Master of Public Health

Master de Santé Publique

Balancing speed and sustainability

Humanitarian perspectives on the role of Emergency Health Kits in medical waste generation

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Acknowledgements

I would like to express my deepest gratitude to my professional advisors, Osama and Mouna, for their guidance, unwavering support, and expert perspectives throughout the entire process of this thesis.

I am sincerely grateful to Julien Mousquès, my academic advisor, for his invaluable advice and assistance, and to Odessa for her insightful contributions.

My heartfelt thanks also go to my colleagues at the French Red Cross, who generously shared their experience and knowledge with me, particularly Benjamin, whose support was essential in both the writing and the conceptual development of this work.

I wish to extend my gratitude to the participants of this research, who took the time to share their diverse and meaningful experiences.

I also warmly thank my husband for his constant encouragement (and for preparing delicious meals while I dedicated long hours to this thesis), as well as my dear sister and my dear friend Mariama for patiently listening to my complaints.

Finally, to my parents, without whom I wouldn’t have come this far.

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List of acronyms

AIDS: Acquired Immunodeficiency Syndrome

CAR: Central African Republic

CSR: Corporate Social Responsibility

DRC: Democratic Republic of Congo

EHK: Emergency Health Kit

GBV: Gender Based Violence

HIV: Human Immunodeficiency Virus

ICRC: International Committee of the Red Cross

IEHK: Interagency Emergency Health Kits

MDM: Médecin du Monde

MSF: Médecins sans frontières

NCDs: Non Communicable Diseases

NGO: Non-Governmental Organization

PEP: post exposure prophylaxis

RCRC: Red Cross and Red Crescent movement

UNFPA: United Nations Population Fund

UNICEF: United Nations International Children's Emergency Fund

WASH: Water Sanitation Hygiene

WHO: World Health Organization

Abstract

Background: Standardized Emergency Health Kits (EHKs), such as the WHO Interagency Emergency Health Kit, are central to humanitarian health responses, enabling rapid access to essential medicines and supplies. However, their standardized composition and rigid procurement systems may contribute to medical waste (through unused items, packaging, and expired products) raising environmental, ethical, and logistical concerns.

Objective: This study examined humanitarian actors' perceptions of how EHKs contribute to medical waste in emergency contexts, focusing on kit composition, utilization, and related logistical practices.

Methods: A qualitative approach was adopted, using semi-structured interviews and written questionnaires with 16 humanitarian professionals, including pharmacists, physicians, nurses, logisticians, and WASH experts. Participants were purposively selected for their direct experience with EHKs in acute emergencies. Data were analyzed thematically following Braun and Clarke's framework.

Results: Five themes emerged: (1) Adaptability and structural limits, kits provide an essential baseline but often require supplementation and may contain items systematically unused; (2) Logistical and organizational constraints, storage challenges, weak stock management tools, turnover, and unclear responsibilities increase waste risks; (3) Medical waste management and perceptions, practices vary widely, with limited resources, traceability, and integration into operational priorities; (4) Prioritization in emergencies, waste management is deprioritized in favor of rapid care delivery; and (5) Areas for improvement, greater coordination, flexible resupply, better training, and digital tracking were recommended. Waste was often seen as inevitable, yet its scale and impact were underestimated and under-documented.

Conclusion: EHKs remain indispensable for rapid health interventions, but their current design and deployment can unintentionally generate avoidable waste. Integrating waste prevention and management into kit design, procurement, and operations is essential.

Public health implications: Poorly managed medical waste can harm the environment, endanger public health, and erode trust in humanitarian actors. More adaptable supply models, stronger data systems, and enhanced training could foster environmentally responsible responses without compromising care quality or speed.

Keywords: humanitarian health, emergency health kits, medical waste, logistics, sustainability, qualitative research

I. Introduction

In recent years, the scale and frequency of humanitarian crises have reached unprecedented levels. In 2023 alone, approximately 363 million people required humanitarian assistance worldwide, underscoring the immense challenge of addressing health needs in emergency settings.(1) Whether driven by conflict or natural disasters, these crises place affected populations at heightened risk, disrupting access to care and exacerbating pre-existing vulnerabilities.

When the scale of the crisis is overwhelming for local authorities, they may request support from the international community, including actors like the Red Cross and Red Crescent International Movement (RCRC), to re-establish essential healthcare services for the most affected populations, including Sexual and Reproductive Health, care for Communicable and Non Communicable Diseases. This support often takes the form of surge capacity for a defined period, until domestic healthcare services are restored. In acute emergency settings, ensuring access to safe, effective, and affordable medicines and vaccines is essential, not only to prevent the spread of communicable diseases, but also to reduce complications in patients with chronic conditions.(2) However, the delivery of these services in humanitarian contexts depends heavily on efficient and well-coordinated logistics.

Logistical operations in emergencies are inherently complex. They are shaped by urgency, geographical constraints, a lack of precise knowledge about local needs and capacities, and rapidly evolving contexts. In such high-pressure environments, issues of sustainability, particularly around medical waste management, are often not a priority or entirely overlooked.(3) Yet humanitarian operations must strike a balance between responding to immediate needs and supporting the long-term recovery and resilience of affected communities. Ignoring sustainability concerns, such as waste management, can weaken both health outcomes and the trust of local populations in humanitarian actors.(4) Moreover, unmanaged medical waste can pose significant public health and environmental threats. Unused or expired medications may enter black markets, contributing to drug misuse or the emergence of multi-resistant bacteria. Improper disposal can lead to soil and water contamination, harming ecosystems and facilitating the spread of disease. In the end, it can endanger the very communities it was meant to protect.(3)

During emergencies, international actors, including the RCRC Movement, often rely on Emergency Health Kits (EHKs), standardized and predefined packages of medicines and medical supplies designed for rapid deployment based on pre-set criteria and scenarios.

