

# **Update:** Tool for Waste Management Considerations for Viral Load and Early Infant Diagnosis (EID) Testing Laboratories and Associated Healthcare Facilities

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# Session overview

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- Background
- Purpose and intended use of the waste management tool
- Inputs to the tool
- Some specific updates to the five sections of the waste management tool
- Summary

# Background

**The President's Emergency Plan for AIDS Relief (PEPFAR) supports viral load (VL) scale-up in over 40 countries**

**By 2020, more than 30 million HIV VL tests will be performed globally<sup>1</sup>**

**Estimated 924,000 L of effluent chemical waste and 2,102,100 kg of solid waste will be produced annually**

**Facilities conducting majority of VL testing are often located in low-to middle income countries (LMIC) with limited infrastructure and little to no existing waste management policies and practices**

**Improper management of this waste could pose a significant threat to the public health and environment**

**HIV VL molecular diagnostic testing produces potentially hazardous chemical waste, containing Guanidinium Thiocyanate (GTC)**



<sup>1</sup> Habiyambere V, Dongmo Nguimfack B, Vojnov L, Ford N, Stover J, Hasek L, et al. (2018) Forecasting the global demand for HIV monitoring and diagnostic tests: A 2016-2021 analysis. PLoS ONE 13(9): e0201341. <https://doi.org/10.1371/journal.pone.0201341>

# Purpose of the Waste Management Tool

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The purpose of this tool is to assist in **creating awareness** of best practices and **identifying gaps** for waste management processes in HIV molecular testing laboratories and associated healthcare facilities.

CDC is not requesting or requiring any data or follow up with the use of this tool

# Input to the tool

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- The Clinton Health Access Initiative (CHAI)
- The Global Fund (GF)
- The Elizabeth Glaser Pediatric AIDS Foundation (EGPAF)
- Doctors without Borders/Médecins Sans Frontières (MSF)
- Integrated Diagnostics Consortium (IDC)
- Dx Platform Manufacturers
- African Society for Laboratory Medicine (ASLM)
- ASLM WM LabCOP members
- Country input (Malawi, Ethiopia, Kenya, Zimbabwe & Eswatini)
- International Laboratory Branch (ILB)

# Input considerations and suggestions

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- VL/EID waste management has to be embedded in a system approach that addresses health care waste in general
- Processing, transport and safety of health care waste are integral parts of a waste management system that should be considered all the way through
- Add follow up questions on incinerator capacity in the country -- to better understand if there is sufficient capacity or any gaps regarding the expected need
- There were a number of important technical contributions, some of which were incorporated, and for the others, we felt its best they are addressed in an upcoming ECHO session
  - Considerations for storage – protected from the environment, sufficient size, securable
  - Consideration for different types of incineration, e.g., “Open” versus “High Temp”
  - Waste transport issues – options, legal issues, training
- Point of Care (POC) waste handling

# Changes to the tool

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- Corrections of typographical errors
- Corrections of ambiguous references and terminology
- Arranged questions to be more logical and follow from previously asked
- Improvements to questions for clarity and readability
- Questions increased to 55, with new category added

# Completing the Tool

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- This tool is for completion by **Site Managers** or **Safety Officers** for making decisions on how the assessed site can develop and implement best practices for their location.
- 1. Fill in a copy of the tool for **each** testing laboratory or testing facility (for point-of-care and/or near-point-of-care).
- 2. List and fill data for all HIV viral load and early infant diagnosis (EID) testing laboratories and associated healthcare facilities in your country, including all PEPFAR-supported and non-PEPFAR-supported sites.
- 3. The tool is divided into the following **six** sub-sections:
  - **i. WASTE MANAGEMENT STANDARD OPERATING PROCEDURES (SOPS), POLICIES & PRACTICES**
  - **ii. SAFETY TRAINING**
  - **iii. SAFETY PRACTICES**
  - **iv. HIV/TB MOLECULAR TESTING INSTRUMENTS**
  - **v. HIV/TB MOLECULAR TESTING INSTRUMENT WASTE**
  - **vi. AVAILABILITY OF WASTE MANAGEMENT OPTIONS**

