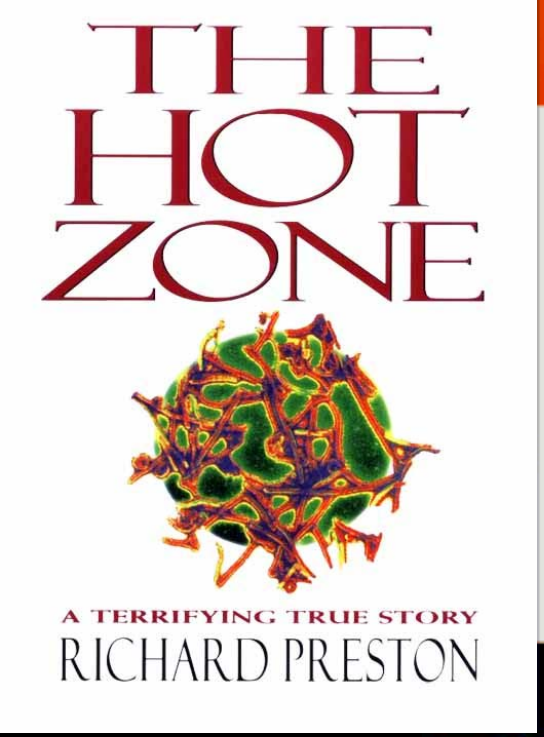
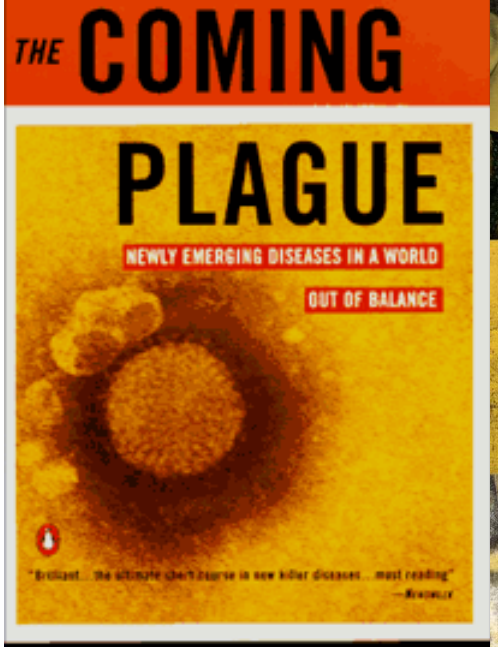
Ebola Virus Disease West Africa, 2014

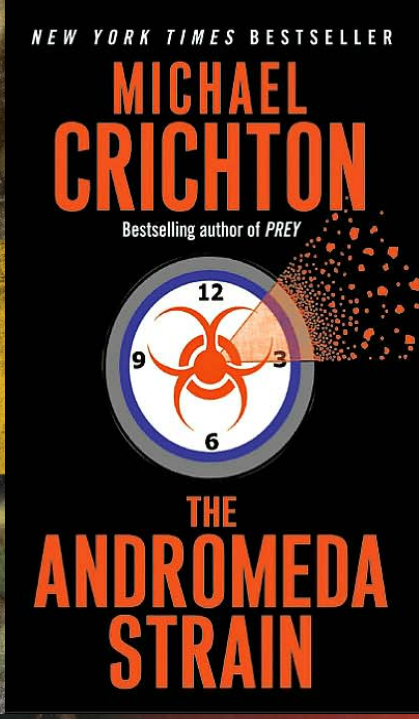
Preparing for and Responding to Potential Cases in NYC

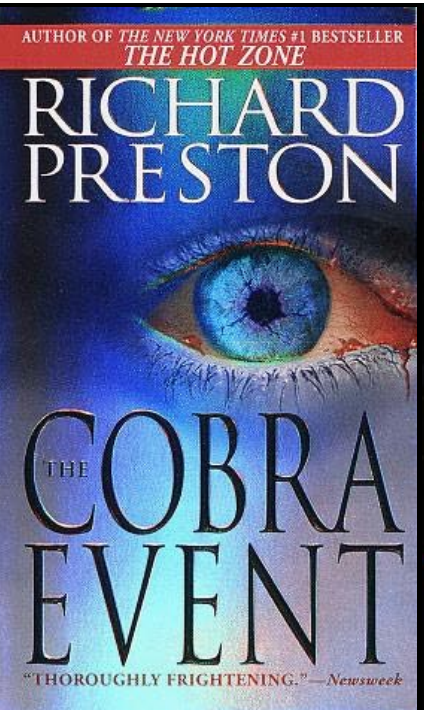
Marci Layton, MD
Bureau of Communicable Disease, DOHMH


THE HOT ZONE
A TERRIFYING TRUE STORY
RICHARD PRESTON

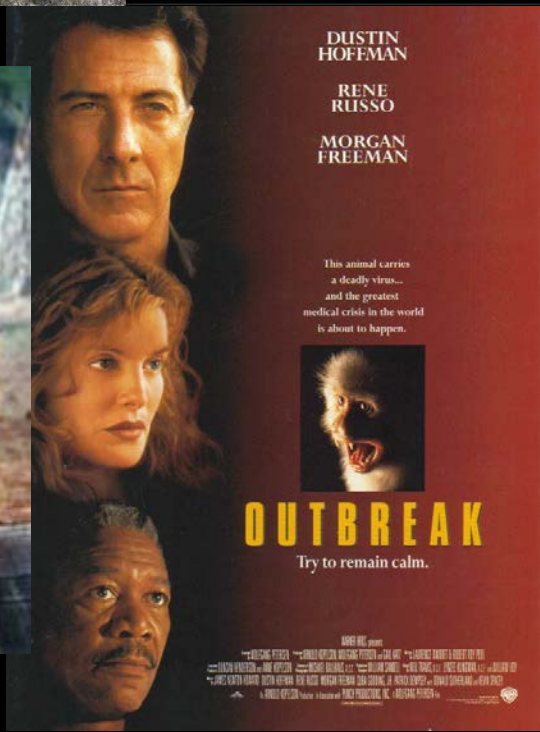

THE COMING
PLAGUE
NEWLY EMERGING DISEASES IN A WORLD
OUT OF BALANCE
Laurie Garrett


MARION COTILLARD
MATT DAMON
LAURENCE FISHBURNE
JUDE LAW
GWYNETH PALTROW
KATE WINSLET
NOTHING SPREADS LIKE FEAR
CONTAGION
SEPTEMBER 9
IN THEATERS AND IMAX


