2018/12/21

The 4th NCGM International Infectious Diseases Forum

MERS outbreak and its response in Japan

National Center for Global health and Medicine

Disease Control and Prevention Center

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NCGM

National Center for Global Health and Medicine

NCGM 150TH ANNIVERSARY

Disease Control & Prevention Center

National Center for Global Health and Medicine

NCGM

Disease Control and Prevention Center

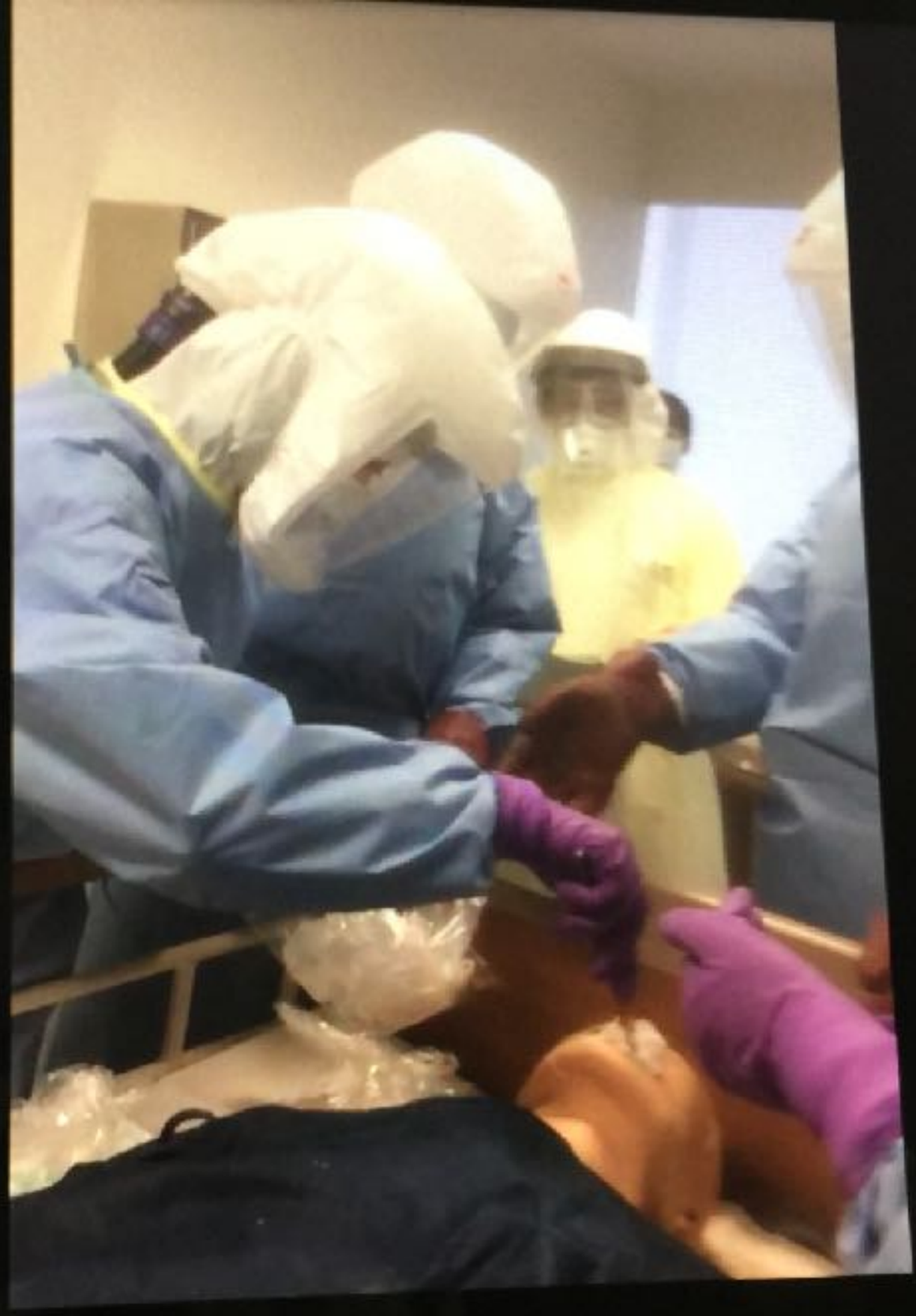
about DCC

- Clinical Infectious Diseases(about 15beds, and ID consultation)
- Travel Clinic
- Emerging Infectious Diseases
- Infection Prevention and Control
- AMR Clinical Reference Center
- Antimicrobial Stewardship

staff for EID patients

- 16 ID doctors(belong to DCC)
- about 20 nurses(usually belong to each inpatients ward)
- Intensivists will attend the care for EID, if necessary
- Other medical specialists will give advises for each specialty
- Laboratory technician, clinical engineer, and radiation technologist

