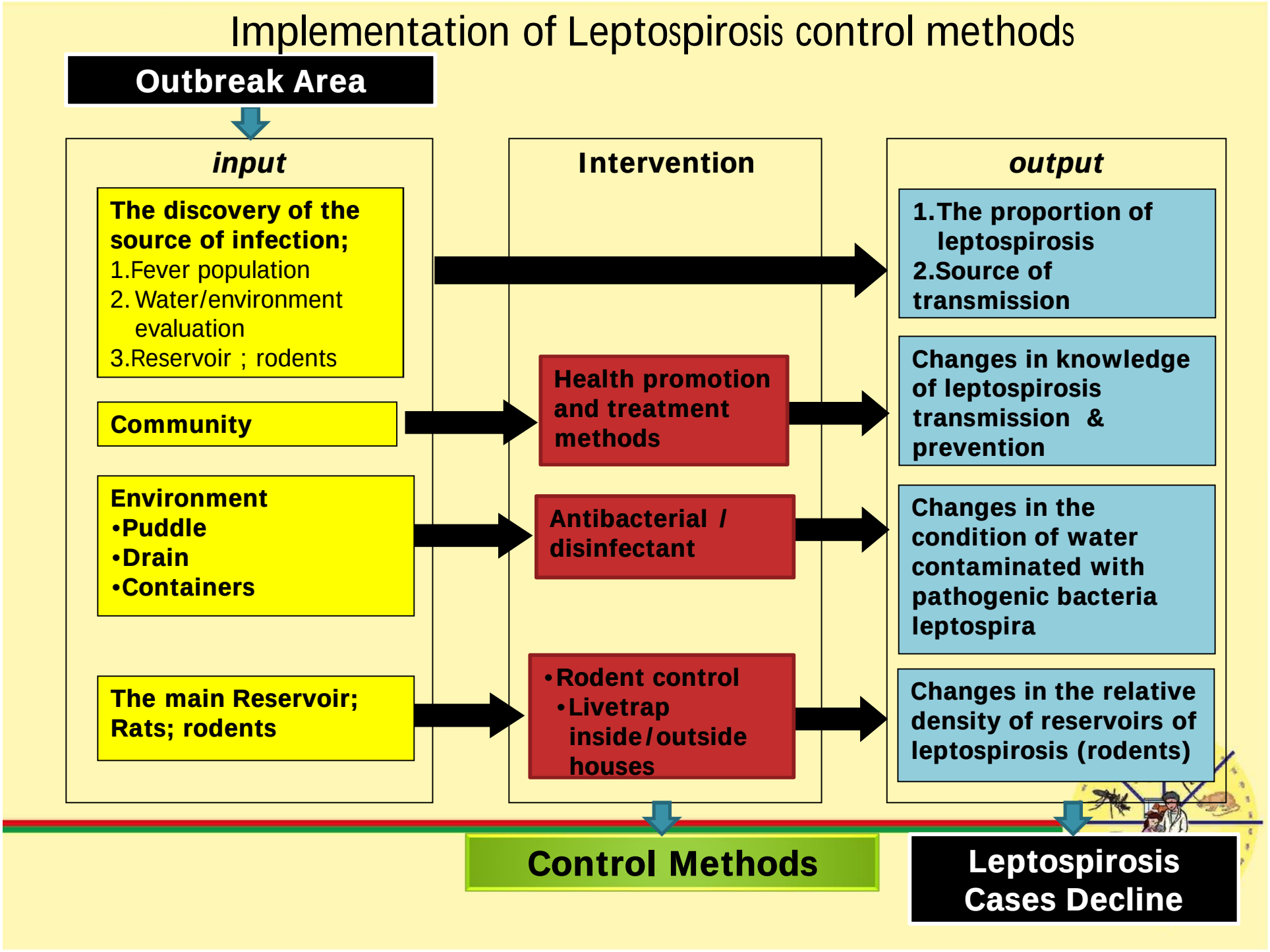


SITUATION OF SAMPANG LEPTOSPIROSIS OUTBREAK

- April 8, 2013 - Big flood (10Y cycle)
- April 10, 2013 - leptospirosis cases suspect (2 cases)
- April 12, 2013 – one suspect died
- April 24, 2013 – 21 cases were reported
- April 27, 2013 – 4 probables died; Outbreak announced
- April 29, 2013 – IVRCRD informed by Zoonosis sub-directorate
- April 30, 2013 – Outbreak team departed to Sampang
- May 4, 2013 – 65 cases reported, 8 died (CFR 12,3%)

