

Ebola and Ebola Preparedness at the UHWI/ UWI

Decreasing our Risk

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2 October, 2014

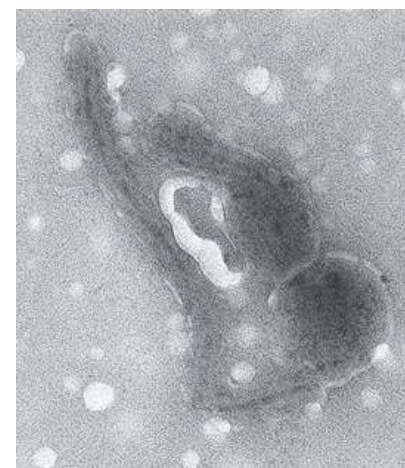
Case History

- Travel from Liberia to USA, Sep 19-20, 2014, via Brussels
- Symptomatic of Ebola Sep 24
- Evaluated at US hospital Sep 26
 - reported travel history from Liberia
 - sent home on antibiotics
- Admitted to ICU/ isolation, critically ill Sep 28, diagnosed Ebola Sep 30
- Exposed about 100 persons, 4 days
 - 5 children from 4 schools
- Significant family exposures
 - Secondary cases?
- Family quarantined for 21 days
- Criminal charges for “lying” x 3?
 - Exposed to Ebola from in Liberia
 - Indicated “No”, to caring for, or touching a dead person with Ebola



“Case Zero”

- **2-year-old boy** died on Dec. 6, 2013, a few days after falling ill in a village in SE Guinea at the intersection of Sierra Leone and Liberia, where the disease entered the region.
- A week later, it killed the **boy’s mother**, then his **3-year-old sister**, then his **grandmother**.
- All had fever, vomiting and diarrhea, of then unknown etiology.
- **Two mourners** at the grandmother’s funeral took the virus home to their village. **A health worker** carried it to still another, where he died, as did his **doctor**. They both infected **relatives** from other towns
- By the time Ebola was recognized, in March, **dozens of people had died in eight Guinean communities**, and suspected cases were popping up in **Liberia and Sierra Leone** — three of the world’s poorest countries
- New ebola strain of *Zaire ebolavirus* (EBOV).



2014 Ebola Outbreak in West Africa

(Guinea, Liberia, Sierra Leone; **Nigeria, Senegal**)

- **Updated: Oct 02, 2014**

- Suspected and Confirmed Case Count: **7,157**
- Suspected Case Deaths: **3,330**
- Laboratory Confirmed Cases: **3,953**

New unrelated EVD cases in DR Congo
- *E. Sudan; E Sudan/Zaire*

Source: WHO – Global Alert & Response



“Unprecedented” Epidemic

- Non specific initial clinical symptoms
 - Fever, fatigue, loss of appetite
- Highly infectious, spread by body fluids,
 - **Blood, vomit, stool**, sweat, saliva, urine, semen,
- No known cure
- 70 to 90% mortality
- Family and Health Care Workers, first responders, most at risk
 - Some **216/377 (57%)** EVD-infected HCW's in Africa have died (WHO, Oct 2, 2014)
 - Spanish nurse, nosocomial EVD

Dr Khan

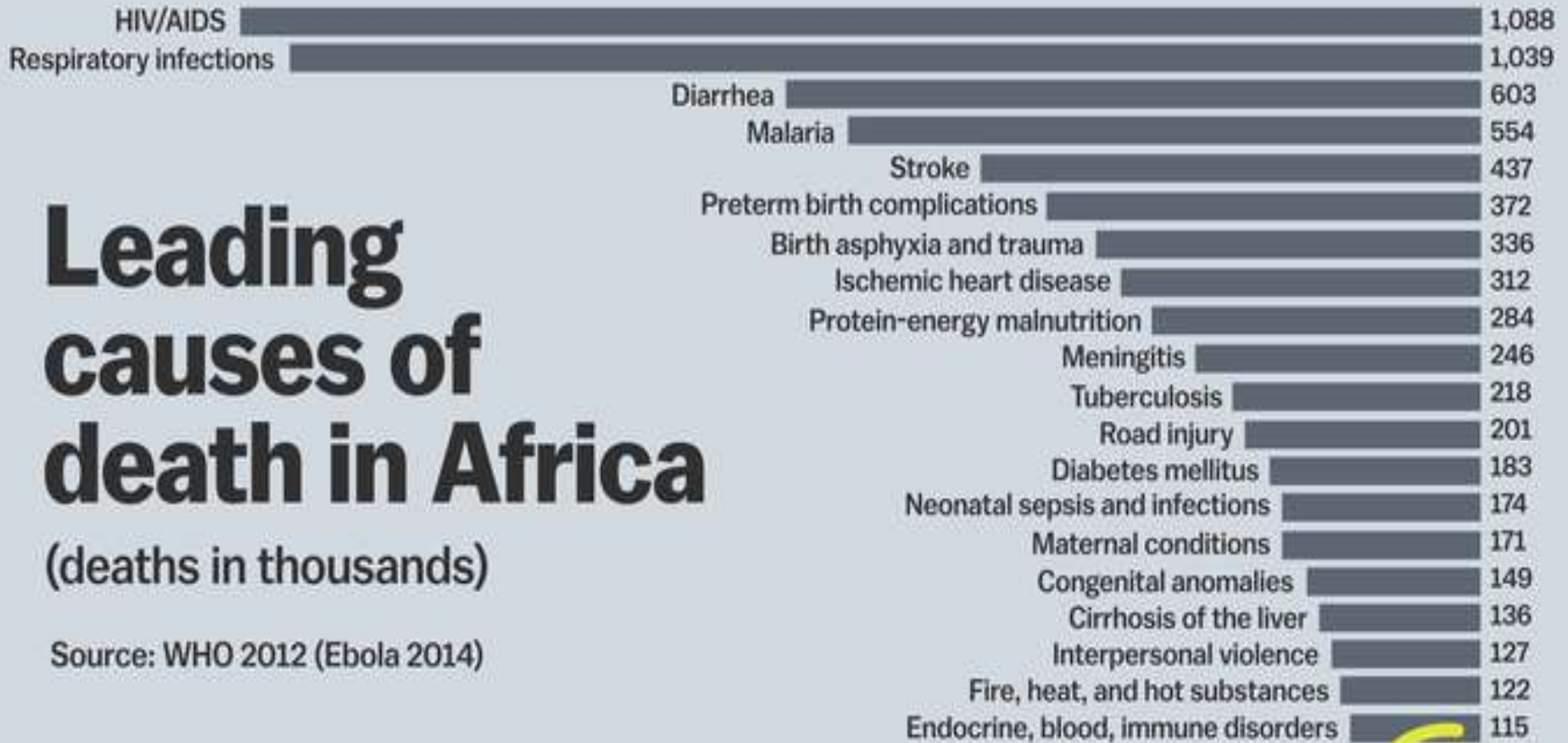




“Vastly Underestimated”

