UGANDA Supranational® Reference Laboratory
Timely Accurate Diagnostics for a TB-Free Africa

Training on Proficiency Testing Scheme (Microscopy PT)

Module 2: Biosafety in Microscopy PT preparation

17th -28th FEB, 2020

Uganda Supranational Reference Laboratory

Content outline

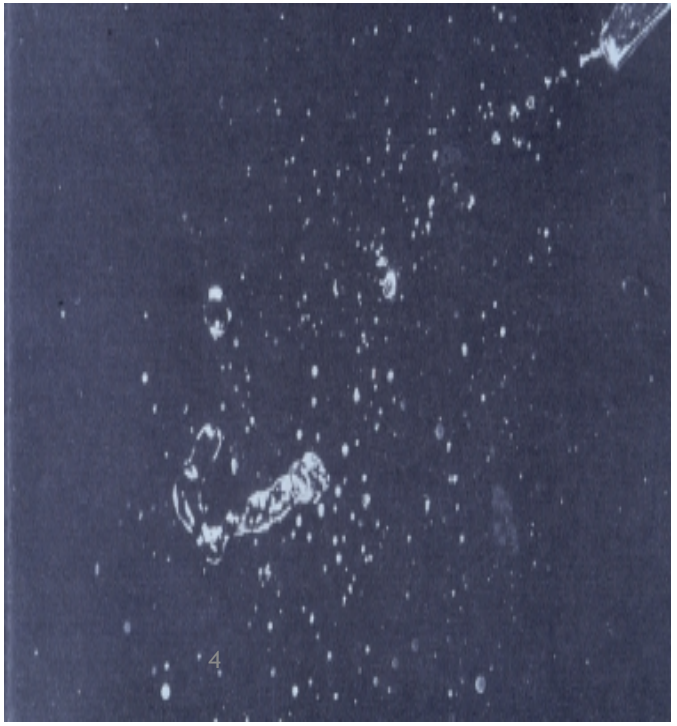
- Biosafety in TB laboratories.
- Personal Protective Equipment in TB labs.
- Disinfection in TB laboratories.
- PPE demonstration
- Video on respirator fit testing
- Assessment
- Summary

Biosafety levels in a TB lab

- BSL1 – AFB smear microscopy
  - Can use countertop if airflow is directed away from laboratory staff
  - Need for exhaust fan to draw air away from area
  - BSC preferred
- BSL2 – Specimen processing for TB culture
  - Work performed in a BSC
  - Safety centrifuge cups opened only in BSC
- BSL2 – Molecular laboratory
  - Three areas with separate airflow
  - NO LIVE TB; dead cells only
- BSL2 and/or BSL3 – TB Culture: Identification and DST
  - All work performed in a BSC
  - Isolation and air exhaust needed for manipulating large quantities of live TB

Biohazards in the laboratory: be aware!

- Inhalation hazards: handling of liquids containing TB bacilli generates infectious aerosols:
  - pipetting
  - working with loops
  - centrifugation
  - opening tubes
  - vortexing suspensions
- Ingestion hazards
- Inoculation hazards



THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

TB culture lab

- Follow all biosafety protocols for work in the TB culture lab
  - Collect samples for TB testing
  - Disinfect outside of tubes before removing from BSC
  - Heat kill samples if DNA extraction occurs in the moderate-risk TB laboratory

PPE in a TB lab

- Each laboratory room should have its own set of PPE
- Laboratory coats
  - Front closing
  - Long sleeved
  - Washable at the lab or disposable
- Gloves
  - Powder free (powder may increase cross contamination)
  - Single use
  - Latex free (due to allergies)

