

# EBOLA-PERSONAL PROTECTIVE EQUIPMENT (PPE)

## معدات الوقاية الشخصية في مواجهة الايبولا

**Georges SAAD, BSN, MBA IP**

Senior Consultant In Emergency Preparedness & Disaster Management

EMS & HEMS Manager Saint George Hospital, UMC

Director of Lebanese European Academy of Emergency Medicine

Health Management, Paris-France.

Emergency Nursing, Scotland-UK

Trauma Nursing, Hong Kong-China

Flight Nursing, Missouri-USA

Retrieval Emergency Medicine-Brisbane-Australia

Emergency Radiation Management-Singapore

Disaster Management-Gothenburg-Sweden

Catastrophic Planning-Montreal-Canada

CBRN Management-San Diego-USA

e-mail: [gfsaad@srgeorgehospital.org](mailto:gfsaad@srgeorgehospital.org)



Mobile:+961 3 210473

# الهدف من ال PURPOSE OF PPE

To isolate and  
protect us  
from hazards

العزل والحماية من  
المخاطر

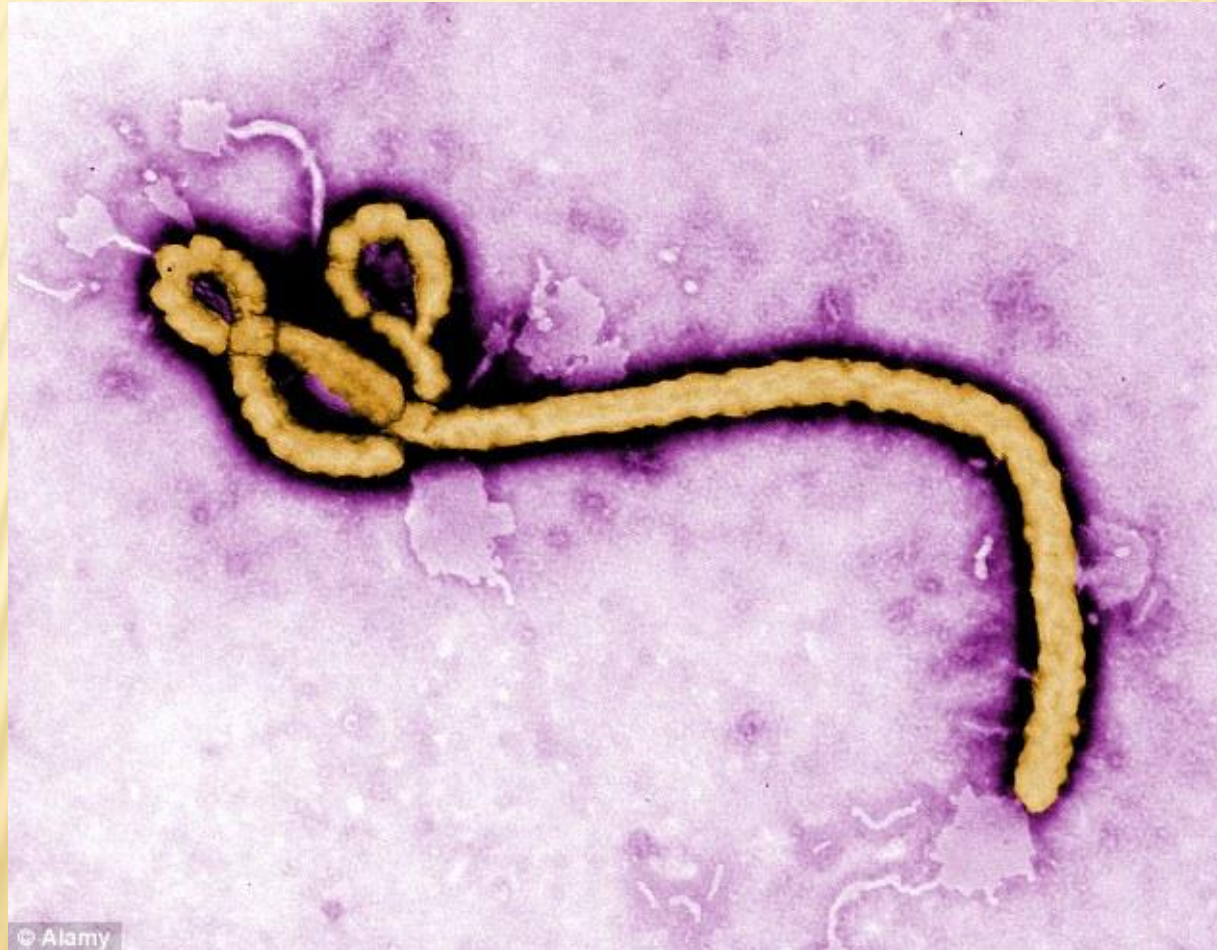


# PROTECT AGAINST HAZARDS الحماية من المخاطر

- × Hazards
  - + Physical المادي
  - + Chemical الكيميائي
  - + **Biological/Infectious البيولوجي**
  - + Nuclear النووي
- × Capable of causing injury or impairment in the function of any part of the body through (routes of entry)
  - + Inhalation التنشق
  - + Skin absorption امتصاص بواسطة الجلد
  - + Ingestion البلع
  - + Contact with skin and/or eyes احتكاك الجلد أو العين



# WHAT ABOUT EBOLA?



# WHAT ABOUT EBOLA VIRUS-OUR HAZARD

- ✘ Ebola virus disease (EVD) or Ebola hemorrhagic fever (EHF) is a disease of human and other primates.
- ✘ Ebola Viruses are contagious.
- ✘ The virus may be acquired upon contact with blood or bodily fluids of an infected animal or person.
- ✘ Once human infection occurs, the disease may spread between people.
- ✘ No specific treatment for the disease is yet available.
- ✘ The disease has a high risk of death



# WHAT ABOUT HEALTH WORKERS

- ✘ As of 29 August 2014, More than 240 health workers have developed the disease in Guinea, Liberia, Nigeria, and Sierra Leone, and more than 120 have died.