- WHO declared ***“public health emergency of international concern”*** (Aug 8, 2014)
 - Only the 3rd time in history
- ***“States of Emergency”*** declared in affected territories, borders closed
 - 2-3 M now quarantined in Sierra Leone
- ***“Ebola toll may vastly underestimate the magnitude of the outbreak”*** (WHO, Aug 15)
 - Distrust of health system, thinking HCW’s and isolation wards “carry the virus”
 - Epidemic now driven underground
 - Cases being managed at home
- ***“Shadow Zones”*** (WHO, Aug 22)
 - Families hiding infected loved ones from medics
 - “Invisible case load”, under-reporting burials, ill
 - Hospitals and clinics overloaded, or closed
 - Patients being sent back home, infecting others
 - Increased “cross-border” traffic





Leading causes of death in Africa

(deaths in thousands)

Source: WHO 2012 (Ebola 2014)

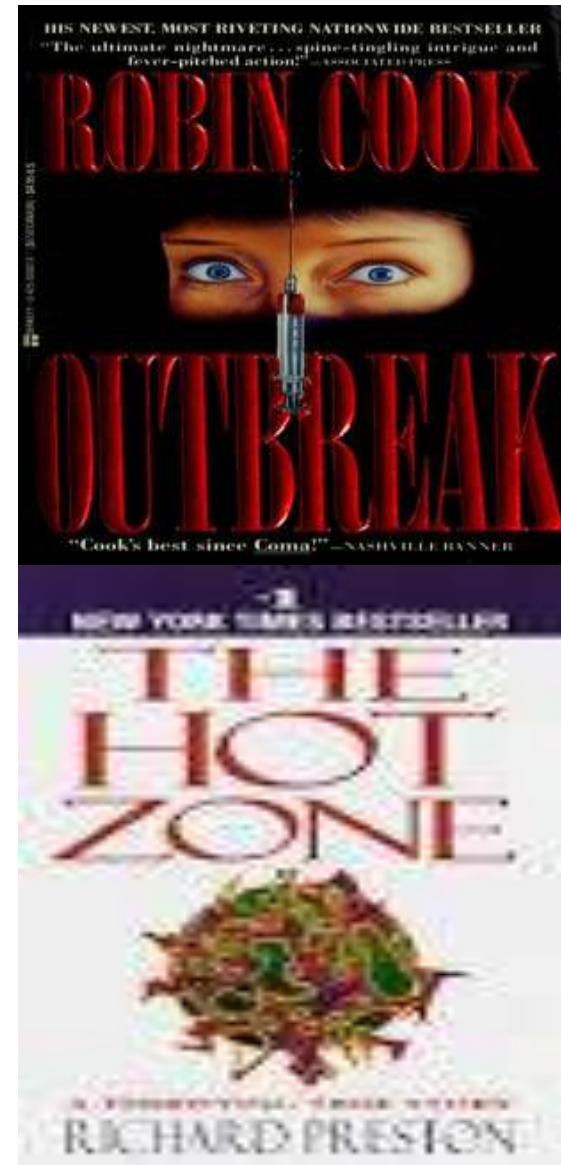


Ebola | 3

- “1.4 Million cases of Ebola expected by 2015” (CDC)
- Ebola may become Endemic in human population of Africa!

Viral Haemorrhagic Fevers

- **Filoviridae**
 - Ebola Haemorrhagic Fever
 - Ebola Virus Disease (55 - 90% mortality)
 - Marburg Virus
- **Arena viridae**
 - Lassa Fever, Lassa virus, Argentine, Bolivian, Brazilian Hemorrhagic Fever
- **Bunya viridae**
 - Hanta virus (Pulmonary/renal hemorrhage)
Crimean-Congo Haemorrhagic fever,
- **Flaviridae**
 - **Dengue, Yellow fever**, Omsk hemorrhagic fever, Kiyasanur Forest disease virus
- **Rhabdoviridae**



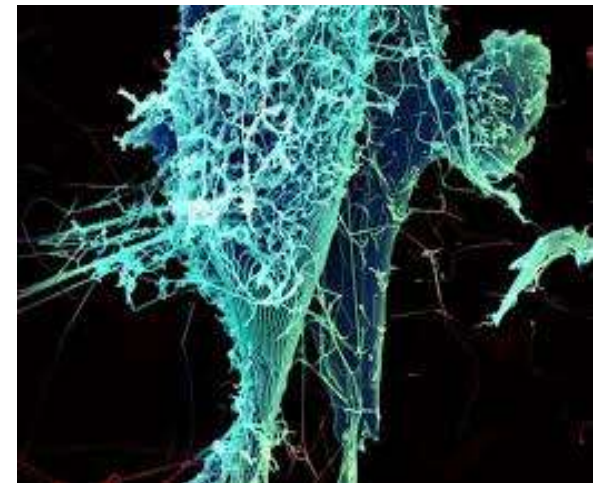
About “Ebola Hemorrhagic Fever”

- One of numerous “Viral Hemorrhagic Fevers”
- Severe, often fatal disease in humans & other primates
 - Monkeys, gorillas, and chimpanzees
- Etiology - infection with a virus of *Filoviridae* family, genus *Ebolavirus*
- Symptoms begin abruptly
- 1st *Ebolavirus* species discovered in 1976 in Democratic Republic of the Congo near the Ebola River
 - By Peter Piot
- Sporadic outbreaks since then (<500 cases)



Etiology

- Five identified subspecies of *Ebolavirus*
- Four have animal hosts in Africa and caused disease in humans:
 - **Ebola virus (*Zaire ebolavirus*)**;
 - Sudan virus (*Sudan ebolavirus*);
 - Taï Forest virus (*Taï Forest ebolavirus*, formerly *Côte d'Ivoire ebolavirus*);
 - Bundibugyo virus (*Bundibugyo ebolavirus*)
- Fifth, Reston virus (*Reston ebolavirus*), caused disease in nonhuman primates, not humans



Ebola Virus Transmission

- Manner in which the virus first appears in a human at the start of an outbreak is unknown
- Hypothesized that the **first patient becomes infected through contact with an infected animal.**



Bats and “bush meat”



- Natural reservoir host of ebola viruses is unknown.
- Available evidence and the nature of similar viruses, suggest the virus is zoonotic
 - Bush meat, antelopes, squirrels, porcupines, monkeys, bats
 - Stewed, smoked, or roasted
- **Fruit bats most likely reservoir**
- 4 of 5 EVD subtypes occur in animal host native, Africa



Ebola Virus Transmission

- Direct contact with the blood or, body fluids of a person who is sick with Ebola
 - **Blood, stool, vomit**, urine, saliva, sweat, semen, breast milk
- Exposure to objects (eg., needles, equipment) that have been contaminated with infected body fluids
- Infected animals



EV Transmission

- Spreads via families and friends, close contact with infectious secretions when caring for the ill.
- During outbreaks, spreads quickly within health care settings, if hospital staff are not wearing protective equipment
- Proper cleaning and disposal of instruments, needles and syringes
- Disposable instruments, or sterilize before reuse, or virus transmission continues and amplifies an outbreak.