Disinfection In TB lab

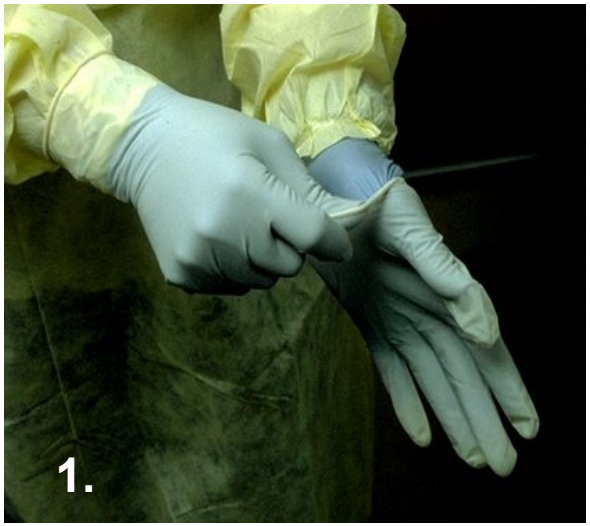
The only adequate disinfectants against TB bacilli are:

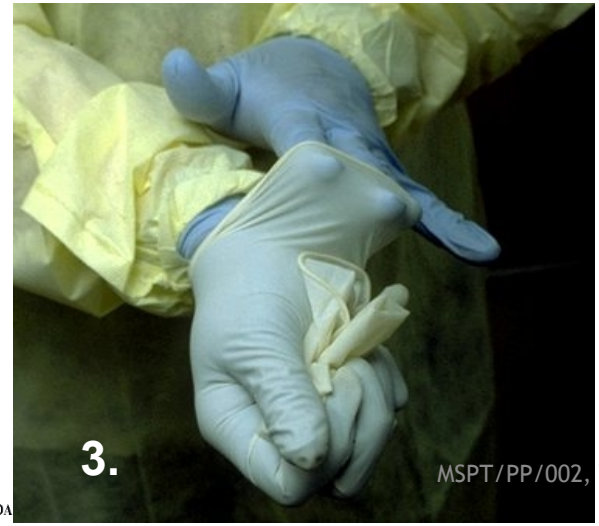
- Phenol, 2–5%: very irritant to skin, use derivatives.
- Hypochlorite (bleach): corrosive to metals.
- Alcohol 70%, no residue, use on skin and work surfaces.
- Iodophores, 3–5%, iodine plus inert polymer.
- Glutaraldehyde, requires an activator, highly

PPE demonstration

- Donning and doffing of PPE
  - Gloves
  - N95 respirator
  - Lab coats/gowns
  - Shoe covers/lab shoes

Example: Doffing Gloves





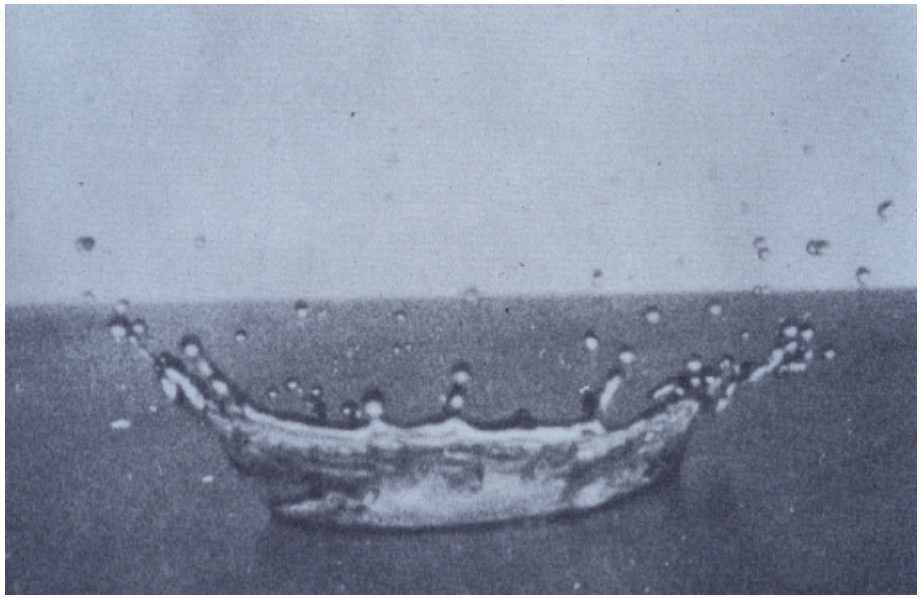
Waste disposal

All infected materials, including closed specimen containers, should be placed in the BSC in autoclavable bags.