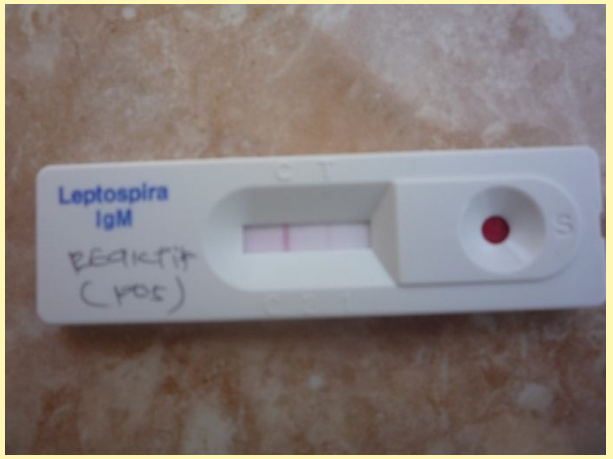


Implementation of Leptospirosis control methods

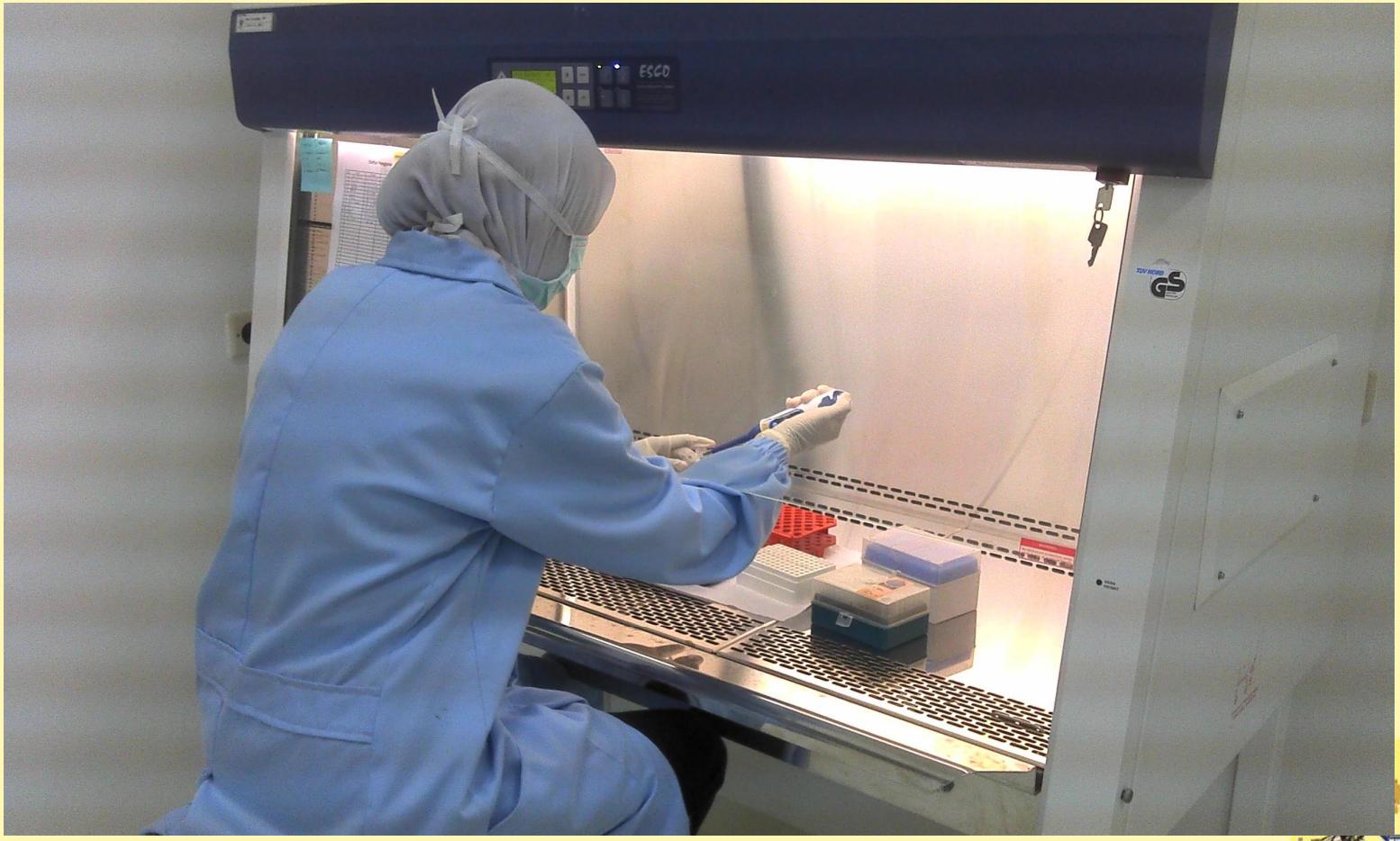


I. Discovery of the source of infection

Rapid diagnostic test

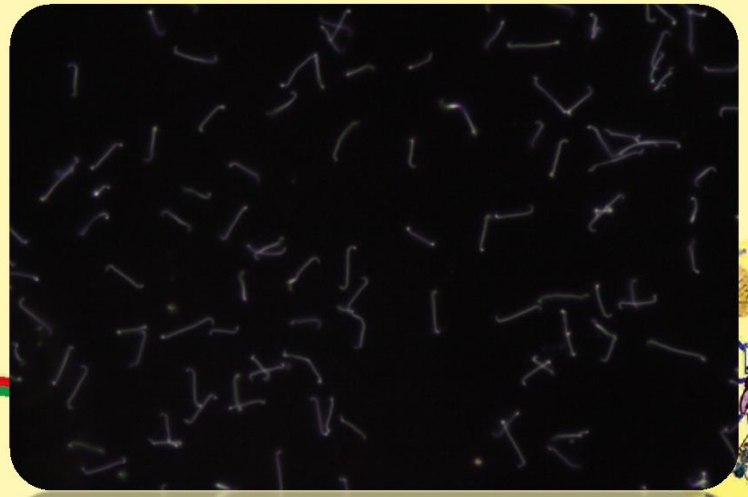


Leptospirosis laboratory (IVRCRD Salatiga)

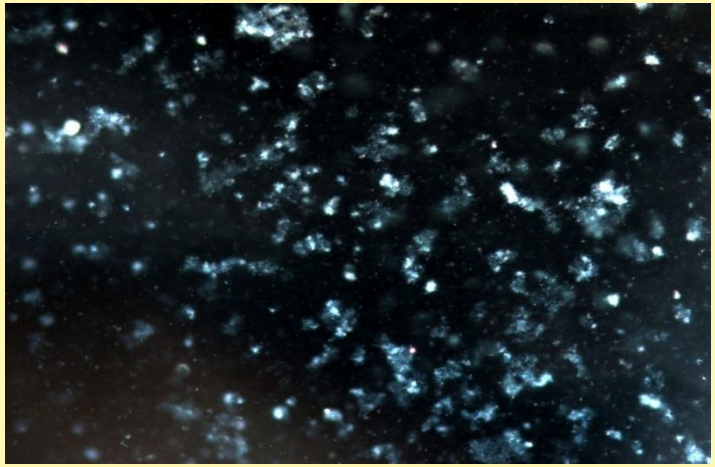


Storage of Serovar

Culturing 20 serovars

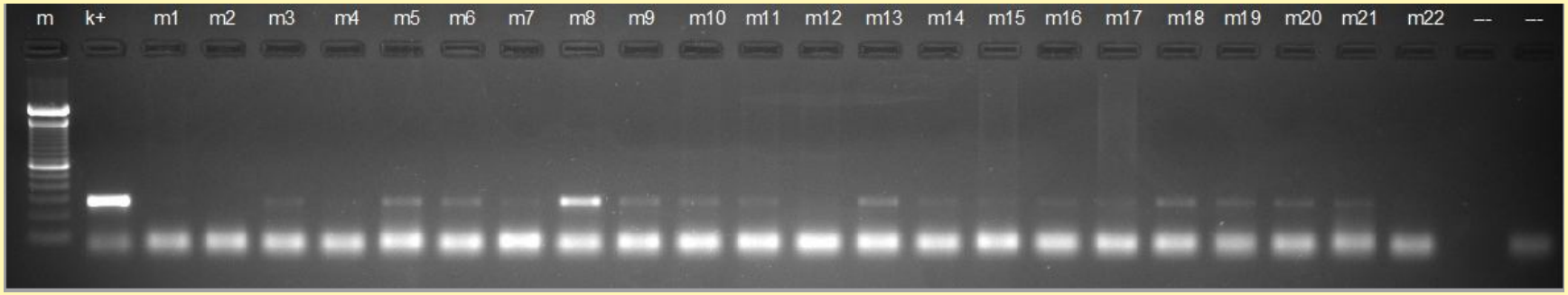


MAT (Microscopic Agglutination Test)