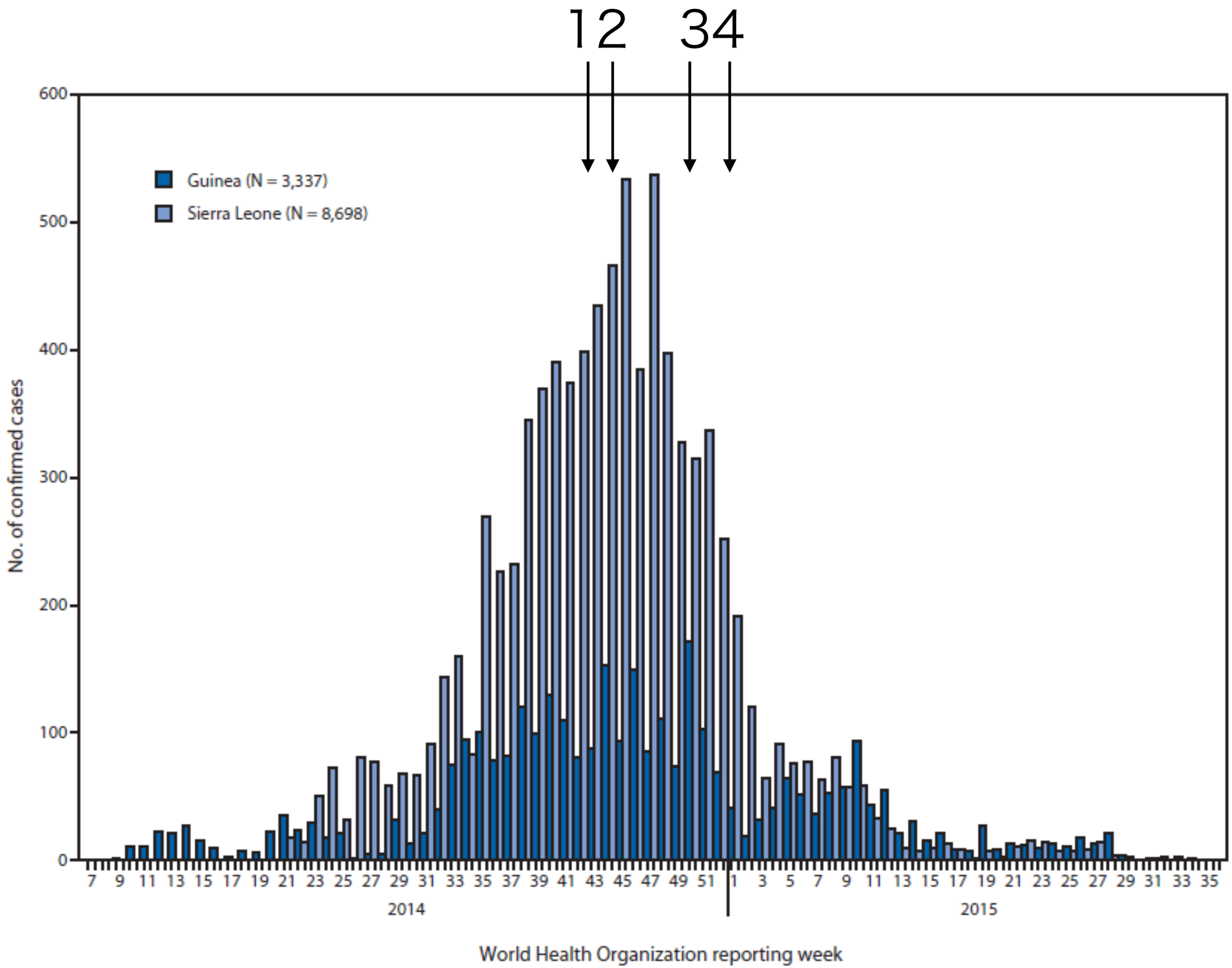

本番用 PPE




Dräger
Agila

4 suspected EVD cases in NCGM

Cases	date	countries	ebola PCR	duration of isolation	final diagnosis
40s M	2014/10/27	unknown	-ve	3 days	unknown
60s M	2014/11/7	Liberia	-ve	2 days	Streptococcal pharyngitis
30s M	2014/12/29	Sierra Leone	-ve	2 days	sinusitis
70s F	2015/1/18	Sierra Leone	-ve	3 days	influenza A



MMWR Morb Mortal Wkly Rep. 2015 Sep 11;64(35):981-4.

FilmArray®
multiplex PCR system

- Simple: 2 minutes of hands-on time
- Easy: No precise measuring or pipetting required
- Fast: Turnaround time of about an hour

Laboratory in ID unit.

・CBC and chems

・Rapid Test

(Malaria, Dengue, etc..)

