

**WEST AFRICAN EBOLA VIRUS
DISEASE (EVD) OUTBREAK,
2014/2015**

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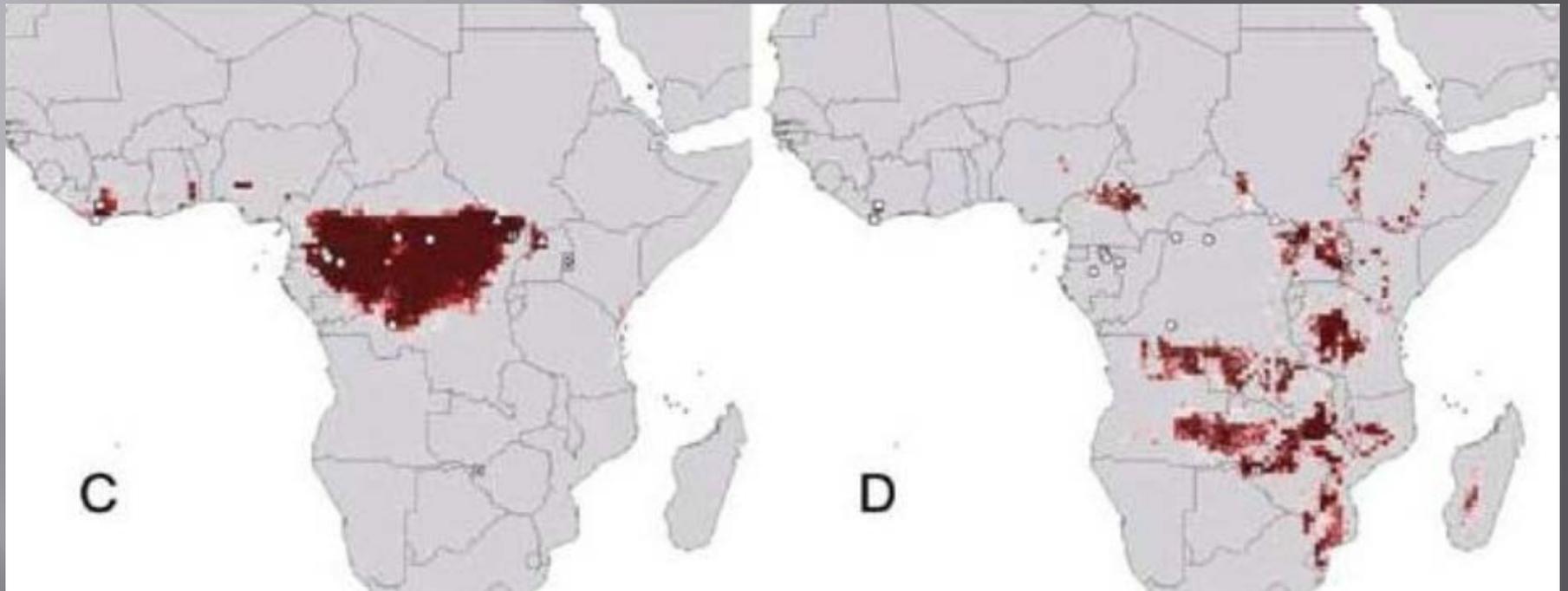
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Distribution of Endemic Areas of Ebola and Marburg viruses (before 2014 outbreak)



Distribution of Ebola (C) and Marburg viruses (D)

