

Project :
**Building national and local capacity for
the treatment of healthcare waste in
countries impacted by the Ebola
epidemic using environmentally friendly
technologies**

De-briefing on the project in Liberia
March 2015



*Empowered lives.
Resilient nations.*

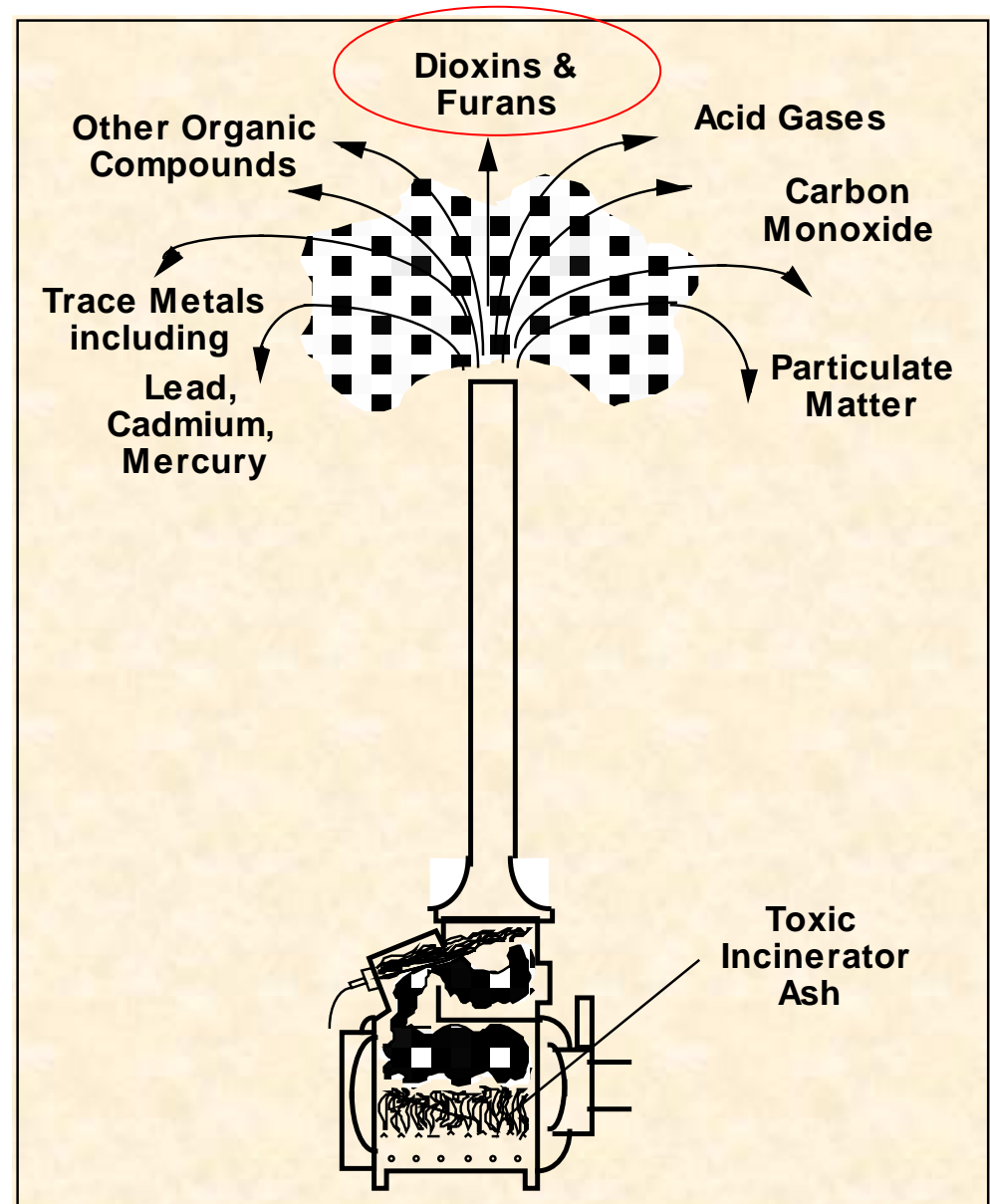
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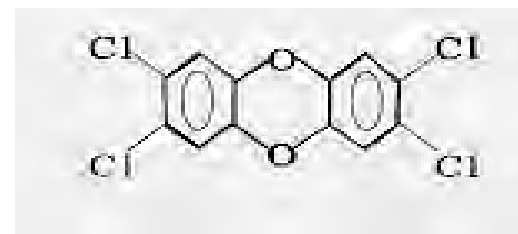
Air Emissions From a Medical Waste Incinerator

Liberia
is a party to the
**Stockholm Convention on
Persistent Organic Pollutants**
which requires the country to
take measures
**to reduce or eliminate the
releases of dioxins**
(Article 5 & Annex C).