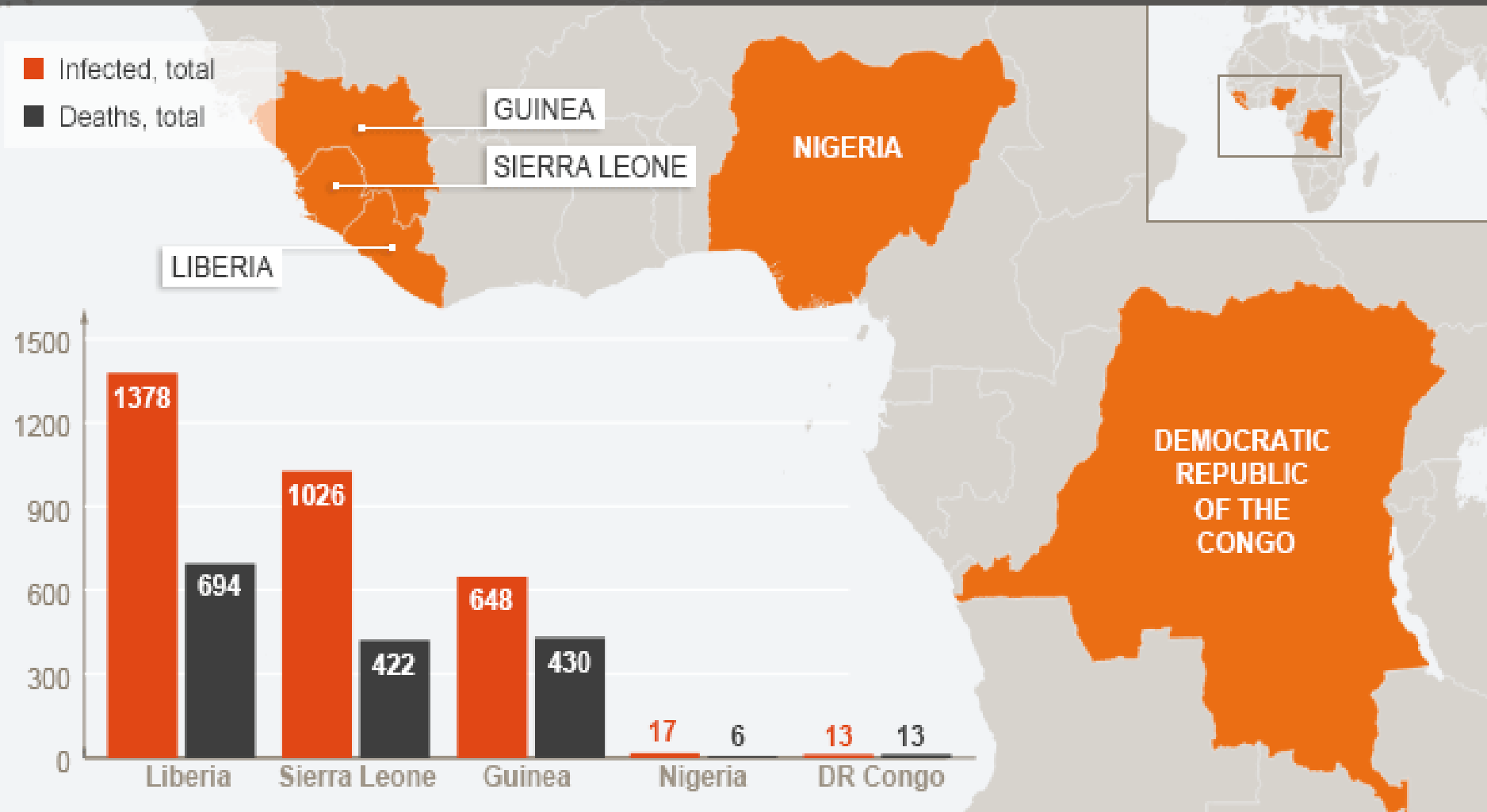


# EBOLA OUTBREAKS

- ✘ 1976 Nsara-Sudan & Yambuku-Congo
- ✘ Till 2013 (during 38 years)
- ✘ → WHO reported 1716 cases.
- ✘ The largest outbreak to date is the ongoing 2014 West Africa Region.
- ✘ As of 28 August 3070 suspected included 1552 deaths (about 52%).
- ✘ Guinea, Liberia, Nigeria, Sierra Leone, Senegal
- ✘ 430/648      694/1378      6/17      422/1026      0/1

# EBOLA OUTBREAK 2014

## Ebola outbreak in West and Central Africa



Source: WHO, Health Ministry DRC | August 28, 2014



# QUARANTINE





## PROTECTIVE EQUIPMENT

معدات  
الحماية

- × Protective Clothing الثياب  
الحامية
- + Proper level المستوى  
الصحيح
- × Respiratory Protection  
الحماية التنفسية

# PROTECTIVE EQUIPMENT **معدات الحماية**

- ✘ Personal protective equipment
  - + Eyes **الأعين**
  - + Face **الوجه**
  - + Head **الرأس**
  - + Extremities **الأطراف**
- ✘ Protective clothing **الثياب العازلة**
- ✘ Respiratory devices **معدات التنفس**



# MINIMUM REQUIREMENT FOR PROTECTION



# WHAT LEVEL OF PPE IS NEEDED FOR EBOLA?

- ✘ Level C - Most protective الأكثر أمناً
- ✘ Level D – Least protective الأقل أمناً

# CASE DEFINITION FOR EVD

---

- ✘ Person Suspected or Under Investigation(PUI)
  
- ✘ Probable Case
  - ✘ Low Risk Exposure(
    - ✘ **High Risk** Exposure; percutaneous (needle stick), mucous membrane exposed to blood or body fluids of EVD patient, Direct Skin contact with EVD without PPE, Direct contact with dead body of EVD.
  
- ✘ Confirmed Case



# ESSENTIAL EBOLA PPE'S

---

- ✘ Non-Sterile patient care gloves
- ✘ Disposable, impermeable or fluid resistant isolation gowns or full body garment.
- ✘ **Facemasks (N95 filtering face piece respirators)**
- ✘ Goggles, Face shield
- ✘ Soap and Water and other hygiene products

