

# **The Current State of Biosafety in the African region**

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Strengthening Laboratory Biosafety through  
Innovation and Sustainability  
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# Presentation Outline



Background/introduction

Public Health Events (PHE) and Lab core capacities

Biosafety in the WHO-African Region

Perspectives and way forward

Conclusion

“...we must come together to prevent, and detect, and fight every kind of biological danger—whether it’s a pandemic like H1N1, or a terrorist threat, or a treatable disease.” **-President Barack Obama, 2011**

## Today’s Global Health Security Risks:

- Emergence and spread of new microbes;
- Globalization of travel and trade;
- Rise of drug resistance; and
- Potential for accidental release, theft or illicit use.

## Global Health Security objectives:

**To prevent** epidemics, **detect** biological threats early, and rapidly **respond** to disease outbreaks, whether naturally occurring, intentionally produced, or accidentally caused.

# International Health Regulations (2005)

“The national public health system should establish the laboratory capacity to identify, monitor and report to the health authorities on agents that may cause epidemics and emergencies, including those of international importance in a **safe**, timely and reliable manner”

Entered into force in **2007** and fully compliant by **2012**

# WHO's public health mandate for biosafety

## World Health Assembly resolution 58.29 (May 2005)

### Member States to:

- Review safety of labs, follow WHO guidance
- Implement safety programs
- Enhance compliance with labs guidelines
- Mobilize human and financial resources
- Cooperate with other Member states to facilitate access to PPE
- Encourage development of biosafety training programs and competency standards



→ "Enhancement of laboratory biosafety"



# Laboratory biosafety is the basis on which to build laboratory biosecurity

Laboratory biosafety describes containment principles, technologies and practices implemented to prevent unintentional exposure to pathogens and toxins, or their accidental release.

[http://www.who.int/csr/resources/publications/biosafety/WHO\\_CDS\\_CSR\\_LYO\\_2004\\_11/en/](http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_CSR_LYO_2004_11/en/)

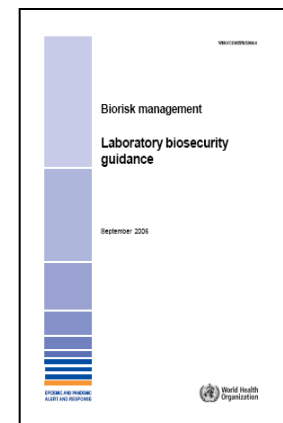
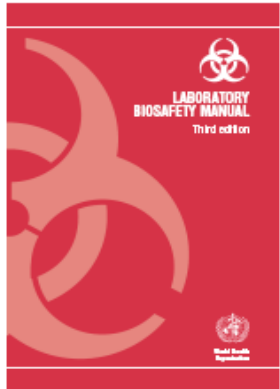
**'Protect people from pathogens'**

**Prevention of accidental or 'deliberate' release from labs**

Laboratory biosecurity describes the protection, control and accountability for valuable biological materials (VBM) within laboratories, in order to prevent their unauthorized access, loss, theft, misuse, diversion or intentional release.

[http://www.who.int/csr/resources/publications/biosafety/WHO\\_CDS\\_EPR\\_2006\\_6/en/index.html](http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_EPR_2006_6/en/index.html)