Although the literature on medical supply chains in humanitarian settings is growing, the specific link between Emergency Health Kits (EHKs) and the generation of medical waste has

received little attention. Some publications, suggest that these kits may contribute to waste production.(3,5) However, this remains a largely underexplored area, with limited research directly assessing the extent and mechanisms of this contribution. Possible sources of waste include the way kits are designed and composed, their imperfect alignment with actual needs in the field, and recurring difficulties in stock management.(3)

Thus, this thesis aims to explore a dimension of humanitarian medical operations that is often overlooked: the potential contribution of EHKs to the generation of medical waste in emergency contexts. While these kits are essential tools for rapid deployment and access to care, their design, use, and management may not always align with the specific needs of the field, potentially leading to unnecessary waste and sustainability concerns.

The central research question of this thesis is therefore: How do humanitarian actors perceive the contribution of EHKs to the production of medical waste in humanitarian contexts, particularly in relation to their composition, utilization, and associated logistical practices?

To address this question, the study adopts a qualitative research approach, with data gathered through semi-structured interviews conducted with professionals involved in humanitarian health logistics and field operations.

A) Background & Context

a. Humanitarian waste in emergency settings: definition, risks, current practices

Medical waste, as defined by the International Committee of the Red Cross (ICRC), encompasses all waste generated through health care and diagnostic activities. While 75% to 90% of hospital waste is similar in composition to ordinary household waste and can be treated through standard municipal systems, the remaining 10% to 25% is classified as hazardous or special medical waste. This portion requires specific handling due to the health and environmental risks it poses.(6)

Hazardous medical waste is typically divided into several risk-based categories (see *Table 1*), and can affect a broad spectrum of individuals, including healthcare workers, technical personnel, waste handlers, and the general public. The associated risks include physical trauma, infections, chemical toxicity, fire or explosion hazards, and pollution. Biological contaminants present in such waste can cause gastrointestinal or respiratory infections, hepatitis, and other transmissible diseases. Many of the chemicals and pharmaceuticals used in health care are toxic or corrosive, and their improper incineration or disposal can release persistent pollutants, contaminating soil and water, and potentially entering the food chain.(6)

1.	Sharps	→ Waste entailing risk of injury.
2.	a. Waste entailing risk of contamination	→ Waste containing blood, secretions or excreta entailing a risk of contamination.
	b. Anatomical waste	→ Body parts, tissue entailing a risk of contamination
	c. Infectious waste	→ Waste containing large quantities of material, substances or cultures entailing the risk of propagating infectious agents (cultures of infectious agents, waste from infectious patients placed in isolation wards).
3.	a. Pharmaceutical waste	→ Spilled/unused medicines, expired drugs and used medication receptacles.
	b. Cytotoxic waste	→ Expired or leftover cytotoxic drugs, equipment contaminated with cytotoxic substances.
	c. Waste containing heavy metals	→ Batteries, mercury waste (broken thermometers or manometers, fluorescent or compact fluorescent light tubes).
	d. Chemical waste	→ Waste containing chemical substances: leftover laboratory solvents, disinfectants, photographic developers and fixers.
4.	Pressurized containers	→ Gas cylinders, aerosol cans.
5.	Radioactive waste	→ Waste containing radioactive substances: radionuclides used in laboratories or nuclear medicine, urine or excreta of patients treated.

Table 1: Classification of hazardous medical waste, from ICRC, 2011 (6)

Beyond these health and environmental consequences, poor waste management can also damage the credibility of humanitarian actors. The circulation of unused or expired medicines on informal markets is not only an ethical problem, it also endangers public health and may erode trust in humanitarian aid, making future interventions more difficult to implement. Indeed, the visible mismanagement of medical waste can negatively influence community perceptions, ultimately compromising the acceptance and effectiveness of existing and future humanitarian programs.(3,6)

Because of these risks, safe and standardized waste management procedures are essential. According to the World Health Organization (WHO), emergency medical teams are responsible for the proper disposal of all medical waste produced in their operations. This involves minimizing the volume of waste, sorting it appropriately, securing it, treating it, and ensuring its safe final disposal. To do so, teams must be equipped with the appropriate infrastructure

and trained personnel, and must comply with both national regulations and international guidelines. Particular attention should be paid to waste types such as infectious materials, sharps, chemicals, liquid waste, and unused medications. When waste cannot be recycled, the recommended disposal methods should prioritize minimal environmental impact.(7)

While guidelines and manuals on hazardous medical waste exist, applying them in crisis contexts is far from straightforward. As the ICRC highlights, the recommended treatment and disposal methods often require financial and technical resources, as well as legal frameworks, that are unavailable or impractical in many humanitarian settings. Several studies have shown that even when good practices are known, multiple barriers limit their implementation in the field.(3,4,8) Strict national regulations may unintentionally obstruct the recycling or redistribution of unused products. In some contexts, public policy itself discourages the reuse or repurposing of medical supplies. Moreover, humanitarian operations often lack waste management strategies integrated from the outset, and limited information-sharing and stock-tracking systems further contribute to avoidable waste. Medicines may be discarded not due to overstocking alone, but due to poor warehouse conditions, untrained staff, or a lack of proper logistics infrastructure. Recycling efforts also require preparation, trained personnel, and adapted infrastructure, resources that are rarely available in post-disaster situations.(8)

Furthermore, transferring responsibility to national actors is not always feasible. Some recipient countries lack the pharmaceutical or logistical expertise required to adapt supply chains or implement new drug protocols. As Corbett et al. pointed out, effective management also depends on robust data systems and a deep understanding of the local context, elements that are often lacking. These gaps can delay the production of relevant operational information and hinder timely decision-making in the field.(4) Humanitarian supply chains also face structural challenges: decision-making is frequently decentralized, with some processes managed at headquarters level and others in the field. This decentralization can result in fragmented visibility and weak governance over logistics and waste flows.