EBOLA SYMPTOMS

- Fever, headache, muscle aches (similar to malaria)
- Contagious only after symptoms begin
- Incubation period 2-21 days (avg. 8-10 days)

Source: CDC

Ebola virus' typical path through a human being



First
symptoms

Day 7-9

Headache,
fatigue, fever,
muscle
soreness



Day 10

Sudden high
fever, vomiting
blood, passive
behavior



Day 11

Bruising, brain
damage,
bleeding from
nose, mouth,
eyes, anus



Day 12

Final
stages

Loss of
consciousness,
seizures,
massive internal
bleeding, death

Signs and Symptoms

Fever	87%	(1002/1151)
Fatigue	76%	(866/1133)
Anorexia	65%	(681/1055)
Vomiting	68%	(753/1114)
Diarrhea	66%	(721/1099)



New England Journal of Medicine, WHO Ebola Virus Response Team, Sep 23, 2014; DOI:10.1056/1411100, the first 4,507 cases

Signs and Symptoms

Headache	53% (553/1035)
“Belly” pain	44% (439/992)
Muscle pain	39% (385/990)
Joint pain	39% (374/950)
Chest pain	37% (254/686)

New England Journal of Medicine, WHO Ebola Virus Response Team, Sep 23, 2014; DOI:10.1056/1411100, the first 4,507 cases



EVD Signs and Symptoms

Cough	30% (194/655)
Difficulty breathing	23% (155/665)
Difficulty swallowing	33% (169/514)
Conjunctivitis	21% (137/658)
Sore throat	22% (102/467)



New England Journal of Medicine, WHO Ebola Virus Response Team, Sep 23, 2014; DOI:10.1056/1411100, the first 4,507 cases

EVD Signs and Symptoms

Confusion	13% (84/631)
Hiccups	11% (108/947)
Jaundice	10% (65/727)
Eye Pain	8% (48/622)
Rash	6% (37/642)
Coma/ unconsciousness	6% (37/627)

New England Journal of Medicine, WHO Ebola Virus Response Team, Sep 23, 2014; DOI:10.1056/1411100, the first 4,507 cases



Bleeding in EVD

Unexplained bleeding	18%
Vomiting blood	4%
Blood in stool	6%
Bleeding gums	2%
Bloody nose	2%
Bloody cough	2%
Other bleeding	1%
Bleeding at infection site	2%
Bleeding from vagina	3%
Blood in urine	1%
Bleeding under skin	< 1%

New England Journal of Medicine, WHO Ebola Virus Response Team, Sep 23, 2014; DOI:10.1056/1411100, the first 4,507 cases



Ebola Patient (Intensive Care)