Countries with cases of Ebola

Countries with Widespread Transmission

- ▣ Guinea
- ▣ Liberia
- ▣ Sierra Leone

Cases in urban settings with uncertain control measures

- ▣ None Currently

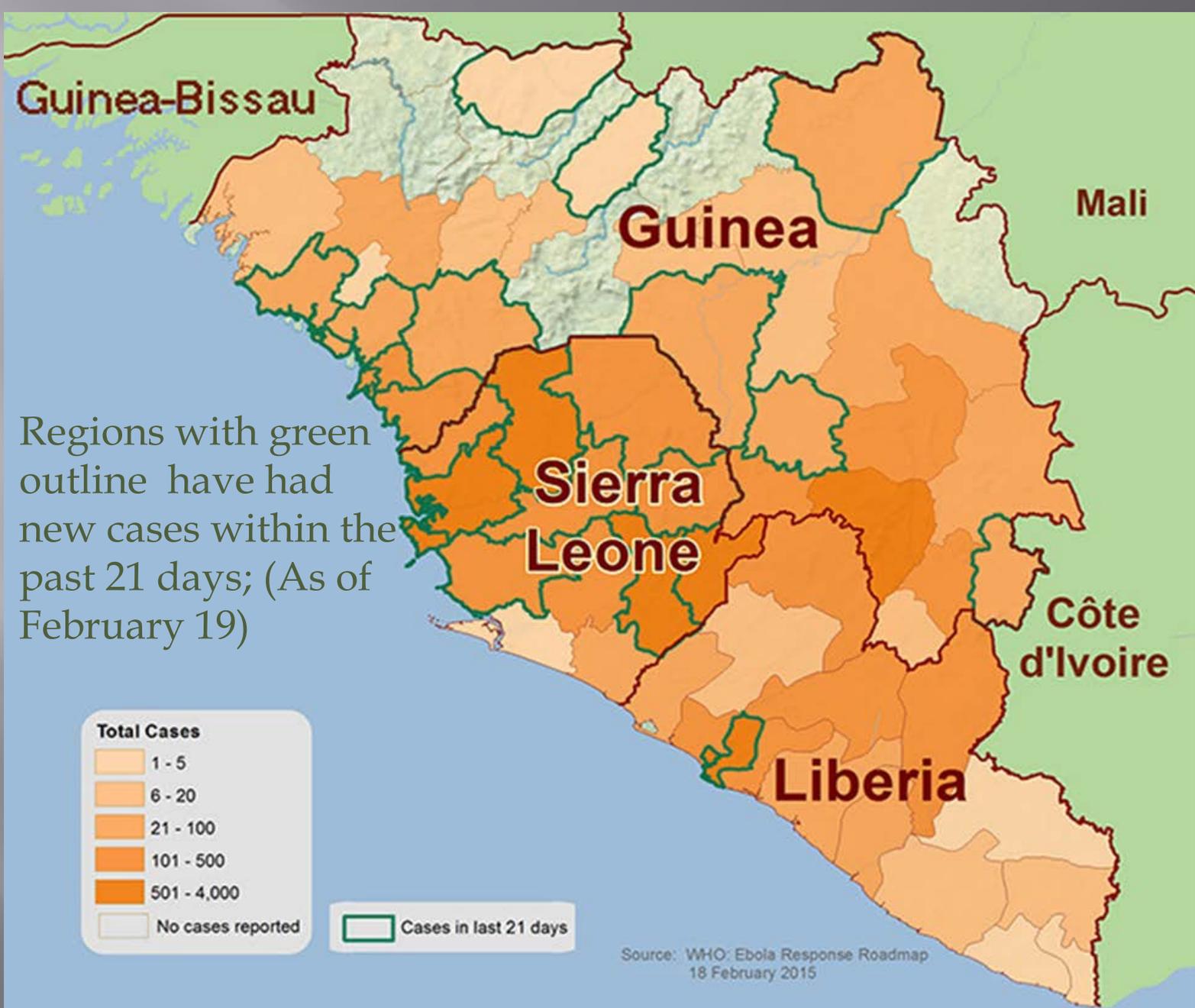
Cases in urban settings with effective control measures

- ▣ United Kingdom

Previously affected countries

- ▣ Nigeria
- ▣ Senegal
- ▣ Spain
- ▣ United States
- ▣ Mali

As of February 19, 2015; An Adaptation of CDC's table found at <http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/distribution-map.html#areas>



Regions with green outline have had new cases within the past 21 days; (As of February 19)

Source: WHO: Ebola Response Roadmap
18 February 2015



**West Africa -
Ebola Outbreak**

- Guinea
- Liberia
- Sierra Leone
- Nigeria
- Lagos
- Port Harcourt
- Senegal

**Democratic Republic of Congo -
Ebola Outbreak**

**Uganda -
Marburg Outbreak**

Human-to-human transmission is spread through direct contact with blood or body fluids to:

- Urine (virus present late in disease)
- Saliva
- Sweat
- Feces
- Vomit
- Breast milk
- Semen