Donor-related constraints further complicate matters: many funding streams are earmarked for specific programs or geographic areas, leaving little to no flexibility for developing infrastructure such as reverse logistics for expired drugs.(3) For instance, an organization may be well-stocked in one country, but unable to redistribute surplus or dispose of waste in another due to funding limitations. Additionally, fear of discouraging donors may lead some organizations to avoid openly addressing the issue of waste or to deprioritize the creation of formal guidelines around expired products.(3) In many contexts, there is also a lack of infrastructure for recycling medical products, and reverse logistics systems are either underdeveloped or absent.(3)

These operational and structural challenges significantly hinder the proper management of medical waste in humanitarian settings. Many of these issues, such as poor stock tracking, limited disposal infrastructure, and lack of anticipatory planning, likely apply to EHKs as well. Yet, despite their central role in emergency response, their potential contribution to medical waste remains largely overlooked. The next section explores the composition, use, and place of these kits within the humanitarian supply chain, and examines how they might contribute to waste generation.

b. Role and structure of standardized medical kits

For decades, humanitarian organizations have provided essential medicines and medical devices to populations affected by crises. In the 1980s, the World Health Organization (WHO) sought to rationalize this process by promoting the standardization of emergency health supplies. This initiative led to the creation of prepackaged, ready-to-ship emergency health kits designed to meet immediate health needs during disasters. The first Interagency Emergency Health Kit (IEHK) was introduced in 1990 and has since undergone multiple revisions, incorporating new recommendations such as post-exposure prophylaxis (PEP), injection safety, treatment of non-communicable diseases (NCDs), and emergency mental health interventions. The latest version was released in 2024.(9)

The IEHK has become a central tool in emergency response logistics, it has been adopted by many humanitarian organizations and national health authorities. It is valued for its standardized content, reliability, low cost, and rapid deployability. Its composition is designed to serve the primary healthcare needs of a population of 10,000 people for a period of 3 months. While designed as a rapid-response tool, it must be prepositioned to ensure swift dispatch. This implies a compromise in its composition, as it is not tailored to the specific characteristics of each emergency, some items may be unnecessary while others may be lacking. Thus, once deployed, additional assessments are required to adapt supplies to the local context.(9)

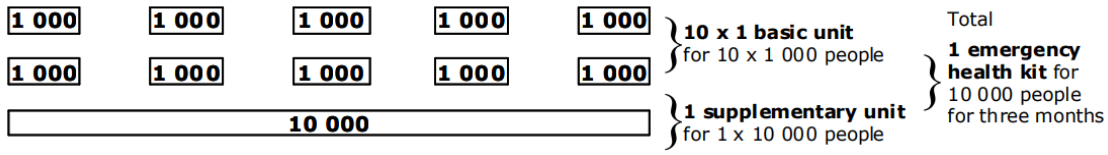

Table 2: IEHK structure (9)

Structurally, the IEHK is composed of several units or modules, grouped to facilitate both use and logistics (see *Table 2*). The basic modules contain oral and topical treatments, essential equipment, and simple malaria treatment that can be used by primary healthcare workers with limited training. In contrast, the supplementary modules, intended for trained professionals

such as nurses or physicians, include injectable medicines, severe malaria treatments, post-exposure prophylaxis (PEP), and glucometers (see *Table 3*) (see Annex 1 for detailed list). These supplementary modules are designed to complement the basic ones and cannot be used independently. One full IEHK contains ten basic modules and one supplementary module, sufficient to cover 10,000 individuals for three months.(9) Additional optional modules, such as cold chain units, may also be included depending on context-specific needs.(10)

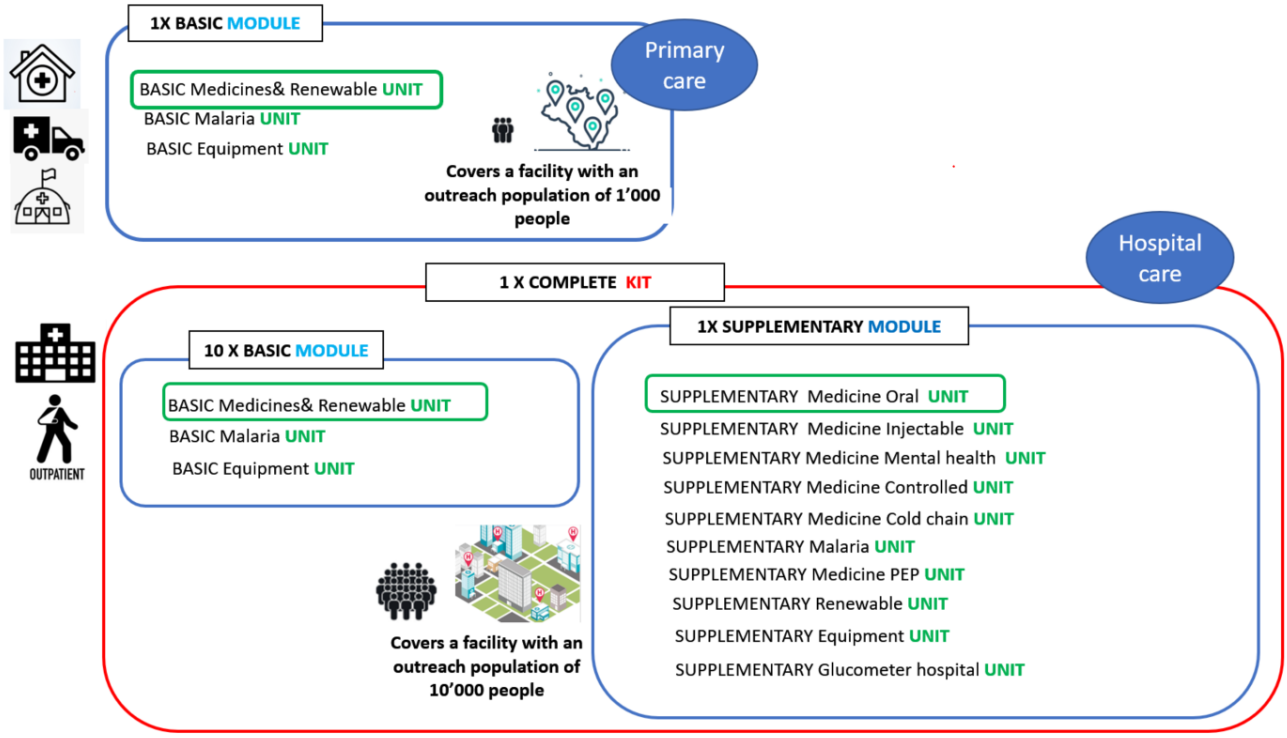

Table 3: 2024 IEHK composition (11)