# Completing the Tool

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- 4. Select **YES**, if the entire question is fulfilled at the site.
- 5. Select **NO**, if none of the question is fulfilled at the site.
- 6. Select **PARTIAL**, if part of the practices are in place, *e.g.*, if practices are in place but not documented, or if practices are not followed, despite procedures being in place.
- 7. **Add** notes explaining any responses or additional useful information in the comments section at the end of each question.
- 8. Use the summary section to **summarize** findings from each the six sub-sections of this tool
- 9. Overall summary: recommendations and/or action items

# Completing the Tool

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## FACILITY INFORMATION

Name of Facility: \_\_\_\_\_

Type of Facility *(for example - regional referral hospital, health center, laboratory, ART clinic):*

\_\_\_\_\_

Facility Address: \_\_\_\_\_

\_\_\_\_\_

Assessor (Name of person filling out checklist): \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_

# 1. Waste Management SOPs, Policies & Practices

1. WASTE MANAGEMENT POLICIES, SOPS, & PRACTICES AT THE FACILITY LEVEL		YES	PARTIAL	NO	COMMENTS
1	Is a National (country) waste management policy, legislation, or a guideline in place and enforced?				
2	Is a Facility health care waste management policy, legislation or guideline in place and enforced? <i>If so, is there a dedicated manager or responsible person/agency for health care waste management in the facility - put answer in comments</i>				
3	If a waste management procedure is in place, is it followed and enforced?				
4	Is there an SOP for the disposal of infectious waste?				
5	Is there an SOP for the disposal of non-infectious waste?				
6	Is there an SOP for the disposal of chemical waste?				
7	Is there an SOP for the use of an on-site incinerator (where an incinerator exists)?				
8	Is there an SOP for the use of an on-site autoclave (where an autoclave exists)?				
9	Is there an SOP for managing accidental spills?				
10	Is there an SOP for tracking the amount of waste collected, treated and/or finally destroyed at the facility?				
11	Are SOPs regularly reviewed and updated?				

**SUMMARY:**

# 2. Safety Training

2. SAFETY TRAINING		YES	PARTIAL	NO	COMMENTS
12	Have all personnel performing HIV molecular testing at the facilities received blood borne pathogen and/or sharps management safety training?				
13	Have all personnel performing HIV/TB molecular testing at the facilities received training on managing healthcare-associated and chemical wastes?				
14	<p>Did this training include:</p> <ul style="list-style-type: none"> <li>a. Types of healthcare-associated waste and how to properly identify and segregate waste for treatment and/or final disposal?</li> <li>b. Hazards associated with Healthcare-associated waste?</li> <li>c. What is infectious and non-infectious waste?</li> <li>d. The segregation of infectious and non-infectious waste?</li> <li>e. How and where different waste types are collected and stored at the facility?</li> <li>f. Disposal of infectious solid waste and sharps</li> <li>g. Chemical waste disposal procedures?               <ul style="list-style-type: none"> <li>i. What is considered chemical waste?</li> <li>ii. Compatibility of different chemical waste streams generated at the site?</li> <li>iii. Handling and disposing of solid waste versus liquid waste?</li> </ul> </li> <li>h. Appropriate waste containers for collection and storage of waste?</li> <li>i. Labeling of waste containers to list the contents of the waste?</li> <li>j. Ensuring waste containers are leak-proof and kept closed?</li> <li>k. Location and use of chemical spill kit?</li> <li>l. Location of Chemical Hygiene Plan and laboratory waste guidance?</li> </ul>				
15	Are janitorial staff that collect healthcare-associated and chemical waste from the facilities trained in biosafety and the use of appropriate personal protective equipment (PPE)?				
16	Is all training documented and are records maintained in the employee folder/binder?				
17	Is an annual safety refresher training provided and documented for each employee?				