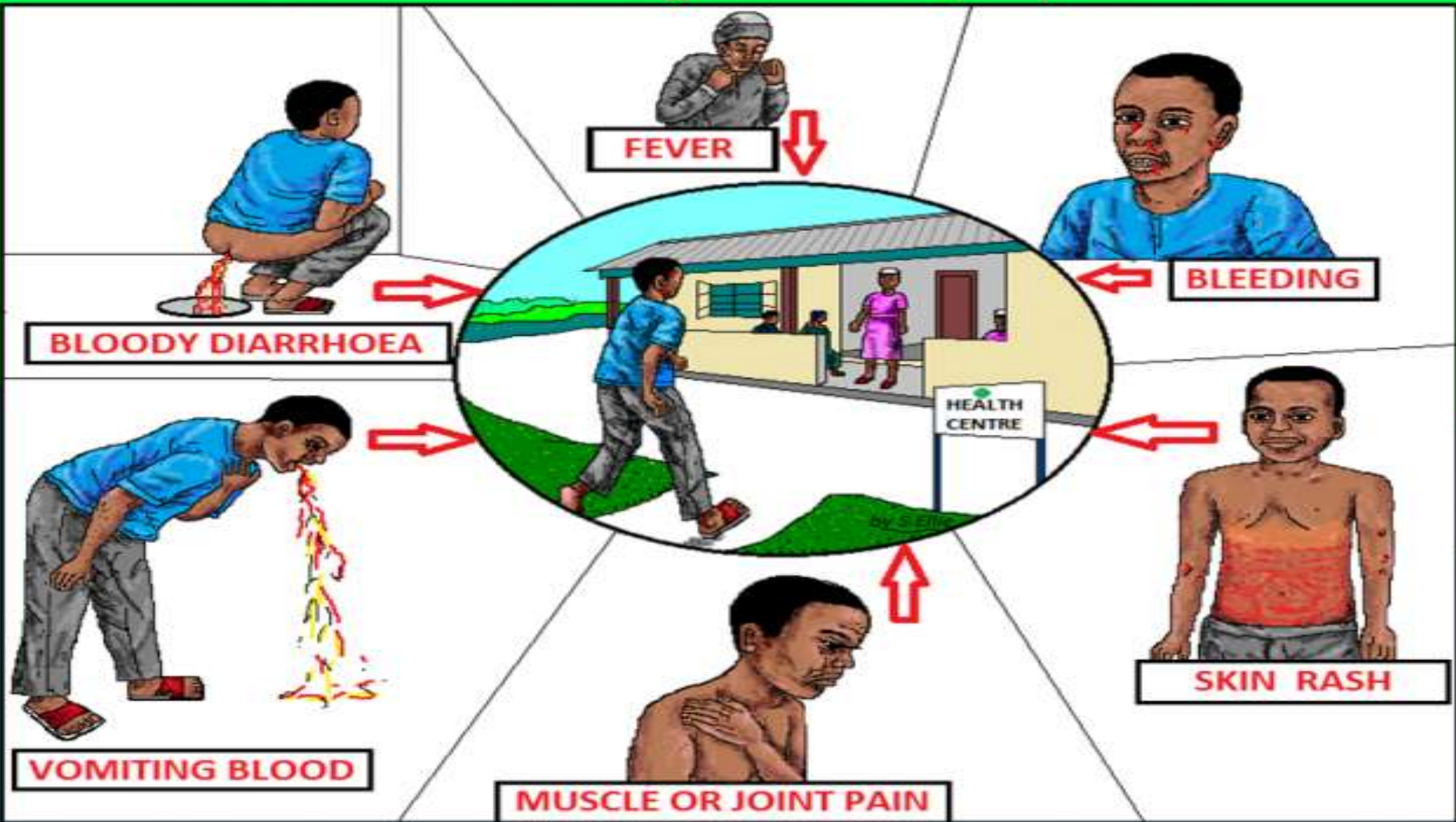
Clinical Features



Clinical Features



EBOLA - Signs and Symptoms



**If you have any of these Signs
GO IMMEDIATELY TO THE NEAREST HEALTH FACILITY**

Multi-Organ System & Lab Anomalies

- **Dehydration and renal failure**
 - Elevated blood urea, creatinine
- **Respiratory failure**
 - Hypoxia, hypercarbia, acidosis
- **Hepatic failure**
 - Elevated hepatic transaminases
- **External and internal bleeding diathesis**
 - Anemia, leucopenia, thrombocytopenia, coagulation abnormalities
- **Coma**
- **Capillary leak syndrome and shock**
 - Marked hypoproteinemia
- **Secondary bacterial infections**



Pathogenesis

- **Cell entry and tissue damage**
 - Mucous membranes, breaks in skin, or parenterally
 - Infects monocytes, macrophages, dendritic cells, causes necrosis, releases new virus, spreads to lymph nodes and causes more infections
- **Systemic inflammatory response**
 - Via cytokines, chemokines, other mediators
- **Coagulation defects**
 - Tissue factor triggers extrinsic coagulation
- **Impairment of adaptive immunity**
 - Disable antigenic immune responses → death

Differential Diagnosis

- Flu-like illnesses
 - Influenza A, B
- Bacterial infections
- Other viral infections
 - CHIKV
 - Dengue fever
- Malaria
- Typhoid Fever
- Shigella
- Cholera
- Leptospirosis
- Plague
- Rickettsioses
- Relapsing fever
- Meningitis
- Hepatitis
- Viral haemorrhagic fevers
 - Dengue
 - Haemorrhagic Fever
 - Shock Syndrome

Laboratory Tests Available

- Within a few days after symptoms begin
 - Sometimes one day before
- Later in disease course or after recovery
- Retrospectively in deceased patients
- Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing
- IgM ELISA
- **Polymerase chain reaction (PCR)**
- Virus isolation
- **IgM and IgG antibodies**
- Immuno-histo-chemistry testing
- PCR
- Virus isolation

Laboratory Diagnosis

- If symptomatic, take **only one sample** of whole blood in **purple top *plastic* tube** from EVD patient
 - maximum bio-safety precautions
 - 2 persons in PPE
 - one taking blood (more persons if a child)
 - other IATA trained “at the door” to accept and package sample for immediate shipment to
 - Zoonotic Diseases and Special Pathogens Laboratory, Public Health Agency of Canada, per MoH guidelines

Lab Investigations

- Blood, urine, stool *etc*, should **NOT** be sent to labs, due to high risk of exposures, per MoH
- Deaths from EVD?
 - Oral swab, only
 - **Autopsy is now contraindicated!**



Treatment

- Supportive care may aid recovery, *viz*,
 - Nutrition
 - Rehydration
 - ORS, IV fluids
 - Oxygen
 - Treating co-infections
 - Blood, FFP (O negative)
 - Ebola virus exposures?
 - Other diagnostics? Invasive procedures? Dialysis? ICU care? Associated with high risk(s) of nosocomial exposures
 - **Patient should not be moved around in hospital, per MoH**



Medicines/ Vaccines?

- **There is no vaccine, or cure**
- **Unproven efficacy of a few vaccines and drugs available, for ethical use, by WHO panel**
 - **Experimental drug – ZMapp**
 - **3 monoclonal antibodies, treatment against glycoprotein EVD epitopes, manufactured by expression in tobacco plants; given 1 hour after EVD infection, all Rh monkeys survived**
 - **2 Americans “improved”, 2 doses to African docs; Deaths – 2/5 treated - Spanish priest and African; supply now “exhausted”**
 - **Ms Whitebol and Dr Brantly became ill about 9 days before getting Zmapp; he had a blood transfusion from 14 yo recovered EVD patient, both had high quality diagnosis and care; cannot attribute “cause/ effect” of recovery to ZMapp**
 - **Canadian experimental vaccine**
 - **VSV-EBOV vaccine**
 - **Efficacy in animal models, before and after exposure to Ebola virus; 800 - 1000 doses given to WHO**
 - **Still undergoing research**

Medicines/ Vaccines?

- **GSK vaccine**, now in human clinical trials
- **TKM-Ebola**, small interfering RNA's targeting EV RNA polymerase 1, which reduced mortality in animal model
- **AV1-7537**, targets EV protein via an RNA interferon technology, survival in monkeys
- **BCX-4430**, an adenosine analogue, active against EVD in rodents and monkeys
- **Chloroquin** and **imatinib**, *in vitro* activity
- **Lamivudine, Brincidofovir, promising**

Prognostic Indicators

- **Death – 70% (in this 2014 epidemic)**
 - Severe dehydration, metabolic abnormalities, anoxia
 - Tachycardia, anuria, delirium, coma, irreversible shock, high EVD RNA in blood
 - Pro-inflammatory cytokines
- **Survival (30%)**
 - Signs of clinical improvement and resolution of viremia by week 2, virus specific antibodies
 - Soluble CD4 ligands

Case Definition

- **Person Under Investigation (PUI)**

- A person who has both consistent symptoms and risk factors as follows:
 - 1) **Clinical criteria**, viz: Fever of greater than 38.6 C, or 101.5 F, and 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, eg., 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, rodents, or primates from disease-endemic areas.***

- **Probable Case**

- A PUI who is a contact of an EVD case with either a high or low risk exposure (see below).

- **Confirmed Case**

- A case with laboratory confirmed diagnostic evidence of ebola virus infection.

