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## Strategies to meet the post-Ebola challenge in Liberia

A Dutch sterilisation technician at work

# Sterilization departments of hospitals in Liberia preparing for post-Ebola challenge

J. Huijs

The year 2014, Liberia, West Africa. The country is confronted with the most deadly disease in recent history: Ebola. The already very fragile economies of the affected countries came to a virtually total collapse. At the time, through the German Red Cross and the Medical Mission Institute in Germany a request was pledged to assist in upgrading the sterilization departments of the JF Kennedy Medical Center and the St. Joseph's Hospital in Monrovia.

## Objectives

- Assisting CSSD's in Ebola-affected Liberia to prepare for the post Ebola period
- Improve knowledge and skills of local staff; both in terms of general concepts of sterile supply, all steps of the supply cycle as well as skills for maintenance and repair of their equipment
- Create awareness of the need of adequate sterile supply at the hospital management level and donor communities
- Create awareness of the heroic efforts of local health staff in dealing with the Ebola crisis

## Method and Results

At the time of the Ebola outbreak the German Red Cross assists the 800 bed national John F Kennedy Medical Centre in Monrovia with the establishment of a triage unit, where all incoming patients are tested on signs of Ebola. The representing officer of the Red Cross was invited to visit the neighboring Japanese-Liberian Friendship Maternity Hospital, attached to the Medical Center. The Maternity Hospital has been established in 1983 with the support of the Japanese International Cooperation Agency JICA. In 2010, through a donation of JICA, the hospital was reequipped. Installation of the equipment was done through UNOPS, the United Nations Office for Project Services. The equipment that was supplied includ-

ed a large new 573 litre autoclave. Installation was done and acceptance tests were started but problems developed with the compressor that is required for operating the machine. At that time the technician installing the equipment fell sick and was repatriated. Since then the autoclave had been standing idle; sterilization for the maternity had to be done in a small basic manual sterilizer in the main hospital. The new machine had never been in production. The Red Cross offered support to get the autoclave running again and contacted the Dutch sterilizer technician Jan Huijs for assistance. An assessment visit took place by October 2014 which confirmed that commissioning the machine was feasible and that there is a desperate need for training on sterile supply in general. At the same time support for upgrading its sterile supply was requested by the neighboring St. Josephs Catholic Hospital where at the time of the Ebola crisis, sterilization was done in a basic 39 litre manual sterilizer on a charcoal fire! For both hospitals the necessary equipment was ordered and in May-June 2015 the hospitals were visited again and the actual repair and installation work was started in close collaboration with the hospital technical teams. A major issue in both facilities was the quality of the water. The inside of the steam generator and water piping was covered with a layer of clay-like particles. Water hardness was sufficiently low; so installing a water filter system was sufficient for protecting the autoclave against sediments and dirt. Electricity supply can be very unreliable with long and short black outs and brown outs. For this a UPS (Uninterruptable Power Supply) was installed and thus protects the electronic control system and prevents failed cycles in case of short power cuts. With the great support of

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” The health services of the Ebola affected countries are in desperate need for assistance



the manufacturer's technical team in Europe all technical issues could be resolved and soon we could run a first cycle! For the performance testing the standard Bowie and Dick textile testpack was used in combination with an EBRO datalogger. The passing of the Bowie and Dick test we celebrated with a delicious ice cold beer in a neighboring bar. Finally all acceptance tests were passed. Training for users and technicians were presented and after four years after its installation, the machine at JF Kennedy Medical centre could be handed over for its first production cycles! In the St. Joseph's Hospital the totally renovated CSSD which included the refurbishing of one of their old sterilizers and installing two new autoclaves; one state of the art machine and a manually operated autoclave which is to provide essential backup service in case of problems with the automatic machines. In addition the department was provided with equipment such as trolleys, packing materials, materials for cleaning and sterilization performance monitoring materials. The CSSD was taken into production together with the reopening of the main operating theatre after being closed during the height of the Ebola crisis.

#### Evening of first production runs of the new autoclave at St. Josephs Hospital

After finishing the installation of the new autoclave at St. Josephs hospital we tested it and started production. One of the staff, Michael, of the operating theatre/sterile services department is on call. I do

**Fig. 1:** 28-11-2014. Back to basics. The sterilization room at St. Joseph's Hospital at the height of the Ebola Crisis in November 2014. The main sterilizers were broken down. Sterilization in a manual, charcoal heated pressure cooker type autoclave. In order to assure proper ventilation and prevent hazards of fire, it is installed in a shed outside the hospital building.