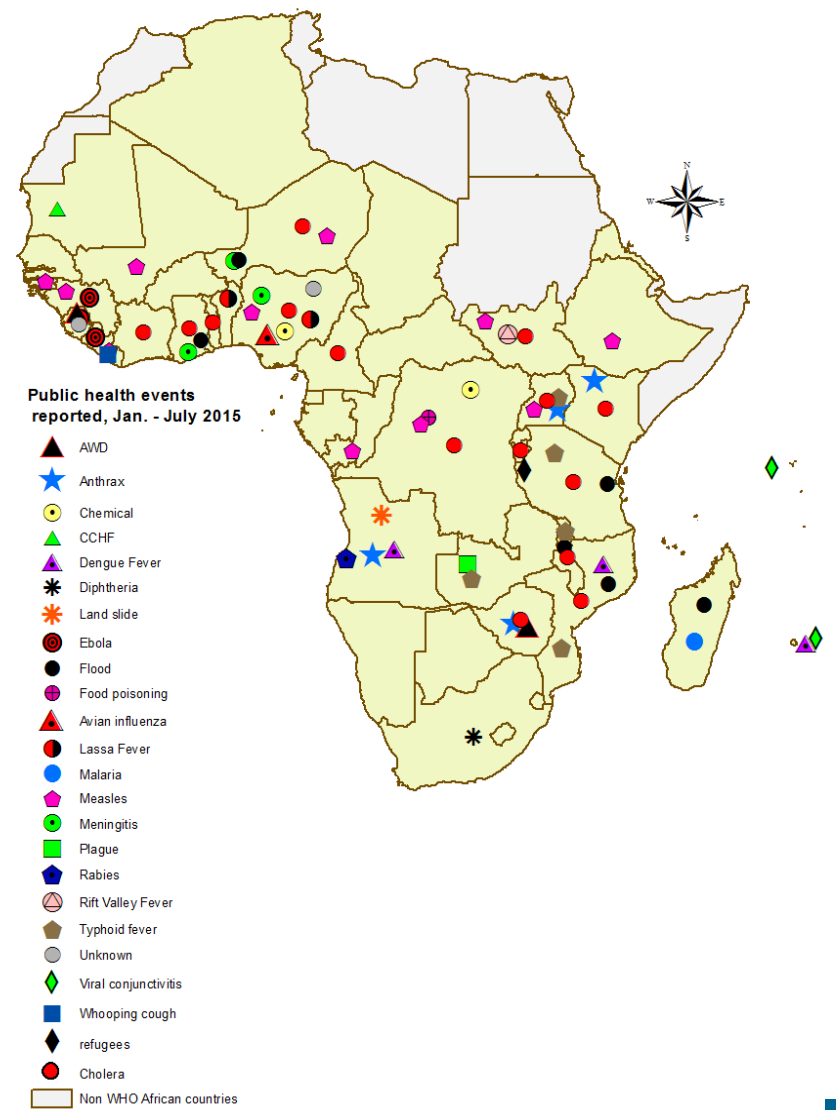
**'Protect pathogens from people'**



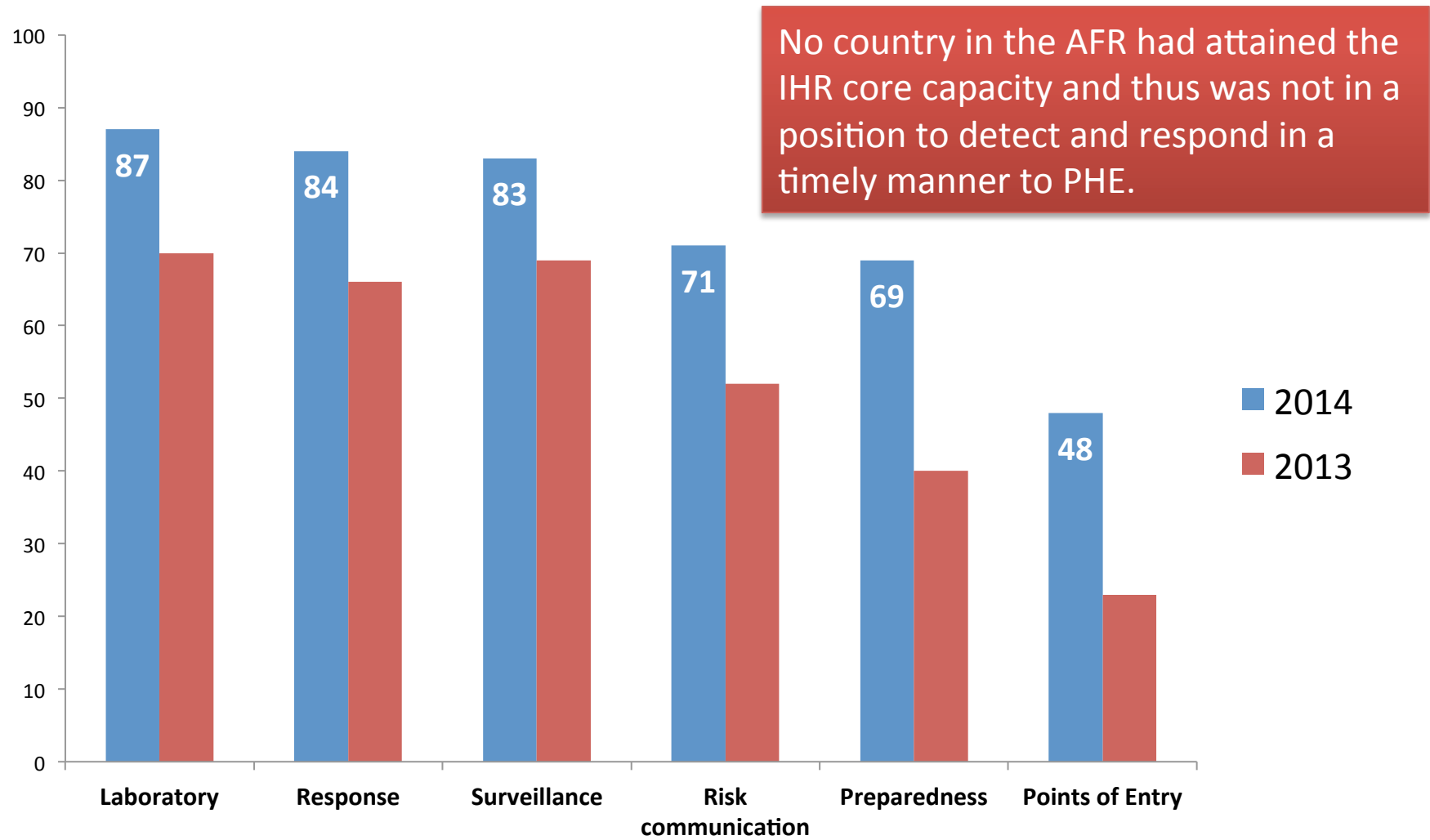
# Public Health Events reported in the WHO African Region (Situation as of July 2015)