To define the content of these modules, WHO relies on standard clinical guidelines, such as Médecins Sans Frontières' "*Clinical Guidelines"*, which outline appropriate treatment strategies for crisis-affected populations.(12) Quantities are based on estimated morbidity patterns in displaced populations and feedback from field-experienced organizations. However, these estimates assume adherence to standardized prescribing practices, which may not always reflect local clinical habits or available human resources.(9) However, the IEHK does not cover all medical needs. For instance, it excludes supplies for vaccination and nutrition programs, reproductive health services, HIV/AIDS, tuberculosis, oncology, and major surgery.(10) To address these gaps, WHO has developed complementary kits tailored to specific health priorities, such as trauma and emergency surgery kits, cholera kits, pediatric kits, NCD kits, pneumonia kits, and mental health kits.(13)

From a logistical perspective, kits such as the IEHK are central to emergency preparedness and response strategies. They are designed and standardized in collaboration with technical

partners such as WHO, UNFPA, RCRC movement and NGOs. Once the contents are defined, items are procured from pre-qualified suppliers, with strict quality control, especially for pharmaceuticals. Kit assembly may be carried out at centralized warehouses (e.g., UNICEF's facility in Copenhagen), outsourced to third parties (e.g., MSF Supply), or performed locally in the destination country, depending on the type and complexity of the kit.(14)

For example, in the case of complex health kits such as the IEHK, some organizations choose to procure individual components (medicines, equipment, devices) separately from pre-qualified suppliers, and then assemble the kits in their own centralized warehouses. This is the case at UNICEF's Supply Division in Copenhagen, where internal staff ensure that pharmaceutical quality standards are met, expiry dates are controlled, and temperature-sensitive items are handled appropriately. By retaining responsibility for this phase, the organization ensures full compliance with international guidelines and better visibility over inventory.(14) In contrast, other actors follow a different approach: the entire process, from procurement and kit assembly to packaging and delivery, is entrusted to an external supplier. This model is often chosen to reduce internal logistics burdens and accelerate deployment, especially for high-volume or frequently used kits, it can also be imposed by national policies. However, it may also offer less direct control over quality assurance and stock traceability. These differing strategies reflect broader trade-offs between flexibility, speed, cost-efficiency, and regulatory compliance in humanitarian supply chains.(14)

Deployment relies on prepositioned stocks, enabling a response within 72 hours in large-scale emergencies. Standardization facilitates coordination among humanitarian actors, reduces administrative burden, and accelerates field operations. EHKs are often used as a "common language" between organizations, allowing actors to request "three IEHKs" without needing to list specific items, thus simplifying logistics and procurement processes.(14) Nevertheless, kit-based responses face several logistical challenges. These include managing expiry dates, anticipating fluctuating demand, and ensuring that kits match the evolving needs on the ground. Inadequate needs assessments may lead to the shipment of non-essential items, creating storage burdens or waste. Conversely, critical shortages may arise when local morbidity patterns are not well matched by standard kit content. As highlighted by field case studies, timely deployment and efficient stock rotation are dependent on institutional knowledge, adaptable batch assembly strategies, and integrated supply chain systems.(14)

To address these limitations, continuous monitoring and evaluation are essential. Feedback from the field helps improve kit design, inform updates, and identify unmet needs, thereby enhancing the relevance and performance of future deployments. In practice, this feedback loop involves both country-level programmatic insights and centralized technical review

processes, ensuring that kits remain an effective tool for rapid health interventions in dynamic humanitarian contexts.(14) Yet these operational challenges may also have unintended consequences beyond logistics alone. When certain items remain unused, expire, or cannot be redistributed effectively, questions arise regarding their contribution to the generation, or poor management, of medical waste. This aspect, however, has received limited attention so far and warrants further reflection.

B) Study objectives

This research aims to investigate the perceptions of humanitarian actors regarding Emergency Health Kits, and the extent to which they perceive their role in the production of medical waste in humanitarian contexts. While these kits are designed to facilitate rapid and standardized responses to health emergencies, their use might generate significant amounts of waste, both in terms of packaging and unused or expired items. Understanding how the kits' design, content, and associated logistics contribute to this issue is essential to improving both the environmental sustainability and operational effectiveness of humanitarian interventions.

The main objective of this study is:

- ⇨ To explore whether and how humanitarian actors who use Emergency Health Kits perceive that they contribute to the production of medical waste in humanitarian contexts, with a focus on their composition, utilization, and associated logistical practices.

In order to achieve this goal, the study will pursue the following secondary objectives:

- To explore how humanitarian organizations use these kits and manage the medical waste they generate in practice.
- To identify potential gaps between kit design and field implementation in terms of waste minimization and management.
- To provide recommendations for more sustainable use of EHKs, or to suggest areas for further research if knowledge gaps are identified.

These objectives will guide both the documentary analysis and the qualitative interviews conducted with field professionals. They aim to inform future strategies to optimize the environmental footprint of emergency medical responses, without compromising care delivery.

II. Methodology

The purpose of this study is to explore field experiences and practices in order to better understand a phenomenon that is both complex and under-studied: the production and management of medical waste linked to the use of EHKs in humanitarian settings.

Therefore, this research adopts a qualitative methodological approach, as it allows for an in-depth understanding of perceptions, experiences, motivations, and representations of humanitarian actors. This approach provides the flexibility necessary to investigate multifaceted operational practices, particularly those that may not be well-documented or standardized across different organizations. In line with Aubry (2017), qualitative research is also well adapted to generate new hypotheses and identify key variables in under-researched fields.(15)

Research Design and Data Collection

To gather empirical data, semi-structured interviews were conducted with humanitarian professionals involved in the use and management of EHKs. This method was chosen because it allows for the collection of detailed accounts and personal perspectives, giving participants the opportunity to reflect on their own experiences. An interview guide was developed, organized around three core themes: The use of medical kits, Medical waste associated with kits, and Possible improvements and perspectives. These themes were directly linked to the research objectives and helped ensure that key aspects of the topic were covered. Open-ended questions were used to encourage participants to provide more developed answers (see *Annex 2*).