OR

- Objects (like needles and syringes) that have been contaminated with the virus

OR

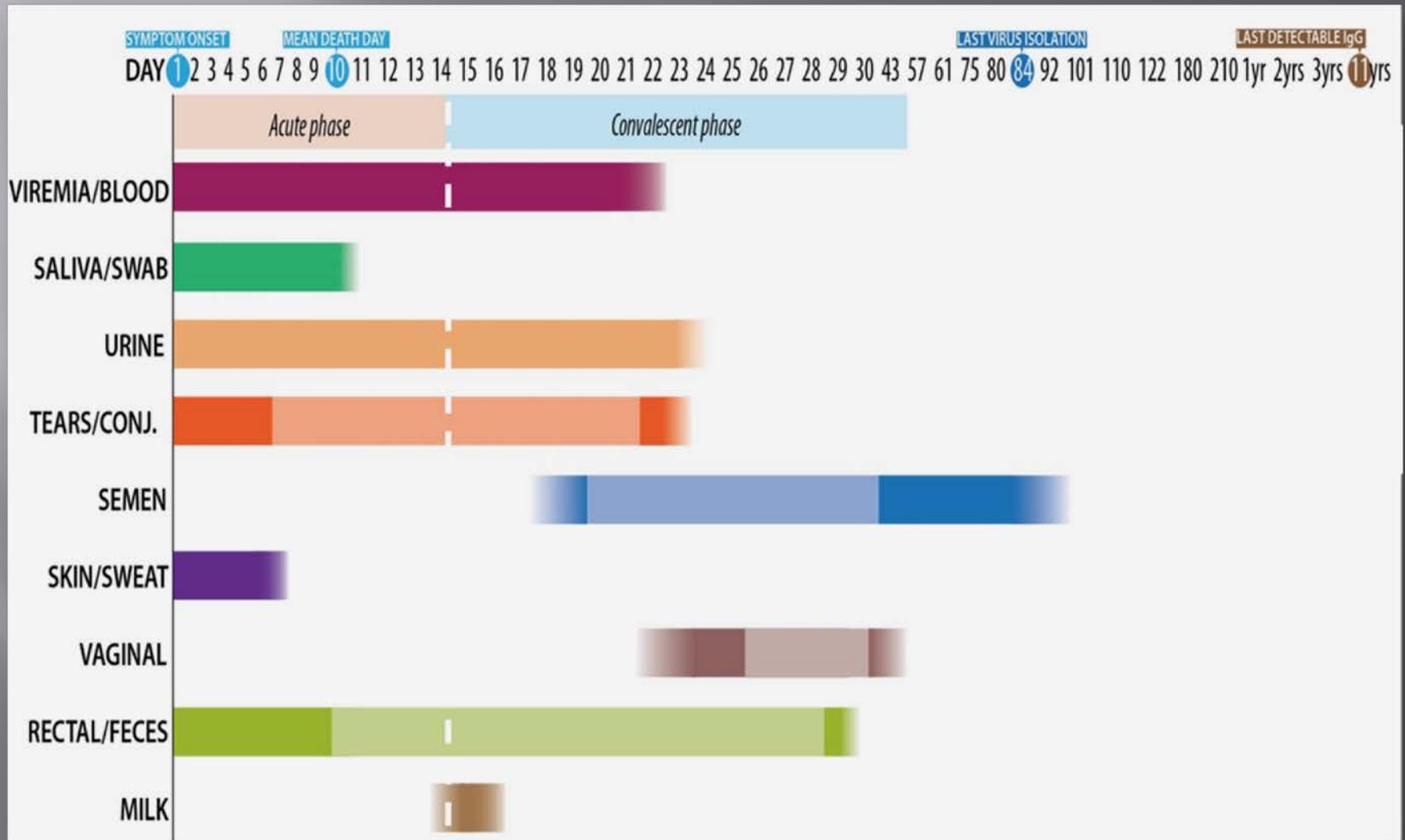
- Infected animals

Transmission

When infected body fluids come in contact with:

1. Broken Skin
2. Mucous Membranes
 - Eyes
 - Nose
 - Mouth

Detection of Ebola Virus in Different Human Body Fluids over Time



Who is at risk during outbreaks of human-to-human transmission

- ▣ Healthcare providers caring for Ebola virus infected and symptomatic patients
- ▣ Family and friends in close contact with infected and symptomatic patients

Why?

- ▣ They are more likely to come in contact is infected blood or body fluids of the sick patient

Personal Protective Equipment (PPE):

- ❑ Double gloves - at least one with extended cuffs (outer pair)
- ❑ Boot covers that are waterproof and go to at least mid-calf or leg covers
- ❑ Single-use fluid resistant or impermeable gown that extends to at least mid-calf or coverall without integrated hood
- ❑ Respirators, including either N95 respirators or powered air purifying respirator (PAPR)
- ❑ Single-use, disposable full-face shield
- ❑ Surgical hoods to ensure complete coverage of the head and neck
- ❑ Apron that is waterproof and covers the torso to the level of the mid-calf (and that covers the top of the boots or boot covers) should be useful if **Ebola patients have vomiting or diarrhea**