□ According to data received from the Early Warning System through the Event Management System (EMS), 70 public health events were reported to the Regional Office between January and July 2015 of which 81% (57/70) were due to infectious diseases; cholera being the most frequently reported infectious disease (26%)

□ Communicable diseases remain the most important public health problem in Africa.



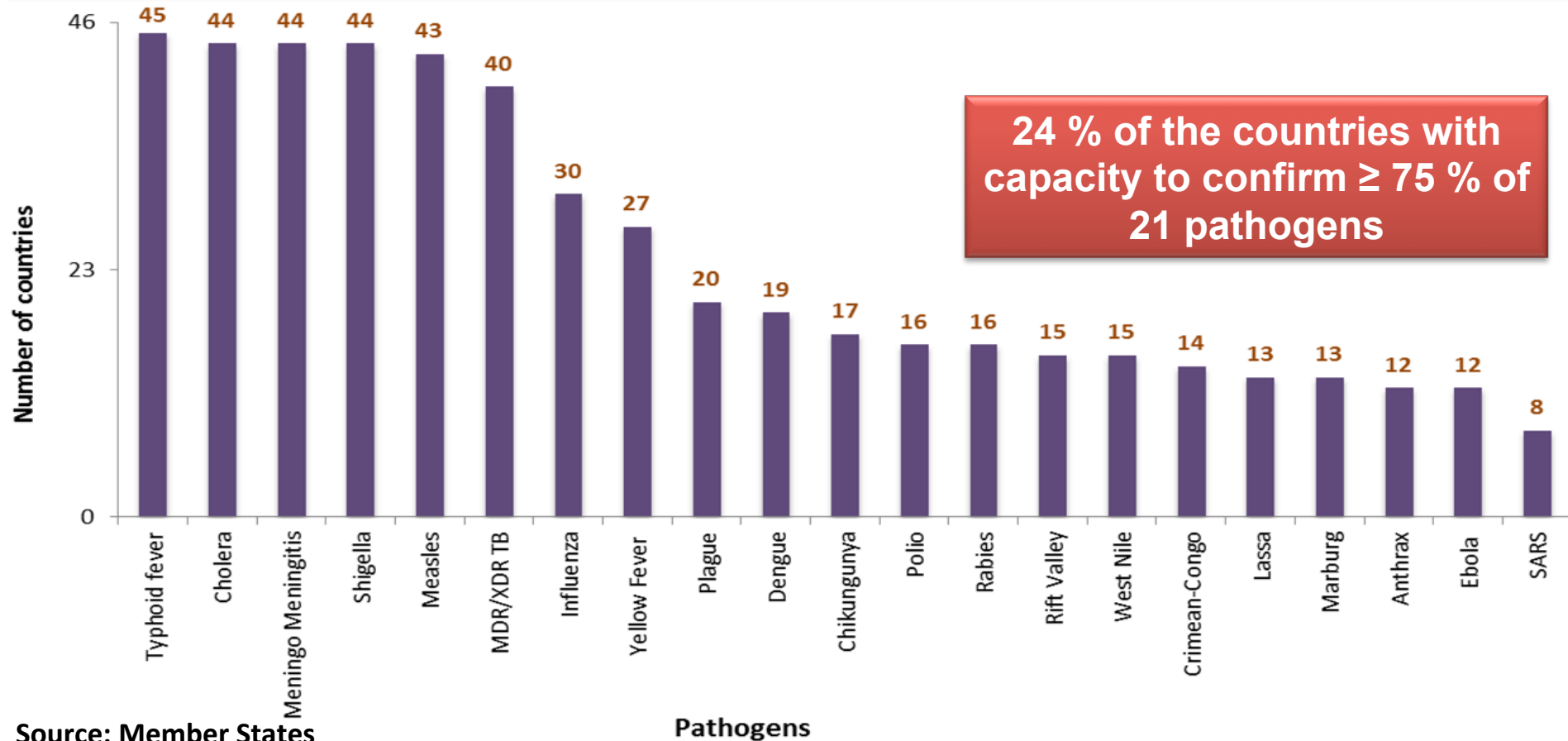
# Status of IHR core capacities (1)