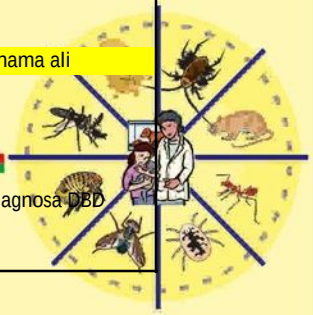


MAT Patient Serum 1:160

Detection of pathogenic leptospires in human cases



					Hasil PCR	Hasil RDT Merk SD	Hasil RDT Merk Focus	Keterangan
Lane1	m	:	Marker					
Lane2	K+	:	Kultur lepto		Positive			
Lane3	M1	:	Choirul Umam	Human blood	Negative	negative	Positive	Sampel darah terlalu sedikit
Lane4	M2	:	Bahri	Human blood	Negative	-	Negative	
Lane5	M3	:	M.ali	Human blood	Positive	-	Positive	
Lane6	M4	:	Moh.subhan	Human blood	Positive	Positive	tidak dilakukan	
Lane7	M5	:	Moh.Aditya	Human blood	Positive	-	Negative	
Lane8	M6	:	Fauziah	Human blood	Positive	-	Negative	
Lane9	M7	:	Sugianto	Human blood	Positive	Positive	Positive	
Lane10	M8	:	Khoirunisa	Human blood	Positive	-	Negative	
Lane11	M9	:	Tuma	Human blood	Positive	Positive	Negative	
Lane12	M10	:	Namartatula	Human blood	Positive	-	Positive	
Lane13	M11	:	Leyza Tara	Human blood	Positive	-	Positive	
Lane14	M12	:	Hanafi	Human blood	Negative	-	Negative	
Lane15	M13	:	Fathorahman	Human blood	Positive	-	Positive	
lane 16	M14	:	Abd.Aziz	Human blood	Positive	-	Negative	
Lane17	M15	:	M.abdullah	Human blood	Positive	-	Negative	
Lane18	M16	:	Syamsiyah	Human blood	Positive	Positive	Positive	
Lane19	M17	:	Murawati	Human blood	Positive	negative	Negative	istri pasien atas nama ali
Lane20	M18	:	Rahmat N	Human blood	Positive	Positive	tidak dilakukan	
Lane21	M19	:	Sahdi	Human blood	Positive	-	Positive	
Lane22	M20	:	Ach.Animan	Human blood	Positive	-	Positive	
Lane23	M21	:	Sugiarto	Human blood	Positive	-	Positive	
Lane24	M22	:	Chitamul	Human blood	Positive	tidak dilakukan	Positive	Awal MRS dengan diagnosa DBD
Lane25	K-	:	Kontrol Negative		Negative			
Lane26	K-	:	Kontrol Negative		Negative			

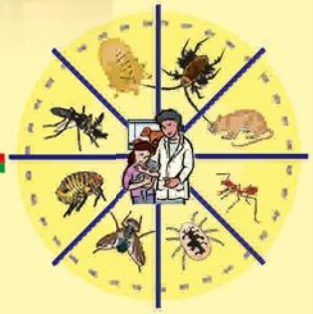


II. Health Promotion for Prevention Leptospirosis

Handed poster to

Penyuluhan

Pemasangan baliho

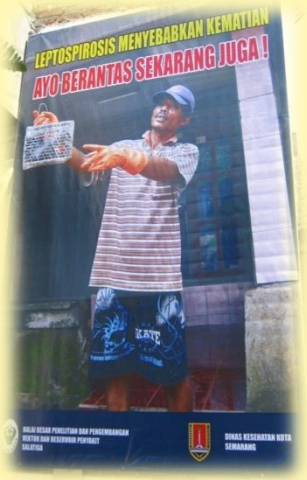


Health Promotion leptospirosis prevention materials

Leptospirosis Etiology
- Cause
- Transmission pathway
- Symptoms
- Reservoir

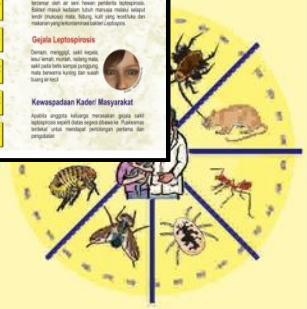
Preventive and Rodent Control
- Method for rodent control
- Method to avoid direct contact with the bacteria
- Method for washing the trap properly
- The benefits of sodium hypochlorite
- Awarness to visit doctor or hospital in early infection

Baliho



Poster

Leaflet



III. Environmental investigation and intervention

Environment surveys in Sampang, East Java

1. Chlorine survey in the water reservoir

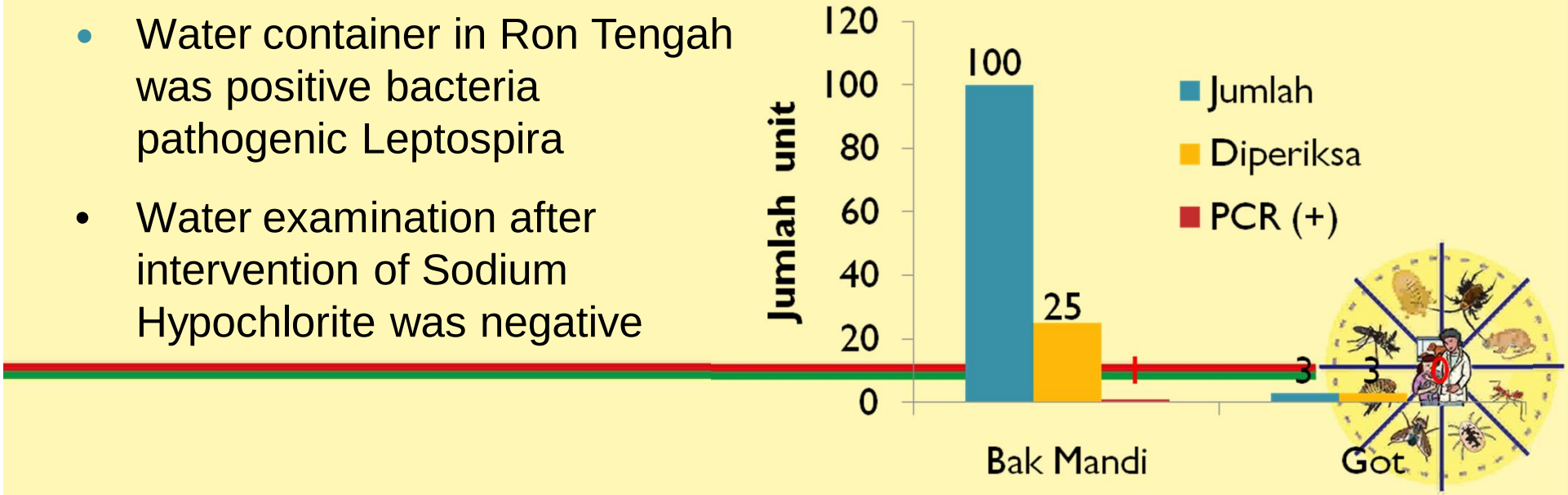
Sub District	Chlor content requirement for killing *Leptospira* sp (mg/L)	Chlor measurements * (mg/L)			
		Water container		Puddle/Drain	
		Pre	Post	Pre	Post
Ron Tengah	0.5 – 3	0	1.23	0	0,5
Gn. Sekar		0,25	1.90	0	0,25
Kontrol (Dalpinang)		0	0	0	0

Well

Changing Chlor levels at pre and post application of Sodium Hypochlorite.

2. Disinfectant (Sodium hypochlorite)

- Water container in Ron Tengah was positive bacteria pathogenic Leptospira
- Water examination after intervention of Sodium Hypochlorite was negative



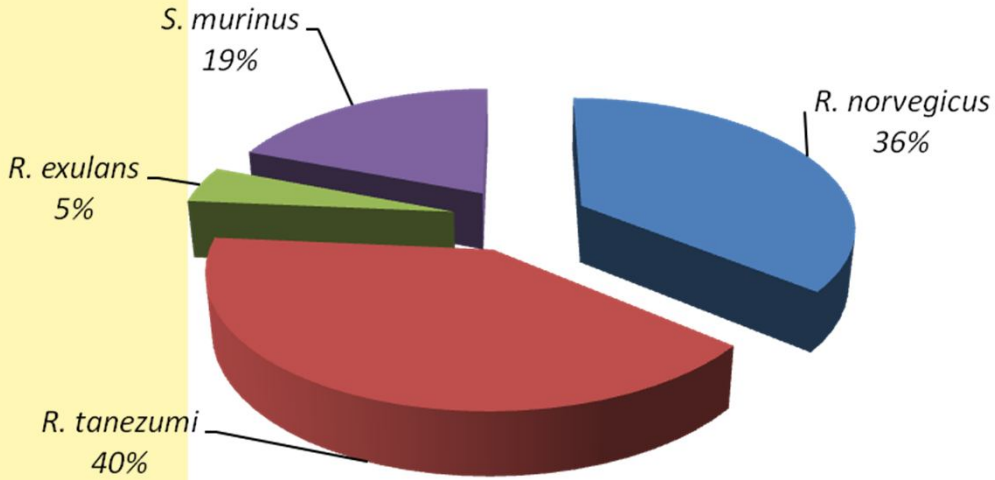
Administration of Disinfectants Sodium Hypochlorite 1%