Incubation Period

- ▣ Range: 2 to 21 days after exposure to Ebola
- ▣ Average: 6 to 12 days
- ▣ The incubation period may be related to the infection route
 - 6 days for injection
 - 10 days for contact

What is being seen in the current outbreak

The most common signs and symptoms reported

- ▣ From symptom-onset to the time the case is detected:
 - Fever (87%)
 - Fatigue (76%)
 - Vomiting (68%)
 - Diarrhea (66%)
 - Loss of appetite (65%)

Initial Symptoms:

- ▣ Abrupt onset of fever
- ▣ Nonspecific symptoms
 - May include chills, myalgia, and malaise

Initial Phase of illness

(1 - 5 days post-onset of illness)

- Elevated body temperature
(or subjective fever)
- Chills
- Myalgias
- Malaise

Differential Diagnoses to Consider & Rule-Out or Rule-In

Other more common infectious diseases:

- Malaria
- Typhoid Fever
- Lassa fever
- Meningococemia
- Other Bacterial infections
(e.g., pneumonia)

About 5 days after onset of symptoms:

Gastrointestinal symptoms

- Severe watery diarrhea (≥ 5 Liters per day)
- Nausea
- Vomiting (unable to replenish what is lost)
- Abdominal pain

Other symptoms

- Chest pain
- Shortness of breath
- Headache or confusion
- Conjunctival injection
- Hiccups

The Rash

Diffuse erythematous maculopapular rash

- ▣ 5 – 7 days post-illness onset but can be earlier
- ▣ Usually involves the neck, trunk, and arms
- ▣ Desquamate around day 8 or 9

Rash is commonly missed in dark-skinned

- ▣ Desquamation may be only sign that rash occurred

Complications During Course of Illness

- ▣ Pregnant women may experience spontaneous miscarriages
- ▣ Secondary Infections -

Bleeding frequency in the current outbreak

- ▣ Unexplained bleeding has been reported
 - 18% of patients
 - ▣ A "hemorrhagic syndrome," that if occurs, it happens in the late stages of the disease, about 24 to 48 hours before death
- ▣ Most often **blood in the stool** has been reported
 - About 6% of patients

Less Common & Late Occurring Symptoms & Signs:

- Seizures
- Cerebral Edema
- Bleeding
- Petechiae
- Ecchymosis/ Bruising
- Oozing From Venipuncture Sites
- Mucosal Hemorrhage
- Frank Hemorrhage Is Less Common

Patients with fatal disease

(mean of 7.5 days from symptom-onset to death during the current outbreak in West Africa)

- ▣ Usually develop more severe clinical signs early during infection
- ▣ Die typically between days 6 and 16 of complications
 - Multi-organ failure
 - Septic shock