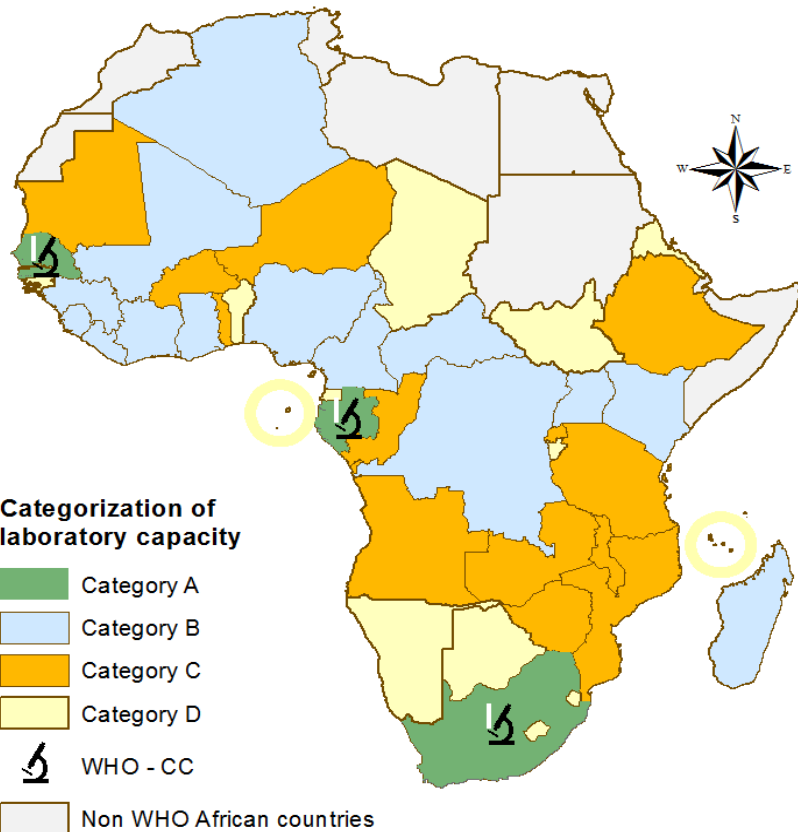


# Epidemic-prone diseases and lab core capacity

## Laboratory core capacity to diagnose IDSR epidemic-prone diseases in the WHO African Region (2012)



# Categorization of laboratory capacity for confirmation of VHF in the WHO African region



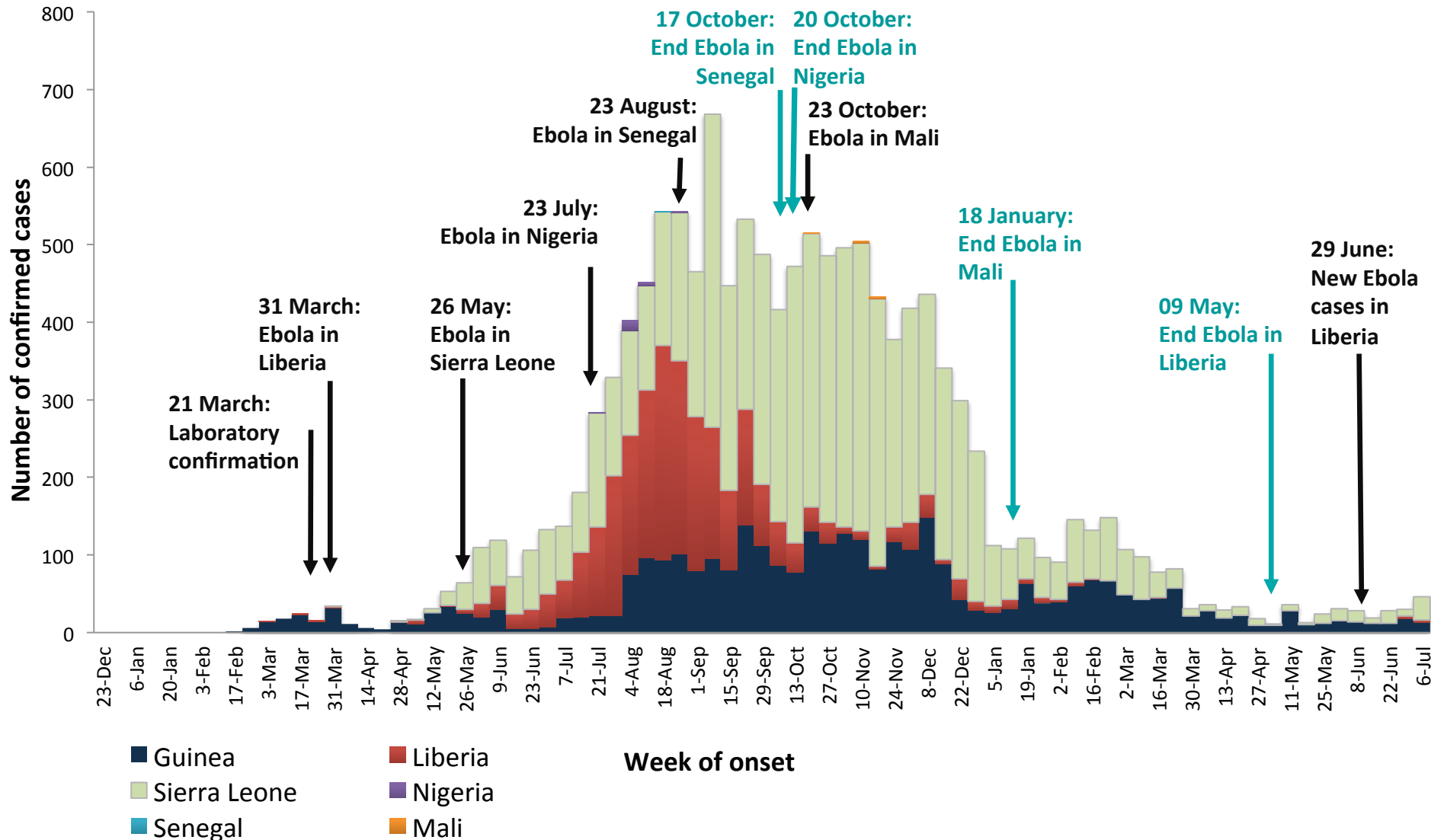
- Category A - Countries with VHF laboratory capacity and designated as regional reference laboratories for neighboring countries
- Category B - Countries with VHF laboratory capacity and ensuring national confirmation of VHF