What are Dioxins?

- ❖ Among the **most toxic substances** known to science
- ❖ Remain in the environment for **hundreds of years**
- ❖ Enter the body primarily through ingestion of **fish, meat, eggs, milk and other dairy products**



- ❖ Health Effects of dioxins

- Different types of cancers
- Birth defects
- Effects on the learning ability and development of children
- Suppression of the immune system
- Effects on male and female reproductive systems

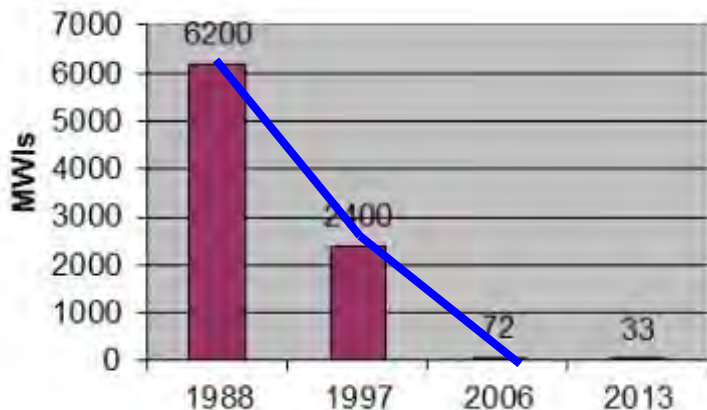


Findings of the WHO Risk Assessment Study

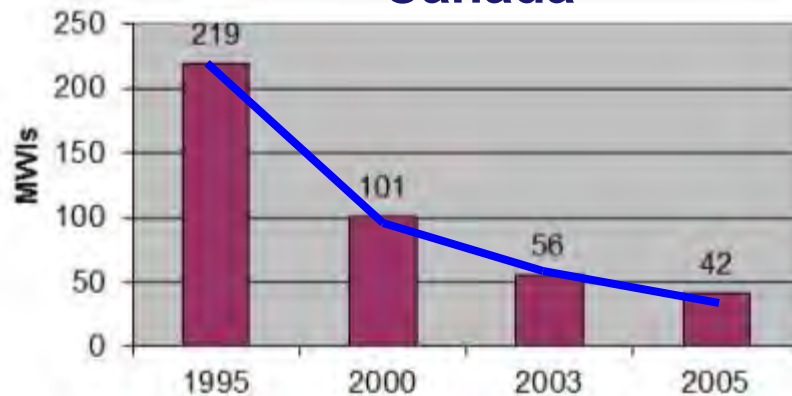
“Assessment of Small-Scale Incinerators for Health Care Waste,” January 2004

◦	Compared to WHO ADI	Compared to EPA Cancer Risk
Worst Case: High Use	unacceptable	unacceptable
Worst Case: Medium	unacceptable	unacceptable
Worst Case: Low Use	unacceptable	unacceptable
Expected: High Use	unacceptable	unacceptable
Expected: Medium Use	unacceptable	unacceptable
Expected: Low Use	Acceptable	unacceptable
Best Practice: High Use	Acceptable	unacceptable
Best Practice: Medium	Acceptable	Acceptable
Best Practice: Low Use	Acceptable	Acceptable