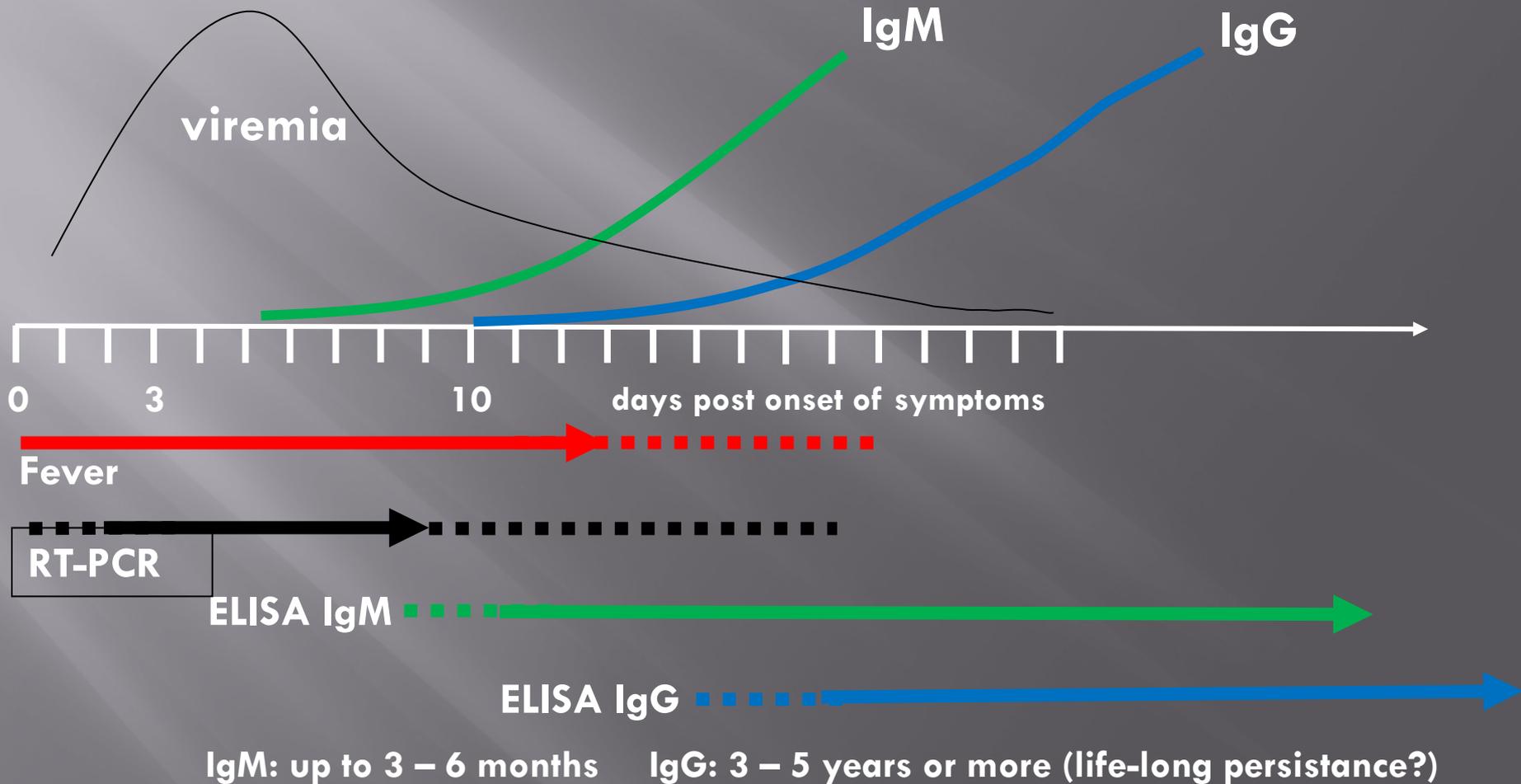
In non-fatal cases

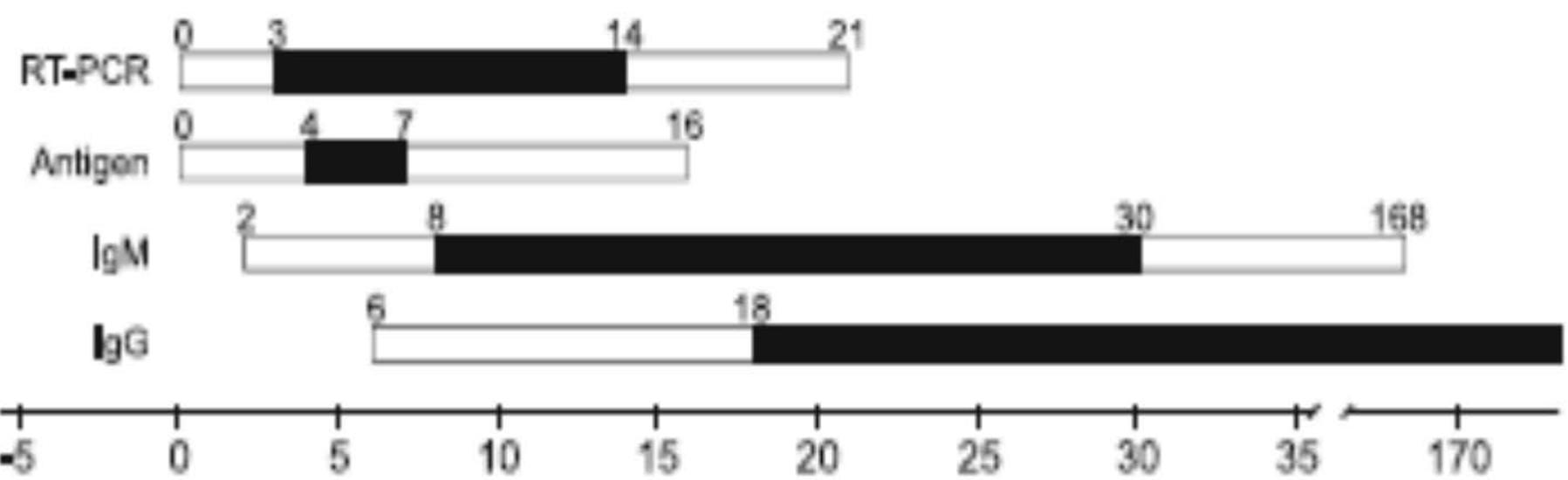
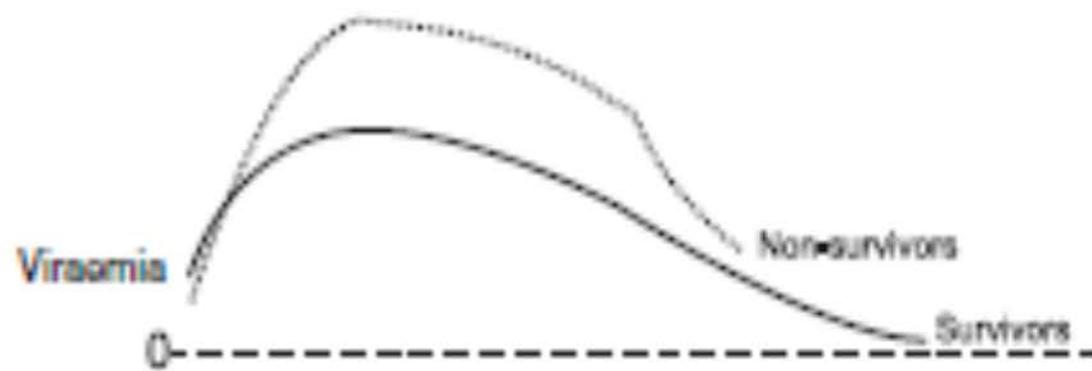
- ▣ May have fever for several days and improve, around day 6
- ▣ Survivors can
- ▣ Have a prolonged convalescence
- ▣ The case fatality proportion among patients with a known outcome is about 71%
(ranges from 46% in Nigeria to 69-72% in Guinea, Sierra Leone and Liberia)