- Category C - Countries without existing VHF laboratory capacity but have a laboratory capacity for confirmation of influenza viruses by PCR (Potential laboratory to be upgraded for VHF confirmation capacity)
- Category D - Countries without VHF and other EDP laboratory capacity and sending VHF suspected clinical specimens to a designated regional reference laboratory

**Enhanced regional capacity for confirmation of VHFs**



**14 countries, members of the Emerging and Dangerous Pathogens Laboratory Network (EDPLN)**

# We don't want to see this again!



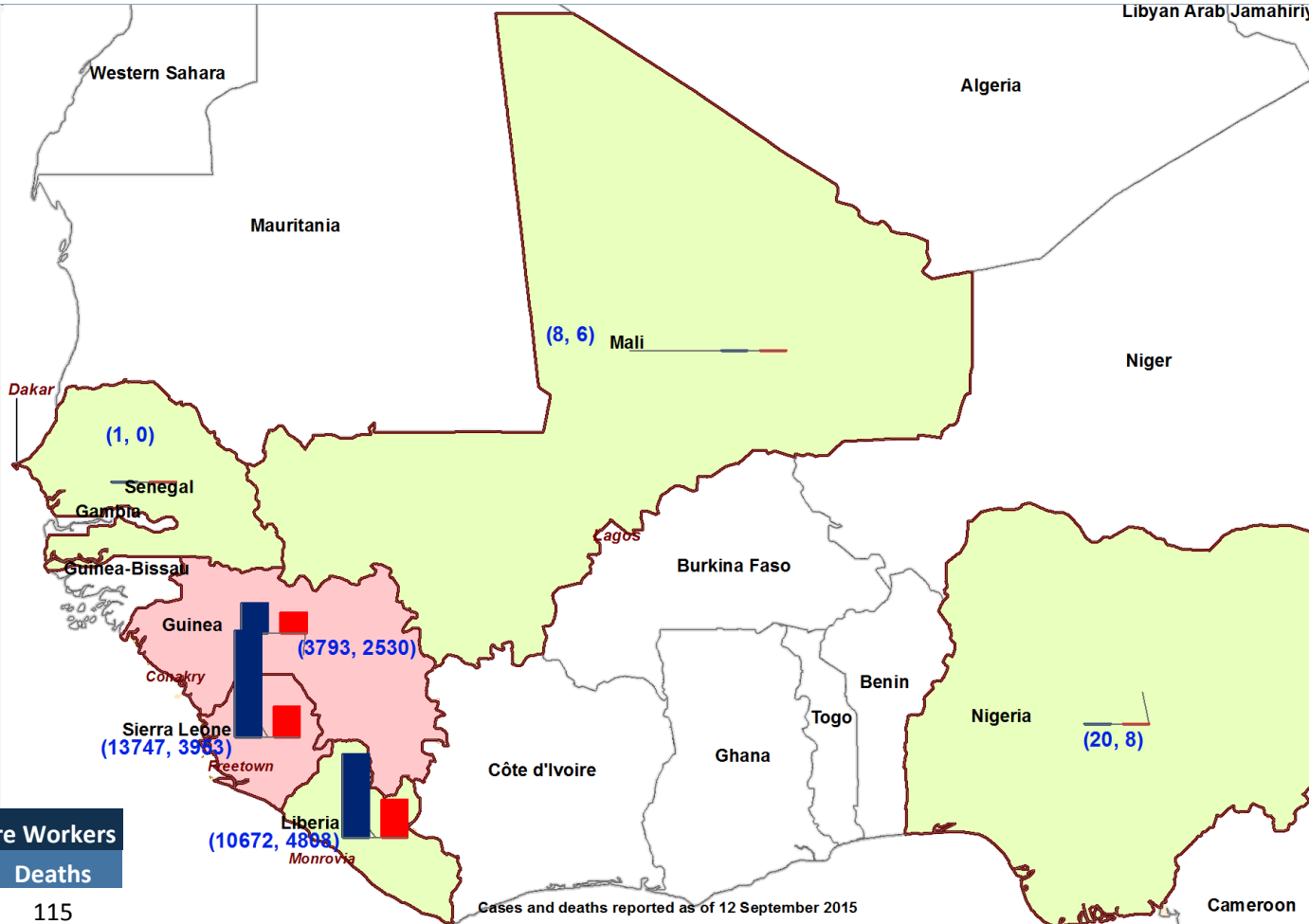
# Ebola Virus Disease in West Africa (Situation as of 12 September 2015)

