

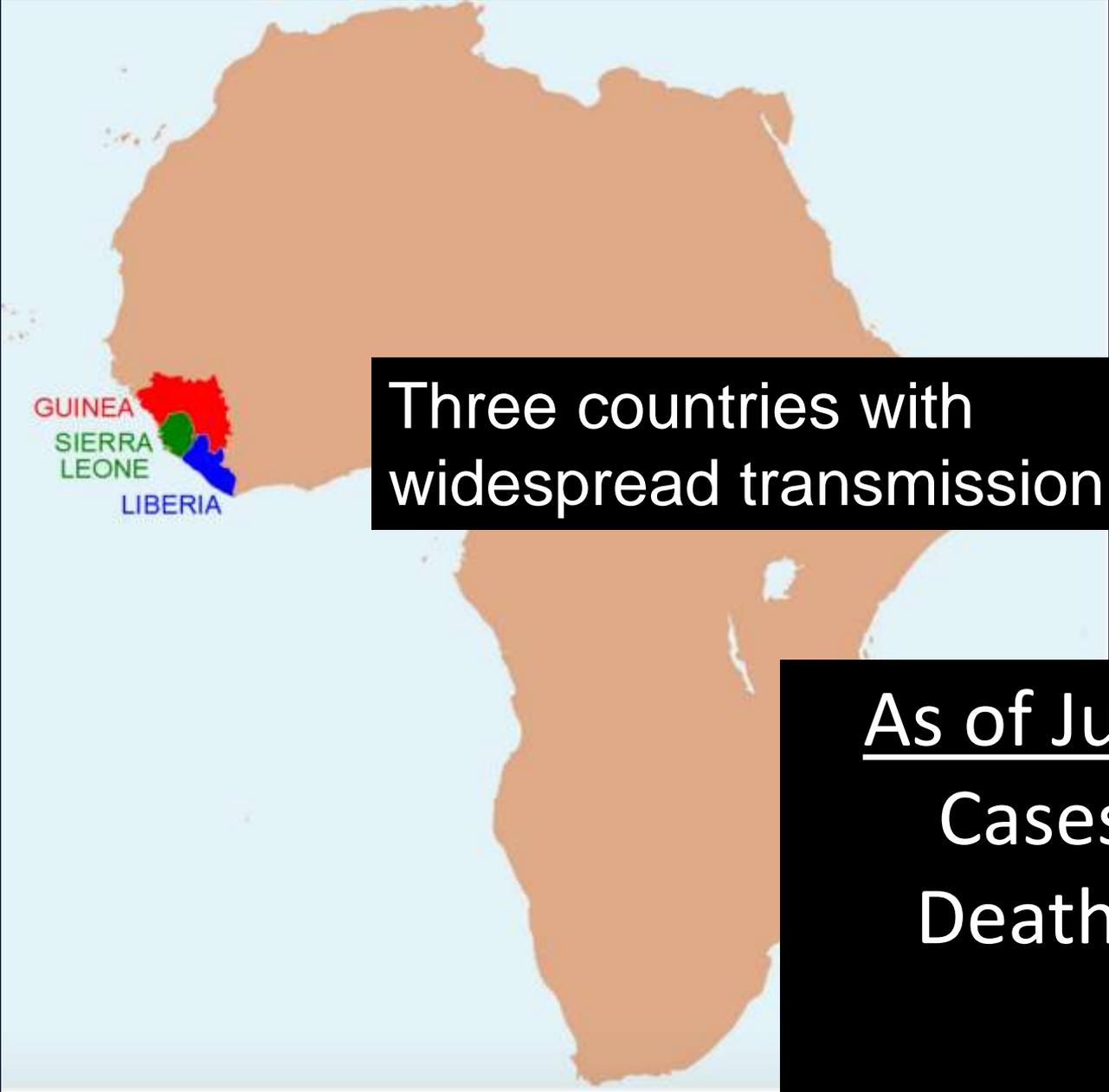
Ebola in Liberia: Two Points in an Epidemic

June 8, 2015

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Illinois Department of Public Health

I have nothing to disclose.

This talk represents my personal experiences and does not necessarily represent the viewpoint or opinions of the Centers for Disease Control and Prevention or the Illinois Department of Public Health.

A map of West Africa with Guinea, Sierra Leone, and Liberia highlighted in red, green, and blue respectively. The rest of the continent is shown in a light orange color. The labels 'GUINEA', 'SIERRA LEONE', and 'LIBERIA' are placed to the left of their respective colored regions.

GUINEA
SIERRA
LEONE
LIBERIA

Three countries with
widespread transmission

As of June 3, 2015

Cases: 27,145

Deaths: 11,147

Confirmed Weekly Ebola Cases January 2014 – March 2015

Liberia



July-August
2014

January-February
2015

	United States	Liberia
Gross Domestic Product per capita	\$46,400	\$454 (184 th /189 countries)
Health care spending per capita per year	\$6,719	\$15
Physicians per 100,000 pop.	242	< 2