High risk exposures

- **Health care workers:**

- Percutaneous, e.g. needle stick, or mucous membrane exposure to body fluids of EVD patient
- Direct care, or exposure to body fluids of an EVD patient without appropriate personal protective equipment (PPE)
- Laboratory worker processing body fluids of confirmed EVD patients without appropriate PPE, or standard biosafety precautions

- **Family and Friends:**

- Care givers; participation in funeral rites, *viz*: direct exposure to human remains in geographic area where outbreak is occurring without appropriate PPE

Low Risk Exposure

- Includes any of the following:
 - Household member, or other casual contact with an EVD patient
 - Providing patient care or casual contact without high-risk exposure with EVD patients in health care facilities in EVD outbreak affected countries*

No Known Exposure

- Persons with no known exposure were present in an EVD outbreak affected country* in the past 21 days with no low risk or high risk exposures
 - **Casual contact** is defined as
 - a) being within approximately 3 feet (1 meter) or within the room or care area for a prolonged period of time (e.g., healthcare personnel, household members) while not wearing recommended personal protective equipment (i.e., droplet and contact precautions—see Infection Prevention and Control Recommendations); or
 - b) having direct brief contact (e.g., shaking hands) with an EVD case while not wearing recommended personal protective equipment (i.e., droplet and contact precautions—see Infection Prevention and Control Recommendations). At this time, brief interactions, such as walking by a person or moving through a hospital, do not constitute casual contact.



EBOLA VIRUS



EBOLA IS A DEADLY VIRUS. IT SPREADS QUICKLY AND KILLS!

HOW TO PREVENT IT FROM SPREADING



1 AVOID PHYSICAL CONTACT WITH PEOPLE SHOWING SIGNS AND SYMPTOMS SUCH AS CONTINUOUS HIGH FEVER, RED EYES, VOMITING AND STOMACH ACHE.



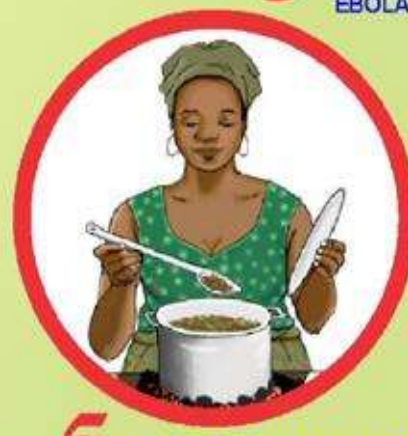
2 WASH YOUR HANDS REGULARLY WITH SOAP AND CLEAN WATER



3 DO NOT SHAKE HANDS WITH PERSONS SHOWING SIGNS OF EBOLA



4 KEEP AWAY FROM BATS, MONKEYS, BABOONS AND DEAD ANIMALS



5 AVOID EATING BUSH MEAT COOK ALL FOOD VERY WELL

Contact

- **Contact person:** defined as any person having had contact with an EVD case during the 21 days preceding the onset of symptoms in at least one of the following ways:
 - Having slept in the same household with a case
 - Has had direct physical contact with the case (dead or alive) during the illness
 - Has had direct physical contact with the (dead) case at the funeral
 - Has touched his/her blood, or bodily fluids during the illness
 - Has touched his/her clothes, or linens
 - Has been breastfed by the patient (eg., baby)

Monitoring of Contacts

- Both health personnel involved in the direct care of a patient under investigation for EVD, or of a confirmed case of EVD, as well as laboratory personnel, must be considered as a contact and ***monitored for 21 days*** after the opportunity for exposure to contaminated material, EVD person
- Contacts developing symptoms must go to isolation ward of nearest hospital for evaluation

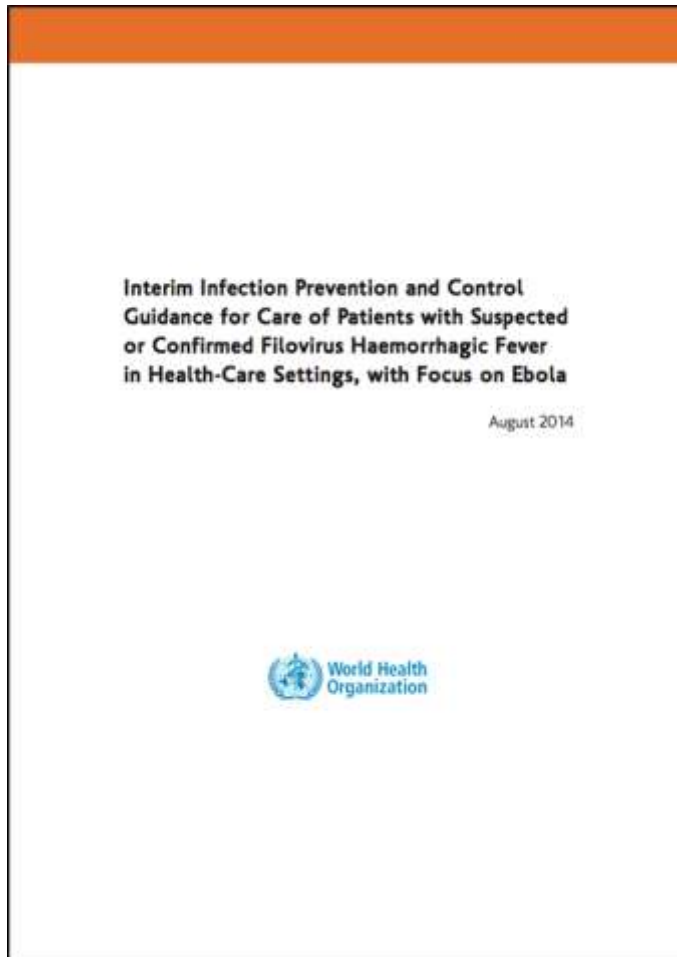
Infection Control

- Human to human transmission of EVD occurs directly or indirectly from contact with ***body fluids**
- Healthcare worker transmission occurs with inappropriate infection control precautions



***Body Fluids:** **Blood, stool, vomit,** urine, saliva, sweat, semen, breast milk

WHO Interim Infection Prevention and Control Guidance for EVD



**Interim
Infection Prevention and Control
Guidance for Care of Patients
with Suspected or Confirmed
Filovirus Haemorrhagic Fever
in Health-Care Settings,
with Focus on Ebola
August 2014**

**Document reviewed by PAHO/
CARPHA/ Jamaican MoH/ UHWI
and adapted for use in Jamaica**

Standard Precautions

- Cannot identify EVD patients early, because of initial non-specific symptoms
- Routine precautions to be applied in **ALL** situations for **ALL** patients
 - whether or not they appear infectious or symptomatic
 - Applies to all body fluids

Annex 1. Standard Precautions in Health Care - AIDE MEMOIRE
KEY ELEMENTS AT A GLANCE

1. Hand hygiene*
How to perform hand hygiene:
• Clean your hands by rubbing them with an alcohol-based formulation, on the preferred mean for routine hygiene; hand antiseptics, if hands are not visibly soiled. It is faster, more effective, and better tolerated by your hands than washing with soap and water.
• Wash your hands with soap and water when hands are visibly soiled or visibly soiled with blood or other body fluids or after using the toilet.

