

# Biosafety and Biosecurity in Countries with Low Resources – Sudan as an Example

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## Introduction

People cannot stop working with pathogens just because their laboratories do not meet EU/US standards; still they need to diagnose human illnesses and treat. Agriculture is vital for Sudan and there is an urgent need to deal with animal diseases. Moreover, pathogens e.g. Enteropathogenic *Escherichia coli* (EPEC), *Cryptosporidium parvum*, *Giardia lamblia*, *Entamoeba histolytica*, *Ascaris lumbricoides*, hookworm infection, *Schistosoma haematobium*, *S. mansoni* and *Strongyloides stercoralis* are still in the environment, water and food. They need to be able to do what they have to do as safely as possible with the facilities they have [1-4].

In a previous study, a total number of 190 laboratories were surveyed about their compliance with standard biosafety precautions. These laboratories included 51 (27%) laboratories from government, 75 (39%) from private sectors and 64 (34%) laboratories belong to organization providing health care services. This study concluded that the standards biosafety precautions adopted by the diagnostic laboratories in Khartoum state was very low. Further, the laboratory personnel awareness towards biosafety principles implementation was very low too [5].

Main achievement is seen in the regulations development for genetically modified organisms (GMO) and also the formulation of Sudan Emergency Country Profile which is based on the international health regulations, IHR (2005).

In this report the author is trying to give a general overview on the biosafety and biosecurity issues in Sudan as an example for low resources country.

## Special Challenges

Sudan is a low resource country and it has been under economic sanctions for a very long time [7], this results in little or no new equipment imported for decades; no or few replacement parts and more important there are no maintenance contracts with manufacturers if any.

It is a struggle to maintain and use safely existing capabilities, let alone reach new standards for facility design and equipping.

Sudan's relatively poor in laboratories physical infrastructure and most of the basic required safety tools are absent [4,5] means that biosafety and biosecurity are even more important for scientists to work safely.

## The Current Situation in Sudan

Sudan biosafety framework has been developed for genetically modified organisms (GMO) since 2005 [6] and a law on biosecurity for GMO was approved on 2011, some workshops are held on this law and associated regulations. A lot of work has been done on the GMO with the help of Sudanese Standards and Meteorology Organization (SSMO). But is it biosecurity in the GMO/Cartagena sense protocol? Or more work should be done.

One of the most important steps to enhance biosafety and biosecurity in the country is the development of A national Strategy to compile with IHR (2005) (Nuclear and Chemical Hazards are also included). The IHR (2005) provides a framework to promote global health security in the broadest sense. Public health emergencies of international concern (PHEICs), by definition, do not respect international boundaries, and the IHR (2005) articulates a vision of solidarity that a common vulnerability to microbial and other threats should elicit. Sudan has succeeded to gather all relevant sectors dealing with human, animal and plant health including both government and private agencies to develop a very comprehensive national strategy to compile comply with IHR (2005) [8].

Some Universities start to teach principles of biosafety and biosecurity at both graduate and postgraduate levels. In addition very good effort has been exerted to raise the awareness among technologists and technicians in all sectors, this definitely has improved the level of biosafety especially in hospitals and research laboratories.

We need to do more work at the political and scientific levels to show that biosafety and biosecurity have a much broader applications sense than just GMO regulations or IHR related issues.

## Action Plan

It is very clear that there is a need to develop a sustainable national plan to enhance biosafety and biosecurity among all relevant agencies and departments dealing with biosafety issues sectors.

The first step is to convince politicians and decision-makers with the benefits of biosafety to public health and the national economy to grantee the political support, because biosafety in least developing countries (LDCS) is not a priority at the governmental level.

To work safely in very low resource environments a special sort of training should be designed and delivered with highly qualified experts with emphasis on the training of the trainers (TOT).

Biosafety cannot be known as an issue without an establishment of a National Biosafety Association. This association will help a lot in the development of biosafety regulations and guidelines for different sectors biological applications with the help of the international community. Also it will be a very good platform to gather all relevant people for collaboration and exchange of ideas.

On the other hand a parallel official governmental efforts should

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be encouraged and enhanced, one of the options is a creation of a National Biosafety and Biosecurity Committee which may take long time because of it needs an approval from the Cabinet of Ministers and the Parliament but a network of officials and laboratories directors in different ministries can be easily established to begin work on a national biosafety and biosecurity strategy. This committee must start with a survey of current assets and gap analysis.

As it is well known that pathogens don't respect borders between countries so, regional and interregional networking will help the country to possess the capacities and capabilities to detect, assess, report, and respond to public health threats, whether they are naturally occurring, accidental, or deliberate in origin. Special cross-border network and joint activities with South Sudan is highly recommended.

### The Future

There is an urgent need for assessment of current status with regard to laboratories (design, equipment and safety measures), this cannot be performed without the help of the international community. Also there is a need for expertise to help train our own trainers (TOT).

The aim is sustainable improvements to biosafety and biosecurity

in Sudan, the ability to develop our own capabilities suitable to our own needs and circumstances, and to establish smart Regional and Global partnerships.

### References

1. Ahmed AA, Osman H, Mansour AM, Musa HA, Ahmed AB, et al. (2000) Antimicrobial agent resistance in bacterial isolates from patients with diarrhea and urinary tract infection in the Sudan. *Am J Trop Med Hyg* 63: 259-263.
2. Gbakima AA, Konteh R, Kallon M, Mansaray H, Sahr F, et al. (2007) Intestinal protozoa and intestinal helminthic infections in displacement camps in Sierra Leone. *Afr J Med Med Sci* 36:1-9.
3. Magambo JK, Zeyhle E, Wachira TM (1998) Prevalence of intestinal parasites among children in southern Sudan. *East Afr Med J* 75: 288-290.
4. AH Eldum and NS Saeed (2011) Hepatitis B virus infection among staff in three hospitals in Khartoum, Sudan, 2006–07. *Eastern Mediterranean Health Journal* 17: 474-478.
5. Elduma AH (2012) Assessment of biosafety precautions in Khartoum state diagnostic laboratories, Sudan. *Pan Afr Med J*, 11:19. Epub.
6. Sudan Biosafety Framework, 2005.
7. Security Council Committee established pursuant to resolution 1591 (2005) concerning the Sudan.
8. Sudan Emergency Country Profile (ECP), WHO, Last edition: December 2010.