NEW YORK TIMES BESTSELLER
MICHAEL CRICHTON
Bestselling author of PREY
THE ANDROMEDA STRAIN


AUTHOR OF THE NEW YORK TIMES #1 BESTSELLER
THE HOT ZONE
RICHARD PRESTON
THE COBRA EVENT
"THOROUGHLY FRIGHTENING."—Newsweek


ROBIN COOK
VECTOR

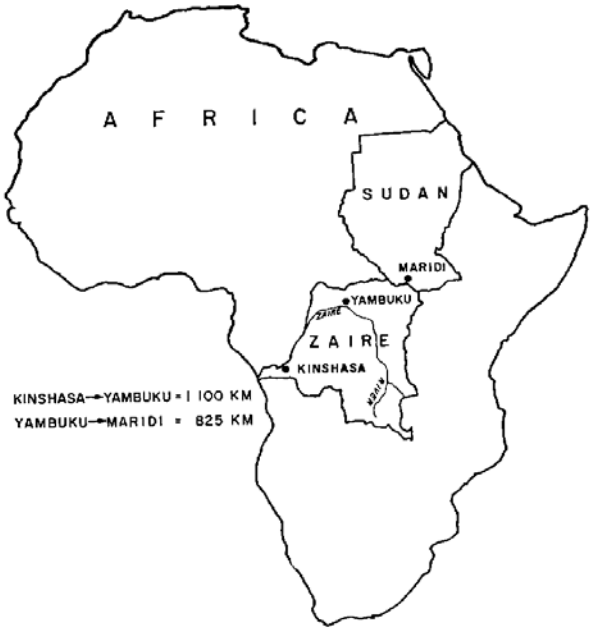

DUSTIN HOFFMAN
RENE RUSSO
MORGAN FREEMAN
This animal carries a deadly virus... and the greatest medical crisis in the world is about to happen.
OUTBREAK
Try to remain calm.

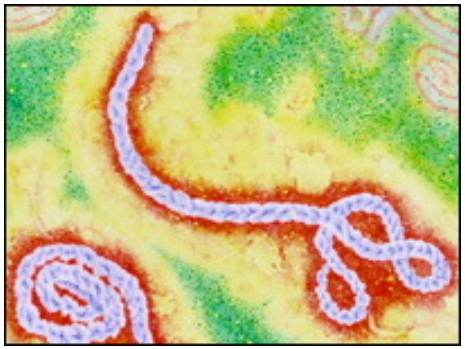
Ebola Virus

Family of zoonotic enveloped RNA viruse

5 species – Zaire, Sudan, Tai Forest, Bundibugyo and Rsoton

Ebola virus was discovered in 1976 near the Ebola River in what is now the Democratic Republic of the Congo (Ebola Zaire), and simultaneously in Sudan (Ebola Sudan)





Ebolavirus Ecology

Enzootic Cycle

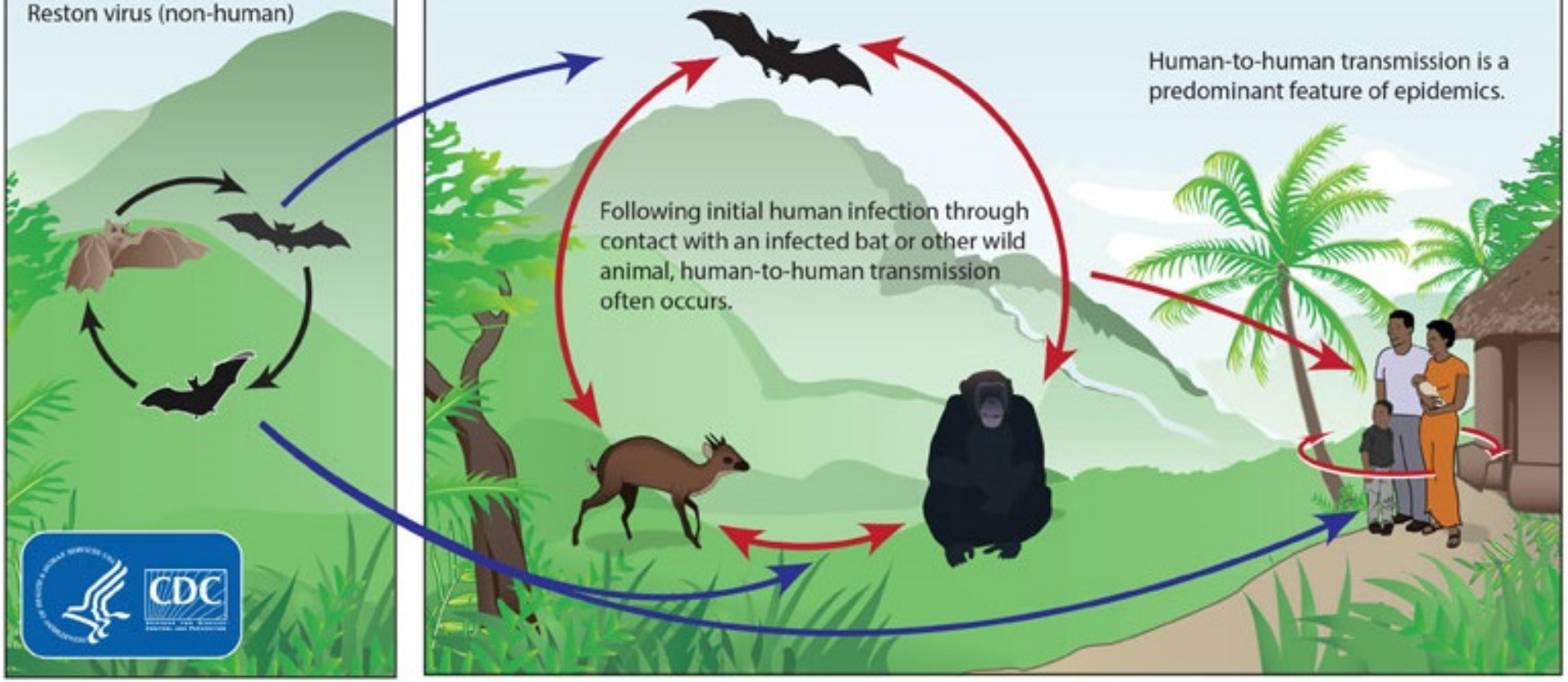
New evidence strongly implicates bats as the reservoir hosts for ebolaviruses, though the means of local enzootic maintainance and transmission of the virus within bat populations remain unknown.