・PCR(EVD)

4 suspected MERS cases in NCGM

Cases	date	countries	MERS PCR	duration of isolation	final diagnosis
20s F	2015/6/16	Korea	-ve	2 days	Bronchitis
10s F	2016/1/3	UAE	-ve	2 days	Influenza B
40s M	2015/1/6	Dobai	-ve	2 days	Streptococcus pyogenes pneumonia
70s F	2015/1/18	Qatar	-ve	2 days	influenza A

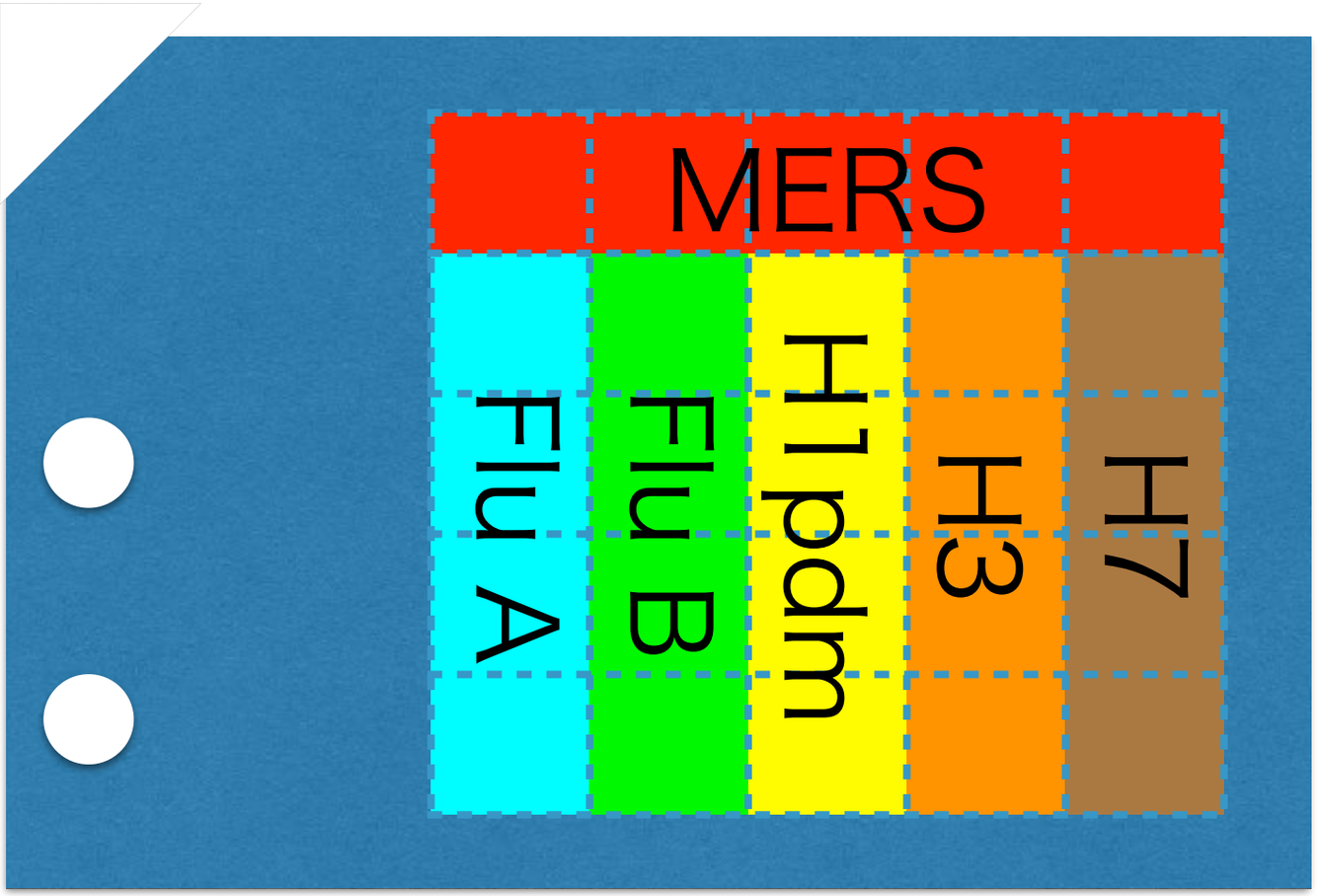
LAMP method for MERS-CoV detection

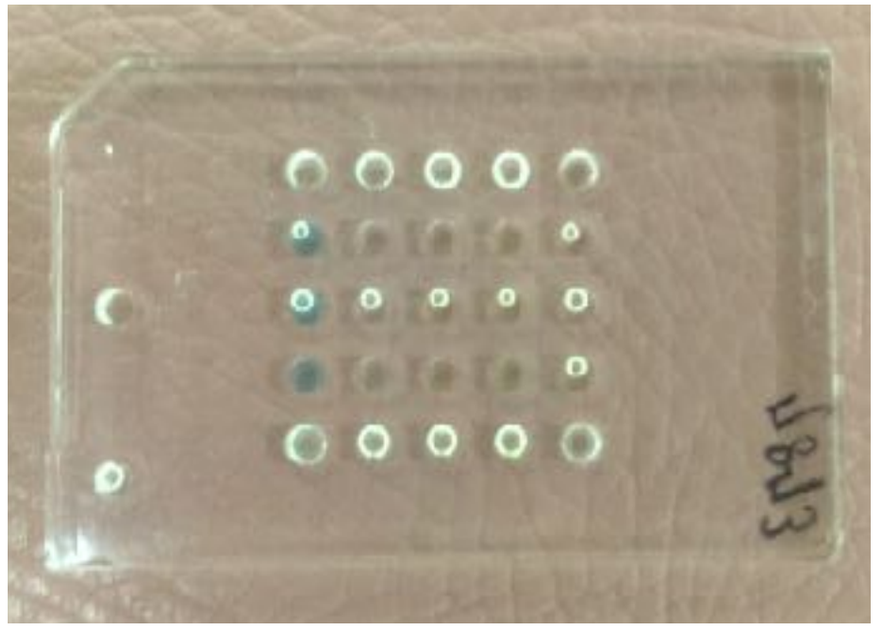
- Loop-mediated Isothermal Amplification is a simple, rapid, specific and cost-effective nucleic acid amplification method solely developed by Eiken Chemical Co., Ltd.