•As of 04 September 2015, a total of **28 241 EVD cases** including **11 305 deaths** have been reported from six West African countries (**Guinea, Liberia, Mali, Nigeria, Senegal and Sierra Leone**).

•**1049 cases** including **535 deaths** were reported **among health care workers**.

•On 03 September 2015, WHO declared end of Ebola outbreak in Liberia.

•As of 18 January 2015, WHO had declared end of Ebola outbreaks in Mali, Nigeria, and Senegal.



Countries	Cumulative number		Health Care Workers	
	Cases	Deaths	Cases	Deaths
Guinea	3793	2530	211	115
Liberia	10672	4808	378	192
Sierra Leone	13747	3953	447	221
Mali*	8	6	2	2
Nigeria*	20	8	11	5
Senegal*	1	0	0	0
<b>Total</b>	<b>28241</b>	<b>11305</b>	<b>1049</b>	<b>535</b>

**(cases, deaths)**

- Cases
- Deaths

**Status**

- Countries with ongoing Ebola outbreak
- Outbreak declared over

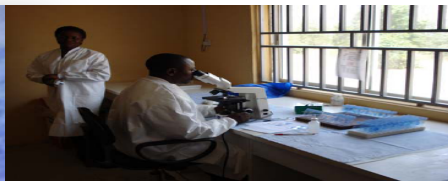
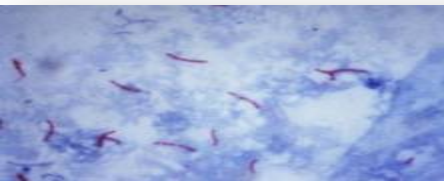
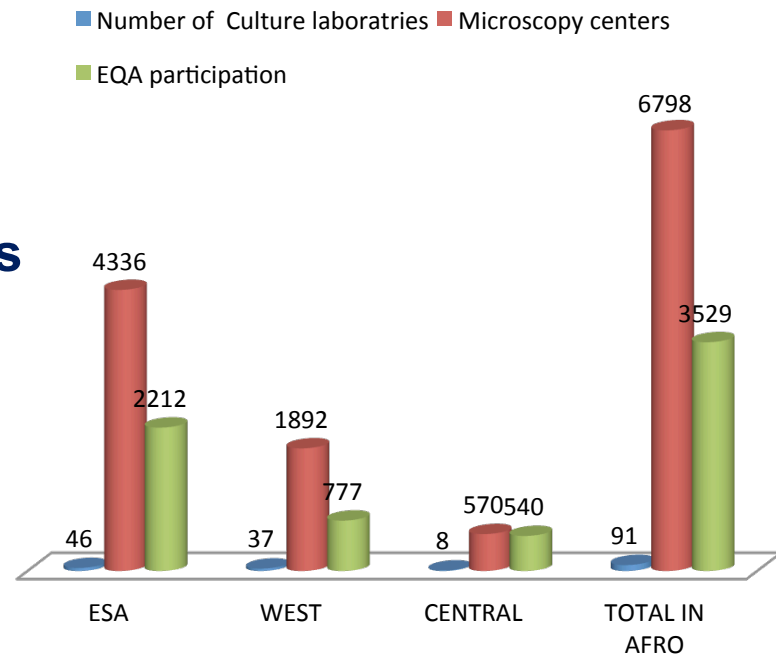
## AMR and biosafety (e.g.: TB)