The interview guide was first tested with two individuals: one with experience in the field of humanitarian logistics and health, and another with no prior knowledge of the topic. This pre-test helped verify the clarity and relevance of the questions for different profiles of respondents.

Interviews were conducted using different modalities depending on participant availability and preferences: video calls (via Google meet), or written responses through an adapted questionnaire. Interviews lasted approximately 1 hour. For written contributions, the interview guide was reformulated into a clear and structured questionnaire to preserve consistency in data collection (see *Annex 3*).

Interviews conducted by video were recorded with the informed consent of participants. Transcriptions were generated using AI-based tools and subsequently reviewed manually to ensure accuracy by comparing the transcripts with the audio recordings.

Participant Selection

Participants were selected using purposive sampling, aiming for maximum variation across roles and experiences to provide a holistic perspective on the use of EHKs.

The inclusion criteria were as follows:

- Professional or volunteer experience in humanitarian missions involving the use of Emergency Health Kits (IEHK or other),
- Participation in at least two acute emergency humanitarian deployments within the last 15 years,
- Direct involvement in at least one of the following areas:
    - ordering, managing, or distributing EHKs (headquarters or logistics roles),
    - Clinical use of kits on the field (medical staff),
    - Handling or overseeing medical waste management linked to EHK use (clinical or operational perspective),
- Ability to communicate in English or French for interview purposes,
- Affiliation with a recognized humanitarian organization (e.g. NGOs, national societies, UN agencies).

The exclusion criteria were:

- A last relevant humanitarian experience involving EHKs dating back more than 15 years,
- No direct involvement in the use or management of EHKs or medical waste, or only marginal roles,
- Refusal to consent to participation in the study.

A total of 10 participants were interviewed, and six additional participants provided written responses to the questionnaire (see *table 4*). The sample was intentionally designed to reflect a diversity of functions, profiles, and organizations, thus supporting the validity of findings through data triangulation.

Participants	Role	Number of missions	Countries	Organization type	Field or HQ	Years of field experience	Types of kits	Type of participation
P1	Pharmacist	2	Haiti, DRC	NGO	Both	6 years	Custom kits	Interview
P2	Pharmacist	6	Haiti, DRC, CAR, Zimbabwe	NGO	Both	5 years	Custom kits	Interview
P3	Pharmacist	4	CAR, Iraq, DRC, Haiti	NGO	Both	5 years	Custom kits	Interview
P4	Pharmacist	11	Philippines, Nepal, Haiti, Mozambique, Honduras, Canada	Association	Both	NA	IEHK, WHO Cholera kits and Custom kits	Interview
P5	Midwife	3	Haïti, Nepal,	Association	Both	9 years	IEHK	Interview

P6	WASH technical expert	4	Chad, Comoros, DRC, Guinea, CAR	Association	Both	3 years	Cholera kits	Interview
P7	CSR Manager	3	Haïti, Ukraine, DRC	Association	Both	+5 years	Cholera kits, IEHK, custom kits	Interview
P8	Physician	2	Nepal, Guinea	Association	Field	NA	Ebola kits	Interview
P9	Logistician	+10	Somalia, Pakistan, Malawi, Zimbabwe, Niger, Mozambique	Association	Both	15 years	Cholera, IEHK…	Interview
P10	Nurse	+15	Pakistan, Lebanon, Mali, DRC, Nepal, Haiti…	Association	Field	20 years	Cholera, Ebola, IEHK, customs	Interview
Q1	Physician	10	Haiti…	Association	Field	NA	IEHK	Questionnaire
Q2	Nurse	6	chad, Pakistan, Malawi, Haïti	Association	Field	NA	IEHK	Questionnaire
Q3	Nurse	10	Nepal, Haiti, Comoros, Bangladesh, Greece	Association	Field	NA	IEHK	Questionnaire
Q4	Physician	10	NA	Association	Field	NA	IEHK	Questionnaire
Q5	Physician	+10	Haiti, Nepal, Philippines, Cameroun, Greece, Malawi, Chad, Pakistan	Association	Field	20 years	IEHK	Questionnaire
Q6	Physician	5	Pakistan, Cameroun, Haiti	Association	Field	NA	IEHK	Questionnaire

Table 4: Summary of participant's characteristics.

One participant was a colleague during my internship, but was included due to their extensive field experience as a pharmacist. The potential for bias was assessed and considered minimal.

Participants were contacted through different channels:

- Professional email via organizational directories,
- The internal database of the French Red Cross,
- LinkedIn and professional networks.

Ethical considerations

All participants were informed of the study's objective and gave their consent prior to participation. Data were anonymized, and any identifying information was removed during transcription and analysis to ensure confidentiality and compliance with ethical standards.

Data analysis

Data from interviews were analyzed using thematic analysis, following Braun and Clarke's six-step framework. This method was chosen for its adaptability and systematic approach to identifying, analyzing, and reporting patterns within qualitative data. The steps followed were:

- Familiarization with the data through repeated reading of transcripts,
- Generating initial codes manually,
- Searching for themes by grouping codes into broader categories,
- Reviewing themes to ensure coherence and consistency,
- Defining and naming themes,
- Producing the final report with illustrative quotes.

Coding was conducted manually to allow for iterative engagement with the data. A reflexive approach was adopted throughout, acknowledging the researcher's position and potential biases.

Limitations

As with all qualitative studies, generalizability is limited. However, the aim of this research is not statistical representativeness but depth and relevance of insight. The diversity of roles and experiences among participants helps mitigate this limitation. Additionally, although written responses may lack the spontaneity of oral interviews, they allowed some participants to provide more reflective answers.