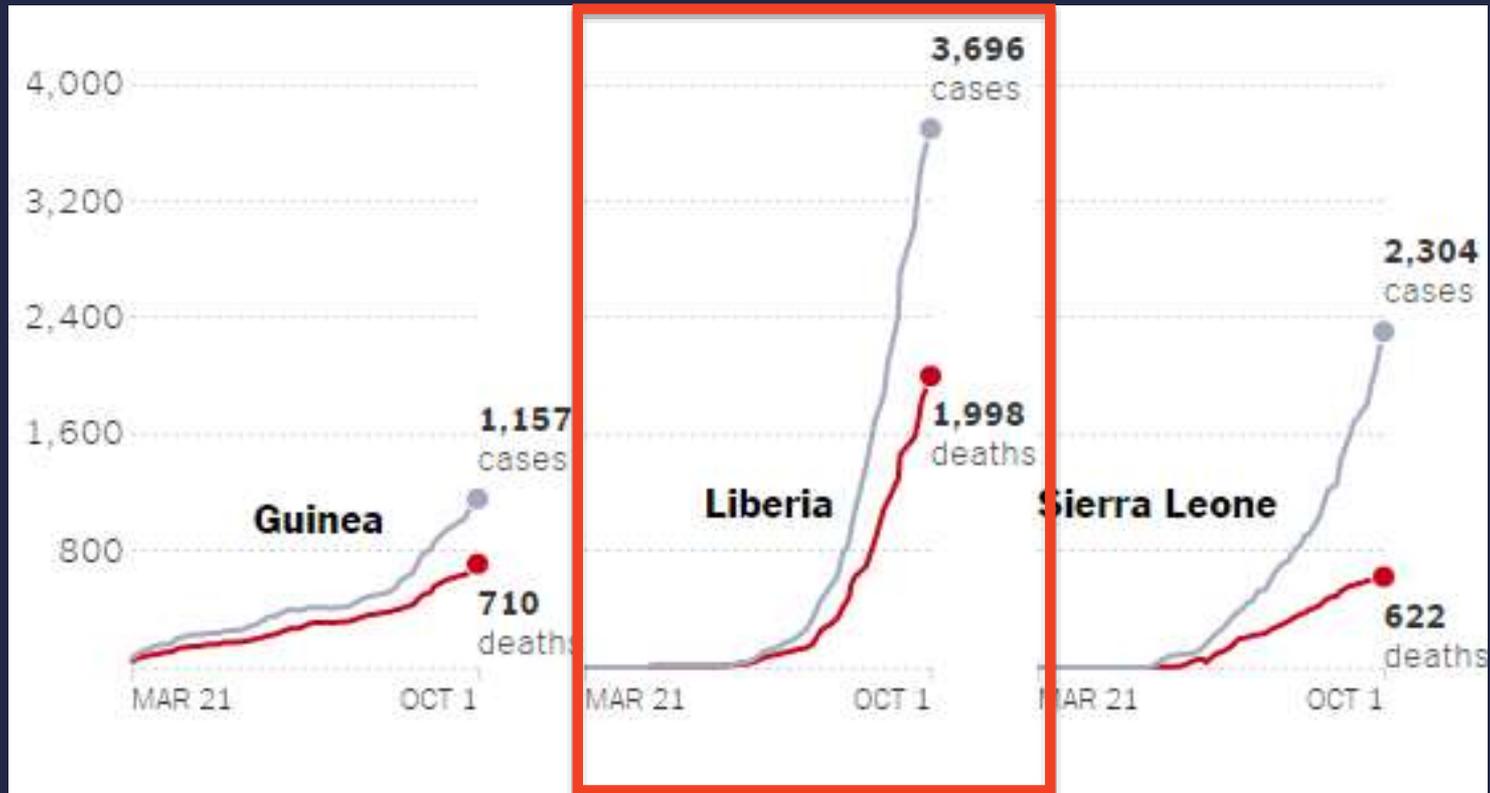
Civil war (1989–2003): poor literacy, weak infrastructure



Liberian Observer, "First West Point Ebola Body Removed Wednesday."
August 14, 2014

What do you need to stop an Ebola epidemic?

Reported Ebola Cases, Probable/Confirmed, March–October, 2014



Outbreak Response Goals

- 1. Organized medical and public health response**
- 2. Patient diagnosis and care (Ebola Treatment Units)**
 - Careful staff training and support
 - Personal protective equipment (PPE)
 - Adequate facilities and safe transportation to facilities
 - Accurate and available laboratory testing
 - Therapeutics (medications, IV fluids, treatment protocols)
- 3. Stop transmission**
 - Case identification and isolation
 - Contact tracing
 - Infection control (health care settings, safe burials, waste disposal)
 - ? Vaccine
- 4. Community engagement and education**