- It takes only 30 minutes to detect pathogens including MERS-CoV.

- We have multiplex LAMP method system in our laboratory in ID unit.

Chip Layout





Chip Layout is designed by Dr. Kageyama, National Institute of Infectious Diseases, Japan and EIKEN Chemical Co., Ltd.

- LAMP Test System

File(F) Edit(E) Setup(S) Version(V)

Program setup

Stand-by

STOP

1502 | 1503 | Unit-3 | Unit-4

Comment

Sample name : 20160104

Chip ID : H-0154

Chip type : No.6

Information

Tray state : CLOSE

Chip state : NONE

Heater temp.(Upper) : 0.0 ℃

(Lower) : 0.0 ℃

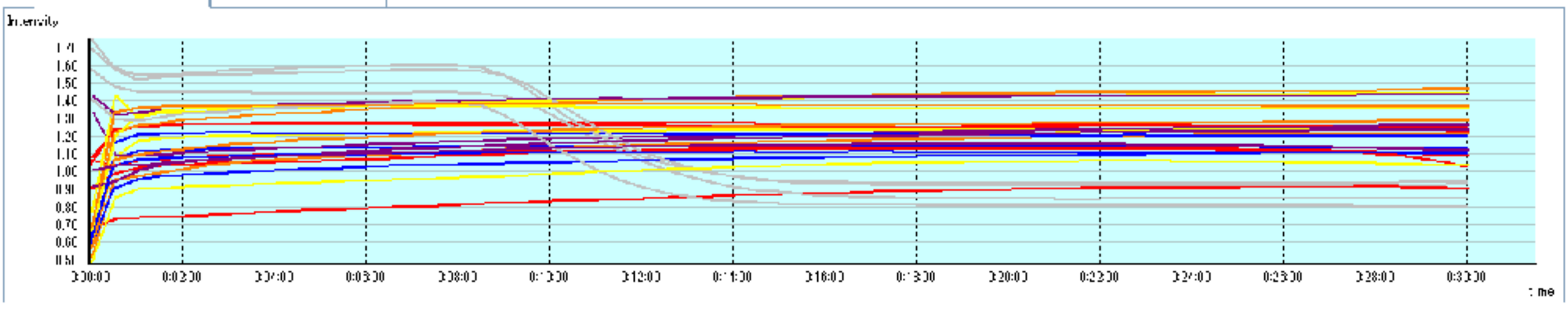
Meas time : 30 min

Remain time :

Well Information

1	MTB		None	2	MTB		None	3			None	4		None	5			None
6	FLUA	-	None	7	FLUB	+	9.58	8	H1pdm	-	None	9	H3	-	None	10	H7N9	-	None
11	FLUA	-	None	12	FLUB	+	9.1	13	H1pdm	-	None	14	H3	-	None	15	H7N9	-	None
16	FLUA	-	None	17	FLUB	+	9.45	18	H1pdm	-	None	19	H3	-	None	20	H7N9	-	None
21	FLUA		None	22	FLUB	+	9.9	23	H1pdm		None	24	H3		None	25	H7N9		None

Real-time graph | Measurement data



Ready

File(F) Edit(E) Setup(S) Version(V)