III.Results

This section presents the main findings from the thematic analysis of the interviews conducted with our panel of participants, as well as responses from the complementary questionnaire.

Five main themes were identified, covering perceptions, practices, and challenges related to the use of medical kits and the management of medical waste in emergency settings (see *Table 5*).

Each theme is illustrated with selected quotes from participants, followed by a neutral interpretation of the key insights they convey.

Themes	Codes
1. Adaptability and structural limits of the EHKs	Kits are adapted in the field based on specific needs
	Kits are perceived as a basic foundation to be completed
	Kits are useful in the acute phase but limited for tailored responses
	Certain items are systematically unused
	Kits are perceived as fast and efficient in emergencies
	The more general the kit, the less efficient it is
	Mismatches with local protocols
	Ordering by item seen as a way to reduce waste
	Risk of waste inherent in kit-based systems

	Needs assessment is essential but difficult
	Exploring more sustainable supply options
2. Logistical and organizational constraints	Storage conditions and degradation
	Stock and expiration management
	Emergency contexts and deprioritization of logistics
	Turnover and communication gaps
	Role ambiguity and process uncertainty
	Inadequate knowledge of supplies and practices
	Quality issues
	Surplus redistribution practices
	Unsolicited donations and ethical concerns
3. Medical waste management and perceptions of its impact	Acknowledged waste volumes: packaging and expired products
	Treatment methods and environmental concerns
	Lack of traceability and data gaps
	Context-driven management practices
	Budget limitations and donor sensitivity
	Diversion risks and parallel markets
	Medical waste: a growing but underestimated issue
4. Prioritization in emergency contexts	Waste management perceived as secondary in emergency responses
	Waste perceived as inevitable in care delivery
	Stock management deprioritized under pressure
5. Areas for improvement and recommendations	Need for greater collaboration and harmonization among actors
	Need for better training on field realities and kit use
	Lack of awareness around medical waste management
	Better risk analysis and needs assessment
	Improve stock management tools

Table 5: Summary of themes and codes

Theme 1: Adaptability and structural limits of the EHKs

Kits are adapted in the field based on specific needs

"For the mobile clinics, we used to constitute 'mini-kits', from the IEHK and other medicines, sometimes from other kits, that we adapted according to the diseases met on the field, in the community."

In this context of mobile clinics, it is expected to break down standard kits into lighter versions. However, what stands out here is that these "mini-kits" are not simply scaled-down versions of the IEHK; they are adapted, with some items removed or replaced depending on the epidemiological profile of the community. This illustrates how the IEHK, while comprehensive, remains too general and lacks the flexibility to respond precisely to specific settings.

Kits are perceived as a basic foundation to be completed

"When we went to a displaced persons camp, for example, we sent IEHK kits according to the number of people, but we often sent other things as well. For example, the IEHK is quite low in antibiotics."

"IEHKs allow you to order primary healthcare supplies, so it's good because it provides the basics. The content is still good, but in my experience, you need to supplement it."

"We use WHO kits and our own custom kits to complete depending on the needs."

These excerpts, coming from professionals working in varied contexts, all reflect the same idea: the IEHK provides an essential baseline of supplies but must be complemented to respond adequately to real-world needs. Depending on the situation, respondents mentioned the addition of GBV kits, NCD kits, Cholera kits, or other more targeted materials. The IEHK is rarely used alone.

"For example, the interagency kit that supports 10,000 people for three months or so was often not very suitable. So we supplemented it with other things."

Even though the kit is technically modular, it remains a generalist solution and does not allow for the level of specificity often required in the field.

Kits are useful in the acute phase but limited for tailored responses

"Kits are great for emergency response, but not for a tailored response. They're especially useful when you're starting from scratch, i.e., when you don't have anything on site. But once you have a team in place and can provide a more tailored response, you need to switch to item supplies as soon as possible."

This quote introduces a critical nuance: IEHKs are highly relevant during the initial phase of an emergency when needs are not yet well defined. They offer a rapid, all-purpose solution. However, once teams are established and needs become clearer, switching to itemized orders is seen as more appropriate. This allows for increased adaptability, helps prioritize what is actually useful, and reduces unnecessary supply.

Certain items are systematically unused

"I had the impression that there were always things in the IEHK that weren't being used, which isn't normal, actually. For example, permethrin, we hardly ever used it. And it expired easily. Chlorhexidine, soaps, health cards, antidotes, certain catheters... these are things we had very little or no need for, and we had quantities of it that remained until they expired."

Due to its standardized composition, the IEHK often includes items that are not used and eventually go to waste. The kits cannot be adjusted by item, so the presence of unneeded products is almost inevitable.

"It's rare to get everything right, and you can often end up with a bunch of medications that won't be used because they weren't suited to the needs. But it's rare to have a large part of the kit that isn't used."

This second testimony offers a slightly more nuanced view: while some waste is acknowledged, most of the kit is generally still used.

Kits are perceived as fast and efficient in emergencies

"When you order the kits, they are already assembled, so it is very quick. However, if you request a retail order, it will take much longer. Therefore, at the beginning of an emergency, when you need to obtain supplies quickly, it is better to go ahead even if you may end up with items you will not use. At least you will have your kit ready quickly."

"The kits are very useful because they allow you to respond very quickly. In the event of a massive influx of casualties, you are ready and efficient in terms of response."

These quotes highlight a key advantage: speed. In emergency logistics, time is critical. Kits are preassembled and sometimes prepositioned, allowing for immediate deployment. Even if they may not be fully used, their availability outweighs the potential waste in the early stages of a crisis.

The more general the kit, the less efficient it is

"The more general your kit becomes (like the IEHK), the more you dilute the effectiveness. You end up treating a generalized population that you have artificially homogenized, and you lose in efficiency. For example, you may miss malaria or parasitic cases."

This participant underlines a major trade-off: a generalist kit can cover a broad range of conditions but may fail to address specific local health issues adequately.

Mismatches with local protocols

"In the case of the GBV kits, I had the impression that the content of the kit did not match our protocols, and sometimes it doesn't match with the countries' protocols."