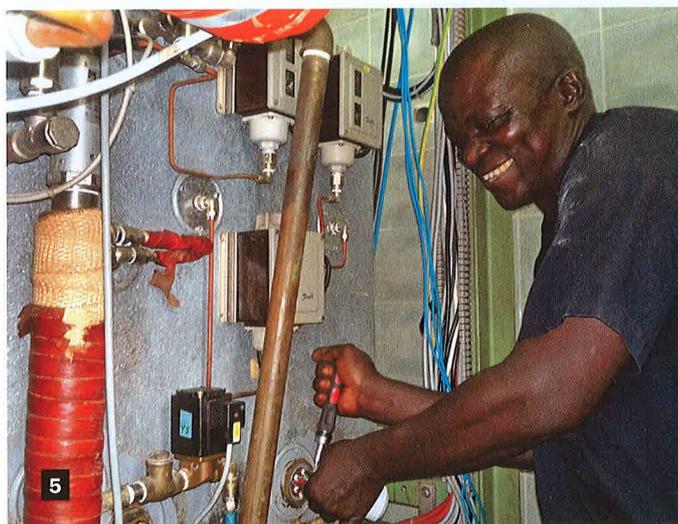
**Fig. 2:** 28-05-2015. The Ebola threat still lurking!. Every morning the at 8am: Taking infectious waste to the incinerator remains a major and also dangerous exercise for the staff.

**Fig. 3:** May 2015. The main operating of the St. Josephs hospital was opened again. During the Ebola crisis any potential contact with bodily fluids is considered yet as high risk; thus operations are done in full PPE

the instructions as to how to operate the autoclave. As we are waiting for the cycle to complete we start talking. He tells about his past. Back into time. The nineties of the past century. The time of James Taylor. The country caught in war. Rebels try to overthrow the government; there are severe clashes between rebels and the government's army. He was 14 years old. His father served in the government's army. The family is on the run. They want to pass the border in order to escape. At the border with Guinea they are caught by the rebels. He, his brothers and sisters, his mother and his father. His father is taken apart. All must be on the scene and watch. They, the children, must sing. While his father's throat is being cut.... My mind tries to comprehend. Total loss of compassion, total brutality. Incomprehensible. The autoclave beeps, indicating that the cycle is finished. I wake up from the dramatic images in my head, that actually have been reality for my colleague standing alongside me.

**Observations and Discussion**

While in the centre of international news, with a wide range of relief organizations on ground, sterile supply departments were found deprived of most essential materials and equipment. Adequate knowledge and awareness of sterile supply at the work floor level as well as hospital management level is desperately needed in order to provide safe sterile products that are needed in virtually each department of the hospitals! Also donor community is to be made convinced of



**Fig. 4:** 25-06-2015. All hands on deck! Arrival of the crate with the new autoclave at the St. Josephs Hospital.

**Fig. 5:** 03-07-2015. Overhauling the 1999-built KSG sterilizer. Training of technical staff remains crucial.

**Fig. 6:** 13-07-2015. After finalizing installations and repairs the staff was trained. With an introduction into physics of steam and the principles of the basic steam sterilizers.





the importance of sterile supply as an essential element for adequate healthcare. After closing of virtually all health facilities during the height of the Ebola crisis the health sector is trying to create new public confidence in its services and more and more patients are coming to the hospitals again.

The CSSD of the Maternity of John F Kennedy Medical Centre and the St. Josephs Hospital are now getting ready to contribute to the new challenges ahead in providing the required health service needed for the people of Liberia, that now slowly but surely are recovering from the time that Ebola crippled country.

### Conclusion

The health services of the Ebola affected countries are in desperate need for assistance in their efforts to recover from the Ebola crisis. Sterile supply has been neglected in the healthcare support programmes. Awareness at the level of the hospital management as well as the donor community of sterile supply needs to be addressed. |

**Fig. 7:** 14-07-2015. After weeks of working on piping, power supply, installing and testing, the staff receives its training on the use of the new autoclave.

**Fig. 8:** 14-07-2015. Quantum leap in sterile supply at St. Joseph's Hospital! Hands-on training: getting to know the operation of the new autoclave.

**Fig. 9:** 16-07-2015. Maternity Hospital of JF Kennedy Medical Centre. Performance testing with ebros temperature pressure data logger:: introduction to the Bowie and Dick test and Process Challenge Device for batch monitoring.