Program setup

1502 | 1508 | Unit-3 | Unit-4

Comment

Sample name : 20160104

Chip ID : I1-0154

Chip type : No.6

Information

Tray state : CLO

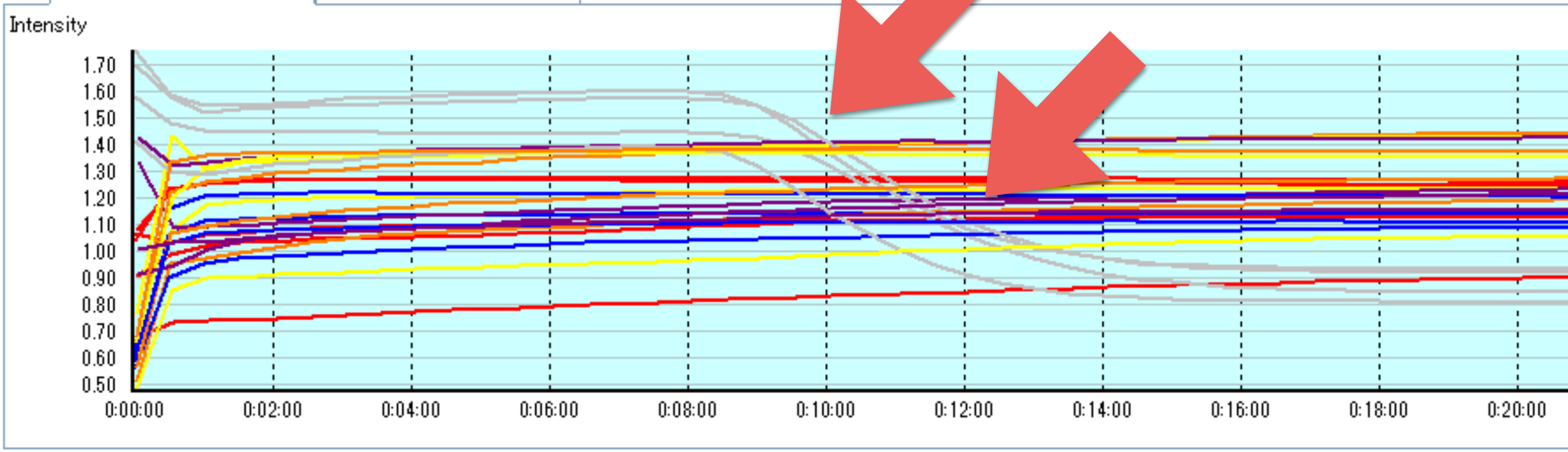
Chip state : NON

Well information

1	MERS	−	None	2	MERS	+/−	None	3		−	None
6	FLUA	−	None	7	FLUB	+	9.58	8	H1pdm	−	None
11	FLUA	−	None	12	FLUB	+	9.11	13	H1pdm	−	None
16	FLUA	−	None	17	FLUB	+	9.45	18	H1pdm	−	None
21	FLUA	−	None	22	FLUB	+	8.91	23	H1pdm	−	None

4			
9	H3		
14	H3		
19	H3		
24	H3		

Real-time graph | Measurement data



Medical system for MERS in Japan

Classification of Infectious Disease Law in Japan

Type 1 (7)	Type 2 (7)	Type 3 (5)	Type 4 (44)
Viral Hemorrhagic Fever EVD Lassa Fever CCHF Marburg disease South American Hemorrhagic Fevers Plague Smallpox	Tuberculosis **MERS** SARS Avian flu (H5N1/H7N9) Polio Diphtheria	Cholera Typhoid fever Paratyphoid fever Dysentery EHEC infection	Dengue Zika Chikungunya Yellow Fever Hepatitis A Legionellosis SFTS Rabies etc…

Classification of Medical Center in Infectious Disease Law in Japan

New Infectious Diseases	Type I Infectious Diseases	Type II Infectious Diseases	Others

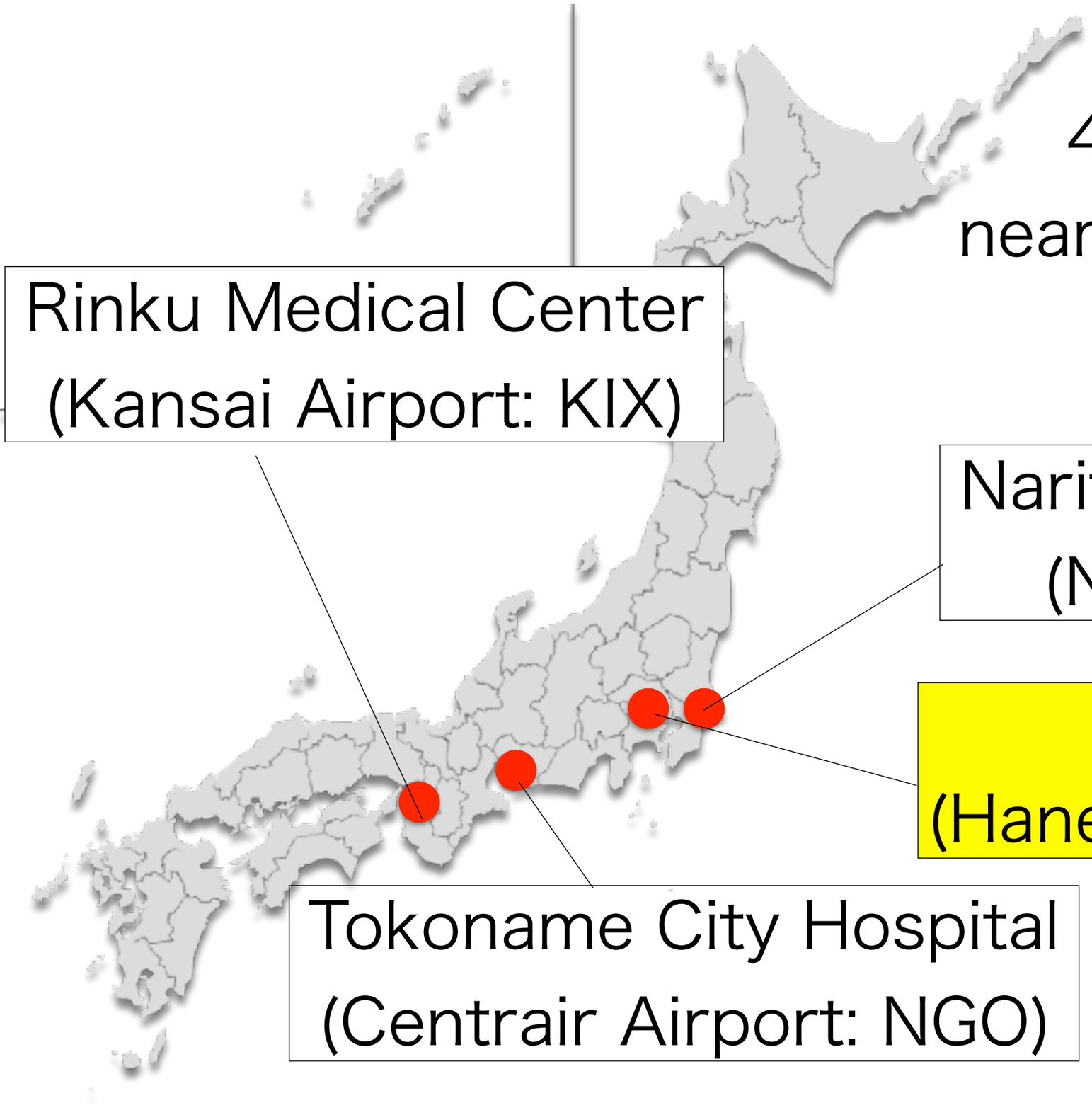
4 Medical institutions designated for **specific** infectious diseases