**SUMMARY:**

# 3. Safety Practices

3. SAFETY PRACTICES		YES	PARTIAL	NO	COMMENTS
18	Are liquid waste and solid waste segregated in laboratories/testing facilities?				
19	Is there a Bio-Safety Manual or guideline in laboratories/testing facilities?				
20	Is there a biological spill kit and associated SOP?				
21	Is there a chemical spill kit and associated SOP?				
22	Is there a chemical hygiene plan?				
23	Is there a chemical inventory? If yes, is it regularly reviewed and updated?				
24	Are current Safety Data Sheets (SDS) available for the chemicals and reagents used at the site?				
25	Is liquid waste stored and collected in labelled puncture-proof, sealed leak proof containers?				
26	Are liquid waste containers stored in a secondary container to prevent leakage due to primary container damage or accidental overfilling?				
27	Is solid waste collected and stored in appropriate and labeled containers?				
28	Are waste containers labeled correctly to facilitate appropriate waste segregation?				
29	Does the facility/lab follow a color-coded waste container to classify waste according to national policy, if any? If yes, what color coding is in use? For example: black= non-infectious waste, yellow= infectious medical waste, red= highly infectious waste and brown= chemical waste. Enter response in comments				
30	Once the solid and liquid waste containers are full, are those containers brought to a secure central location for transport or off-site destruction?				
31	Is accumulated waste transported to a separate facility; <i>(check each box that applies)</i> a. on-site? <input type="checkbox"/> b. off-site? <input type="checkbox"/>				
32	Are areas where liquid and solid waste is generated and stored: a. Organized to handle both chemical and biological waste? b. Non-porous and durable for disinfection practices in case of a spill? c. Are designated waste handling areas access controlled?				
33	Is there a system /process in place for reporting incident and accidents including documentation?				
34	Have all personnel performing HIV/TB molecular testing at the facilities been vaccinated against hepatitis B? If yes, have they completed all the required doses and their vaccination records updated?				

**SUMMARY:**

# 4. HIV Molecular Testing Instruments

4.	HIV MOLECULAR TESTING INSTRUMENTS	RESPONSE	COMMENTS
35	What conventional high-throughput testing platforms are used at this facility, if any? <i>(check all boxes that apply)</i>	<input type="checkbox"/> Abbott m2000SP/RT <input type="checkbox"/> Roche CAP/CTM 48/96 <input type="checkbox"/> Roche 4800 <input type="checkbox"/> Roche 6800/8800 <input type="checkbox"/> Biomerieux NucliSENS <input type="checkbox"/> Hologic Panther Aptima <input type="checkbox"/> Others, specify _____	
36	What point-of-care, or near-point-of-care HIV/TB molecular testing instruments are used at this facility, if any? <i>(check all boxes that apply)</i>	<input type="checkbox"/> Cepheid GeneXpert <input type="checkbox"/> Abbott m-Pima <input type="checkbox"/> RDW Samba I or II <input type="checkbox"/> Others, specify _____	
37	Where is the point-of-care, or near-point-of-care-HIV/TB testing instrument(s) located? <i>At a laboratory, or healthcare testing facility/clinic for example.</i>		
38	What is the volume of testing on each platform, or instrument per <u>month</u> at each of the testing facilities? <i>(From this we can estimate the amount of liquid and solid waste generated by each testing platform and laboratory on a monthly and annual basis.)</i>		
39	Are there obsolete testing platforms or instrumentation at testing facilities? If so, how many and what type of instruments? Is there a procedure in place for the decontamination, removal and disposal of such instruments?		
40	Is there a SOP for handling expired viral load/EID/TB instrument reagents and consumables? Is this SOP followed and enforced?		