# SPECIAL CONSIDERATIONS

---

## ✘ In certain Situations

- ✘ Double gloving
- ✘ Disposable shoe covers
- ✘ Leg covering
- ✘ Head covers


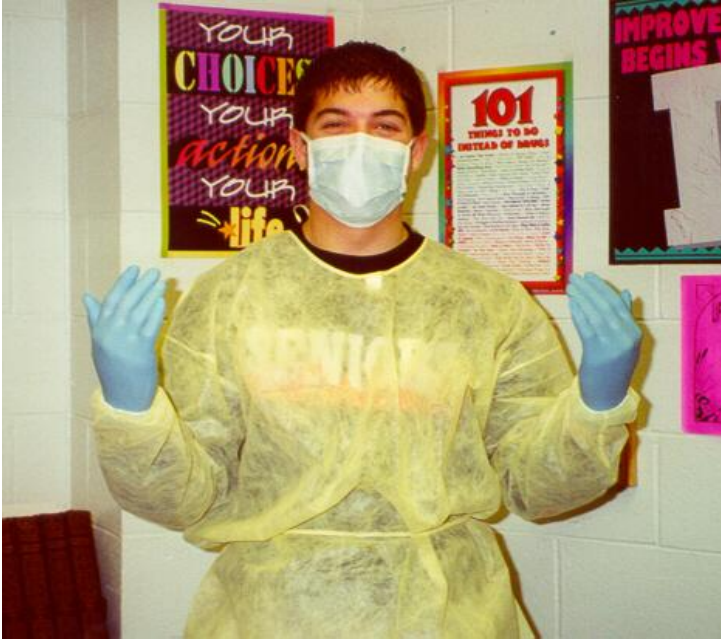

## ✘ Waste Disposal

- ✘ Dry Solid waste(gloves dressing)
- ✘ Sharp items (needles)
- ✘ Suctioned fluids and secretions

## ✘ Cleaning and Disinfection

- ✘ Everything needs to be cleaned and disinfected

# LEVEL D "د" معادل المستوى

Skin	Respiratory	Comments
<p data-bbox="144 321 434 428"><b>No chemical protection</b></p> 	<p data-bbox="643 321 975 428"><b>No respiratory protection</b></p> 	<p data-bbox="1159 321 1845 599">Examples include: work uniforms, street clothes, scrubs, and Standard/Universal Precautions (provides minor chemical protection)</p> 



# CHEMICAL-RESISTANT INNER SUIT LEVEL D+



- ✘ Provides skin protection against hazardous dry particles, aerosols, and nonhazardous light liquid splashes

# معادل المستوى "س" LEVEL C

Skin	Respiratory	Comments
Liquid Splash Protection	Air Purifying Respirator	Lower level of skin and respiratory protection



# CHEMICAL-RESISTANT JACKETS, BIG OVERALLS AND COVERALLS





# CHEMICAL-RESISTANT GLOVES

---



- ✘ Can include inner and outer gloves, plus sleeves

Type of Gloves for Decon?	Butyl	Neo-prene	Nitrile	PVC	
					

For hospital decon purposes, **nitrile gloves** are usually adequate.

# CHEMICAL-RESISTANT BOOTS



- ✘ Can provide complete protection or additional chemical barrier protection as over boots



# CHEMICAL-RESISTANT BOOTS COVER

---



# N95 MASK - NIOSH CERTIFIED







# EYE PROTECTION



# FACE SHIELD

---







# INSPECTION **التحقق**

Before use **قبل الاستعمال** : verify that the clothing material is correct for the specified task at hand.

Visually inspect for:

- ✘ Imperfect seams
- ✘ Non-uniform coatings
- ✘ Tears
- ✘ Malfunctioning closures
- ✘ Observe for cracks
- ✘ Observe for other signs or shelf deterioration

# SEQUENCE FOR DONNING PPE طريقة اللبس

- ✘ Perform Hand Hygien
- ✘ Suit or Gown
- ✘ Boots / Cover Boots
- ✘ Inner gloves
- ✘ Mask or respirator
- ✘ Goggles or Face Shield
- ✘ Outer gloves
- ✘ Tape all seams



# SEQUENCE FOR DOFFING PPE **طريقة الرفع**

- ✘ Boots / Cover Boots
- ✘ Outer gloves
- ✘ Goggles or Face Shield
- ✘ Suit or Gown
- ✘ Mask or respirator
- ✘ Inner gloves
- ✘ Perform Hand Hygien



# THE PRIMARY HAZARDS OF WEARING PPE

- +Heat Stress الإرهاق الحراري
- +Slips / Trips / Falls التّعثر و الوقوع
- +Overexertion (strains and sprains)  
الإرهاق الجسدي

# ADDITIONAL PROBLEMS مشاكل إضافية

- × Slow, insidious loss of performance ضعف في الأداء
- × Difficult recovery in contaminated environment. صعوبة الرجوع الى الوضع الطبيعي في البيئة الملوثة
- × Difficulties in doffing PPE صعوبة في رفع الثياب
- × Drinking Rate is inadequate كمية شرب المياه غير منتظمة

# PERSONNEL MONITORING AND MEDICAL SURVEILLANCE

## المراقبة الطبية للأفراد

- ✘ Baseline vital signs- pulse, temperature, (BP, weight)
- ✘ Medical Surveillance
- ✘ Required for Levels A,B **ل ضرورية**
- ✘ Recommended for Levels C,D **ل ينصح بها**



# MEDICAL COMPLICATIONS OF PPE **المشاكل** الصحية الناتجة عن معدات الوقاية الشخصية

**1-Heat Cramps** **التشنج الحراري** Heat cramps involve the most heavily exercised muscles.

**2-Heat Exhaustion** **الإرهاق الحراري** presents with minor mental status changes, dizziness, nausea, headache, tachycardia and mild hypotension. Temperatures is less than 39° .