54 Medical institutions designated for **type I** infectious diseases

347 Medical institutions designated for **type II** infectious diseases

not designated

Medical institutions designated for specific infectious diseases



4 Hospitals located
near international airports

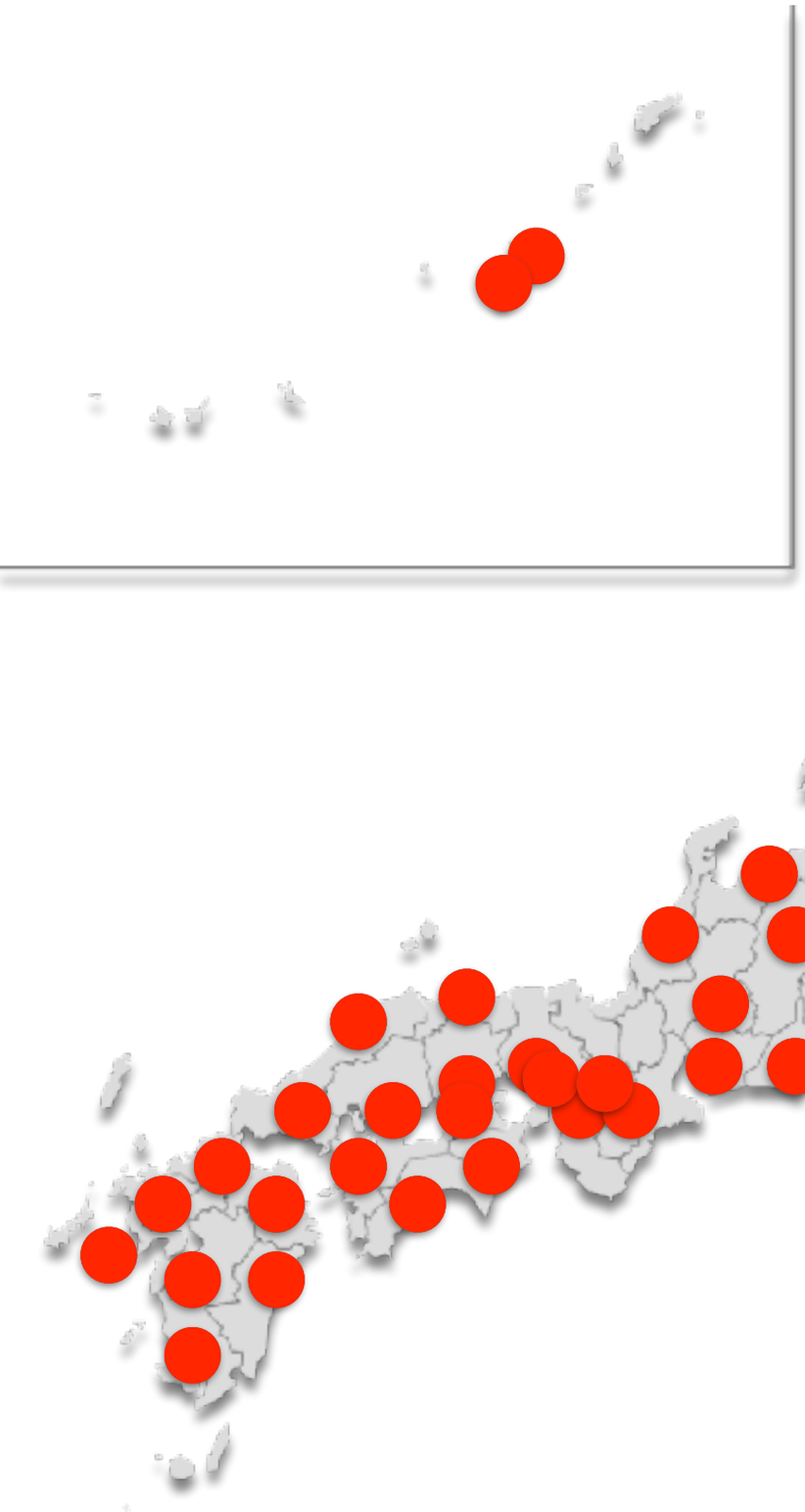
Rinku Medical Center
(Kansai Airport: KIX)