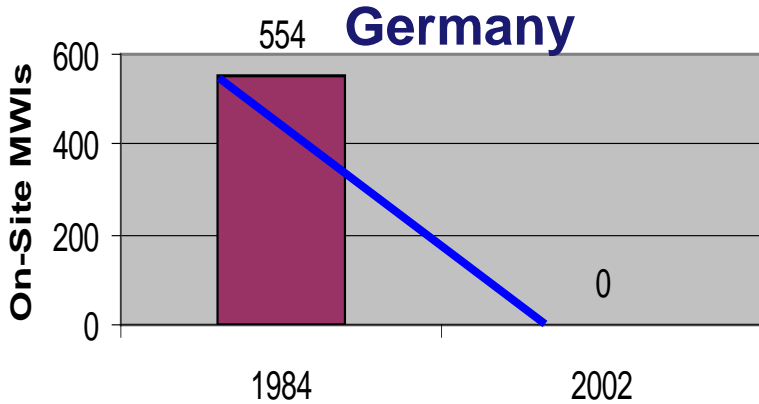
United States



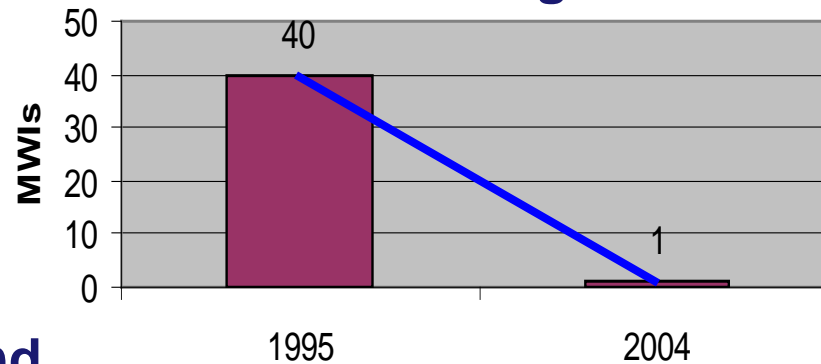
Canada



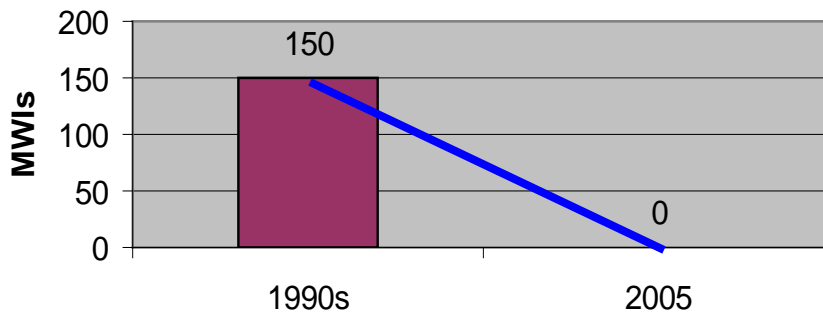
Germany



Portugal



Ireland



Medical Waste Autoclave for Africa

- Developed in collaboration with the UNDP GEF Project for use in Africa
- Based on well-established designs
- Manufactured by Medi-Clave Pty Ltd (Pretoria, South Africa)
- Designed for 150 beds
- Exceeds international STAATT II standard by 10 times
- Medical waste shredder also provided





www.medi-clave.co.za



Place waste inside stainless steel barrel and close the lid



When barrel is full, take to autoclave



Slide barrel into autoclave



Close sliding door



Barrel and trolley are ready to pick up more waste



Unlock & rotate barrel to dump treated waste at the bottom



When finished, open door and remove sterilized barrel



Start heating, multi-vacuum and sterilization cycles

1

2

3

4

8

7

6

5

❖ This project is under UNDP's Ebola Crisis Response and Resilience Programme

- Strengthening essential services in the health sector



❖ Goals:

- To reduce the risk of Ebola contamination in the affected countries
- To enhance resilience in order to manage future outbreaks

❖ Specific Focus:

- To improve the infrastructure and capacity for the treatment of infectious waste using state-of-the-art clean technologies
- To improve infection control, including healthcare waste management practices in healthcare facilities

❖ **Three Outputs**

- 1) **Treatment technologies installed and operational**
- 2) **Staff trained in healthcare waste management**
- 3) **Technologies and approaches integrated into long-term programs, infrastructure, policies and plans**

- 1) Two Waste Treatment Autoclaves Installed and Operational so far
 - o JFK Memorial Hospital, Monrovia