Standardized kits may contain items or recommendations that are not aligned with the organization's or country's clinical protocols, making certain components unusable in practice.

Ordering by item seen as a way to reduce waste

"In the case of cholera kits, quantities are huge. So instead of ordering whole kits when we only needed ringer, we ordered only what we needed. Or I would tell the supply team 'don't put that in the kit'."

As contexts stabilize, ordering by specific items rather than kits is seen as a more sustainable and tailored approach, particularly to avoid oversupply of unnecessary materials.

Risk of waste inherent in kit-based systems

"The IEHK includes 10 basic kits, and each basic kit is designed to be self-sufficient. But this design leads to a lot of waste, because you can't reorder individual items, only full boxes. So even if you just need one item, you get everything else with it. I remember in the Philippines, the meeting room wall was stacked to the ceiling with donated IEHK. Most were unused."

The inability to restock individual items leads to redundancy and accumulation, especially when kits are ordered in bulk for precautionary reasons or donated without prior needs assessment.

Needs assessment is essential but difficult

"Needs assessment is essential to place efficient orders. The problem is, in emergency contexts, you're never sure what the needs will be, and often it's hard to assess them properly."

While participants insist on the importance of needs assessment, they also acknowledge its complexity in rapidly evolving situations. This gap may lead to over- or under-supply, which directly contributes to waste.

Exploring more sustainable supply options

"That's why we're exploring regional resupply options, to restock individual items without repurchasing whole kits."

Some organizations are attempting to design more flexible supply systems, such as regional restocking or tailored kits, in order to address the limitations of the current model and minimize waste.

Theme 2: Logistical and Organizational Constraints

Storage conditions and degradation

Storage is often challenging in humanitarian contexts, particularly in extreme environments. Several participants reported losses due to inadequate or improvised storage.

"Storage conditions are not always easy, especially in high temperatures. For example, in Pakistan, medicines were stored in a cellar dug for this purpose but which was subsequently flooded."

“In the Central African Republic, we wanted to carry out a vaccination campaign, but it couldn't happen. We still received the vaccination kits, but didn’t know where to store them. Since there were no medicines in them, we stored them in tents, and they were eaten by termites. So everything was ruined.”

Inadequate storage, due to lack of infrastructure, space, or weatherproofing, can lead to the loss of entire kits. Even when efforts are made to store them properly, environmental factors can compromise the stock.

Stock and expiration management

Managing medical stock from kits appears to be a major challenge, particularly in the absence of appropriate tools or dedicated systems.

“You really need to create your own basic Excel file to track all the expiration dates in your kit. If you have an ongoing program using the same supplies, it’s easy. But if you're dealing with prepositioned stock with no program alongside, it becomes complicated. Expirations are inevitable in that case.”

“The pharmacist is also key in waste prevention. I always establish stock lists from the beginning. Teams start with 7-10 days of renewable supplies, and I provide reorder templates. I tell them: ‘Always keep one week of stock, not more.’ Too much stock leads to waste.”

“You can't manage it like a regular stock. You need frequent inventories to ensure products are used before they expire. With large kits, that’s very complicated.”

Several respondents explained that they had to develop their own manual tracking systems, such as Excel sheets, to monitor use-by dates. However, without continuity of staff or integrated programs, these tracking tools are rarely maintained, increasing the risk of expiration and waste.

Emergency contexts and deprioritization of logistics

The urgency of response operations often relegates logistics and stock management to a secondary concern.

“Whenever I opened a box, I had no updated tracking file. And people would say, ‘You understand, we were in an emergency.’ Everything was expired or about to expire.”

In emergency contexts, the focus is understandably on patient care, and maintaining updated inventory records or anticipating expirations is not always feasible.

Turnover and communication gaps

Short-term missions and lack of structured handovers also contribute to stock management failures.

“There are often people who abandon prepositioned kits. They come for a six-month mission, place orders, and then say it’s no longer their problem. That’s how you end up with expired items to destroy, and a lot of money wasted.”

When missions are not aligned and there’s no clear communication or responsibility transfer, unused or forgotten stock accumulates, leading to increased waste.

Role ambiguity and process uncertainty

Some participants described situations where responsibilities were unclear between teams, particularly concerning waste management.

“There were tensions with the logistician because he told me it was my job to manage medical waste, while I thought it was his. Roles and processes are often unclear.”

This lack of clarity, especially in high-pressure environments, can result in mismanagement and conflict between staff.

Inadequate knowledge of supplies and practices

Some staff arrive on missions with limited knowledge of the kit contents or are unfamiliar with the materials provided.

“There’s a lack of awareness among healthcare staff about what will be available on site, which creates frustration and resistance when the materials don’t match their usual habits. Briefings on the kit contents should be reinforced.”

“Often the issue isn’t the tool, but the user: prescriptions aren’t followed, protocols are ignored, or staff prefer other materials than what’s provided.”

A mismatch between the standard contents of the kits and the practices of deployed professionals can result in unused or misused supplies.

Quality issues

Some EHKs are reported to include items of low quality, leading to reluctance or refusal to use them.

“We know some kit items are of poor quality. We often have to complete them with other materials.”

This can undermine confidence in the EHKs and lead to waste when staff decide to replace or discard certain elements.

Surplus redistribution practices

When unused medical supplies remain after a crisis, they are often redistributed locally.

“In countries with ongoing programs, if medicines weren’t used during the emergency, they were donated to health structures or hospitals we worked with, basically integrated into the regular system.”

“In Mozambique, we had to negotiate with the Ministry of Health and the hospital over who would receive the leftover items. We prioritized the hospital, and then the Ministry redistributed the rest.”

Surplus donations are common and often seen as a way to avoid waste, by reintegrating leftover supplies into national systems.

Unsolicited donations and ethical concerns

However, several participants expressed concern about donations made without needs assessment or follow-up.

“Sometimes we try to donate, but people tell us they don’t need it. When it’s too specific, that’s always the problem.”