Giving disinfectants in public

Water sampling in river

IV. The main reservoir -Rodent survey

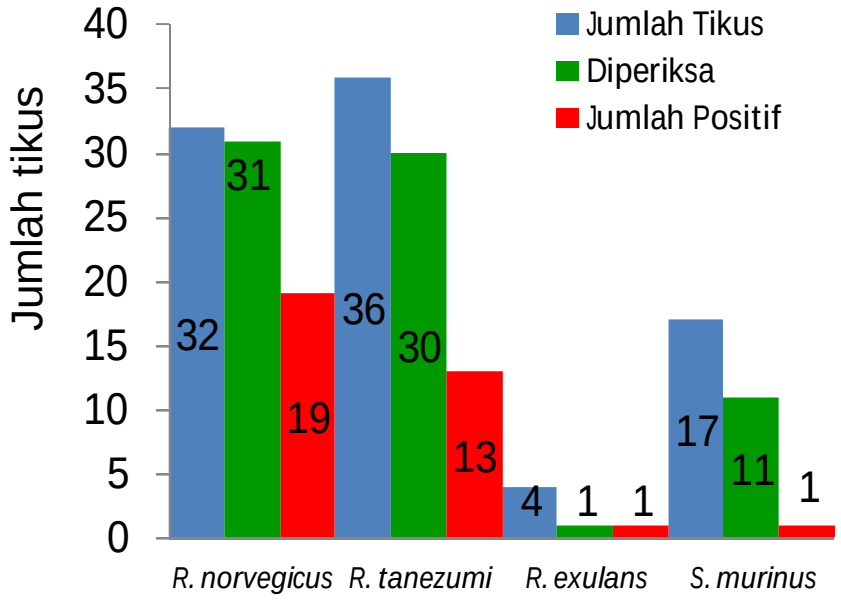
The percentage of rodents caught



Domestic rodent *R. tanezumi* (40%) and *R. norvegicus (36%)* were dominant than other species

- *R. norvegicus* was positive leptospirosis

The number of rats positive (PCR) Leptospirosis



Rodent survey in Sampang

Example 2. National Research :

- RISET KHUSUS VEKTOR DAN RESERVOIR PENYAKIT
  (Rikhus Vektora)
  EC: LB.02.01/5.2/KE.355/2014

Identify the emergence of infectious diseases in mosquitoes, rodents, and high-risk wildlife (Bats) that pose a major threat to human health

Outputs

Data

- *up-dated* biodiversity & Bionomic of V-R
- Surveillance and Endemicity of diseases (V-R)
- Local control methods

Speciments

- Agent of pathogen (bactery, virus, parasit).
- reference collection(V-R)

: Primer Data

: Secondery Data

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Disease examination

- Mosquitoes :
  - Dengue Hemorrhagic Fever
  - Malaria
  - Chikungunya
  - *Japanese encephalitis* (JE)
  - Filariasis
- Rodents :
  - Leptospirosis
  - Infection of Hanta virus
- Bats :
  - Leptospirosis (Jateng dan Papua)
  - JE (Sumsel dan Sulteng)

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RESULTS OF VEKTORA 2015

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RISET KHUSUS VEKTOR DAN RESERVOIR
B2P2VRP SALATIGA

Implementation Phase

2014	2015 Phase I	2016 Tahap II	2017 Tahap III
- planning; - Preparation of the guidelines; - Trials - Evaluation of Trial; - Finalization of the Guidelines	- Rikhus Vektora in 4 Provinces (Sumsel; Jateng; Sulteng; dan Papua).	- Rikhus Vektora in 15 Provinces (Sumbar; Aceh; Babel; Lampung; Jabar; Banten; Jatim;Kalbar; Kalsel; Sultra; Sulut; NTB; NTT; Maluku; Malut).	- Implement ation Rikhus Vektora in 15 Provinces

1. 1.a. Total sample of vector dan reservoir collected

Tabel 1. Jumlah Spesies Nyamuk, Tikus, Kelelawar Terkonfirmasi

Provinsi	Jenis Spesimen	Jumlah diperoleh	Jumlah spesies teridentifikasi	
			Genus	Spesies
1. SUMSEL	1. Nyamuk	34157	24	122
	2. Tikus	357	6	11
	3. Kelelawar	403	13	20
2. JATENG	1. Nyamuk	29130	26	83
	2. Tikus	240	5	10
	3. Kelelawar	425	13	19
3. SULTENG	1. Nyamuk	24195	11	145
	2. Tikus	317	8	15
	3. Kelelawar	240	15	21
4. PAPUA	1. Nyamuk	31829	26	83
	2. Tikus	241	4	6
	3. Kelelawar	211	9	17

1.1.b. Mosquitoes new reports

Tabel 4. Spesies Terduga Baru / Belum Terlaporkan di Indonesia

PROVINSI	Σ Nyamuk	REMARKS
1. Sumsel	57	*Unpublished Data*
2. Jateng	17	*Unpublished Data*
3. Sulteng	70	*Unpublished Data*
4. Papua	62	*Unpublished Data*

Collection of Rarities

Aedes quasiferinus

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RISET KHUSUS
VEKTOR DAN RESERVOIR PENYAKIT
B2P2VRP SALATIGA

1.2. a. LABORATORY EXAMINATION (VECTOR)