Ebola in Liberia: Part One

July-August, 2014

1. Organized medical and public health response



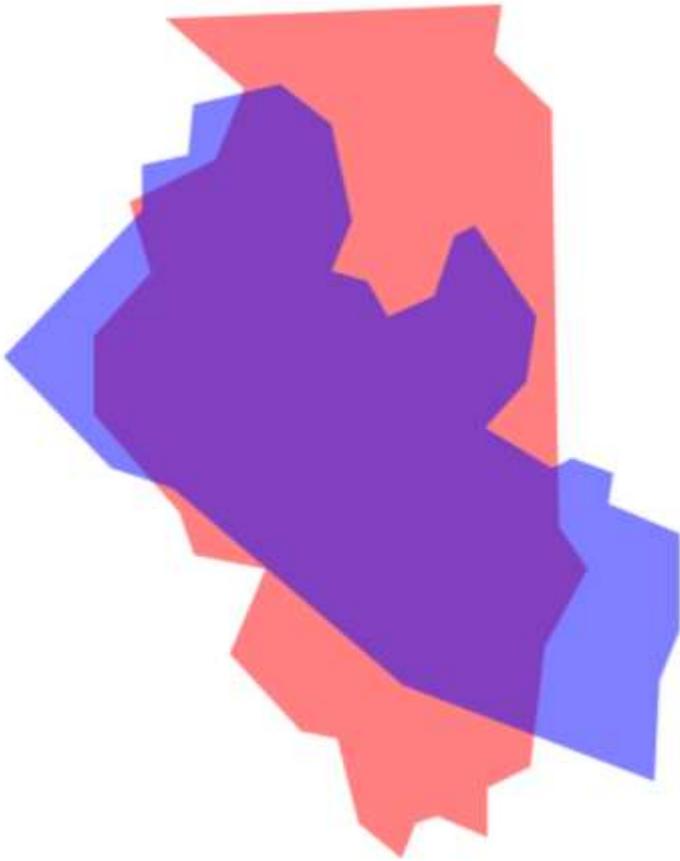
1. Organized medical and public health response



2. Organized medical and public health response



2. Patient diagnosis and care: safe transportation



Most of Liberia's hinterland unpaved roads become virtually impassable during the Rainy Season

Bad Roads Hamper Deliveries Of Needed Ebola Emergency Materials

Tue, 08/26/2014 - 05:42 admin

2. Patient diagnosis and care: safe transportation



2. Patient diagnosis and care (Ebola Treatment Units)



2. Patient diagnosis and care (Ebola Treatment Units)



2. Patient diagnosis and care (Ebola Treatment Units)

Science

AAAS

Genomic surveillance elucidates Ebola virus origin and transmission during the 2014 outbreak

Stephen K. Gire *et al.*
Science 345, 1369 (2014);
DOI: 10.1126/science.1259657

Genomic surveillance elucidates Ebola virus origin and transmission during the 2014 outbreak

Stephen K. Gire,^{1,2*} Augustine Goba,^{3*†} Kristian G. Anders,⁴ Rachel S. G. Sealfon,^{2,4*} Daniel J. Park,^{2*} Lansana Kanneh Jalloh,³ Mambu Momoh,^{3,5} Mohamed Fullah,^{3,5‡} Gytis Duda Wohl,^{1,2,7} Lina M. Moses,⁸ Nathan L. Yozwiak,^{1,2} Sarah Winn Christian B. Matranga,² Christine M. Malboeuf,² James Qu, Gladden,² Stephen F. Schaffner,^{1,2} Xiao Yang,² Pan-Pan Jia Nekoui,^{1,2} Andres Colubri,¹ Moinya Ruth Coomber,³ Mbalu Alex Moigboi,^{3‡} Michael Gbakie,³ Fatima K. Kamara,³ Vero Edwin Konuwa,³ Sidiki Saffa,³ Josephine Sellu,³ Abdul Azz Alice Kovoma,^{3‡} James Koninga,³ Ibrahim Mustapha,³ Kar Momoh Foday,³ Mohamed Yillah,³ Franklyn Kanneh,³ Willie James L. B. Massally,³ Sinéad B. Chapman,² James Bochic Murphy,² Chad Nusbaum,² Sarah Young,² Bruce W. Birren, Grant,³ John S. Scheffelin,⁸ Eric S. Lander,^{2,7,9} Christian H M. Gevao,¹¹ Andreas Gnrke,^{2§} Andrew Rambaut,^{6,12,13§} Ro Garry,^{8§} S. Humarr Khan,^{3‡§} Pardis C. Sabeti^{1,2†§}