Ebolaviruses:

Ebola virus (formerly Zaire virus)
Sudan virus
Taï Forest virus
Bundibugyo virus
Reston virus (non-human)

Epizootic Cycle

Epizootics caused by ebolaviruses appear sporadically, producing high mortality among non-human primates and duikers and may precede human outbreaks. Epidemics caused by ebolaviruses produce acute disease among humans, with the exception of Reston virus which does not produce detectable disease in humans. Little is known about how the virus first passes to humans, triggering waves of human-to-human transmission, and an epidemic.



Clinical

Incubation period: 2 - 21 days, average of about a week.

Signs of Ebola include fever (greater than 38.6°C or 101.5°F) and additional signs/symptoms such as

- Severe headache
- Muscle pain
- Vomiting
- Diarrhea
- Abdominal pain
- Unexplained hemorrhage
- Macular erythematous eruption, eventual desquamation

Lab

- Leukopenia, subsequent neutrophilia
- Thrombocytopenia, increase LFTs, increase coags (DIC)
- Proteinuria

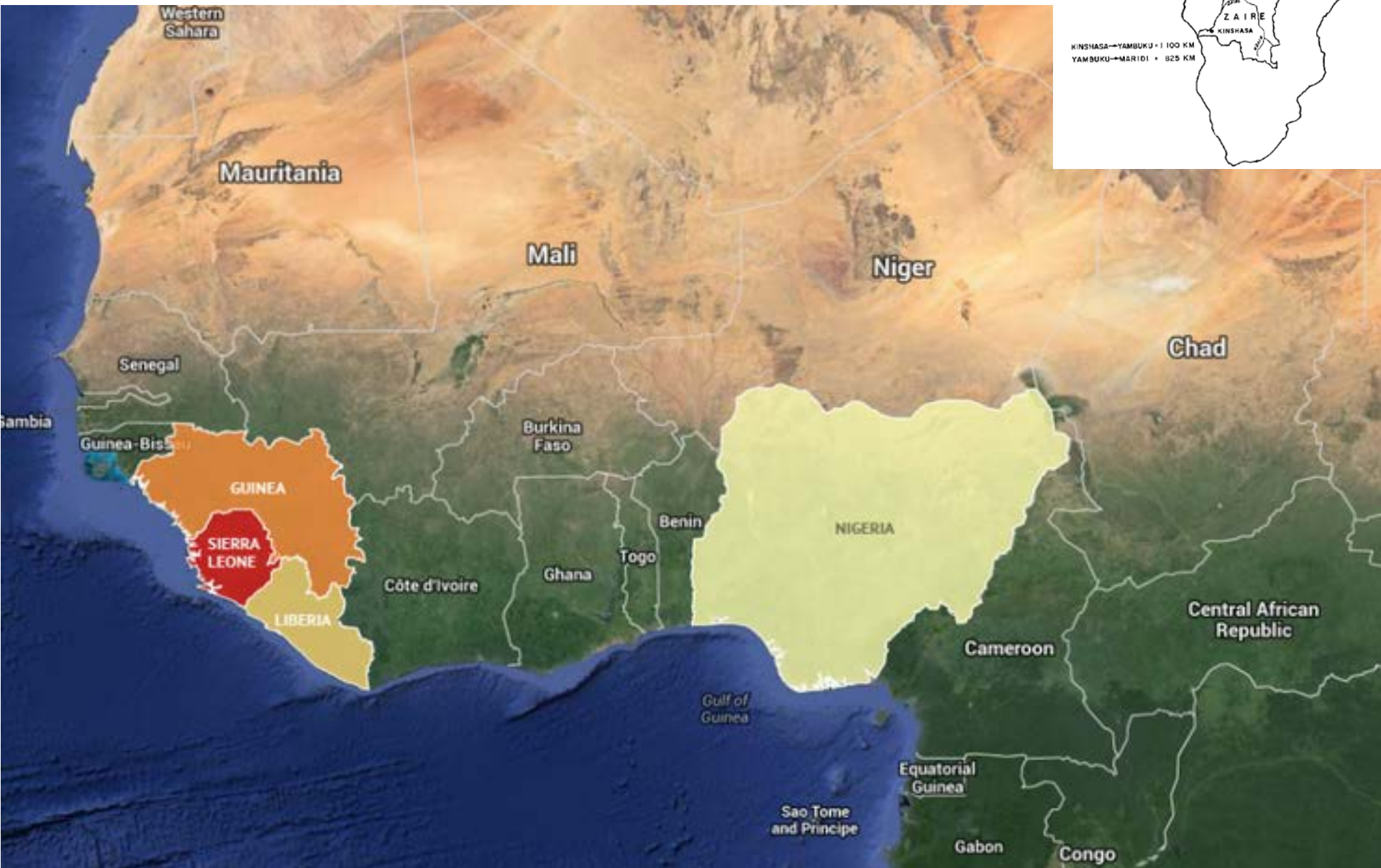
Differential Diagnosis

- **Vague nature of patient presentation necessitates broad differential diagnosis**
- **Consider**
  - Malaria
  - Typhoid
  - Bacterial sepsis
  - Leptospirosis
  - Cholera
  - Other viral hemorrhagic fevers (Lassa, yellow fever, dengue, etc.)