Tabel 2.1 Hasil Pemeriksaan Laboratorium Penyakit Tular Vektor

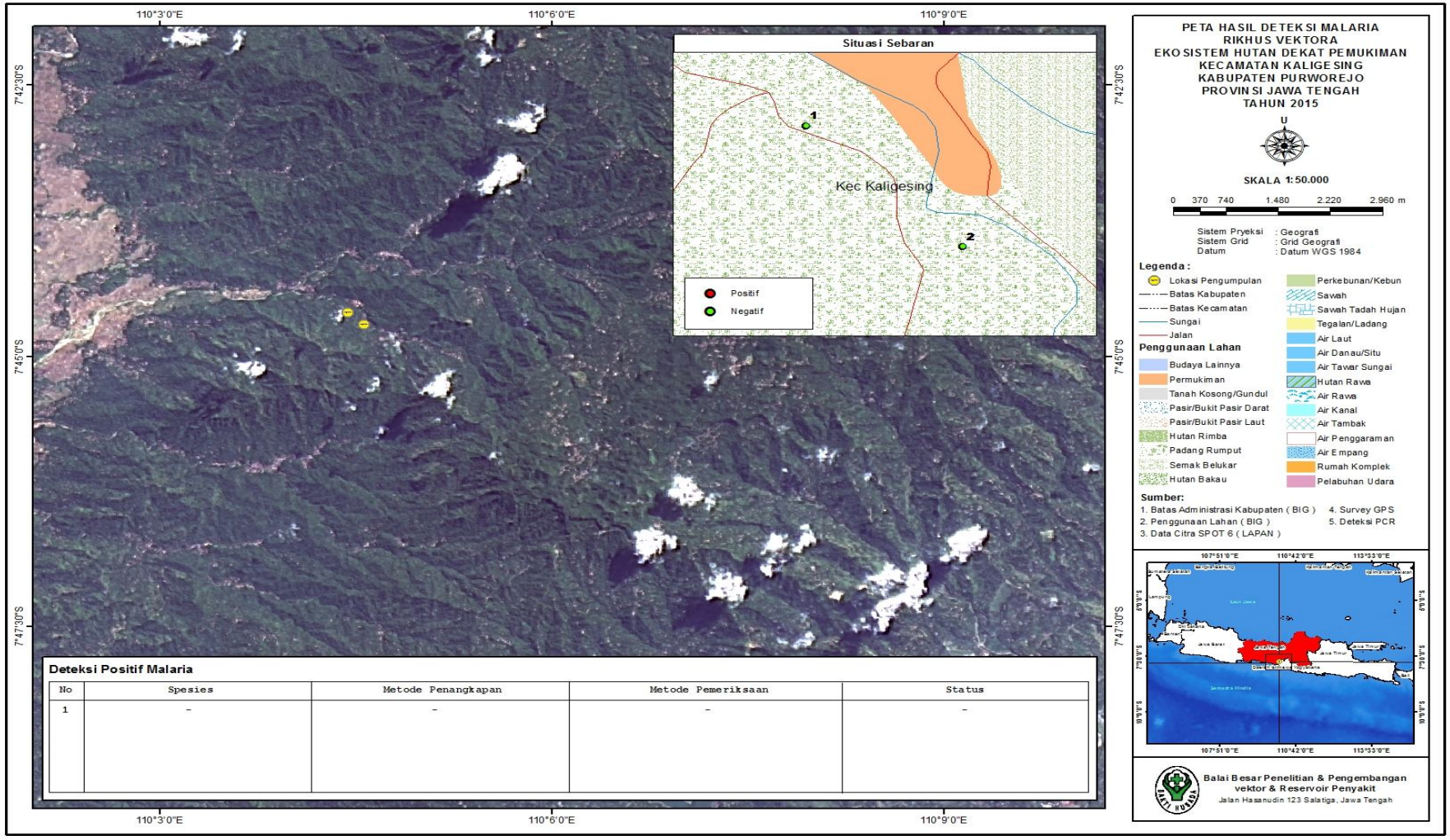
Provinsi	Pemeriksaan Laboratorium Penyakit Tular Vektor									
	Malaria		**Dengue**		**Chikungunya**		**JE**		**Filariasis (*wuchereria bancrofti*)**	
	S Diperiksa	S Positif	S Diperiksa	S Positif	S Diperiksa	S Positif	S Diperiksa	S Positif	S Diperiksa	S Positif
1. SUMSEL	76	4 (5,3%)	107	1 (0,9%)	107	1 (0,9%)	1570	46 (2,9%)	883	.
2. JATENG	279	.	48	4 (8,3%)	48	.	972	.	863	.
3. SULTENG	133	.	40	.	40	.	777	8 (1,0%)	693	.
4. PAPUA	173	.	**65**	1 (2,3%)	**65**	1 (1,5%)	636	.	631	.
TOTAL	**661**	**4 (0,6%)**	**260**	**6 (2,3%)**	260	**2 (0,8%)**	**3955**	**54 (1,4%)**	**3070**	.

1.2. LABORATORY EXAMINATION (RESERVOIR)

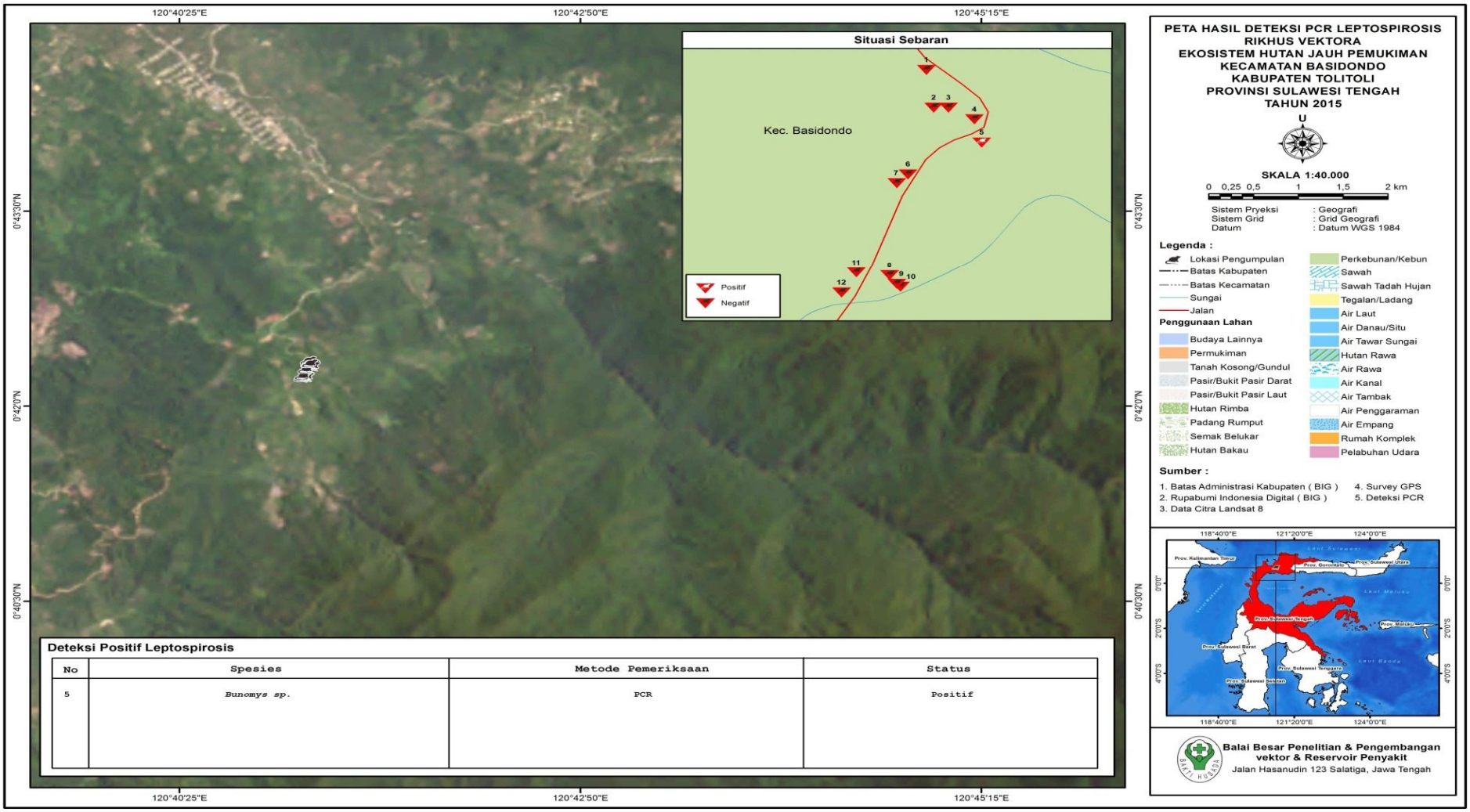
Tabel 2.2 Hasil Pemeriksaan Laboratorium Penyakit Tular Reservoir