Summary techniques*
• Hand-washing with all wet feet hands and apply soap full all surfaces, then hands and dry thoroughly with a single use towel, one towel to turn off faucet.
• Hand rubbing (20-30 sec): apply enough product to cover all areas of the hands, rub all surfaces until dry.

Summary indications*
1. Before touching a patient: Clean your hands before touching a patient when approaching further*
2. Before clean/ aseptic procedure: Clean your hands immediately before accessing a critical site with infection risk for the patient (e.g. a mucous membrane, non-oculated site, an invasive medical device)*
3. After body fluid exposure risk: Clean your hands as soon as the task involving an exposure risk to body fluids has ended and after glove removal*
4. After touching a patient: Clean your hands when leaving the patient's side after having touched the patient*
5. After touching patient surroundings: Clean your hands after touching any object or furniture when being the patient surroundings, without having touched the patient*

2. Gloves
• Wear (COVID) when touching blood, body fluids, secretions, excretions, mucous membranes, non-oculated skin.
• Change (GLOVES) between tasks and procedures on the same patient after contact with potentially infectious material.
• Remove (GLOVES) after use, before touching non-contaminated items and surfaces, and before going to another patient, perform hand hygiene immediately after removal.

3. Facial protection (eyes, nose, and mouth)
• Wear (I) a surgical or procedure mask and eye protection (eye shield, goggles) or (II) a face shield to protect mucous membranes of the eyes, nose, and mouth during activities that are likely to generate splashes or sprays of blood, body fluids, secretions, and excretions.

4. Gown
• Wear to protect skin and prevent soiling of clothing during activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions.
• Remove soiled gown as soon as possible, and perform hand hygiene.

5. Prevention of needle stick and injuries from other sharp instruments?
Use care when:
• Handling needles, scalpels, and other sharp instruments or devices.

6. Respiratory hygiene and cough etiquette
Persons with respiratory symptoms should apply certain control measures:
• Cover their nose and mouth when coughing/sneezing with tissue or elbow, dispose of used tissues and masks, and perform hand hygiene after contact with respiratory secretions.
Health-care facilities should:
• Place and use face respiratory symptomatic patient at least 1 meter (3 feet) away from others in common waiting areas, if possible.
• Post small signs at the entrance to health-care facilities instructing persons with respiratory symptoms to practice respiratory hygienic cough etiquette.
• Consider making hand hygiene resources, tissues and masks available in common areas and areas used for the evaluation of patients with respiratory illnesses.

7. Environmental cleaning:
• Use the appropriate procedures for the routine cleaning and disinfection of environmental and other frequently touched surfaces.

8. Linens
Soiled, contaminated, and soiled items used linen in a manner which:
• Prevents skin and mucous membrane exposures and contamination of clothing.
• Avoids transfer of pathogens to other patients and to the environment.

9. Waste disposal
• Dispose safe waste management.
• Treat waste contaminated with blood, body fluids, secretions and excretions as clinical waste, in accordance with local regulations.
• Handle gloves and laboratory waste that is directly associated with specimen processing should also be treated as clinical waste.
• Discard single use items properly.

10. Patient care equipment
• Single equipment used with blood, body fluids, secretions, and excretions in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of pathogens to other patients or the environment.
• Clean, disinfect, and reprocess reusable equipment, appropriately before use with another patient.
• Cleaning used instruments.
• Disposing of used needles and other sharp instruments.

Source: Modified from: Standard precautions in health care WHO MEMO, World Health Organization, Geneva, 2017. Available from: <http://www.who.int/publications/m/item/standard-precautions-in-health-care>
* For more details, see: (I) WHO Guidelines on Hand Hygiene in Health Care, 2009, available at: <http://www.who.int/publications/m/item/standard-precautions-in-health-care>
or (II) WHO Guidelines on Infection Prevention and Control, 2016, available at: <http://www.who.int/publications/m/item/standard-precautions-in-health-care>
*NBS: Hand hygiene must be performed in all indicated situations regardless of whether gloves are used or not.

Standard Precautions: key elements

- Hand hygiene
- Gloves → **BASED ON RISK ASSESSMENT**
- Gown → **BASED ON RISK ASSESSMENT**
- Facial protection
(eyes, nose, mouth) → **BASED ON RISK ASSESSMENT**
- Respiratory hygiene and cough etiquette
- Environmental cleaning and disinfection
- Cleaning and disinfection of patient care equipment
- Waste disposal
- Injection safety and prevention of sharps injuries