Outbreak in Historical Perspective

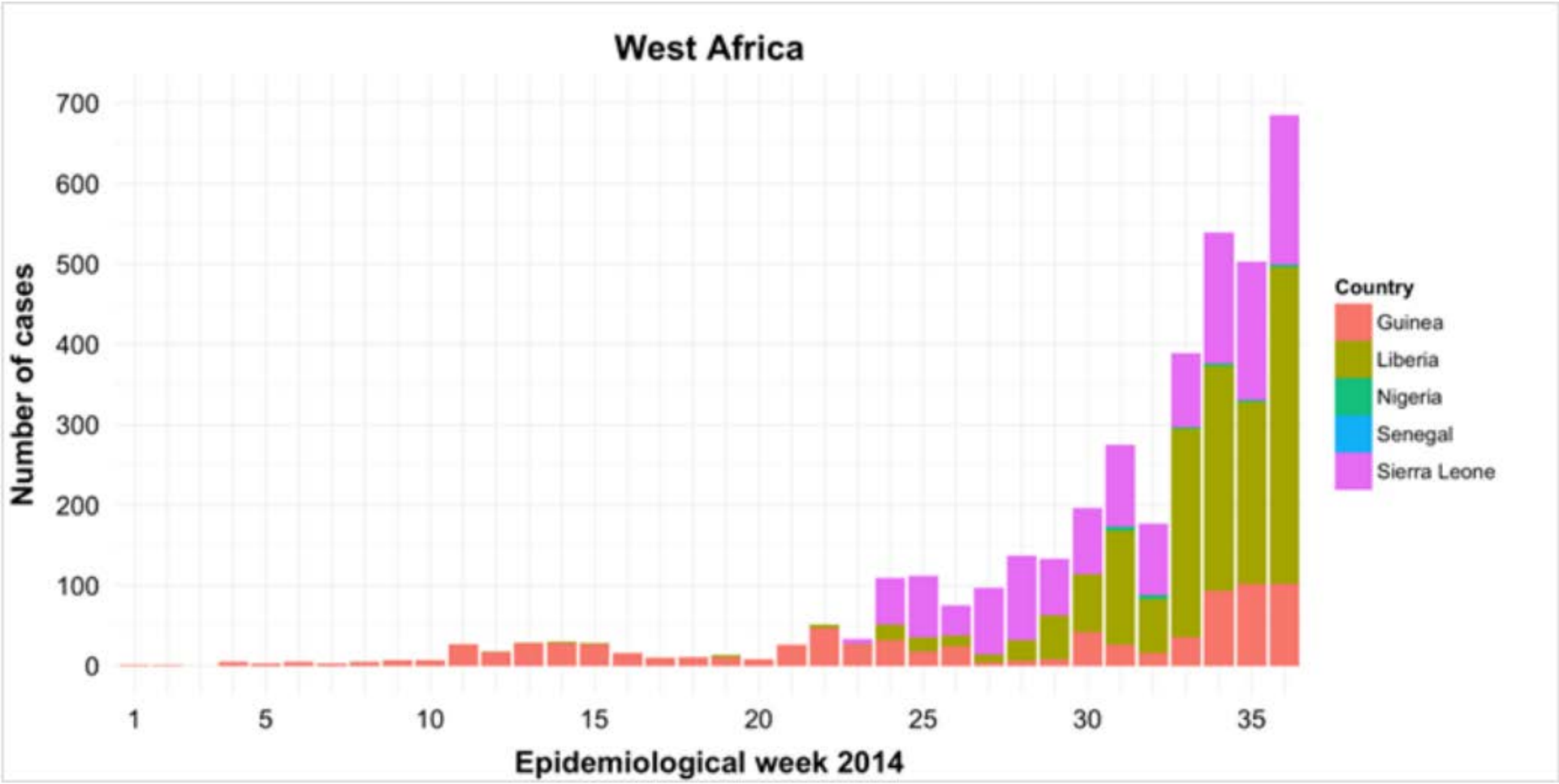
Year began	Country	Ebola virus subtype	Duration (mos)	Rep. No. cases	Rep. No. deaths	Case Fatality Ratio
1976	Zaire (Democratic Republic of Congo)	Ebola	3.5	318	280	0.88
1976	Sudan	Sudan	6.3	284	151	0.53
1979	Sudan	Sudan	3.7	34	22	0.65
1994	Gabon	Ebola	2.6	52	31	0.60
1995	Democratic Republic of Congo	Ebola	7.8	315	250	0.79
1996	Gabon	Ebola	5.0	60	45	0.75
1996	Gabon	Ebola	8.1	37	21	0.57
2000	Uganda	Sudan	4.7	425	224	0.53
2001	Gabon & Republic of Congo	Ebola	6.6	65	53	0.82
2001	Republic of Congo	Ebola	6.3	57	43	0.75
2002	Republic of Congo	Ebola	4.4	143	128	0.90
2003	Republic of Congo	Ebola	2.3	35	29	0.83
2004	Sudan	Sudan	3.8	17	7	0.41
2007	Democratic Republic of Congo	Ebola	7.8	264	187	0.71
2007	Uganda	Bundibugyo	5.6	149	37	0.25
2008	Democratic Republic of Congo	Ebola	1.8	32	15	0.47
2012	Democratic Republic of Congo	Bundibugyo	5.9	36	13	0.36
2012	Uganda	Sudan	4.2	11	4	0.36
2014	Guinea, Liberia, Sierra Leone, Nigeria	Ebola	9.5	4413	2299	0.52