Narita Red Cross Hospital
(Narita Airport: NRT)

NCGM
(Haneda Airport: HND)

Tokoname City Hospital
(Centrair Airport: NGO)

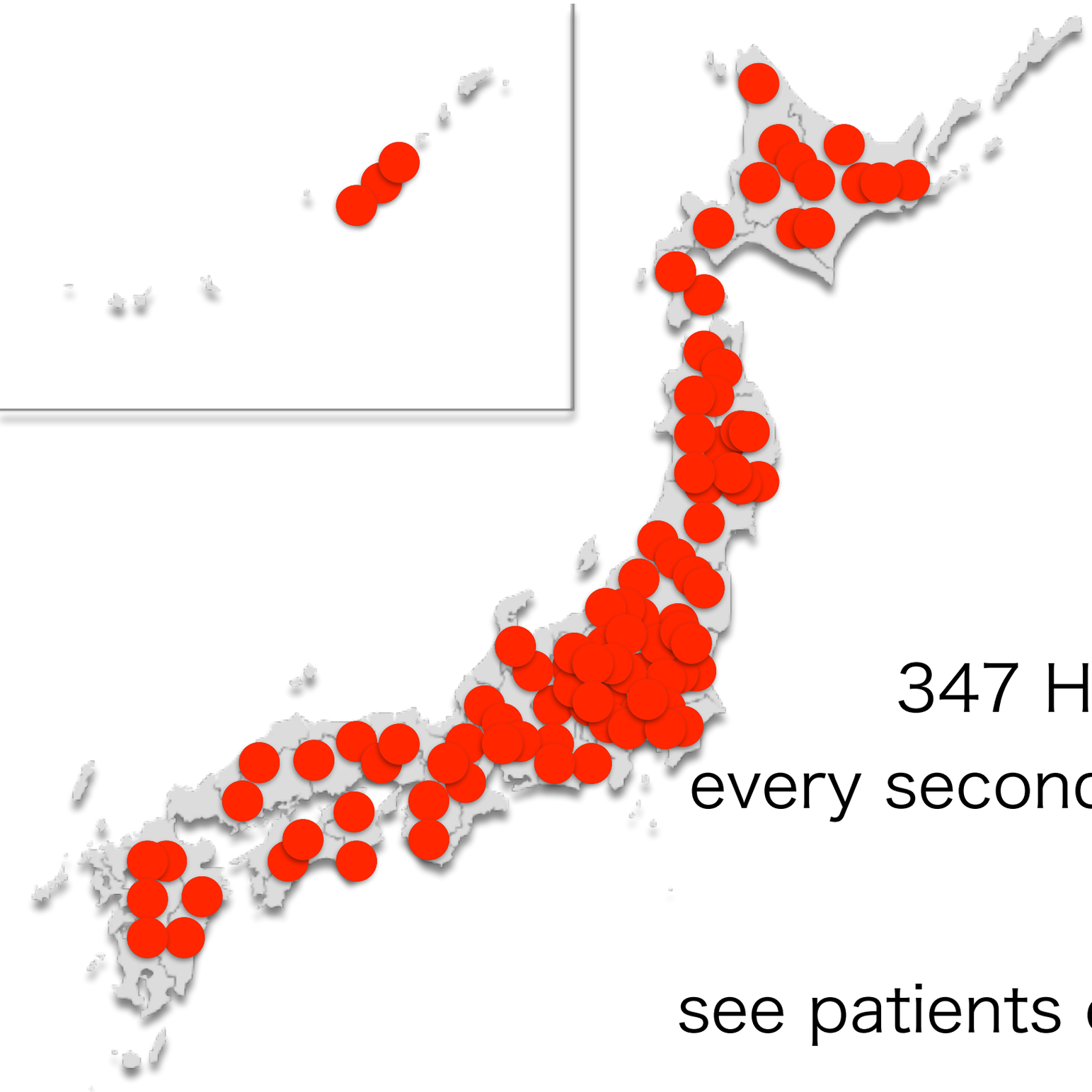
Medical institutions designated for **type I** infectious diseases



54 Hospitals located
almost every prefectures

see patients of Ebola, MERS etc.