- Since 2006, increasing emergence of multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB)
- January 2004 -December 2011, a total of **53, 798 MDR-TB cases** were reported by **42 countries** in the Region. At the same time, **3 231 XDR-TB cases** were reported from **8 countries**
- Most African countries lack the laboratory capacity to confirm drug-resistant TB and so the true burden is not well known

# TB Lab capacity

- **Microscopy:** All the countries have facilities for TB microscopy.
- **Culture facilities:** 35/46 countries
- **Few countries have got DST facilities:** 53 labs only

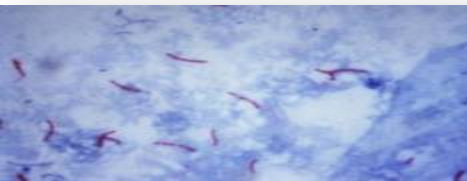
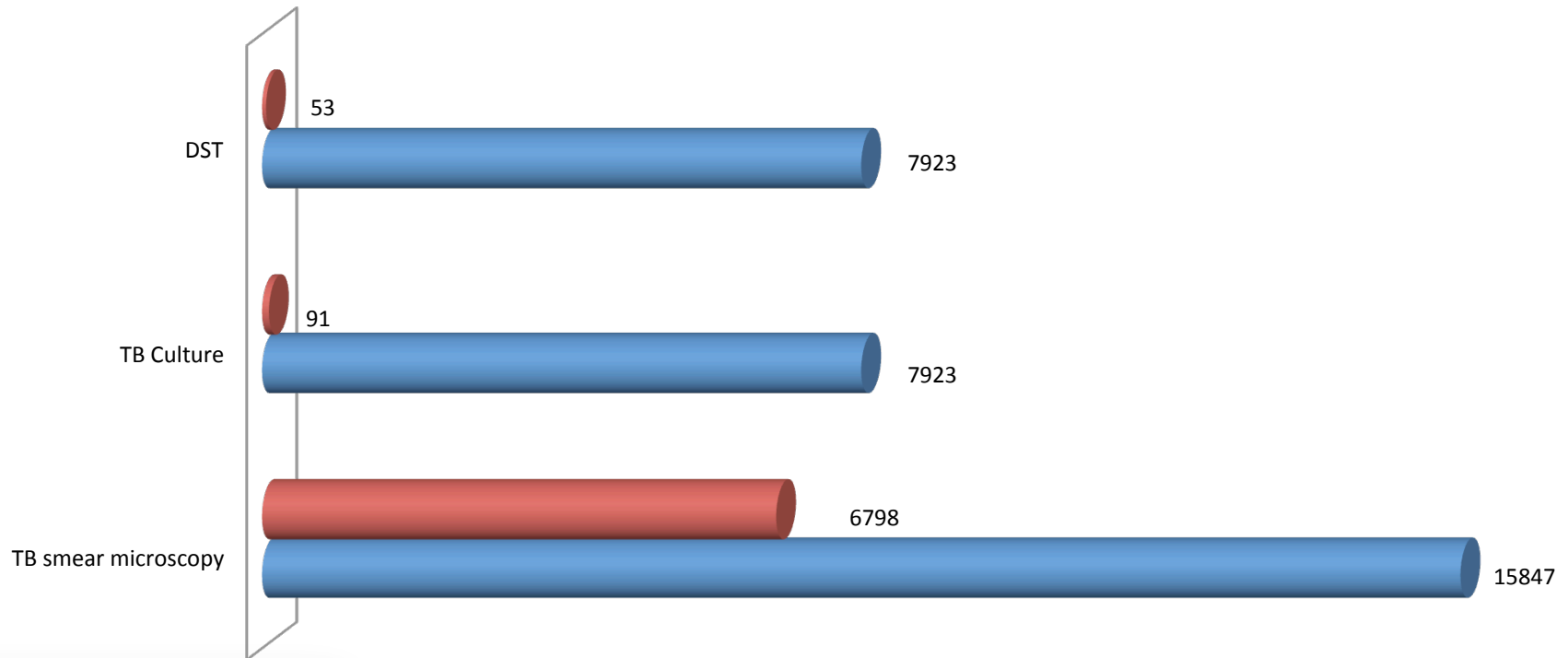
## TB lab services in the AFR



# Facilities available for TB Control

## Facilities available for TB control

Available Expected



# Biosafety in the African region

**Biosafety assessment using the WHO Laboratory Assessment Tool (LAT) to assess the following components:**

- Training in Biosafety
- Use of protective clothing
- Use of appropriate/safe equipment
- Safety procedures
- Waste disposal
- Biosafety documentation including SOPs
- Infrastructure and equipment



