Managing Insecticide-treated nets (ITNs) Waste from Public Health Campaigns

Managing Insecticide-treated nets (ITNs) Waste from Public Health Campaigns

An Overview

While the ITN campaigns aim to enhance Public Health, it is imperative to prioritise the safe management and treatment of the waste they generate. Proper waste management is essential for campaigns like ITN distribution and immunisation efforts to mitigate health risks and environmental pollution. The waste stemming from most health campaigns comprises plastics, used ITNs, syringes, chemicals (piperonyl butoxide), pharmaceuticals, vials, and packaging from healthcare activities. Responsible disposal of these items is critical to prevent harm. In particular, the distribution of insecticide-treated nets (more than 190 million ITNs were distributed globally in 2022 alone) generates significant plastic waste, which, if not managed correctly, can contaminate air and water sources when burned or buried by households. Alternatively, campaign personnel can collect and transport the waste to recycling facilities, requiring substantial resources. Collaboration with recycling companies can mitigate these risks by repurposing the plastic into raw materials for local production, contributing to environmental sustainability and the economy.

Operationalizing Waste Management from Health Campaigns

Waste management is a multifaceted process encompassing various stages, including waste generation, segregation, collection, transportation, treatment, and disposal. Enhancing visibility and simplifying operations in medical waste management is key. Introducing a digital platform streamlines operations by allowing participants to record daily waste transactions, perform waste management tasks, and access crucial information for strategic planning.
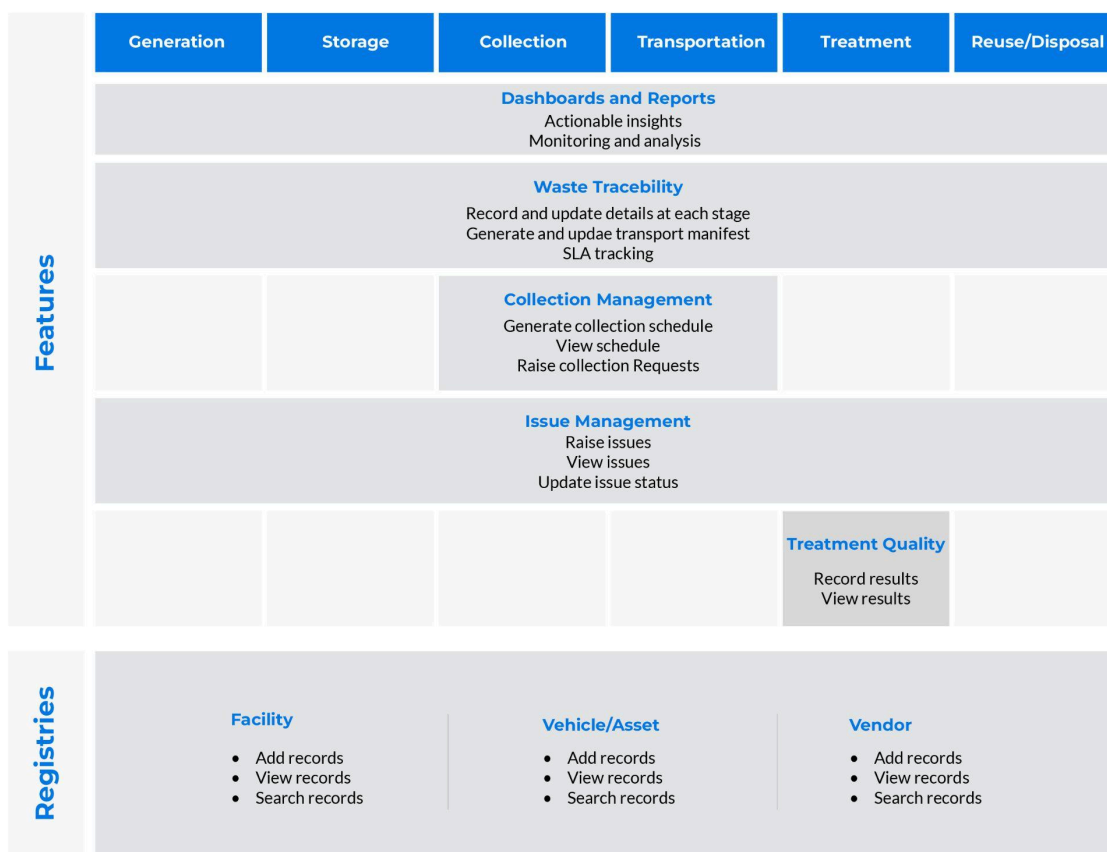
A way to look at it is reverse logistics of the health campaign distribution system.