Laboratory Findings

- ▣ On admission
 - **Leukopenia** frequently with **lymphopenia**
- ▣ Later
 - **Elevated neutrophils** and a left shift
 - **Platelet counts** decreased - 50,000 to 100,000
 - **Amylase** – elevated
 - (pancreatic involvement - inflammation/infection)
 - **Hepatic transaminases** - elevated
 - ▣ Aspartate Aminotransferase (AST) > Alanine Aminotransferase (ALT)
 - ▣ AST peaks at more than 1,000 IU/L while ALT is only slightly raised
 - **Proteinuria, Blood Urea Nitrogen (BUN) & Creatinine – Kidney Failure**
 - **Prothrombin (PT)** - prolonged
 - **Partial Thromboplastin Times (PTT)** - prolonged
 - **Fibrin degradation products** – elevated
 - ▣ Disseminated intravascular coagulation (DIC)
 - **Electrolytes** (hyponatremia, hypomagnesemia, and hypocalcemia)

EVD: Expected Diagnostic Test Results Over Time





Most tests positive
 Variable results

CASE DEFINITION FOR EBOLA VIRUS DISEASE (EVD)

- ▣ **Person Under Investigation (PUI)**
- ▣ A person who has both consistent symptoms and risk factors as follows:
 1. Clinical criteria, which includes fever of greater than 38.0 degrees Celsius or 100.4 degrees Fahrenheit, and **additional symptoms** such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; AND
 2. Epidemiologic risk factors within the past 21 days before the onset of symptoms, such as contact with blood or other body fluids or human remains of a patient known to have or suspected to have EVD; residence in – or travel to – an area where EVD transmission is active; or direct handling of bats or non-human primates from disease-endemic areas.

CASE DEFINITION FOR EBOLA VIRUS DISEASE (EVD)

Probable Case

- A PUI whose epidemiologic risk factors include high or low risk exposure(s) (see below)

Confirmed Case

- A case with laboratory-confirmed diagnostic evidence of Ebola virus infection

Risk Categories and Public Health Actions - High Risk

Clinical Criteria	Public Health Actions
Asymptomatic upon arrival in Texas	<ul style="list-style-type: none">• Public health meets passenger at the airport, and retakes temperature• Support Do Not Board (DNB) if issued by CDC• Notification of LHD followed by in-home visit within 12 hours of LHD notification• Control Order issued for quarantine (No public transportation, no large congregate setting activities, and no leaving home)• Twice daily visualized temperature checks at least 6 hours apart for 21 days after departure from country<ul style="list-style-type: none">○ At least one must be in-person, both in-person preferred• Report daily monitoring outcomes to DSHS Emerging and Acute Infectious Disease Branch 7 days/week• Proceed to “symptomatic” if indicated