West Africa

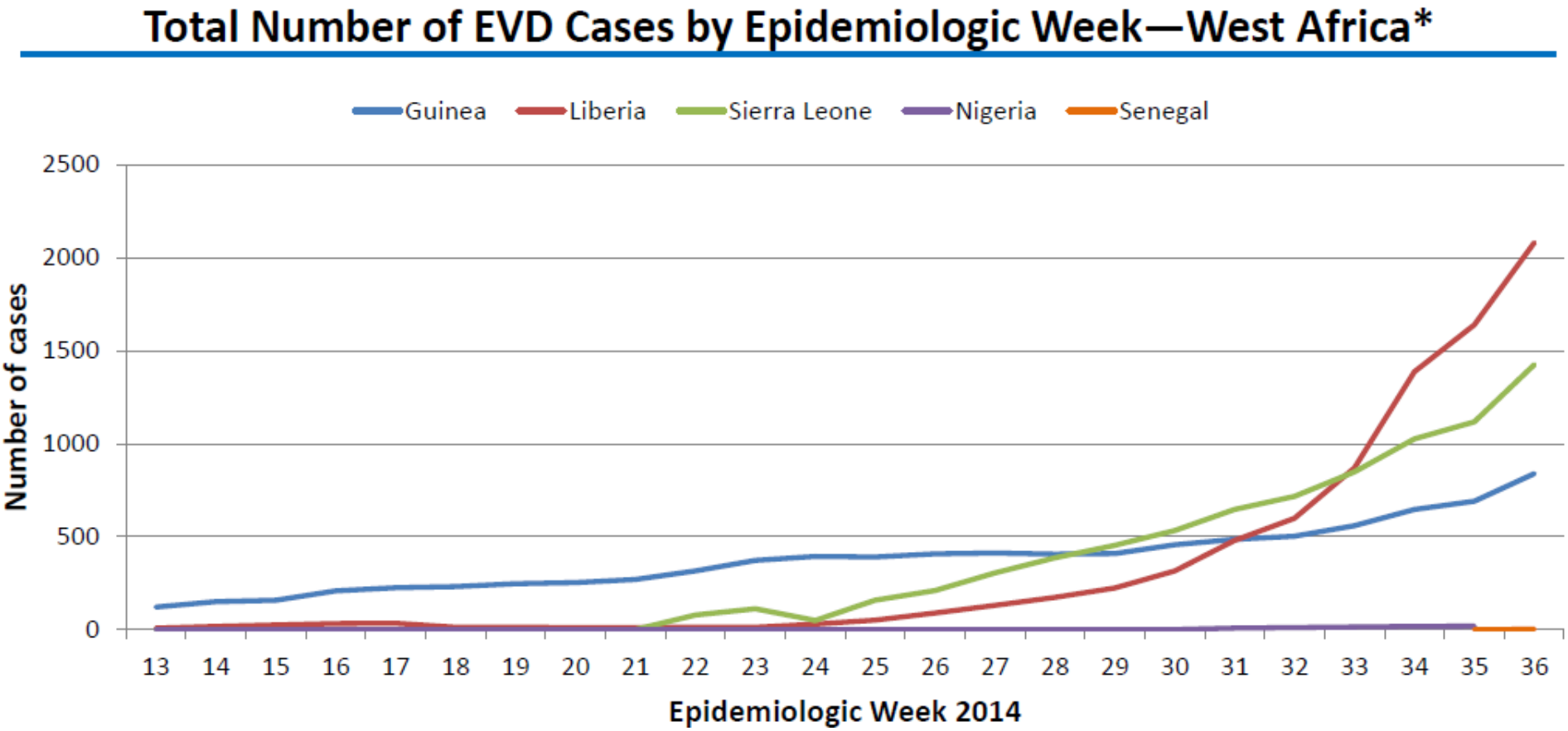

Western Sahara
Mauritania
Mali
Niger
Chad
Senegal
Guinea-Bissau
GUINEA
SIERRA LEONE
LIBERIA
Côte d'Ivoire
Burkina Faso
Ghana
Togo
Benin
NIGERIA
Cameroon
Central African Republic
Equatorial Guinea
Sao Tome and Principe
Gabon
Congo
Gulf of Guinea

AFRICA
SUDAN
MARIDI
YAMBUKU
ZAIRE
KINSHASA
KINSHASA→YAMBUKU = 1 100 KM
YAMBUKU→MARIDI = 825 KM

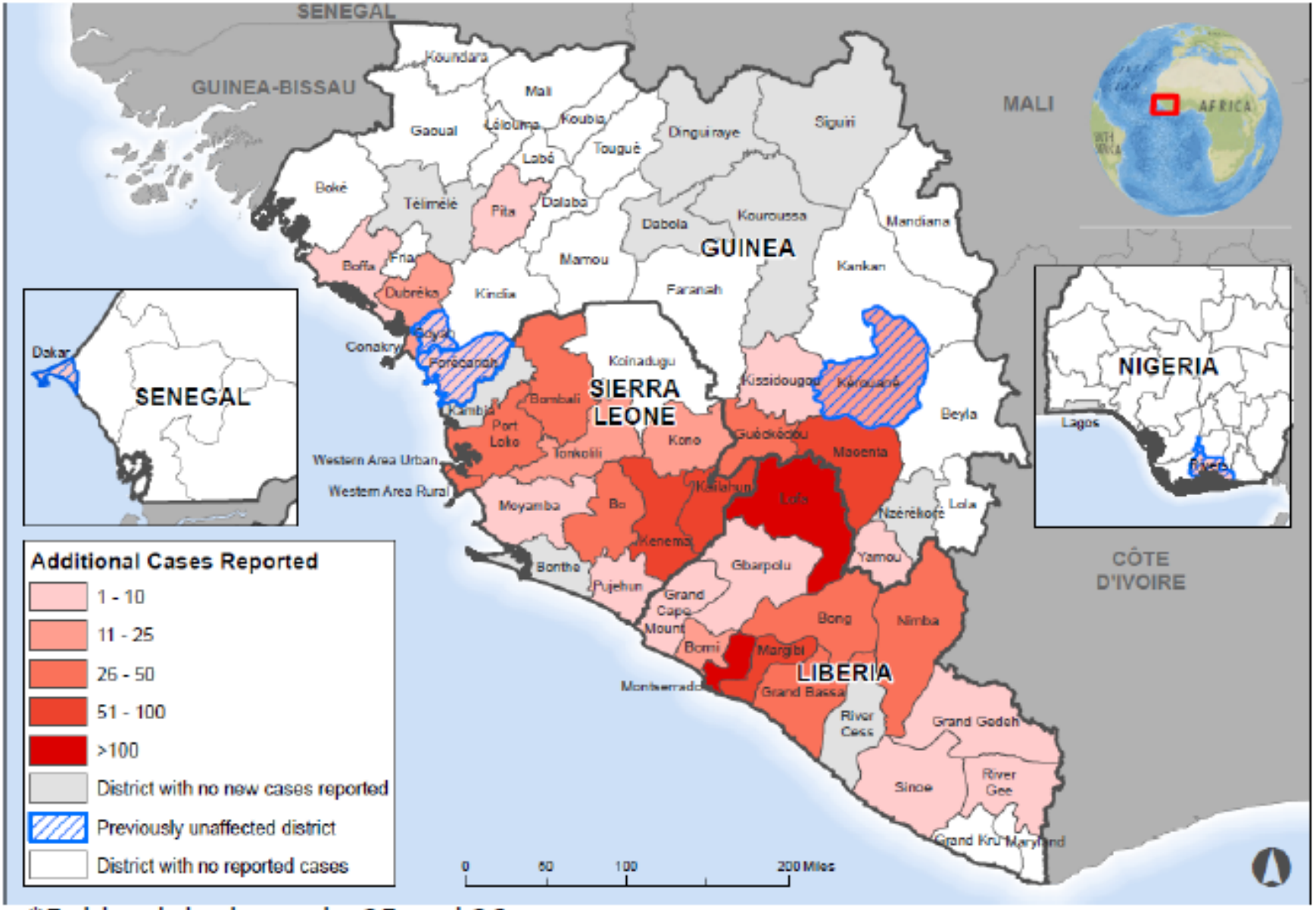
EVD Cases in West Africa



EVD Cases in West Africa



New EVD Cases Reported, 25 Aug–8 Sept 2014*



*Epidemiologic weeks 35 and 36

Transmission

- Spread through direct contact (via broken skin or unprotected mucous membranes) with
  - A sick person's **blood** or body fluids, such as urine, saliva, feces, vomit, or semen
  - Contaminated objects (e.g., needle-stick)
  - Infected animals (e.g., handling of bushmeat)
- Not contagious until symptoms appear

Transmission – Hospitals

- South Africa – demonstration of effectiveness of current recommendations
- Anesthetic assistant Dx'd with Ebola 12 days after hospitalization
- > 300 healthcare personnel exposed to her and to index case, no nosocomial transmission with standard precautions

Richards GA, Murphy S, Jobson R, Mer M, Zinman C, Taylor R, et al.
Unexpected Ebola virus in a tertiary setting: clinical and epidemiologic aspects.
Crit Care Med. 2000;28:240-4.