Broken incinerator that does not meet international standards



Infectious waste piled up due to broken incinerators

- 1) Two Waste Treatment Autoclaves Installed and Operational so far
 - o JFK Memorial Hospital, Monrovia



Hospital maintenance technicians trained during the assembly and installation

- 1) Two Waste Treatment Autoclaves Installed and Operational so far
 - o JFK Memorial Hospital, Monrovia



Training of the operators

- ❖ Two Waste Treatment Autoclaves Installed and Operational so far
 - JFK Memorial Hospital, Monrovia



Control wheel, gauges, instructions and front panel



Sterile compact waste mass after treatment; to be collected by NC Sanitary company (except sharps)

- 1) Two Waste Treatment Autoclaves Installed and Operational so far
 - o JFK Memorial Hospital, Monrovia



Completed installation at the back of JFK- Maternity Hospital

- 1) Two Waste Treatment Autoclaves Installed and Operational so far
 - o Jackson F. Doe Hospital, Tappita, Lower Nimba



Chinese incinerator that does not meet international standards (used for sharps)



Open burning for infectious waste and burial pit for regular waste

- 1) Two Waste Treatment Autoclaves Installed and Operational so far
 - o Jackson F. Doe Hospital, Tappita, Lower Nimba



Training maintenance and repair technicians during the installation



Installation completed in 1 day

- 1) Two Waste Treatment Autoclaves Installed and Operational so far
 - o Jackson F. Doe Hospital, Tappita, Lower Nimba



Training operators



Training maintenance & repair technicians

- 1) Two Waste Treatment Autoclaves Installed and Operational so far
 - o Jackson F. Doe Hospital, Tappita, Lower Nimba



Operator in action

1) Two Waste Treatment Autoclaves Installed and Operational so far

- o Jackson F. Doe Hospital, Tappita, Lower Nimba



**Turnover ceremony:
handing over the operating
and maintenance manual**



**1 autoclave, 3 waste barrel trolleys
and 8 reusable sharps containers**



2) Staff trained in healthcare waste management and infection control at the 2 hospitals so far

Five types of training provided:

- **For medical and nursing staff:** WHO guidelines for classification and segregation, general healthcare waste management, and infection control
- **For waste workers, cleaners:** WHO guidelines on collection and transport, general healthcare waste management, and infection control
- **For administrators:** Organizational and institutional measures, assessment tools, roadmap and plans to sustain healthcare waste management
- **For operators:** Practical training on operations
- **For maintenance technicians:** Basic maintenance and repair of the equipment



❖ Waste Management is a whole system not just a technology. It must include ...

Procedures for ...

- Waste Classification
- Waste Segregation
- Waste Minimization
- Use of Proper Containers
- Placement of Containers
- Posters, Signs, Communication
- Color Coding
- Labeling
- Handling
- Transport
- Storage
- Treatment
- Final Disposal
- Contingency Planning



Policies, Administrative Measures Organization

- HCWM subcommittee

- HCWM coordinator

- Integrated into Health and Safety Committee

Situational Analysis, Developing Plans, Roadmap, Grid

Training

- Training of trainers

- Periodic, multi-level training

System of Monitoring, Evaluation and Continuous Improvement

- Incentives

- Enforcement

Human & Financial Resources

- ### 3) Technologies and approaches integrated into long-term programs, infrastructure, policies and plans
- Training provided to the Environmental & Occupational Health Division of the Ministry of Health
 - Support to UNICEF on their assistance to MOH on national policies and plans
 - Presentation to Dr. Bernice Dahn, Chief Medical Officer
 - Presentation to and collaboration with IMS and IMS WASH team
 - Presentation at Monrovia City Council's Medical Waste Management System for Ebola Response Committee
 - Greater collaboration with WHO WASH Liberia and WHO WASH regional
 - Initial collaboration with Accel on infection control training in Nimba

- ❖ The Ebola crisis highlighted the weakness in healthcare waste management (HCWM) and infection control and prevention (IPC) in the three countries. The crisis is an opportunity to raise the level of HCWM and IPC nationwide.
- ❖ In the framework of the recovery period, the future HCWM and IPC program should benefit from the gains of the UNDP Project.
- ❖ The installation of state-of-the-art waste treatment autoclaves and training in HCWM and IPC will enhance the resiliency of the countries to future outbreaks