**3-Heat Stroke** **الصدمة الحرارية** Body temperature is elevated to extreme levels (>40°) , mental status and physiological collapse.

# WHEN TO DISCONTINUE WORK IN PPE DUE TO HEAT STRESS

- ✘ Symptoms of sudden, severe fatigue, nausea, dizziness, or lightheadedness are warning signs to doff your PPE immediately.

✘ إن العوارض المفاجئة من الإرهاق الحاد، الغثيان، الدوخة أو الدوار هي علامات تنبيه لرفع معدات الوقاية الشخصية

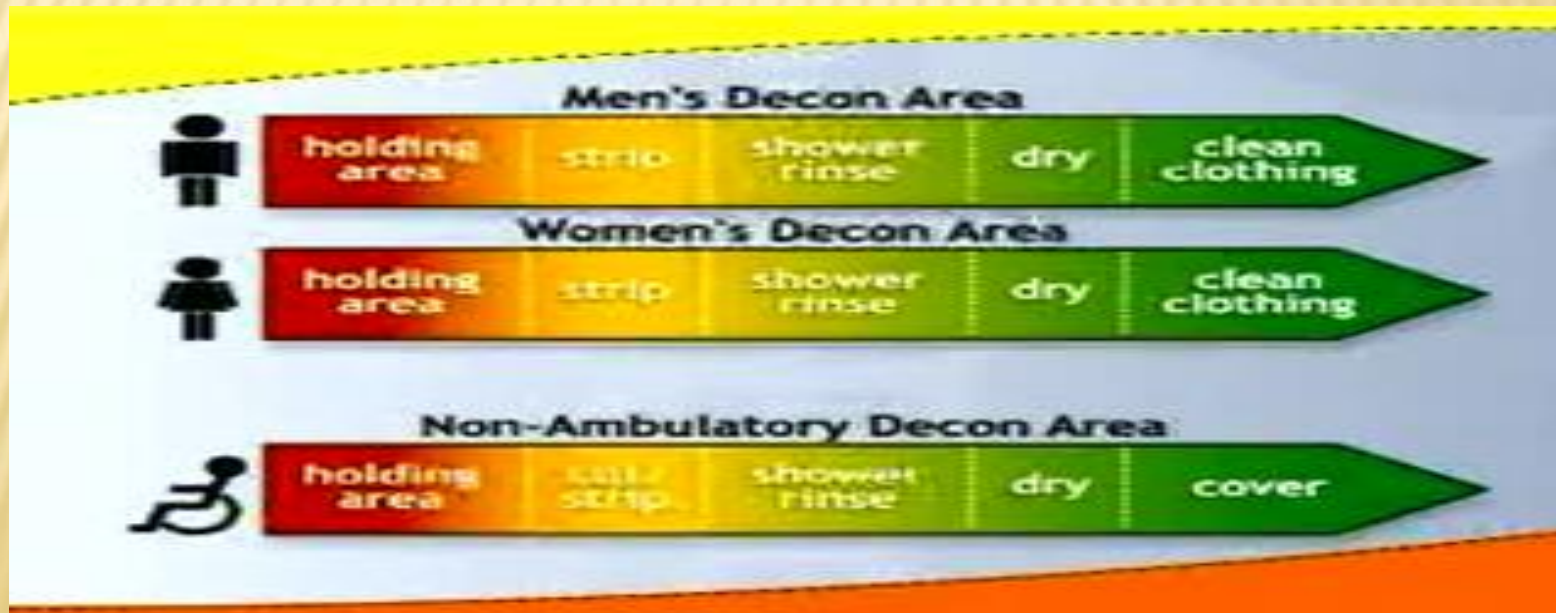
# CONTROL ZONES & PPE

Hot (red) zone & Warm (yellow) zone

Level C or above is required

Cold (green) Zone

Level D





# ON SCENE WITH PATIENT



# DECONTAMINATION ON SCENE





# PATIENT TRANSPORT





# ISOLATION PACKING UNIT



# BIOLOGICAL CONTAINMENT UNIT





# ISOLATION PACKING UNIT





# MORTUARY



# WASTE





# WASTE





**BIOHAZARD**



**INFECTIOUS  
WASTE**

# QUESTIONS?



REUTERS