Provinsi	Pemeriksaan Laboratorium Penyakit Tular Reservoir							
	Tikus							
	Leptospirosis				Hantavirus			
	MAT		PCR		ELISA		PCR	
	∑ Diperiksa	∑ Positif	∑ Diperiksa	∑ Positif	∑ Diperiksa	∑ Positif	∑ Diperiksa	∑ Positif
1. SUMSEL	293	8 (2,7%)	357	49 (13,7%)	355	33 (93%)	33	21 (63,6%)
2. JATENG	215	5 (2,3%)	222	15 (6,8%)	233	37 (15,9%)	37	17 (45,9%)
3. SULTENG	256	7 (2,7%)	277	28(10,1%)	317	15 (4,7%)	15	8 (53,3)
4. PAPUA	230	5 (2,2%)	233	38 (16,3%)	241	4 (1,7%)	4	4 (100%)
TOTAL	**994**	**27 (2,7%)**	**1089**	**136 (12,5%)**	**1146**	**86 (7,5%)**	**86**	**77 (89,5%)**

2. a. PETA PERSEBARAN NYAMUK POSITIF MALARIA DI EKOSISTEM HUTAN DEKAT PEMUKIMAN KAB. PURWOREJO JATENG



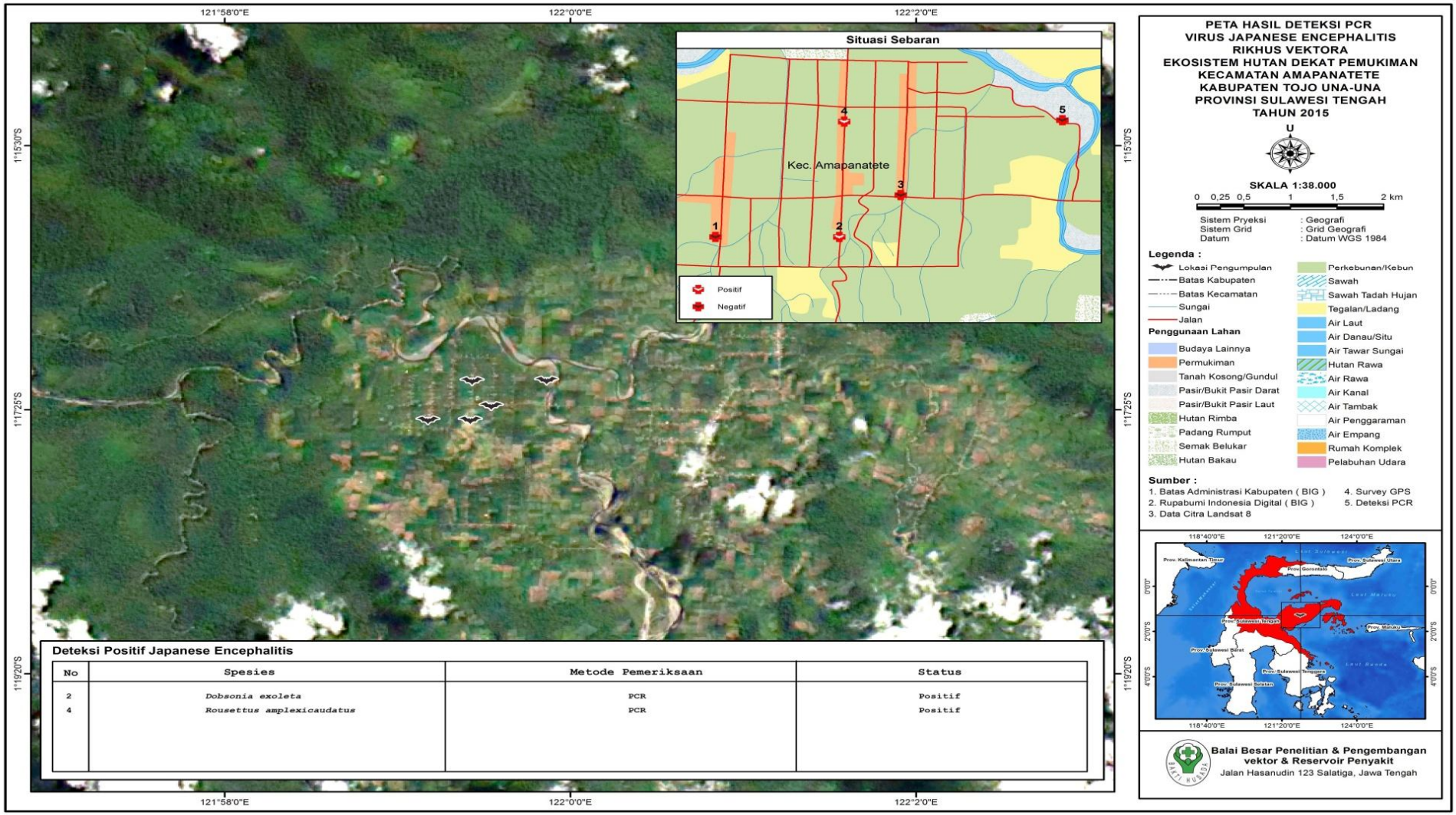
2.b. PETA PERSEBARAN TIKUS POSITIF LEPTOSPIROSIS DI EKOSISTEM NON HUTAN DEKAT PEMUKIMAN KAB. TOLI-TOLI SULTENG



Deteksi Positif Leptospirosis

No	Spesies	Metode Pemeriksaan	Status
5	*Bunomys sp.*	PCR	Positif

2.c. PETA PERSEBARAN KELELAWAR POSITIF JE DI EKOSISTEM HUTAN DEKAT PEMUKIMAN KAB. TOJO UNA-UNA, SULTENG



Deteksi Positif Japanese Encephalitis

No	Spesies	Metode Pemeriksaan	Status
2	*Dobsonia exoleta*	PCR	Positif
4	*Rousettus amplexicaudatus*	PCR	Positif

3. a. SPESIES NYAMUK SEBAGAI VEKTOR BARU / BELUM TERLAPORKAN di INDONESIA

Tabel . 5

Provinsi	Nama Spesies	Vektor Penyakit
1. Sumsel	An. barbirostris*)	Malaria

Keterangan:

*)	Spesies potensial vektor (1902), pernah dilaporkan sebagai suspected vector (belum confirmed) oleh NAMRU (unpublished)

3.b. SPESIES TIKUS SEBAGAI RESERVOIR PENYAKIT BARU / BELUM TERLAPORKAN di INDONESIA

Tabel 5

Provinsi	Nama Spesies	Reservoir Penyakit
1. Sumsel	Rattus tiomanicus	Hantavirus
	Sundamys muelleri	Leptospirosis
	Maxomys surifer	Hantavirus
2. Jateng	Maxomys surifer	Leptospirosis dan Hantavirus
	Rattus argentiventer	Hantavirus
	Bandicota indica	Hantavirus
3. Sulteng	Bunomys sp.	Leptospirosis, Hantavirus
	Rattus hoffmanni	Leptospirosis, Hantavirus
	Maxomys whiteheadii	Leptospirosis, Hantavirus
	Bunomys penitus	Hantavirus
	Rattus tiomanicus	Hantavirus
	Dobsonia exoleta	JE (Japanese encephalitis)
	Rousettus amplexicaudatus	JE (Japanese encephalitis)

3. c. SPESIES KELELAWAR SEBAGAI RESERVOIR PENYAKIT BARU / BELUM TERLAPORKAN di INDONESIA

Tabel 5.