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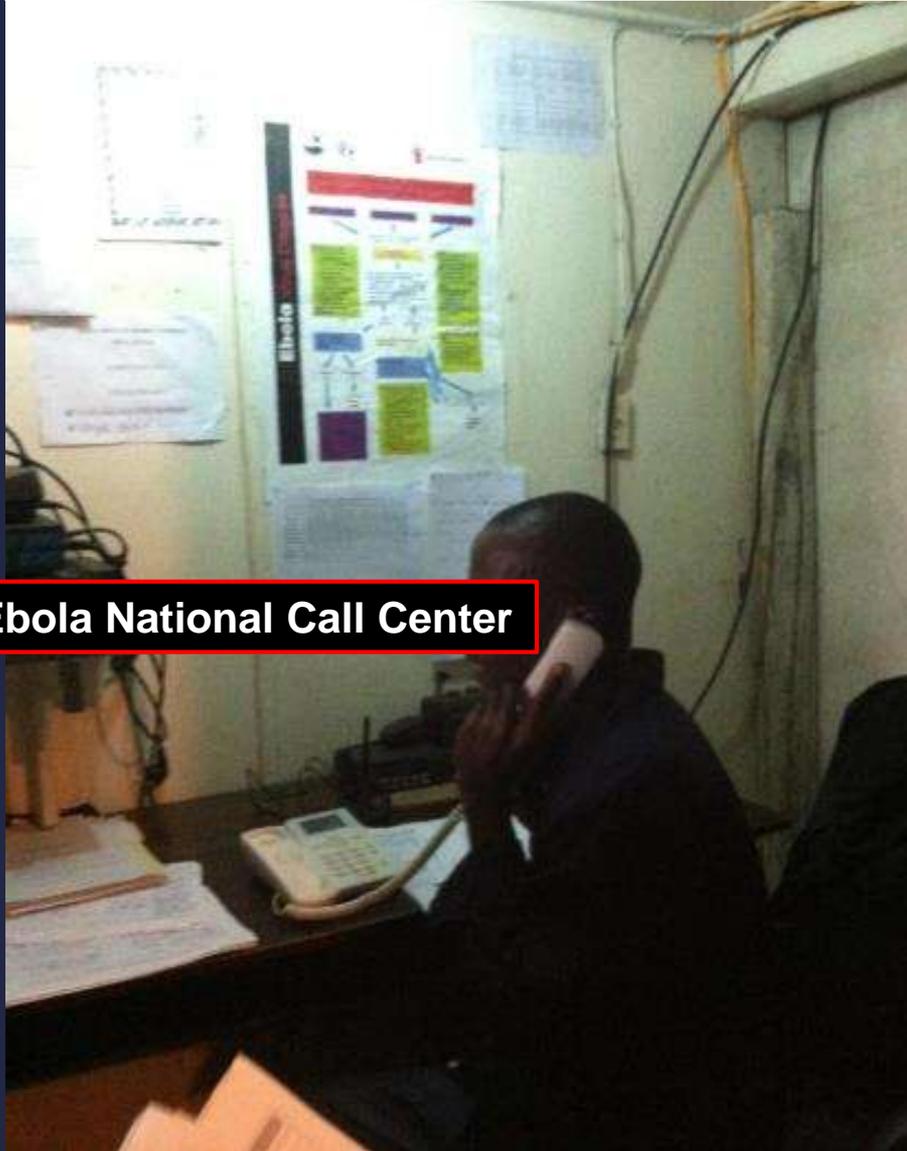


CREDITS: (LEFT TO RIGHT) MAMBU MOMOH; SIMBIRIE JALLOH; PARDIS SABETI (2); MIKE DUBOSE

The five co-authors of a *Science* study who contracted Ebola and died.

Ebola's heavy toll on study authors

3. Stop transmission: case finding



Ebola National Call Center

DISPATCH FORM # 1		DISPATCH FORM # 2	
DISPATCH NUMBER: 2014070701	DISPATCH NUMBER: 2014070701	DISPATCH NUMBER: 2014070801	DISPATCH NUMBER: 2014070801
TIME OF CALL: 11:27 hrs			
LOCATION: Monit	LOCATION: Monit	LOCATION: Monit	LOCATION: Monit
DETAILED LOCATION: Monit	DETAILED LOCATION: Monit	DETAILED LOCATION: Monit	DETAILED LOCATION: Monit
CALLBACK NUMBER: 0888884820	CALLBACK NUMBER: 0888884820	CALLBACK NUMBER: 0888884820	CALLBACK NUMBER: 0888884820
AGE: 22 yrs	AGE: 22 yrs	AGE: 22 yrs	AGE: 22 yrs
SEX: Male	SEX: Male	SEX: Male	SEX: Male
SYMPTOMS: Suspected Ebola	SYMPTOMS: Suspected Ebola	SYMPTOMS: Suspected Ebola	SYMPTOMS: Suspected Ebola
CALLER'S NAME: Timothy Kallab			
UNIT: []	UNIT: []	UNIT: []	UNIT: []
TIME OUT: 11:27 hrs			
ENROUTE TIME: 30 min			
ON SCENE TIME: []			
TRANSPORT TIME: []			
ARRIVAL TIME AT THE HOSPITAL: []			
NAME OF HOSPITAL: []			
AVAILABLE TIME: []			
CANCELLED TIME: []			
KEY INFO: []			
DISPATCHER: Korpo S. Dukuly			
DISPATCH FORM # 3	DISPATCH FORM # 4	DISPATCH FORM # 5	DISPATCH FORM # 6
DISPATCH NUMBER: 2014070702	DISPATCH NUMBER: 2014070801	DISPATCH NUMBER: 2014070801	DISPATCH NUMBER: 2014070801
TIME OF CALL: 11:28 hrs			
LOCATION: Monit	LOCATION: Monit	LOCATION: Monit	LOCATION: Monit
DETAILED LOCATION: Monit	DETAILED LOCATION: Monit	DETAILED LOCATION: Monit	DETAILED LOCATION: Monit
CALLBACK NUMBER: 0888884820	CALLBACK NUMBER: 0888884820	CALLBACK NUMBER: 0888884820	CALLBACK NUMBER: 0888884820
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DISPATCHER: Korpo S. Dukuly			