1. Reusing existing infra and personnel available for waste collection and transportation
2. Create registries
   a. Identify existing vehicles used for campaign purposes with potential reusability for waste transportation or new vehicles.
   b. Create a registry of Treatment Centres/Recycling Facilities for various kinds of waste and their quality. This can be overtime enhanced through each waste campaign to reach an exhaustive list and reduce effort for data collection.
3. Collect waste, segregate it, and tag it for efficient tracking
4. Transport waste to recycling and treatment centres

Pivotal Challenges	Addressing Pivotal Problems
Broken chain of custody from waste generation to safe disposal	The product will streamline operations by recording actions and transitions between stakeholders, tracking waste movement in real time, and ensuring a transparent and auditable waste disposal record.
Lack of transparency and coordination between actors	The product offers real-time access and action capabilities. Waste transporters and treatment facilities can view pickup requests and waste status, while healthcare facilities can track waste progress from generation to disposal. Integration with existing digital systems reduces data entry duplication and improves visibility.
Lack of a single version of aggregated data, across stakeholders	The product serves as a centralised hub for all medical waste data, ensuring consistency across government departments as a single source of truth.
Insufficient infrastructure	The product will assess current waste management infrastructure use and aid future planning by predicting waste generation and infrastructure needs, improving planning.
Inadequate recycling of Waste	The product standardizes waste classification, improves segregation, and includes a reporting feature to address issues with segregation.
Limited awareness and training	The product provides a guided workflow to prevent user errors and generates alerts to address any disposal process discrepancies promptly, ensuring timely corrections.

Digitalization of Medical Waste Management: A Product Approach

The sequence of waste management stages can differ based on a nation's infrastructure and policies, yet generally encompassing these steps, highlighting key product features aligned with each stage.

Generation	Storage	Collection	Transportation	Treatment	Reuse/Disposal

Features

Dashboards and Reports
Actionable insights
Monitoring and analysis

Waste Tracebility
Record and update details at each stage
Generate and updae transport manifest
SLA tracking

Collection Management
Generate collection schedule
View schedule
Raise collection Requests

Issue Management
Raise issues
View issues
Update issue status

Treatment Quality
Record results
View results

Registries

Facility
- Add records
- View records
- Search records

Vehicle/Asset
- Add records
- View records
- Search records

Vendor
- Add records
- View records
- Search records

Key Product Features mapped to the stages of waste management

DIGIT can play a significant role in addressing the bednet waste problem in Africa by providing a structured approach to managing the entire lifecycle of insecticide-treated nets (ITNs).

1. **Data Management:** It can serve as a centralised repository tracking ITN distribution to disposal and reuse/recycle. By recording data on distributed nets, their expected lifespan, and locations, stakeholders can improve disposal management and replacement planning.

2. **Supply Chain Management:** Facilitating coordination and communication among stakeholders, including manufacturers, distributors, healthcare facilities, and waste management providers, will ensure that ITNs are collected, transported, and disposed of in a timely and efficient manner.

3. **Traceability and Accountability:** Provide transparency and traceability throughout the ITNs waste management process. By tracking each net's journey from distribution to disposal, stakeholders can identify any gaps or inefficiencies in the system and hold responsible parties accountable for proper disposal practices.

4. **Public Awareness and Education:** Just as with medical waste, public awareness and education are crucial for promoting proper disposal practices for ITNs. A platform can serve as a hub for information and resources related to ITNs waste management,

providing guidance on how to safely dispose of nets and raising awareness about the importance of proper disposal in preventing environmental pollution and health hazards.

5. **Infrastructure Development:** In many regions, particularly in low-resource settings, infrastructure for waste management may be inadequate. A platform approach can help identify gaps in infrastructure and support efforts to develop and improve waste management facilities and systems, ensuring that ITNs are disposed of safely and responsibly.

Co-creating a practice – Indonesia's Medical Waste Management

Utilising the above platform approach, UNDP Indonesia and eGov Foundation have collaborated address Indonesia's infectious medical waste challenge. Utilising eGov's DIGIT platform, this partnership aims to extend digitization efforts to manage waste streams across 13,000 health facilities nationwide. While hospitals and community health centres (puskesmas) prioritise trash segregation and packing to protect sanitation personnel, challenges arise during transportation, with shredded and broken packing compromising safety precautions. Despite refined waste segregation practices observed at community health centres, inefficiencies persist in waste management routes. An unregulated transportation system exacerbates these challenges, emphasising the need for a more efficient and controlled waste management system. The ME SMILE app, developed by UNDP for Indonesia's Ministry of Health, tracks medical waste from source to collection, while eGov's DIGIT Sanitation DPG, originally built for waste traceability, aims to integrate with ME SMILE for comprehensive tracking throughout the waste lifecycle.