Medical institutions designated for **type II** infectious diseases



347 Hospitals located
every secondary medical care area

see patients of MERS, Avian flu etc.

The Number of hospitals which see patients of MERS in Japan

4+54+347=405

specific　type I　type II

405 Hospitals are designated for MERS ,not only diagnosis, but also treatment.
But...is it possible?

Why MERS is type 1 infectious diseases in law?

	Ebola	MERS	Avian flu H7N9
Fatality Rate	39.5% (west Africa)	34.9%	38.9% (China)
Number of reproductions	1.5-2.5 (west Africa)	8.0977 (Korea)	0.07 (China)
Transmission	body fluid	droplets (aerosol)	droplets (aerosol)
Classification of Infectious Disease Law	1	2	2

PLoS Curr. 2014 Sep 2;6. pii: ecurrents.outbreaks.
Biomed Eng Online. 2017 Jun 13;16(1):79.
BMJ. 2015 Nov 19;351:h5765.

報道資料

くらしの中に
総務省

MIC Ministry of Internal Affairs and Communications

平成 29 年 12 月 15 日

In Medical institutions designated for type I infectious diseases (44 HPs)

Fear of accepting patients due to insufficient system(23%; 11/44)

There is no full-time infectious disease specialist(50%; 22/44)

Not assume the number of medical staff required per infectious disease patient or the organizational planning of medical team(23%; 11/44)

	specific type I	type II
Infection Control Nurses	93%	83.3%
Infectious Diseases Doctors	65.1%	16%
Intensivists	59.0%	25.0%
Pediatrics Intensivists	26.3%	7.2%

Ishikane, Morioka, Kutsuna, Ohmagari. In press

	specific type I	type II
Number of doctors who attend care for EID patients	1-15 (median: 3)	0-6 (median: 1.5)
Hospitals which have 7 or more doctors for EID patients	10.3%	0%
Number of nurses who attend care for EID patients	0-65 (median: 15)	0-30名 (median: 3)
Number of clinical laboratory technician for EID patients	0-9 (median: 2)	0-3 (median: 1)
Number of Radiologist for EID patients	0-6 (中央値: 1)	0-3 (median: 0)

Ishikane, Morioka, Kutsuna, Ohmagari. In press

Preparing U.S. Hospitals for Ebola

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

CDC has developed a strategy to help healthcare facilities and state health officials prepare for patients with possible or confirmed Ebola. This strategy identifies which hospitals will provide different levels of care for patients being assessed and treated for Ebola.

Frontline Healthcare Facility

- Quickly identifies and isolates patients with possible Ebola
- Notifies facility infection control and state and local public health officials
- Has enough Ebola personal protective equipment (PPE) for at least 12–24 hours of care
- Prepares for patient transfer, if needed

Ebola Assessment Hospital

- Safely receives and isolates a patient with possible Ebola
- Provides immediate laboratory evaluation and coordinates Ebola testing
- Cares for a patient for up to 96 hours (including evaluation and management of alternative diagnoses) until Ebola diagnosis is confirmed or ruled out
- Has enough Ebola PPE for up to 96 hours of care
- Transfers a patient with confirmed Ebola to an Ebola treatment center in consultation with public health officials

Ebola Treatment Center

- Safely receives and isolates a patient with confirmed Ebola
- Cares for patients with Ebola for duration of illness
- Has enough Ebola PPE for at least 7 days of care (will restock as needed)
- Has sustainable staffing plan to manage several weeks of care
- CDC experts are ready to deploy to provide assistance as needed

All of the hospitals will be prepared to do the following:

Ensure staff are appropriately trained and have documented competency in safe PPE practices

+

Have systems in place to safely manage waste disposal, cleaning and disinfection

+

Adhere to infection control protocols

Medical systems for EID in US and Europe

35 hospitals are designated as Ebola Treatment Centers

EID patients(VHF or MERS) will be gathered at **One** Hospital (Royal Free hospital) in London

EID patients(VHF or MERS) will be gathered at **2** hospitals(each 1 hospital in north / south area)

405 is too big number !!

Treatment of ebola in developed countries

- In the outbreak of Ebola virus disease in West Africa from 2014 to 2015, the mortality rate was 39.5%

- Whereas the mortality rate was reduced to 18.5% by carrying in MedEvac and performing intensive care in developed countries.

N Engl J Med. 2016 Feb 18;374(7):636-46.

Our proposition

- 405 hospitals should be divided into 2 types of hospitals.
    - Treatment hospitals: Hospitals for EID diagnosis and treatment.
    - Assessment hospitals: Hospitals only for EID diagnosis.
    - Medical resources and staff should be collected in the treatment hospital.
- If not, MERS should be type I infectious diseases in law.

Conclusion

- MERS is highly contagious EID with high mortality rate.
- In developed countries, it is required not only to isolate patients but also to save their lives.
- Medical resources and stuff should be more concentrated and roles divided in each hospitals.