3. Stop transmission: infection control



3. Stop transmission: infection control



CDC Team/Allison Arwady



CDC Team/Allison Arwady

3. Stop transmission: case finding

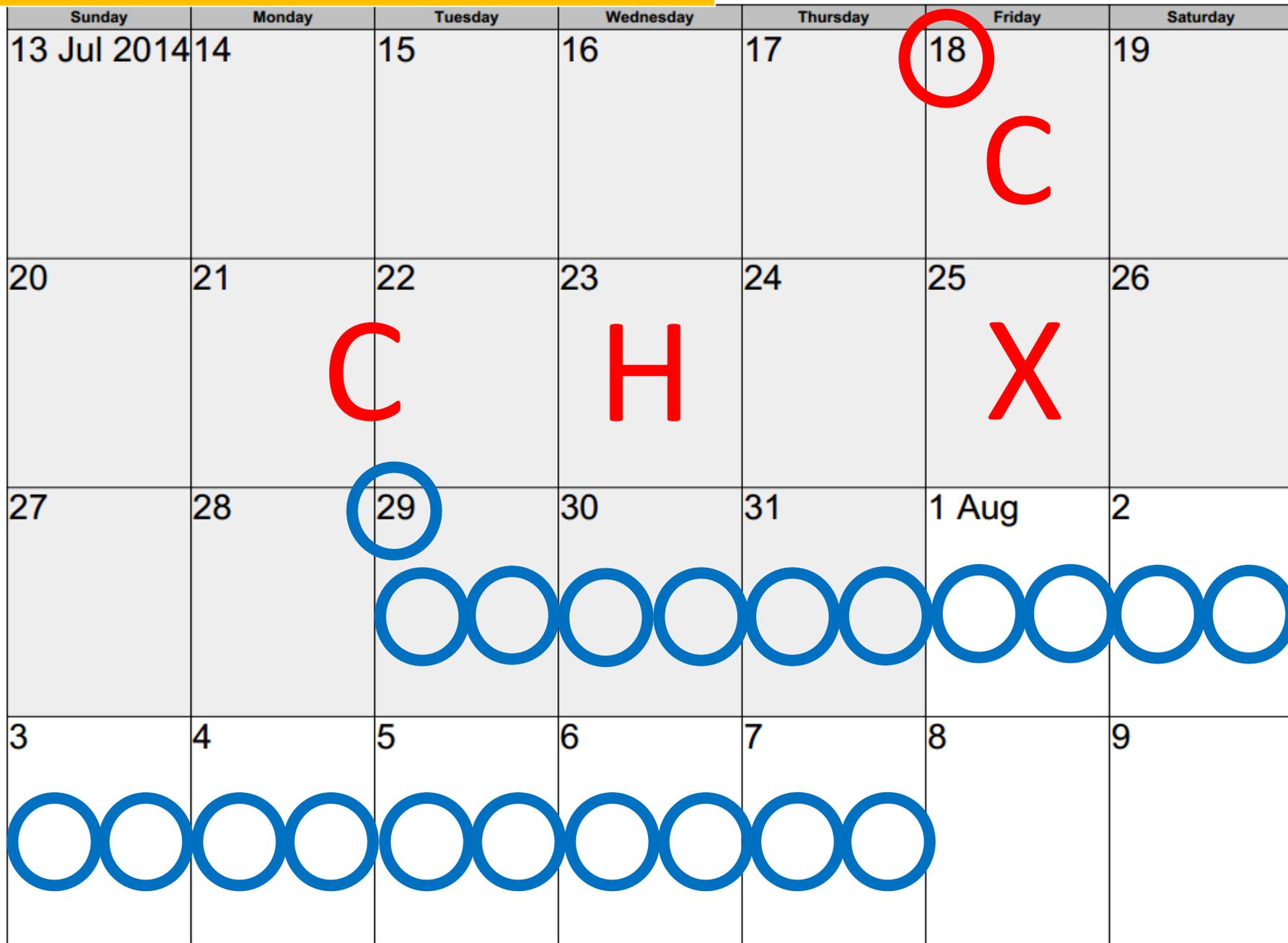
One County in July

- Official county case count: 4
- Line list: 80+
- 30+ additional burials
- Community rumors/unrest
- PPE available at hospital: 0
- Ebola Treatment beds (Monrovia) available: 0
- Community health workers available: 0

3. Stop transmission: case finding



3. Stop transmission: case finding



3. Stop transmission: case finding

Nurse (officer in charge)

Nurse

Vaccinator

Physician assistant

Lab technician

Nurse (ER supervisor)

Lab aide

Nurse anesthetist

Lab aide

Nurse

Lab aide

Nurse aide

X-ray technician

Nurse aide

Security guard

Nurse aide

Medication dispenser

Nurse aide

Cleaner

Student nurse

Nurse (officer in charge, OPD)

16/21 (76%) died

State of Emergency



Bong County Health Team

Preble Hospital & School of Nursing
Sudakin, Bong County
Email: mohbong@yahoo.com

**THERE WILL BE NO INDEPENDENCE DAY
BREAK, WEEKENDS OR HOLIDAY FOR ALL CHT
STAFFS DURING THIS PERIOD OF
EMMERGENCY.**

This measure is to ensure uninterrupted surveillance activities and psychosocial support to the affected families.

Stringent administrative measures will be taken against all those who will stay away from work.