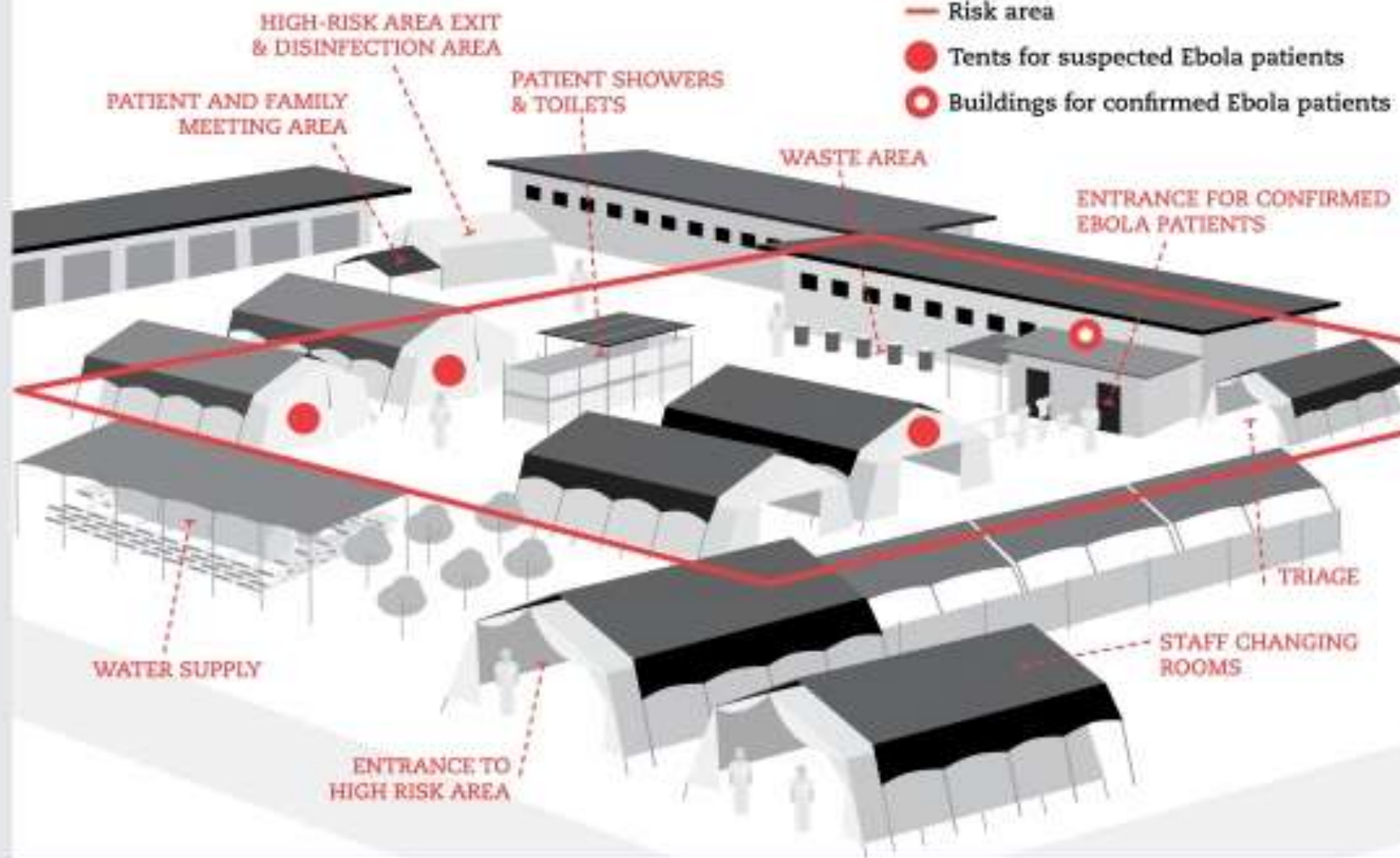
Patient placement

- Put suspected or confirmed cases in **single isolation rooms** with
 - adjoining dedicated toilet
 - showers
 - sink equipped with running water, soap and single-use towels, alcohol-based hand rub dispensers
 - stocks of personal protective equipment (PPE)
 - stocks of medicines
 - good ventilation
 - screened windows, doors closed
 - restricted access

Patient placement

- If isolation rooms are unavailable, cohort these patients in specific confined areas
 - Rigorously keep suspected and confirmed cases separate
 - Ensure the items listed for isolation rooms are readily available
 - Make sure that there is at least 1 meter (3 feet) distance between patient beds

MSF EBOLA CLINIC



EVD Isolation Units/ Wards



Isolation Units – Europe Prepares



Staff allocation

- Ensure clinical and non-clinical personnel are **exclusively assigned** to EVD areas
- Ensure members of staff do not move freely between the EVD isolation areas and other clinical areas during the outbreak
- **Restrict all non-essential staff** from EVD patient care areas

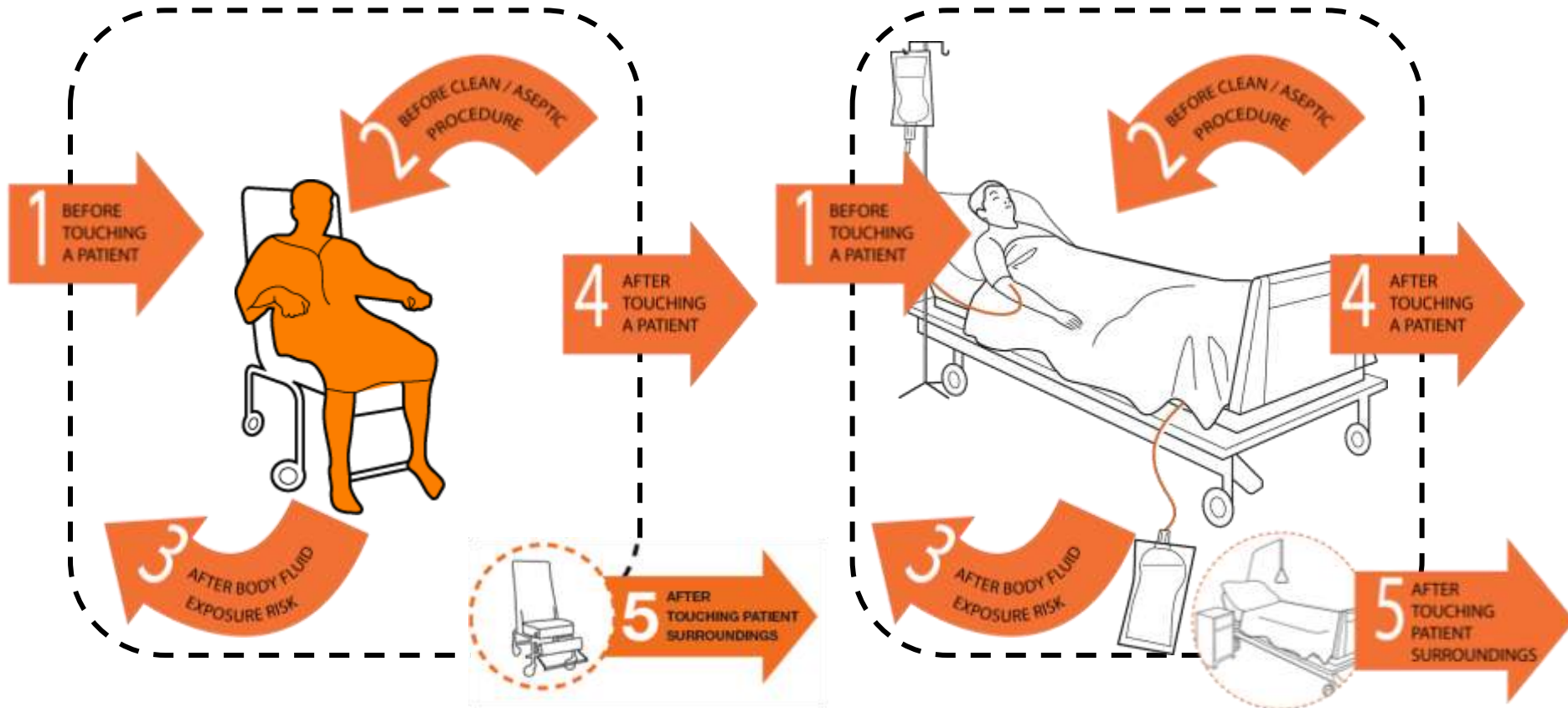
Visitor Restriction

- Stop visitors direct access to the patient is preferred,
 - except absolutely necessary, a child's parent
- Do not allow other visitors to enter the isolation rooms/areas
- Visitors may observe patient from a distance of 50 feet

Hand hygiene, PPE, and other precautions

- Ensure that **all HCWs** (including aides and cleaners) **wear PPE according to expected level of risk** before entering the isolation rooms/areas and having contacts with patients and/or the environment
- Personal clothing should not be worn in patient areas. Scrub or medical suits should be worn.