Risk Categories and Public Health Actions - Some Risk

Clinical Criteria	Public Health Actions
Asymptomatic upon arrival in Texas	<ul style="list-style-type: none">• Public health meets passenger at the airport, and retakes temperature, and interviews for risk factors• If interview demonstrates need to reassess risk, consult with DSHS Emerging and Acute Infectious Disease Branch• If elevation of risk is agreed upon, follow instructions of the higher risk category• Support Do Not Board (DNB) if issued by CDC• Notification of LHD followed by in-home visit within 12 hours of LHD notification• Twice daily visualized temperature checks at least 6 hours apart for 21 days after departure from country<ul style="list-style-type: none">○ In-person checks preferred• No public transportation or large congregate setting activities; failure to comply can result in Control Order<ul style="list-style-type: none">○ Healthcare workers are not allowed to care for any patients○ Visitors allowed• Report daily monitoring outcomes to DSHS Emerging and Acute Infectious Disease Branch 7 days/week• Proceed to “symptomatic” if indicated

Risk Categories and Public Health Actions - Low Risk

Clinical Criteria	Public Health Actions
Asymptomatic upon arrival in Texas	<ul style="list-style-type: none">• Notification of LHD followed by in-home visit and risk interview within 12 hours of LHD notification• If interview demonstrates need to reassess risk, consult with DSHS Emerging and Acute Infectious Disease Branch• If elevation of risk is agreed upon, follow instructions of the higher risk category• Twice daily temperature checks at least 6 hours apart for 21 days after departure from country• Report daily monitoring outcomes to DSHS Emerging and Acute Infectious Disease Branch each business day• Proceed to “symptomatic” if indicated

Risk Categories and Public Health Actions

Exposure Category	Clinical Criteria	Public Health Actions
No Identifiable Risk	Not Applicable	No monitoring
Exposure Category	Clinical Criteria	Public Health Actions
A person of any risk category	<p><u>Symptomatic upon arrival in Texas or within 21 day monitoring period:</u></p> <p>Fever (subjective fever or measured temperature $\geq 100.4^{\circ}\text{F}/38^{\circ}\text{C}$) OR any of the following:</p> <ul style="list-style-type: none"> • Severe headache • Muscle pain • Vomiting • Diarrhea • Stomach pain • Unexplained bruising or bleeding 	<ul style="list-style-type: none"> • Implement rapid isolation • Arrange for designated transport • Arrange for medical evaluation • Notify DSHS Emerging and Acute Infectious Disease Branch • If medically determined not to have Ebola infection, return to assessed risk-appropriate asymptomatic protocol for remainder of 21 days

Persons Under Investigation

Persons Under Investigation	
Number persons evaluated	54
Number persons tested	23
Number tested at DSHS	16
Number tested at Dallas	5
Number tested other (e.g. UTMB)	2
Number persons negative	20
Number persons positive	3
Number not meeting testing criteria	31
*First suspect reported 7/27/14. Excludes individuals monitored and tested through the military	