Dr. Arzoaquoi/CHO

Bong County Health and Social Welfare Team

4. Community engagement and education



CDC Team/Allison Arwady



CDC Team/Allison Arwady



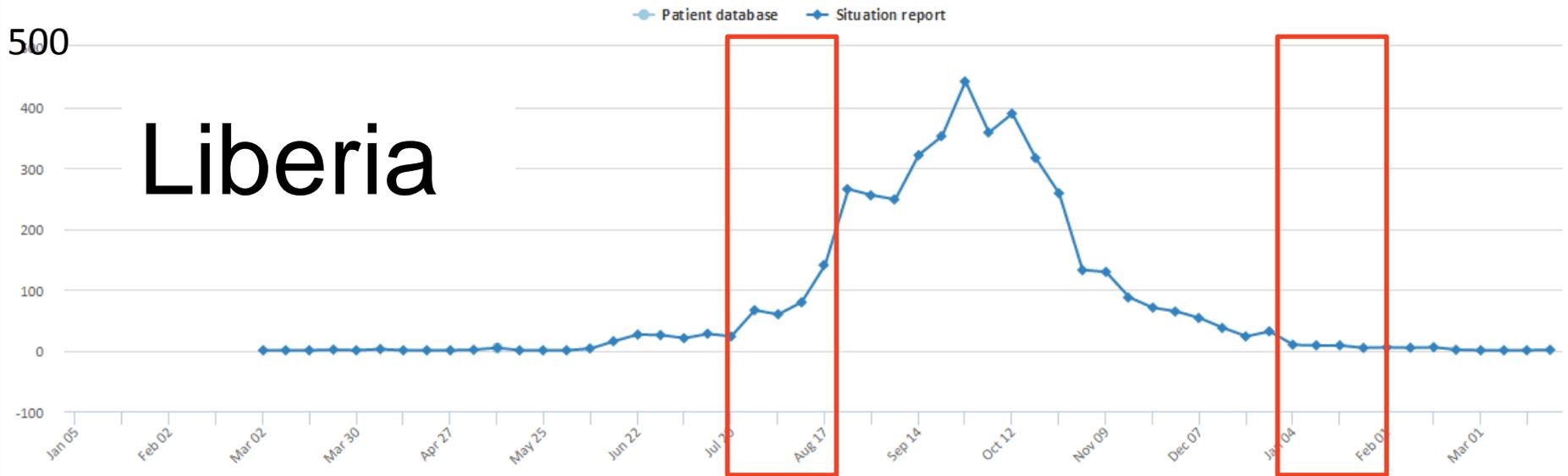


Ebola in Liberia: Part Two

January-February, 2015

Confirmed Weekly Ebola Cases

Liberia



July-August
2014

1 laboratory (Monrovia)
2 Ebola Treatment Units
(20 beds each)

January-February
2015

9+ laboratories
20+ ETUs and
holding centers

1. Organized medical and public health response



1. Organized medical and public health response



2. Patient diagnosis and care: safe transportation



2. Patient diagnosis and care (Ebola Treatment Units)



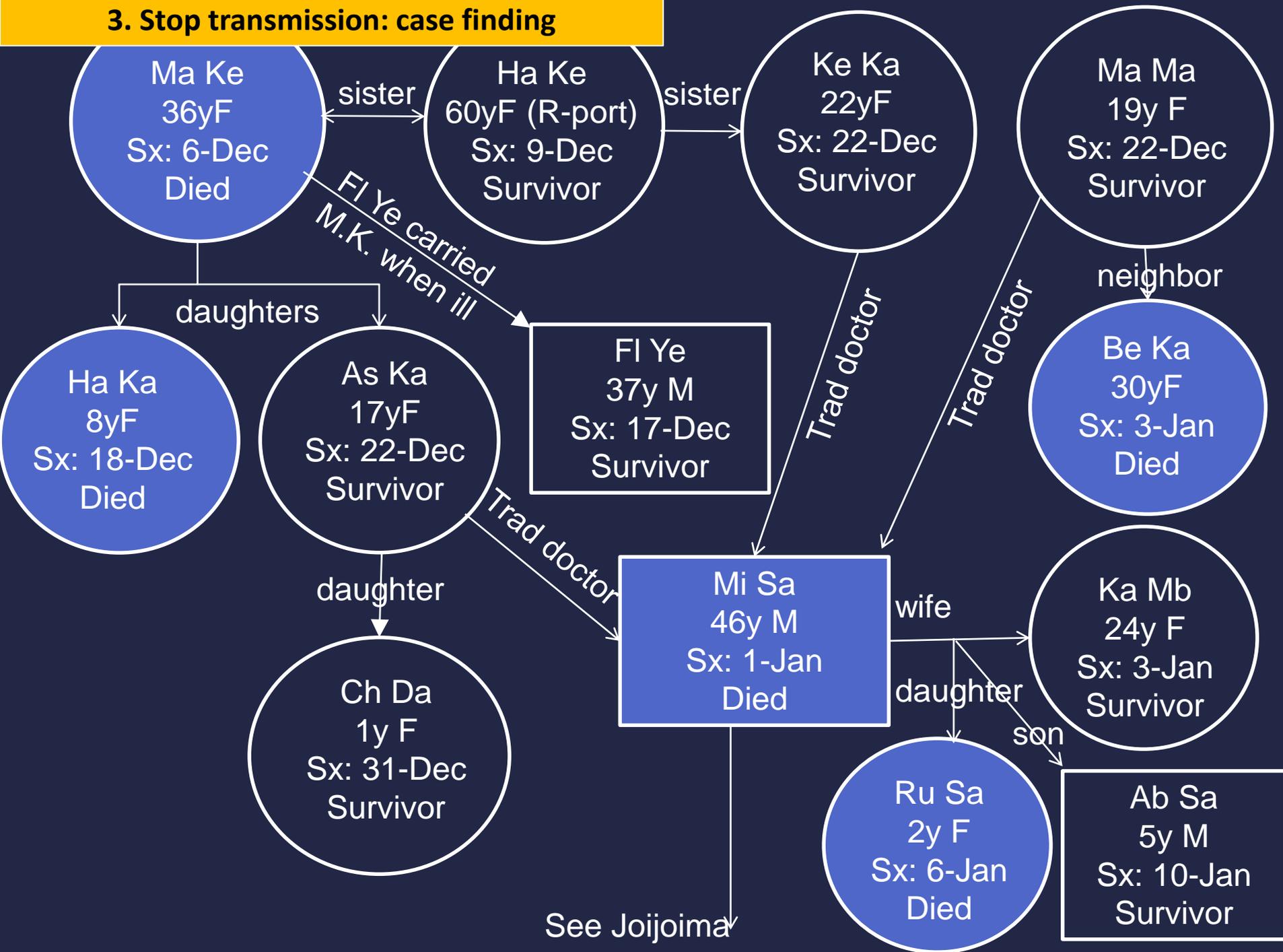
2. Patient diagnosis and care (Ebola Treatment Units)