The 5 Moments apply to any setting where health care involving direct contact with patients takes place



To perform hand hygiene



- Use **soap and running water** or an **alcohol-based hand rub** applying the correct technique recommended by WHO
 - Always perform hand hygiene with soap and running water when hands are visibly soiled

Hand Hygiene



- **Alcohol-based hand rubs** should be made available at every point of care (at the entrance and within the isolation rooms/ areas) and are the WHO's standard of care

Personal Protective Equipment



- Correctly sized **gloves** (non-sterile exam gloves) when entering patient care area
- **Change gloves if heavily soiled** with blood or any body fluids while providing care to the same patient
- **Perform careful hand hygiene** immediately after removal
- Double glove

Isolation Suits – Europe Prepares



Personal Protective Equipment

- Surgical masks/ N95 respirator, goggles (with anti-fog visor), full body cuffed disposable gowns, waterproof apron, double latex gloves and closed water boots to enter patient's room
- Remove PPE in isolation area
 - Gloves, goggles, gowns then respirator
 - Prevent splashing and contact with eyes and mucous membranes



Direct Patient Care - Precautions

- Designate staff to monitor appropriate use of PPE
- Disposables, preferred;
Reuse with disinfection:
 - Goggles or eye wear, washed with water and soap and disinfected with 70% alcohol
 - Impervious gowns or aprons that can't be sent to hospital laundry should be disinfected with 0.05% bleach



Different standards

- 40 min vs 2.5 - 3 hours
- Human interaction and facial expressions
- Concerns about “neck area exposure”
- Resource implications
- Other health care settings



When using PPE

- Avoid touching or adjusting PPE
- Remove gloves if they become torn or damaged
- Change gloves between patients
- Perform hand hygiene before donning new gloves
- Avoid touching your eyes, mouth, or face with gloved, or ungloved hands

... Management of linens ...

- Exposures may occur via heavily contaminated linens
- Use gloves, gown, boots, masks and goggles
- Place soiled linen in clearly-labeled, leak-proof bags, or buckets at the site of use
- Container surfaces should be disinfected before removal from the isolation room/area
 - If there is any solid excrement such as faeces or vomit, scrape off carefully using a flat firm object and flush it down the toilet or in the sluice before linen is placed in its container
 - If the linen is transported out of the patient room/area, put in a separate container – never be carried against the body
- Linens should be incinerated

Sharps and Waste Management

- All sharp-edged objects must be disposed of in puncture-resistant containers and discarded at 75% capacity
- Other solid waste must be disposed of in medical waste plastic bags
- All solid waste and sharps related to suspect or confirmed EVD patients must be **incinerated, or buried, by MoH standards**

PPE for waste management

- Wear heavy duty/ rubber gloves to elbows, impermeable gown, closed shoes (e.g. boots) and facial protection (mask and goggle or face shield), when handling infectious waste (e.g. solid waste or any secretion or excretion with visible blood even if it originated from a normally sterile body cavity)
 - Goggles provide greater protection than visors from splashes that may come from below when pouring liquid waste from a bucket
- Avoid splashing when disposing of liquid infectious waste.



Prevention – Clean up



Cleaning in Hospitals and Homes of EVD Patients

- **At home:**
 - Disinfected and
 - Patient's clothing and bedding incinerated
- **Environment:**
 - Clean contaminated surfaces with blood/ body fluids with water and detergent
 - Disinfect with 0.05% bleach
 - Use gloves, gowns and closed shoes for clean-up

Percutaneous or muco-cutaneous exposure: what to do?

- Persons including HCWs with percutaneous or muco-cutaneous exposure to blood, body fluids, secretions, or excretions from a patient with suspected or confirmed HF should:
 - immediately and safely stop any current tasks,
 - leave the patient care area,
 - safely remove PPE
 - exposure during PPE removal can be just as dangerous
 - immediately after leaving the patient care area, wash the affected skin surfaces or the percutaneous injury site with soap and water
 - accordingly, irrigate mucous membranes (e.g. conjunctiva) with copious amounts of water or an eyewash solution, and not with chlorine solutions or other disinfectants

Managing exposure

- Immediately **report** the incident to supervisor
- **Medical evaluation**, viz: other exposures (e.g., HIV, HCV) and follow-up care, **fever monitoring**, twice daily for 21 days
- Immediate **consultation with internist/** infectious diseases physician for any exposed person who **develops fever** within 21 days of exposure
- HCWs with suspect EVD should be **cared for/isolated**, and the IPC precautions must be applied until a negative diagnosis is confirmed
- **Contact tracing** and follow-up of exposed family, friends, co-workers and patients, through close contact with the infected HCW is essential

PAHO/ WHO Recommendations

Caribbean Countries must:

- Develop capacity to manage travellers from known Ebola-infected areas who arrive at international airports or major land crossing points with unexplained febrile illness
- ***"At this time, all actions in the Americas should be oriented to prevent established local transmission before the introduction of a possible imported case"***
- Regional governments urged to identify and follow up on contacts of cases compatible with Ebola, and raise awareness of general population about the virus and communicate risk information to all stakeholders

EVD Surveillance in Airports

- Contacts should be assessed in a designated area within the airport, or seaport according to the airport/ seaport contingency plan.



Patient Transport

- By trained HCW's in “ambulance”
- Only essential personnel for medical care, in PPE
 - Mask/ N95 respirator, goggles (anti-fog visor), full body disposable gowns, latex gloves, plastic apron, water boots
- Vehicle cleaned with 0.05% bleach after patient transfer, by professionals wearing PPE



Safe Disposal of Dead Bodies

- Train morgue staff, appropriately in use of PPE
- **Dead body must be kept whole**
- **Body must not be embalmed**
- Disinfect body with 0.05% bleach
- Place in two resistant extra-vasation body bags, properly closed and placed in a hermetically sealed casket for “immediate” burial, by MoH standards



Communication and Education

- All HCW's
 - evolution of the outbreak, characteristics and mode of transmission of disease, protocols.
- All civil aviation and port authorities
- Tourist sector
- Embassies and diplomatic channels
- General population
- Travellers
- Expat communities
- Media





“Unprecedented” Epidemic

- Non specific initial clinical symptoms
 - Fever, fatigue, loss of appetite
 - Highly infectious, spread by body fluids
 - **Blood, vomit, stool**, sweat, saliva, urine, tears, semen, breast milk
- No cure; 70 to 90% mortality
- Family and Health Care Workers, first responders, most at risk
 - **Some 216/377 (57%) EVD-infected HCW's in Africa have died (WHO, Oct 2, 2014)**
 - **Spanish nurse, nosocomial Ebola**

Dr Khan



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