Transmission – Hospitals

- Several previous US viral hemorrhagic fever cases, initially unrecognized, no nosocomial transmission
- Nosocomial transmission in current outbreak occurring in settings with inadequate or no PPE

Transmission – Environmental Contamination

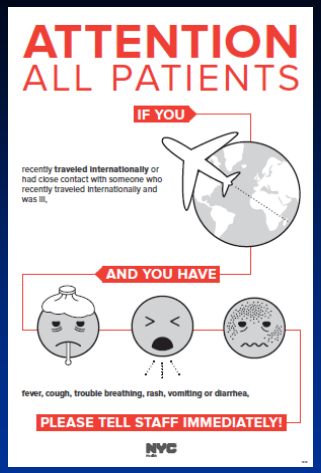
- 54 clinical specimens from 26 Ebola cases
- Virus found in 16 specimens, including saliva, stool, semen, breast milk, tears, blood, and skin swabs
- 33 environmental samples – stethoscope, bed frame, chair, food bowl, spit bowl, floor, IV tubing, skin of 3 attendants – None positive
- Only 2 extracorporeal specimens positive: MD's blood-stained glove, and bloody IV insertions site on patient

Bausch DG, Towner JS, Dowell SF, Kaducu F, Lukwiya M, Sanchez A, et al.
Assessment of the risk of Ebola virus transmission from bodily fluids and fomites.
J Infect Dis. 2007;196 Suppl 2:S142-7.

Transmission – Household Contacts

- No infx control precautions
- 173 household contacts of 27 patients, transmission rate 16% (N= 27 positive contacts)
- Of 78 household contacts reporting no physical contact with patients, none were infected
- Among 95 persons with direct physical patient contact, 27 became infected
- Risk highest after contact with patients' blood

Francesconi P, Yoti Z, Declich S, Onek PA, Fabiani M, Olango J, et al.
Ebola hemorrhagic fever transmission and risk factors of contacts, Uganda.
Emerg Infect Dis. 2003;9:1430-7.



Triage Procedures for Travel Related Infections

- Establish procedures to routinely and immediately ask any patient with fever about recent travel
- If patient reports travel within past 21 days to an area with EVD transmission:
  - Place in private room w closed door
  - Implement standard, droplet and contact precautions
  - Notify appropriate hospital staff, including Infection Control
  - Minimize number of staff who enter room
  - Interview patient re details on travel history and exposure to EVD while in Africa

Initial Questions to ask the Patient

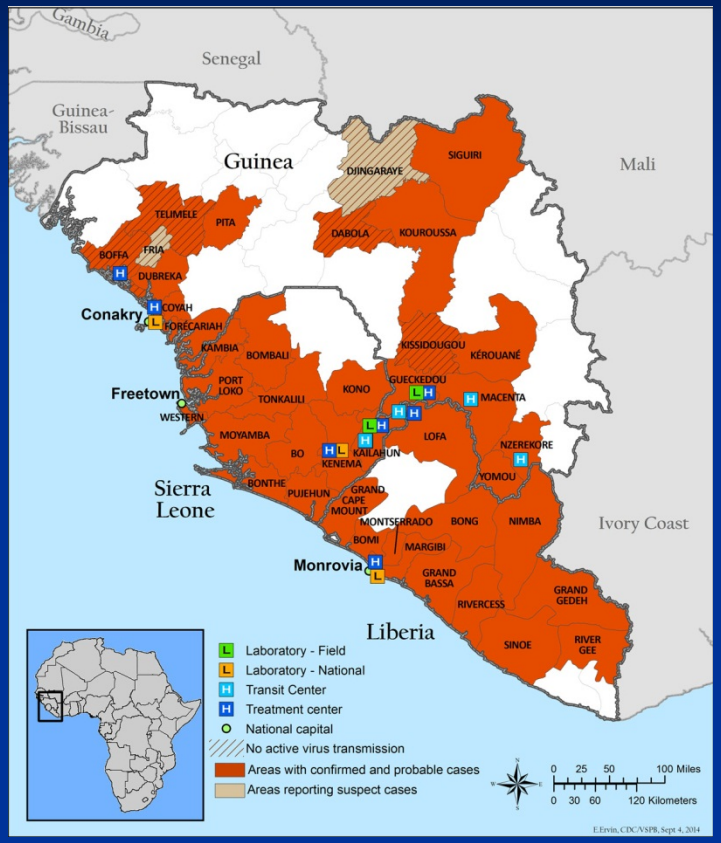
- Contact with known or suspected EVD case
- Work or spend time in a healthcare facility where EVD patients cared for
- Work in a lab where specimens from EVD cases were tested
- Participate in funeral rites or have other exposure to human remains in EVD affected area

Criteria for reporting suspect cases to NYC DOHMH

- Travel within 21 days before illness onset to an EVD outbreak affected area* and
- Fever (>38.6° C or 101.5 ° F) and
- Compatible symptoms (e.g. severe headache, myalgias, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage)

*as defined by CDC: Guinea, Liberia, Sierra Leone, Nigeria (Lagos, Port Harcourt), Senegal (Dakar)—list of affected countries may change