West African Traveler Monitoring

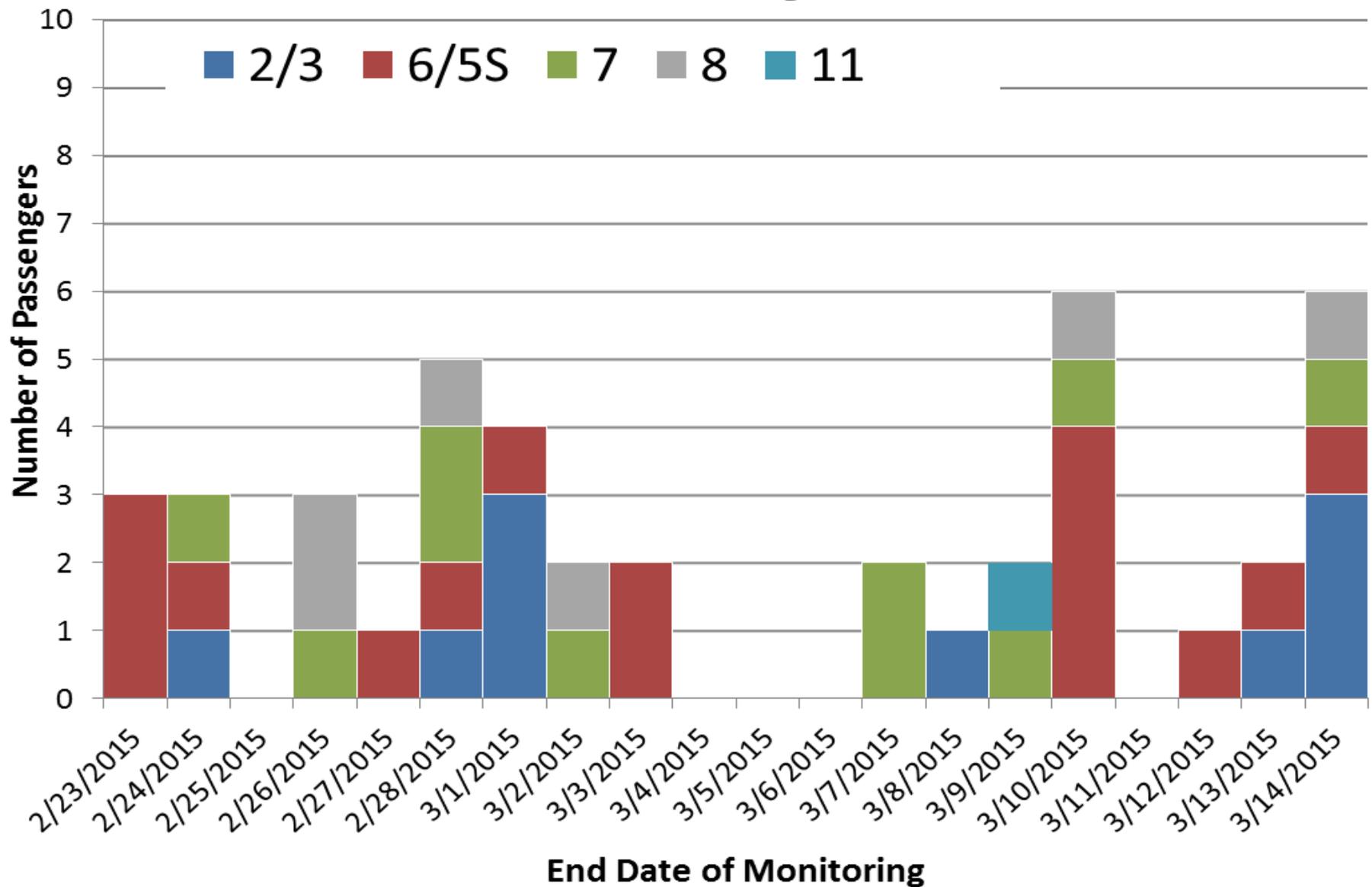
	Currently under Monitoring		No Longer being Monitored		Total Assigned to Texas to Date
	Low Risk	High/Some Risk ²	Number Transferred Out of State	Number Completed Monitoring	
Region 1	0	0	1	9	10
Region 2/3	6	4	29	100	139
Region 4/5N	0	0	0	2	2
Region 6/5S ³	15	1	29	80	125
Region 7	9	1	8	32	50
Region 8	4	2	4	11	21
Region 9/10	0	0	4	8	12
Region 11	1	0	0	2	3
Texas Total	35	8	75	244	362

1. Countries include: Guinea, Liberia, Sierra Leone, and Mali (Mali arrivals between 11/17/14-1/6/15). The first passengers for monitoring arrived in US on 10/14/14.

2. An additional nine "some risk" individuals have completed monitoring or have been downgraded to "low risk" due to additional information about exposures.

3. Includes two low-risk travelers that were subsequently identified to be on a flight with the Scottish nurse diagnosed with Ebola. Monitoring completed 1/18/15

West African Travelers by Region and End Date of Monitoring



Reporting and Testing

- ▣ If you have a patient with a history of exposure and any symptoms that makes you think Ebola – call your local health department
- ▣ Report suspicion to your local health department as soon as you suspect Ebola
 - Just as you do for all reportable diseases
- ▣ This will allow for:
 - Response needs to be assessed
 - Initiation of interventions early and timely
 - Discussion and evaluation for indications to test
- ▣ If the case is determined to at least meet the PUI criteria for Ebola, by the LHD or further guidance is required the LDH will contact their Health Service Region (HSR)

We have discussed:

- ▣ Transmission, Clinical Diagnosis, & Risk Assessment
- ▣ Infection Control and Prevention
- ▣ Course of Illness
- ▣ Reporting
- ▣ Indications for Testing

Thank you