

Biosafety Cabinet Certification Program in Ethiopia

Sarah Young¹, Sherrie Staley¹, Mary Ann Sondrini², Robert Jones²

¹Association of Public Health Laboratories, ²Eagleson Institute, ³ Ethiopian Public Health Institute

BACKGROUND

Biosafety cabinets (BSCs) are widely used to provide protection to personnel, the laboratory environment, and work products against possible biohazardous agents. In order for BSCs to function effectively, they require proper installation, maintenance and certification. Many countries, especially in Africa, do not have access or possess the skills to provide the necessary maintenance and certification. In 2016, APHL began collaborating with Eagleson Institute and the Ethiopian Public Health Institute (EPHI) to implement a rigorous three-phase Biosafety Cabinet Certification Program in Ethiopia for biomedical engineers to learn how to inspect, repair, and certify BSCs.

Program Objectives

- ✓ Build capacity at EPHI to maintain and certify BSCs nationwide
- ✓ Improve biosafety practices at EPHI to protect engineers and the lab environment
- ✓ Position EPHI as a regional resource for BSC training, maintenance, and certification

METHODS

The three key areas of this program include education, training, and mentoring. Students learn the many components of certifying BSCs, including how to assess the cabinets and perform the necessary certification tests. This training program ensures that students are able to evaluate BSCs according to both NSF and EN standards. Only NSF has a certification exam for people trained to test BSCs.

For this program, 12 engineers from the Ethiopian Public Health Institute (EPHI) were selected.

Acknowledgements

APHL would like to thank Centers for Disease Control and Prevention, Eagleson Institute, Ethiopian Public Health Institute, and NSF for their assistance and guidance. We are grateful for their time, effort, and expertise which has helped make this program a success.

Phase I: February 1-12, 2016

2 week training which included an introduction to certification, decontamination, lab design, and a one-week hands on workshop

- Students learned how to implement minor corrective actions on 8 cabinets
- Students developed a checklist of tools and materials needed to complete tests
- 18 BSCs were tested



Phase II: December 7-20, 2016

2 week training which focused mainly on decontamination and repair of BSCs

- Students developed SOPs for decontamination
- Students learned how to repair sashes, alarms, HEPA filters, and changing out electrical components
- 21 BSCs were tested



Phase III: July 6-21, 2017

2.5 week training which focused on decontamination, trouble-shooting, and repair

- Only 7 students were recommended to participate in Phase III
- 1 mock and 3 actual decontaminations were performed
- Students developed new label categorization for BSCs
- 27 BSCs were tested
- Physical and written evaluation were conducted at end of the training



NSF Certification Exam

RESULTS

Of the twelve students that began the program, seven students completed all three phases. A total of 100 biosafety cabinets were tested.

After the students completed the program in its entirety, they were able to move toward taking the NSF certification exam for accreditation. In September 2019, four engineers took and passed the NSF 49 basic biosafety cabinet field certifier accreditation exam. This NSF accreditation provides assurance to laboratories around the country that these engineers are capable of certifying BSCs in accordance with the NSF certification process.

FUNDING

This research was supported under Cooperative Agreement# NU2GGH001993 and Cooperative Agreement # NU600E000103-03 between the Association of Public Health Laboratories and Centers for Disease Control and Prevention. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC or the Department of Health and Human Services.

CONCLUSION

There are a limited number of BSC trainings and certification programs available and tailored to developing countries. Routine testing and certification is essential to keep BSCs functioning at the highest level. BSCs are the best protection when working with biohazardous agents, and continued certification and maintenance is critical to ensure that they are working safely and effectively. Assisting developing countries in providing BSC trainings that focus on improving the skills and knowledge required to maintain and certify BSCs is key for developing workforce capacity and sustainability.



Lessons Learned

- ✓ Students must continue to practice testing cabinets between each phase in order to succeed in the program
- ✓ Cooperation of the Ministry of Health is imperative in the success of the program
- ✓ The students and MOH must understand the long term goals of the program
- ✓ A strategic plan must be set up for the country to take over BSC certification from outside contractors