2. Stop transmission (infection control)



3. Stop transmission: case finding



3. Stop transmission: case finding



3. Stop transmission: case finding



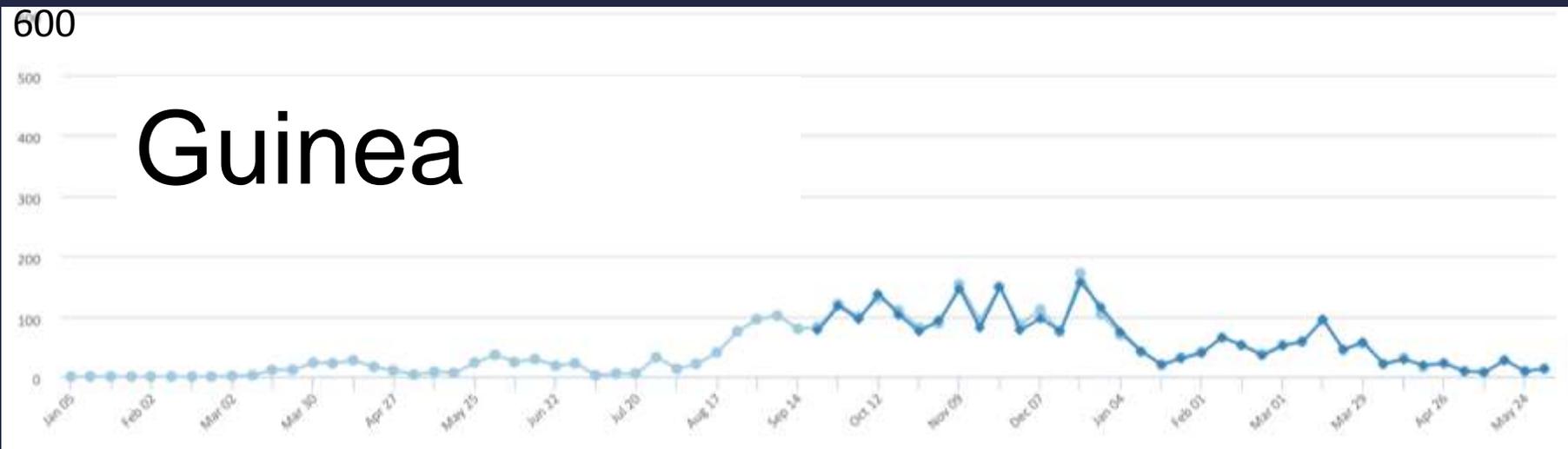
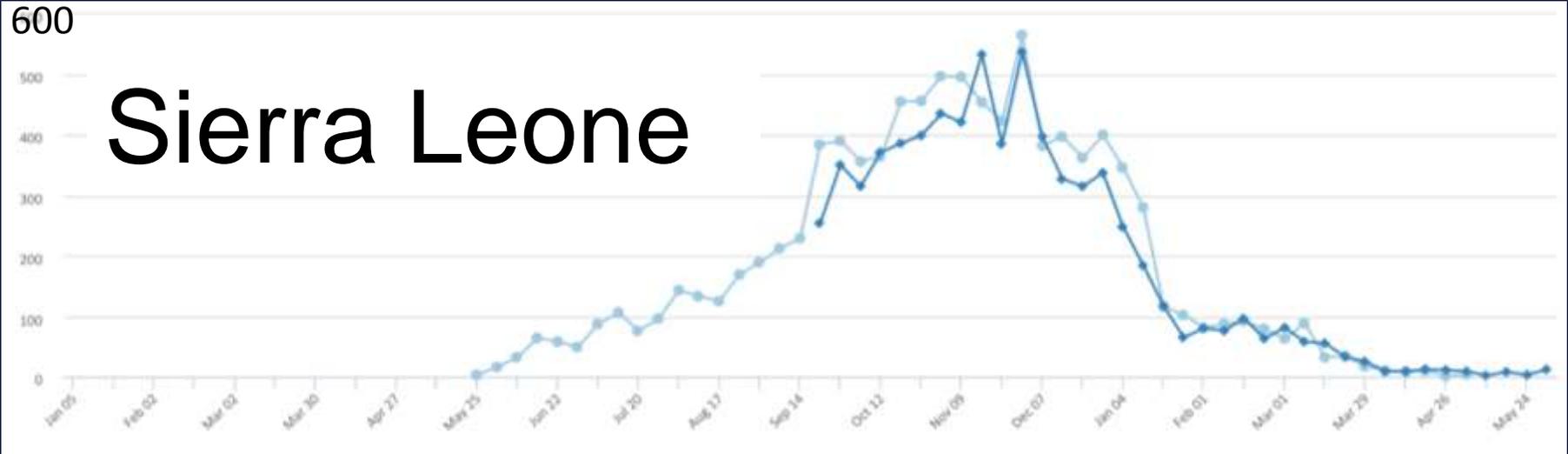
4. Community engagement and education