CDC 2014 Outbreak Distribution Map



Districts, Counties, and Cities

Countries	Affected Area
Guinea	Conakry, Coyah, Forecariah, Gueckedou, Kouroussa, Macenta, Siguiri, Pita, Nzerekore, Dubreka, Yomou, Kerouane **No longer active**: Boffa, Dabola, Dinguiraya, Kissidougou, Telimele
Liberia	Lofa, Montserrado, Margibi, Bomi, Bong, Grand Cape Mount, Nimba, Grand Bassa, Grand Gedeh, RiverCess, River Gee, Sinoe, Gbarpolu
Nigeria	Port Harcourt, Lagos
Sierra Leone	Kailahun, Kenema, Kono, Kambia, Bombali, Tonkolili, Port Loko, Pujehun, Bo, Moyamba, Bonthe, Western area

Countries with Travel-associated Case(s)	Affected Area
Senegal	Dakar

http://www.cdc.gov/vhf/ebola/resources/distribution-map-guinea-outbreak.html#areas

Risk for Exposure to EVD

For patients who have travelled to an affected country, are febrile and have clinically compatible illness, manage according to risk of exposure to EVD while in affected country (according to CDC risk stratification)

- High Risk Exposure
- Low Risk Exposure
- No Risk Exposure

Ebola Virus Disease (EVD) Evaluation Algorithm

(Last updated September 3, 2014)

FEVER (≥ 101.5°F) *and* compatible symptoms* for EVD in patient who has traveled to an Ebola affected area** in the 21 days before illness onset.

* Severe headache, myalgias, vomiting, diarrhea, abdominal pain or unexplained hemorrhage

No → No need to call NYC DOMH. Advise patient to continue to check temperature daily until 21 days after return from Africa. Consult with a physician at the first sign of illness

Yes

1. Isolate patient in single room with private bathroom.
2. Implement standard, contact and droplet precautions.
3. Identify any risk exposures for EVD
4. Notify appropriate hospital staff, including Infection Control Program
5. IMMEDIATELY report to New York City Department of Health (NYC DOH) at 1-866-692-3641

HIGH-RISK EXPOSURE

- Percutaneous, mucous membrane or direct skin contact with blood or body fluids from a confirmed or suspected EVD patient without appropriate PPE

OR

- Laboratory handling of body fluids from a confirmed or suspected EVD patient without appropriate PPE or biosafety precautions

OR

- Participation in funeral rites which include direct exposure to human remains in the geographic area where outbreak is occurring without appropriate PPE

LOW-RISK EXPOSURE

- Healthcare workers in facilities that have treated confirmed or suspected EVD patients

OR

- Household members or others with direct contact to confirmed or suspected EVD patient

NO KNOWN EXPOSURE

- Residence or travel to affected areas** without HIGH or LOW-risk exposure

Review Case with NYC DOHMH Using Additional Evaluation Criteria:

- Severity of illness
- Abnormal blood work:
  - Platelet count < 150,000/μL
  - Elevated hepatic transaminases
  - Abnormal coagulation studies
- Possible or likely alternative diagnosis

EVD SUSPECTED-TESTING INDICATED

- NYC DOHMH will arrange specimen transport and testing at Public Health Laboratory and CDC
- NYC DOHMH, in consultation with New York State DOH and CDC, will provide guidance to hospital on all aspects of patient care and management,

EVD Unlikely, Testing Not Currently Indicated

If patient requires in hospital management:

- Admit to single patient room with private bathroom
- Implement standard, contact, and droplet infection control precautions
- Evaluate for other likely illnesses, e.g., malaria and typhoid fever
- Observe clinical course for 24-48 hours and if patient has improved or an alternate diagnosis is made then EVD ruled out
- If patient's symptoms progress, re-assess need for testing with NYC DOH

If patient does not require in hospital management

- Alert NYC DOHMH prior to discharge to arrange home isolation and monitoring by NYC DOMH to ensure symptoms improve.

**** CDC Website to check current affected areas: www.cdc.gov/ebola**

Management of Suspect Cases with No Known Risk Exposures

- Very unlikely to have EVD and more likely to have another disease associated with travel to Africa
- Initial lab evaluation should include CBC w differential, chemistries, LFT, coag studies and blood/stool cultures
- Malaria testing should include at least thin smear every 12 hours (no fewer than 3), rapid test and/or PCR
- Encouraging infectious disease consultation
- If clinical presentation not concerning for EVD, the DOHMH will recommend close monitoring for several days. No need for Ebola testing.

Infection Control

- At minimum, use standard, contact and droplet precautions – including eye protection
  - Additional barrier precautions warranted for LOW or HIGH risk case, if increased body fluids (e.g., vomiting)
  - Active monitoring of staff during both donning/doffing
- Routine laboratory testing for suspect EVD patients with No Risk for exposure should be performed according to usual and standard protocols
  - NYSDOH revised guidelines for Low and High Risk exposure cases

Testing, Collection and Transport of Clinical Specimens

- Ebola virus detectable by PCR 3-10 days after illness onset
  - If < 3 days, may need to repeat testing to rule-out EVD
- PHL will only accept specimens after approval by the DOHMH medical epidemiologist
  - 2 plastic tubes (purple top) with minimum volume of 4 ml
  - PHL staff will travel to hospital to package specimen and transport to PHL
  - PCR test with 6 hour turn around
  - Will also send blood to CDC for confirmatory testing