Provinsi	Nama Spesies	Reservoir Penyakit
Sulteng	Dobsonia exoleta	JE (Japanese encephalitis)
	Rousettus amplexicaudatus	JE (Japanese encephalitis)

4. & 6. KONFIRMASI PATOGEN (PADA TIKUS) BARU / BELUM TERLAPORKAN :

→ Hasil Lab >< Data Sekunder

Tabel 5.2 Patogen pada Tikus yang baru/belum terlaporkan

Prov	Tikus positif penyakit Leptospirosis (%)		Kasus Terlaporkan (2014)	Keterangan	Tikus positif penyakit Hantavirus (%)		Kasus Terlaporkan (2014)	Keterangan
	MAT	PCR			ELISA	PCR		
1. SUMSEL	2,0	11,5	-	DKK,Puskesmas,Rumah Sakit	9,2	63,6	-	DKK,Pusk,RS
2.JATENG	2,2	6,7	81	DKK=32,Puskesmas=15,Rumah Sakit=34	14,3	45,9	-	DKK,Pusk,RS
3. SULTENG	2,7	11,3	-	DKK,Puskesmas,Rumah Sakit	5,5	53,3	-	DKK,Pusk,RS
4. PAPUA	3,5	16,3	-	DKK,Puskesmas,Rumah Sakit	1,7	100	-	DKK,Pusk,RS

5. SPECIMENT COLLECTION

Syloctenium wallacei

Nictymene aello

Hydromys chrysogaster

Hydromys chrysogaster

Cont...

BATS

RATS

MOSQUITOES

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Potential Benefits ... ??? Potential negotiations.... ???

- Strengthening surveillance systems of SKD (Early Alert System).
- Community empowerment.
- Renewable of fauna biodiversity.
- Innovation in science and technology related to data and archive specimens.
- Development of the training model for Capacity Building Technical Human Resources Lab.

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Example 3. DHF:

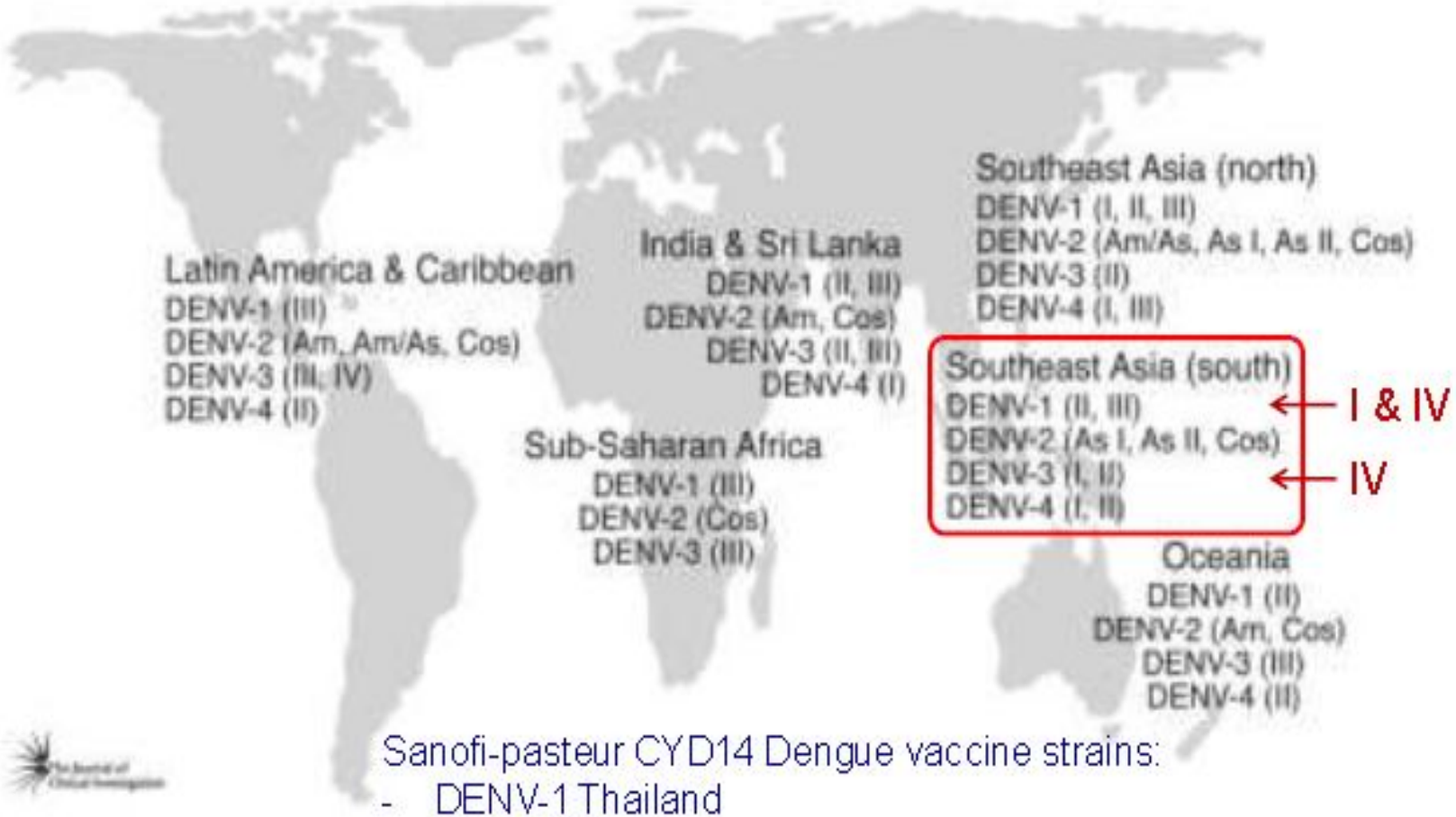
Vector Control: DBD Current Situation

- There is no effective dengue vaccine yet.
- Vector control methods recommended already exists, but is not optimal:
  - Source reduction (3M plus)
  - Chemical control (Space spraying & larvaciding)
  - Health education (community and student)
  - Implementation of cross-sectoral policy
  - An integrated approach

Aedes aegypti

- Range of *Aedes* flying in radius <150 m.
- Biting behavior has not changed (anthropophylic)
- *Ae albopictus* (m) may mating with *Ae aegypti* (f), but the eggs were produced would be sterile.
- *Aedes* still prefer in fresh water to breed, although some cases are found in polluted water.
- *Ae aegypti* are also potentially have a role in the spread of Chikungunya.