Outbreak declared over in Liberia on May 9, 2015

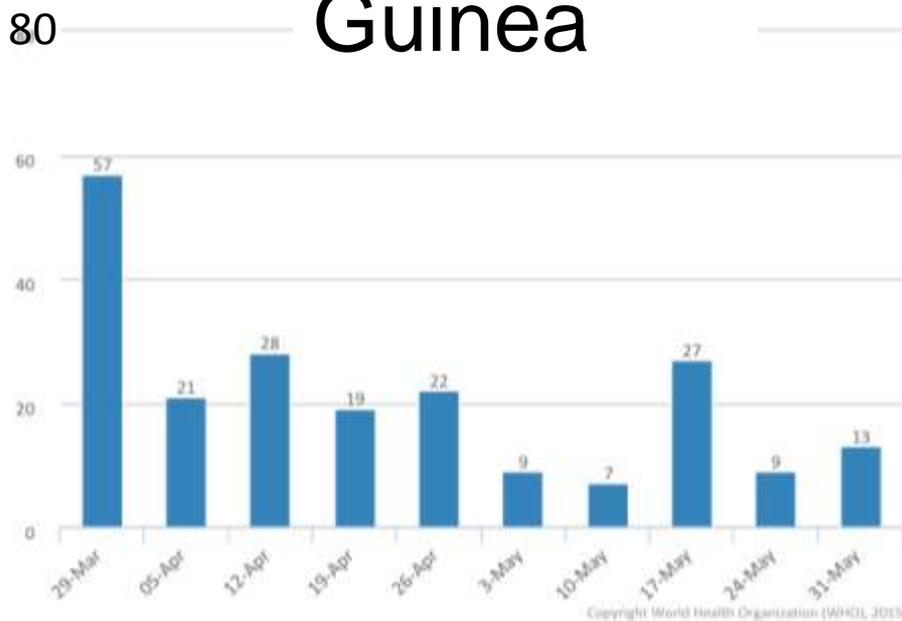


Confirmed Weekly Ebola Cases, January 2014 – May 2015

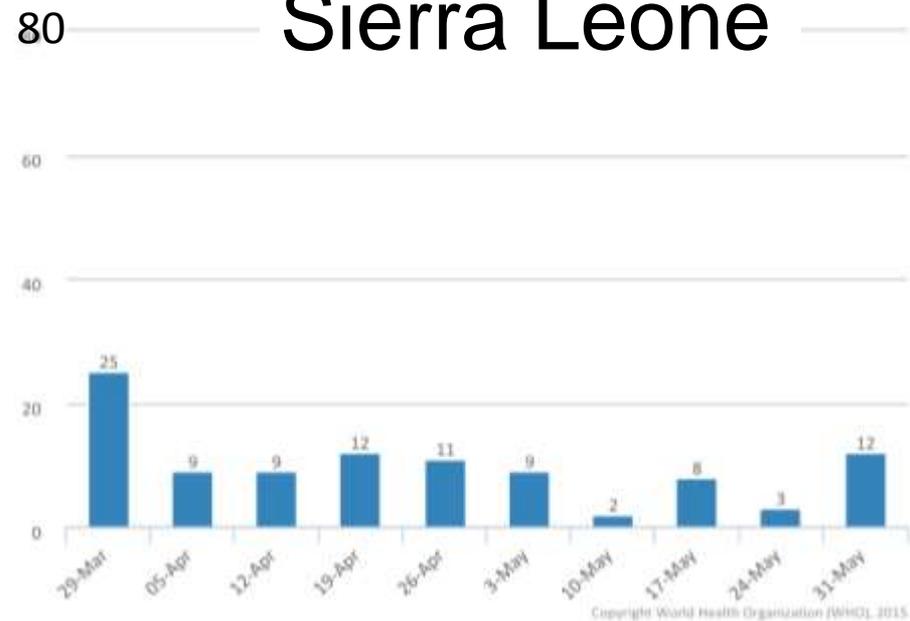


Total confirmed cases by week, March 29 – May 31, 2015

Guinea



Sierra Leone



25 new confirmed cases in the week to May 31, 2015, from 4 prefectures in Guinea and 3 districts in Sierra Leone

Final Thoughts

- In West Africa, unprecedented numbers
 - A new setting, not a new disease
 - Epidemic coming under control, but not over
 - Resources are critical
- Health care settings
 - Importance of infection control and protecting health care workers
- Change in how we think about global health security and global interconnectedness
 - Humanitarian response and source control
 - We are all as vulnerable as our weakest point