

A blood culture system adapted to field laboratories in Ebola Virus Disease outbreaks: Design and pilot testing in the Democratic Republic of the Congo



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INTRODUCTION

- Patients with Ebola virus disease (EVD) may suffer from bloodstream infections
- There is limited experience about implementing blood cultures within EVD care.
- Main challenges are biosafety aspects and microbiological work-flow adaptations to glovebox containment of EVD diagnostic laboratories



Figure 1. Microbiological work-up in the glovebox

AIM

Design and pilot testing of a bacterial blood culture (BC) laboratory work-up system tailored to conditions and biosafety requirements of EVD field laboratories

METHOD

1. Preparation
 - Literature review
 - Target product profile
 - Field visit
2. Design and assembly in a reference setting (ITM)
3. Pilot validation: it was pilot tested during the 2019 – 2020 EVD outbreak in Beni, North Kivu, DR Congo.

RESULTS

1. Preparation

Literature review: Lack of concrete guidelines

Target product profile

- Provide on-site growth detection, identification, and antibiotic susceptibility testing
- Offer the maximum biosafety level (Sharp-free)
- Fit to the glovebox and infrastructure of EVD laboratories capacities
- Be adapted to the end user

Field visit for prospection, planning and partnering



Figure 2. Building used as bacteriology laboratory in Beni

2. Design and assembly in a reference setting (ITM)



Figure 3. Subculture in the glovebox

- Selection of equipment and consumables
- Set-up of test laboratory and try out with spiked BC
- Development of bench aids, worksheets and training materials



Figure 4. Identification and antibiotic susceptibility testing

3. Pilot validation

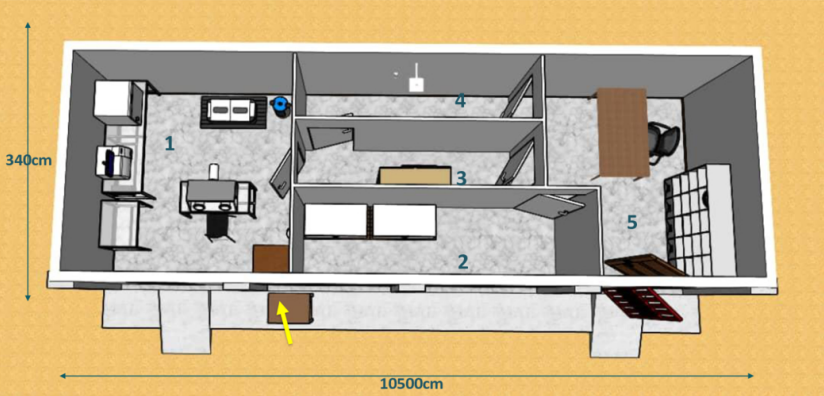


Figure 5. Map of bacteriology laboratory

Infrastructure

- Ordinary building
- 1=Red zone, 2=Cold Chain, 3=Dressing area, 4=Undressing area, 5= office
- Reception of samples:

Equipment

- Negative pressure Glovebox 83 X 53X 46 cm
- BacTALERT 3D 60 automate
- Incubator
- Autoclave

Consumables

- Autoclavable polycarbonate blood culture bottles
- Safe subculture unit
- Sealable cassette with 4 types of pre-poured agar medium
- Pre-identification : aminopeptidase spot, catalase, oxidase
- Immunochromatographic test for *Streptococcus pneumoniae*
- Dehydrated 96-well plates for identification and susceptibility testing

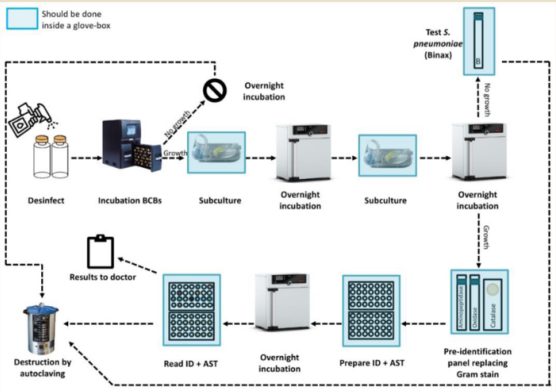


Figure 6. Sample flow

CONCLUSION

Our pilot study demonstrated practicability of blood culture work-up in EVD field laboratories

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