Global Distribution of DENV Genotypes



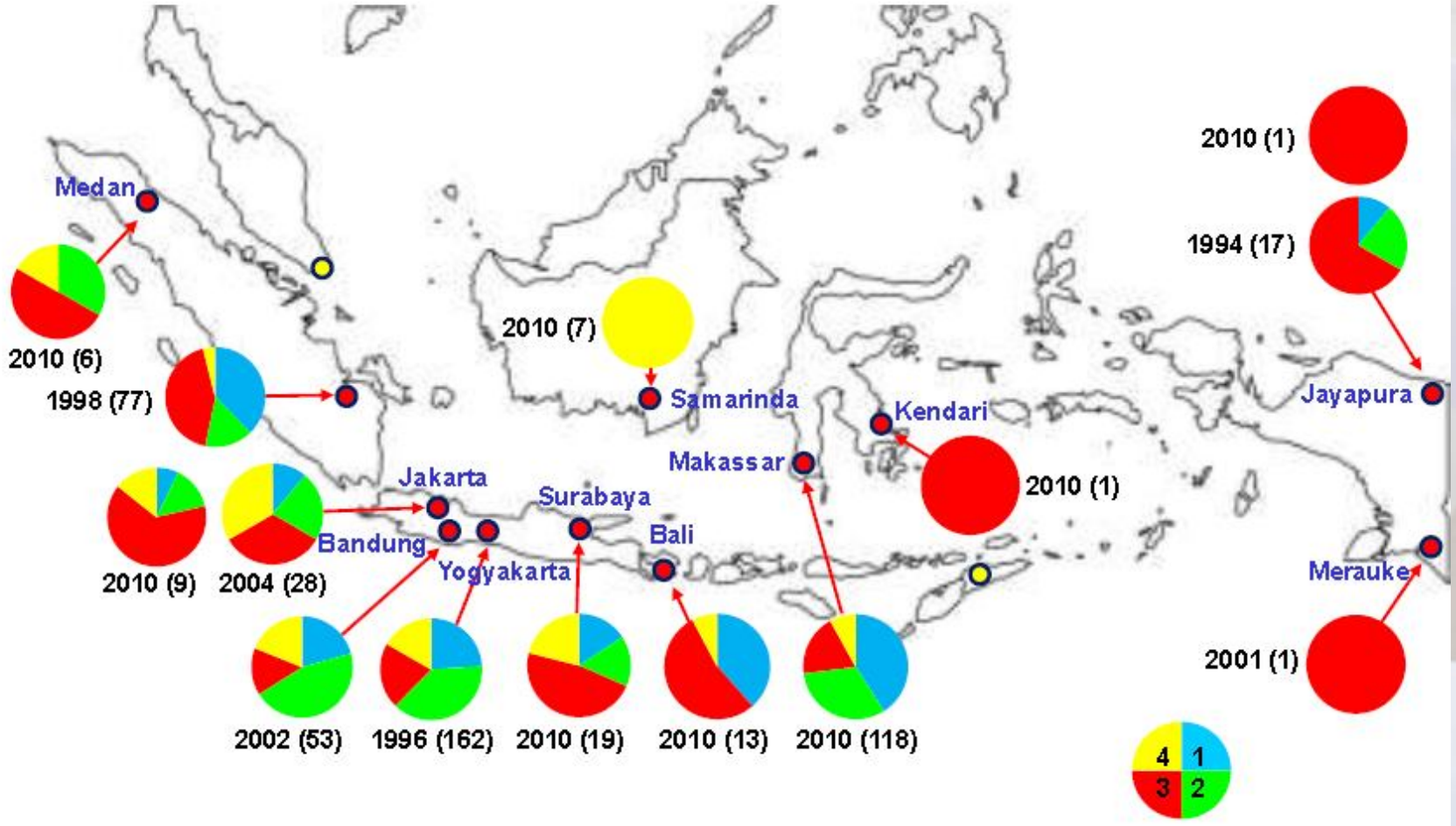
Sanofi-pasteur CYD14 Dengue vaccine strains:

- DENV-1 Thailand
- DENV-2 Thailand
- DENV-3 Thailand
- DENV-4 Indonesia

Source: Holmes 2009

DENV Serotypes in Indonesia

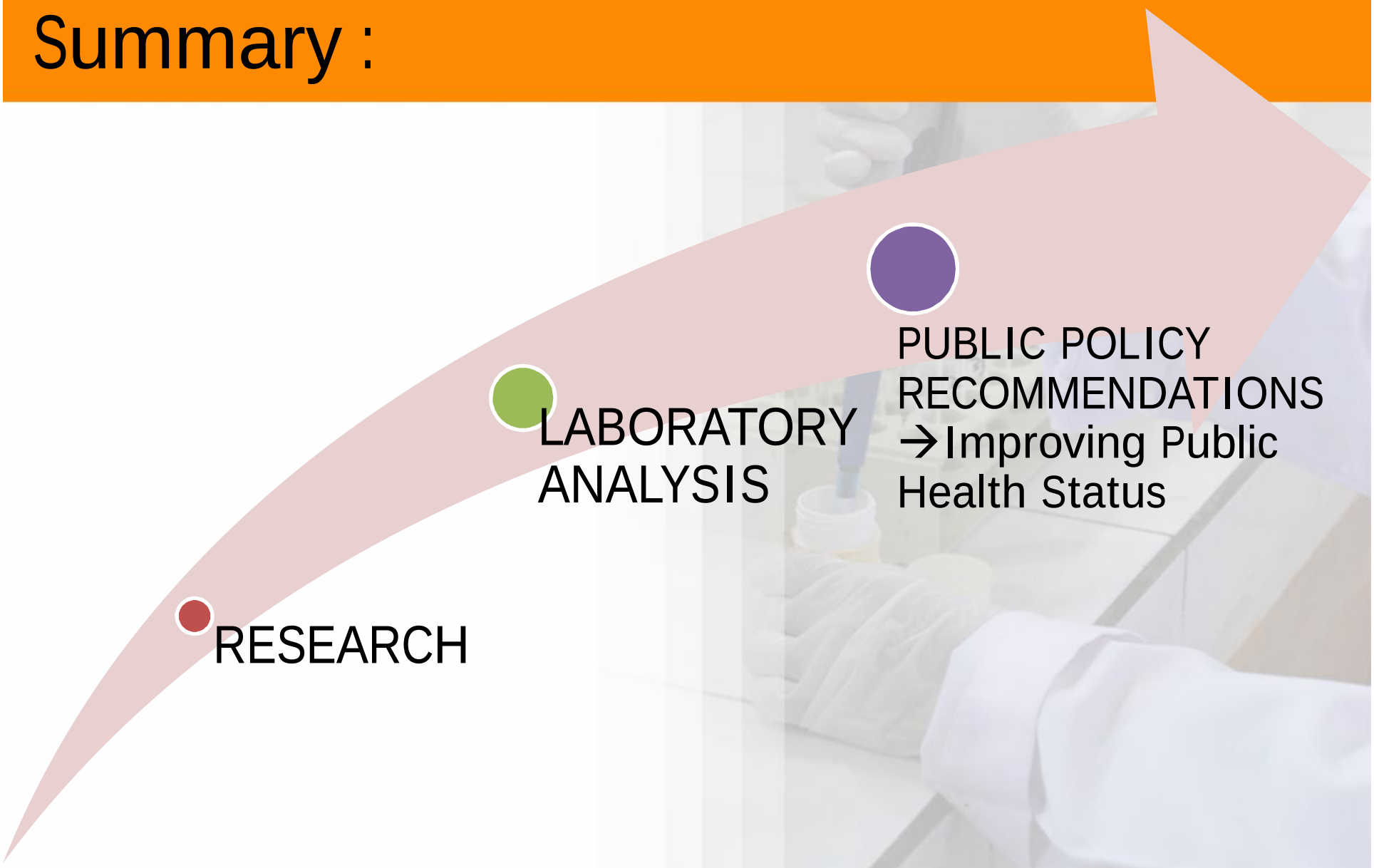
Past and present serotype distribution



Ong 2008, Osman 2009, Kalayanarooj 2007, Ito 2010, Schreiber 2009, Sasmono 2011

By doing research activities; laboratory examinations and the analysis data will give a comprehensive picture of the source of infection, how the diseases are transmitted and how effective the treatment to the disease.

Summary :


PUBLIC POLICY RECOMMENDATIONS →Improving Public Health Status
LABORATORY ANALYSIS
RESEARCH


TERIMA
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