**SUMMARY:**

# 5. HIV Molecular Testing Instrument Waste

5.	HIV MOLECULAR TESTING INSTRUMENT WASTE	YES	PARTIAL	NO	COMMENTS
41	Is biohazardous/infectious waste separated from non-infectious waste in laboratories/testing facilities (at the point of generation)?				
42	<p>What method of <b>solid</b> viral load/EID/TB associated waste disposal is currently in use at each testing laboratory or point-of-care facility? (<i>check all boxes that apply</i>)</p> <p>a. Transportation for disposal off-site?</p> <p>    i. Off-site incineration?</p> <p>    ii. Off-site autoclaving?</p> <p>    iii. Off-site open burning?</p> <p>    iv. Off-site landfill?</p> <p>    v. Off-site encapsulation?</p> <p>b. On-site open incineration?</p> <p>c. On-site autoclaving?</p> <p>    i. How are pre-treated waste being disposed? (<i>check all boxes that apply</i>)</p> <p>        landfill/burial pit <input type="checkbox"/></p> <p>        encapsulation <input type="checkbox"/></p> <p>        others, specify <input type="checkbox"/> _____</p> <p>d. On-site open burning?</p> <p>e. Other methods, please specify: _____</p>				
43	<p>How is <b>liquid</b> chemical waste currently disposed in laboratories using conventional viral load/EID testing platforms?</p> <p>a. Transportation for disposal off-site?</p> <p>    i. Off-site incineration?</p> <p>    ii. Off-site autoclaving?</p> <p>    iii. Off-site open burning?</p>				

# 5. HIV Molecular Testing Instrument Waste cont.

44	<p>Are <b>autoclaves</b>:</p> <ul style="list-style-type: none"> <li>a. Regularly serviced and records maintained?</li> <li>b. Is preventative maintenance performed and documented?</li> <li>c. Under service contracts?</li> <li>d. Operated by trained staff?</li> <li>e. Operated by staff trained in proper biosafety procedures?</li> </ul>				
45	<ul style="list-style-type: none"> <li>a. Are <b>incinerators</b>: Regularly serviced and records maintained?</li> <li>b. Is preventative maintenance performed and documented?</li> <li>c. Under service contracts?</li> <li>d. Operated by trained staff?</li> <li>e. Operated by staff trained in proper biosafety procedures?</li> </ul>				
46	Is liquid waste combined from multiple instruments or other waste streams/processes at the testing laboratory/facility? If yes, mention which ones in the comments column.				
47	<p>If liquid waste is being poured down a sink;</p> <ul style="list-style-type: none"> <li>a. Is there an SOP that is followed?</li> <li>b. Is the SDS for specific chemical disposal mechanism followed?</li> <li>c. Are Laboratory sinks equipped with chemical dilution traps?</li> <li>d. Is there a scheduled chemical granules replacement and/or as prescribed by the manufacturer?</li> </ul>				
48	Does the run-off from the sink go directly into the sewer system?				
49	Does the waste from the sink accumulate with other waste streams from the same testing facility (e.g. if the laboratory shares waste water systems with a large hospital?)				
50	Is bleach mixed with all liquid waste? Is there an SOP for the chemical disinfection of waste?				

# 6. Availability of Waste Management Options

6. AVAILABILITY OF WASTE MANAGEMENT OPTIONS		YES	PARTIAL	NO	COMMENTS
51	Are there any <b>licensed</b> waste management companies currently operating in your country?				
52	Are there any <b>licensed</b> waste management companies outside of your country that are currently contracted to transport and dispose of waste, either within your country or outside of your country?				
53	Are there managed landfill sites in proximity to the facility/sites? If so, are the landfill sites owned and operated by the government or private businesses?				
54	<p>Are there incinerators in country?</p> <p>a. Do you have access to an incinerator? If yes;</p> <p>b. Is it equipped with a primary chamber?</p> <p>c. Is it equipped with a secondary chamber?</p> <p>d. Do the primary and secondary chambers reach required operational temperatures?</p> <p>e. Does the incinerator have gas filtration chambers before exhaustion to the environment?</p> <p>f. Are incinerator gas emissions monitored and tested as part of maintenance and certification to ensure compliance with environmental safety regulations?</p>				
55	Are there any in-country partners that can help with waste management or that may be already focusing efforts on addressing country needs?				

**SUMMARY:**

# 7. Follow up and Action Items

## SUMMARY OF ACTION ITEMS (If applicable)

KEY FOLLOW UP ACTION	RESPONSIBLE PERSON/ENTITY	SUGGESTED TIMELINE

# Summary

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- This is intended to be a tool to determine your facility/country WM situation
- This waste management tool is still in **DRAFT** format
- We would like to hear your thoughts, comments and suggestions on the functionality of this tool
- We'd like feedback on usefulness of the tool; improvements
- Consideration for electronically fillable form that could be used with tablet and/or phone

Questions?