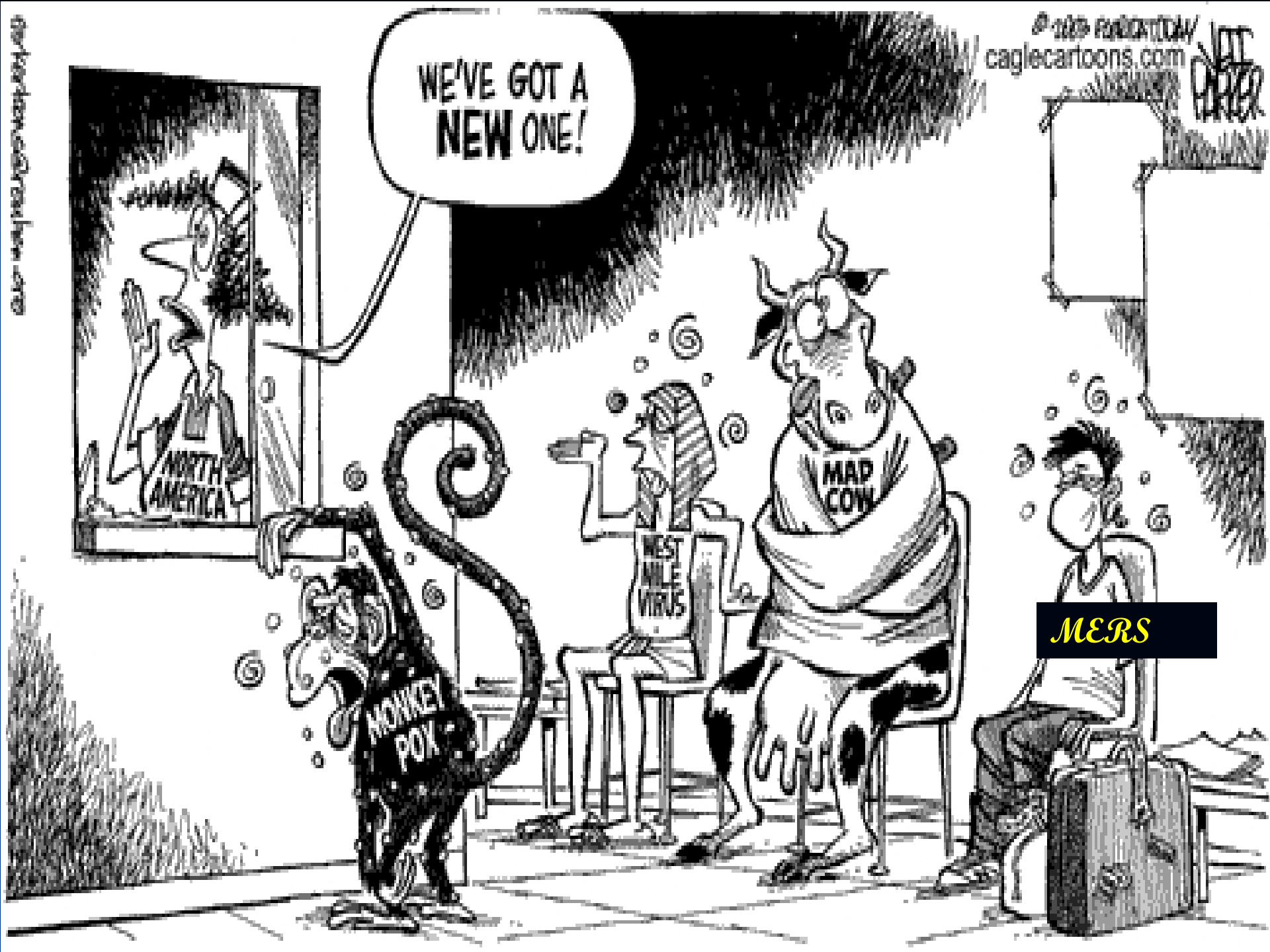
Bellevue as EVD Referral Hospital

- Planning in place to use secure isolation ward
- Limited to suspect EVD patients with High or Low Risk Exposures and either:
  - Clinically stable patient identified at JFK Airport
  - Inter-hospital transfer **only if approved by DOHMH**
- All NYC hospitals are expected to be able to:
  - Conduct initial triage and evaluation of any suspect EVD patient who presents for care
  - Provide care for all suspect EVD patients who report No Risk Exposures

Suspect EVD reported to DOHMH

Since July 31, 2014 DOHMH has received 64 calls regarding suspect EVD cases

- 10 met reporting criteria
  - None with High or Low Risk Exposure; one tested at CDC
  - Alternative diagnoses were made for 7 cases; other 3 improved
    - Included Malaria (5), Typhoid (1) and UTI (1)
- 54 did not meet reporting criteria
  - 18 traveled to EVD area but did not have compatible sx
  - 36 no travel or travel to non affected area

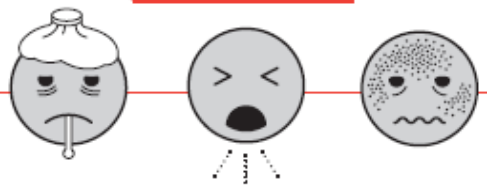

WE'VE GOT A NEW ONE!
NORTH AMERICA
MONKEY POX
WEST NILE VIRUS
MAD COW
MERS
caglecartoons.com
PAT BAKER

ATTENTION
ALL PATIENTS

IF YOU

recently **traveled internationally** or had close contact with someone who recently traveled internationally and was ill,

AND YOU HAVE



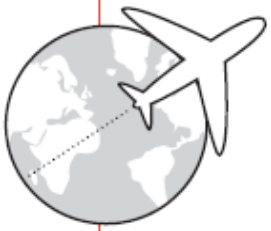
fever, cough, trouble breathing, rash, vomiting or diarrhea,

PLEASE TELL STAFF IMMEDIATELY!

NYC

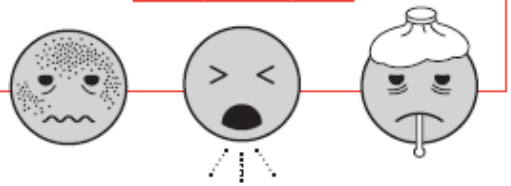
تنبيه
لجميع المرضى

إذا



سافرت خارج البلاد مؤخراً أو كان لك اتصال مباشر بشخص سافر خارج البلاد مؤخراً وكان مريضاً،

وأنت مصاب



بالحمى أو السعال أو ضيق التنفس أو الطفح الجلدي أو القيء أو الإسهال،

فيُرجى إخبار الفريق الطبي فوراً!

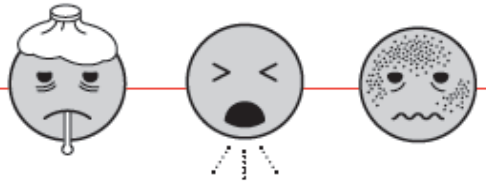
NYC

注意
所有患者

如果您

最近進行了**國際旅行**，
或者您與最近進行了
國際旅行而且生病了的人
有過近距離接觸，

並且您有



發燒、咳嗽、呼吸困難、皮疹、嘔吐或腹瀉，

請立即告知工作人員！

NYC

Remain Alert for Potential Travel-Related Infections

- Take travel history on all patients presenting with febrile illness, especially in setting of current concerning outbreak overseas
  - Consider EVD in patients with febrile illness within 21 days of travel to affected area in W Africa
  - Consider MERS in patients with pneumonia/ARDS and travel to Arabian peninsula in past 14 days
  - Consider H7N9 within 10 days of leaving mainland China
- Immediate isolation and strict adherence to infection control precautions
- Report suspect case to DOHMH ASAP
  - DOHMH will arrange reference lab testing if indicated