# SAFETY TRAININGS

**“Did you receive any training in biosafety, hygiene or laboratory biosecurity before your assumption of duties in the laboratory” <Y or NO>**

# SAFETY CONDITIONS

- **Do you disinfect the lab with HYPOCHLORITE regularly <Y or N>**
- **Do you have a separate sink designated for hand washing <Y or N>**
- **Are the workbenches made of a material resistant to solvents and chemicals <Y or N>**
- **Are the benches made of a material that is easily washable (of blood, stools ...) <Y or N>**

# WASTE DISPOSALS

- **Do you have at least 2 types of waste (infectious/non infectious)? <Y or N>**
- **Do you have lid-covered waste containers? <Y or N>**
- **Do you have safe waste containers? <Y or N>**
- **Do you have special sharp containers? <Y or N>**
- **Do you have special solvent waste containers? <Y or N>**

# SAFETY WITH EQUIPMENT

- **Do you regularly disinfect your centrifuge?**  
**<Y or N>**
- **Do you regularly disinfect your incubators?**  
**<Y or N>**
- **Do you systematically use temperature strips while sterilizing? <Y or N >**

# BIOSAFETY DOCUMENTATION

- **Do you follow specific biosafety guidelines?**  
**<Y or N >**
  
- **Are you aware of the WHO laboratory biosafety manual? <Y or N >**

# Findings

- Biosafety and biosecurity are not included as components of the day to day supervision of laboratory workers:
  - No training program
  - No guidelines
  - No biosafety and laboratory biosecurity SOP's
- Many laboratories are not supplied with essential biosafety equipment (waste disposals, antiseptic etc.)-old or inadequately serviced equipment-**safety cabinets not certified**
- Inadequate lab infrastructure: the design of lab facilities does not fully meet the biosafety and biosecurity requirements
- It seems that biosafety and biosecurity are not recognized as being essential elements to the laboratory management

# Biosafety capacity strengthening



19/07/2010

# BRM and TIS capacity strengthening

- The main objective is to increase the number of qualified trainers able to support biorisk management regionally.
- Countries capacity is strengthened on the TIS and the new concept of  **biorisk management**, which combines  **risk assessment**,  **risk mitigation**, and  **performance systems**.
- Biorisk management:
  - Recommendations on how to work safely,
  - Addresses users and policy makers
  - Introduces 'laboratory biosecurity'
- More than 150 biosafety officers were trained in BRM including safe handling/shipment of infectious substances
- **Implementation of the SLIPTA process**



# Biosafety capacity strengthening

- Provision of PPEs and appropriate packaging boxes to all Ref Labs
- Support to the **establishment of the African Biological Safety Association-AfBSA**  
[www.afbsa.org](http://www.afbsa.org) :
  - to enhance the knowledge and practices of biosafety and biosecurity issues throughout the African region.
- Distribution of WHO Biosafety manuals





# Accredited laboratories in Africa – ASLM Survey, 2015<sup>a</sup>

Country	SANAS	SADCAS	CAP	Other	Total
Tanzania	3	4	1		8
Swaziland		1			1
Zimbabwe	1	1			2
South Africa	359				359 (87%)
Botswana	6				6
Kenya	9		1		10
Uganda	2		4		6
Ghana	2				2
Namibia	9				9
Nigeria	3				3
Ethiopia				1	1
Mauritius				1	1
Mali			1		1
Egypt			2		2
<b>TOTAL</b>	<b>394</b>	<b>6</b>	<b>9</b>	<b>2</b>	<b>411</b>

87 % of accredited labs in South Africa; 13% of accredited labs in rest of Africa

<sup>a</sup> The data includes laboratories that are accredited to ILAC-recognised institutions

# Perspectives and way forwards

- **Countries to ensure essential biosafety equipment and documentation (SOPs) are in place**
- **Appointment of biosafety officers in labs**
- **Work with partners to develop process for Strengthening of Laboratory Biosafety norms and standards in the countries:**
  - **SOPs of testing algorithms for priority EDPs**
  - **Framework document for sharing and storage of EDP specimens in the regional EDP labs with appropriate containment facilities**
  - **Comprehensive tool to assess the key processes associated with construction of BSL3 facilities and identification of issues linked to BSL3 specifications, including regulatory requirements**
- **Work with partners to increase the number of suitably trained laboratory staff**

# Conclusion

- **Biosafety is crucial in the implementation of the IHR and the Global Health Security Agenda**
- **Biosafety is one of the weakest components of the national health laboratory systems in the WHO African region**
- **Need for joint efforts to support countries strengthen their biosafety for diseases prevention and control including epidemics and AMR**

# Thank you



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