All cultures and related materials should be autoclaved.

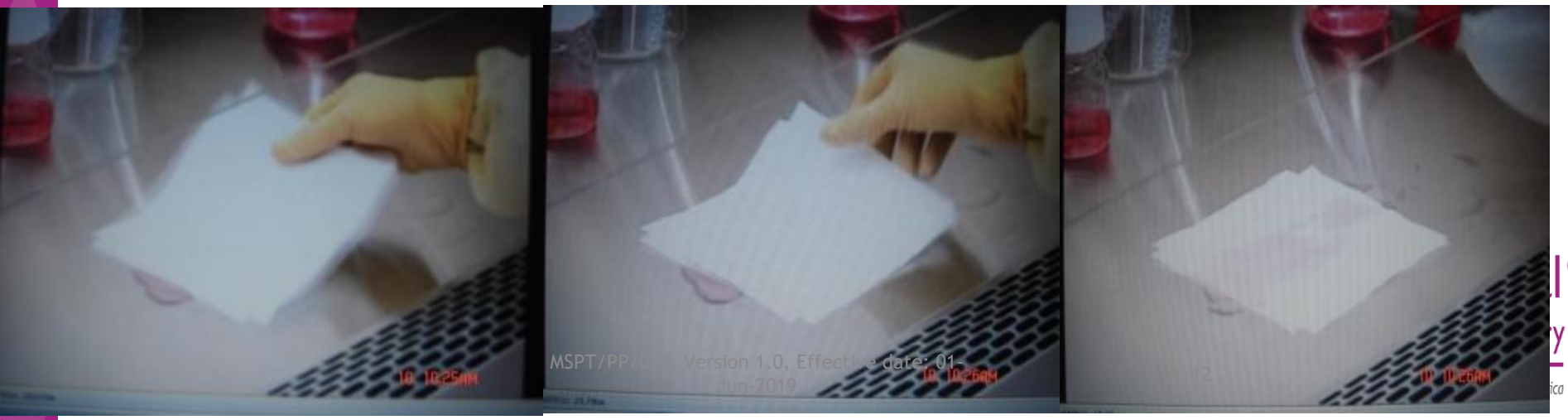
All material handled in the BSC should be considered as infected.

Incident: spill



Spills – what to do

- Cover the spill with absorbent paper towel.
- Pour over disinfectant and leave for at least 2 hours.
- Discard absorbent tissue and all clean-up material in an autoclavable bag and autoclave.



Spill outside the BSC

- EVACUATE the room and stay outside with the door closed for at least 2 hours.
- Using appropriate respiratory protection devices, return to the accident area to clean the spill.
- Cover the spill with paper towel and pour over disinfectant. Leave for at least 2 hours.
- Once disinfection is complete, discard all waste into suitable waste containers and autoclave.

Assessment (True/False)

1. Surgical masks protect you from TB infection.
2. Remove personal protective equipment in the following order:

   respirator/mask

   disposable gloves

   gowns/coats/suits/overalls.
3. In case of spills outside the BSC, you should evacuate the room and stay outside with the door closed for at least 30 minutes.

Summary

- Heat killed specimens pose reduced risk of TB infection in a TB lab.
- Conduct an appropriate risk assessment for TB lab prior to selection of the appropriate PPE.
- Bleach should always be freshly prepared.
- Good lab practice should be maintained at all times

References

- GLI TB training package http://www.stoptb.org/wg/gli/trainingpackages.asp

Acknowledgments

KOFIH
Korea Foundation for International Healthcare
한국국제보건의료재단