“We donate all leftover drugs when we leave, but they’re not always suited to local practices, which can be problematic.”

“We think, ‘Great, we made a donation!’ But in fact, we’ve just shifted the problem. Once the crisis is over, the need disappears, but the kit remains, with its expiration dates, storage needs, and end-of-life issues. We turn the kit into unused waste.”

“Once we donate, we lose all visibility. It’s not a good idea to donate large quantities without knowing what happens to them. We have a moral responsibility. The thinking around donations has to go further than just ‘getting rid of it’.”

These reflections point to the need for greater accountability and transparency in post-crisis donation practices. While donations may be well-intentioned, they can transfer logistical burdens and waste management responsibilities to local actors unprepared for them.

Theme 3: Medical waste management and perceptions of its impact

Acknowledged waste volumes: packaging and expired products

Numerous participants described large amounts of waste generated by emergency kits, particularly due to packaging and unused or expired medicines.

“We end up with a lot of packaging to deal with, at best.”

“In Bangui, it was the most shocking: containers filled with expired medications.”

Packaging materials are mostly plastic and cardboard. Although waste linked to packaging is sometimes considered inevitable, some interviewees acknowledged improvements in eco-design:

"IEHK tablets are packaged in bulk, not in blisters, that's already a big optimization. I don't see how it could be much better."

"Cardboard is easy to recycle, and the multilingual labels are more environmentally friendly."

However, cardboard packaging may be ill-suited to harsh field conditions:

"We lost entire boxes due to moisture. I had to repackage all my injectables manually after water leaked into the tent."

Treatment methods and environmental concerns

When it comes to the elimination of medical waste, practices vary significantly and are often limited by logistical and technical constraints.

"We burn everything we can. But when plastics are burned at low temperature, they release toxic compounds like dioxins and furans, a danger for operators, often national volunteers."

"Most of the time, what we use in the field aren't real incinerators, just low-efficiency burners. So we think we're incinerating properly, but we're not."

Some teams are equipped with mobile incinerators, while others rely on open-air dumps, a practice considered highly problematic:

"Open dumps are the worst-case scenario. Everyone has access to them, even children."

"Often, we say we use the country's system... but that system is *the open dump."*

Alternatives such as using cement or soap factories or encapsulation (cemented burial) were mentioned, but cost and feasibility remain barriers.

"Cement kilns would be a miracle solution, but they're not interested, unless we pay."

Lack of traceability and data gaps

A recurring concern is the lack of traceability of what happens to waste once it leaves the humanitarian structure.

"We sort our waste roughly, sharps, plastics... But after it leaves our centre, we have no idea what happens to it. That's worrying, especially in places with waste picking by children."
"People say we have no expired medications, but I have seen it… Sometimes they just disappear quietly. We don't know what happens to them."

“It starts with data, but nobody is producing it.”

Without proper data collection, monitoring waste flows or improving practices is difficult.

Context-driven management practices

Many respondents underlined that waste management practices are context-specific, and that importing overly sophisticated solutions into low-resource settings is rarely effective:

“No point bringing a Ferrari to turn on a radio. Local partners might only use 10% of the system's potential because they lack the capacity.”

In some countries, national systems are available, though often inefficient, costly, or administratively heavy. In others, systems are absent or symbolic:

“Sometimes we’re told a system exists, but in reality, waste is just buried behind the hospital.”
“You’re supposed to destroy medicines according to national regulations, but those vary completely. Some require detailed lists, others just let you handle it yourself.”

Waste management is rarely standardized across contexts, and NGOs often have to adapt to variable and fragile local systems.

Budget limitations and donor sensitivity

Waste disposal is not always anticipated in the initial budget. Delays in funding can lead to accumulation:

“Sometimes containers fill up because nobody budgeted for destruction. People store, store, and then eventually destroy when money is unlocked.”

Some funders are reluctant to cover waste disposal costs, perceiving them as a sign of poor planning:

“If you have expired products, they assume you did a bad job. Donors can be touchy about that.”

Diversion risks and parallel markets

Improper destruction can lead to diversion of medical products into informal circuits:

“This feeds the street medicine markets. People recover what wasn’t properly destroyed.”

“Once, we discovered that the official destruction site address didn’t exist. We never found out where our medicines ended up.”

In settings with weak governance or high corruption risks, the lack of control over final disposal can have serious public health consequences.

Medical waste: a growing but underestimated issue

Some participants expressed concern that the issue of waste is still not sufficiently prioritized by healthcare teams:

"It's really a weak link in many of our activities. Medical staff think that once the room is clean, the waste is managed."

"In mobile clinics, we saw that healthcare waste was often not handled properly."

Despite growing awareness, medical waste management remains inconsistent and insufficiently integrated into operational priorities.

Theme 4: Prioritization in emergency contexts

Waste management perceived as secondary in emergency responses

In emergency settings, the primary concern for healthcare professionals is to provide care and ensure timely access to essential supplies. As a result, tasks related to managing stocks, monitoring protocols, or minimizing waste are often deprioritized.

"The problem in emergency situations is that you're mostly focused on procurement. Analyzing usage and compliance with protocols always comes second."

"Honestly, the kits could have arrived with tons of plastic, I was just happy they arrived. What mattered was treating people."

These testimonies reflect a pragmatic approach driven by urgency: delivering care overrides logistical or environmental concerns. The emphasis is on speed and access to supplies, not on managing potential excess or the environmental footprint of interventions.

This mindset can lead to overprescription or overuse, with the underlying idea that "more is better," especially when leftovers can be integrated into the local health system.

"The priority is care, not management. There's a tendency to prescribe broadly, even without a real need. The mindset is: better too much than not enough, since what's left can be handed over to the local health system."

Waste perceived as inevitable in care delivery

Another recurring perception is that waste is an unavoidable byproduct of providing care, especially in humanitarian settings where safety and hygiene are paramount.

"It's hard to provide care without generating waste."

"We produce waste just like in any healthcare structure, especially with the growing use of single-use items. And not everything is used in a procedure..."

These quotes illustrate the normalization of medical waste in the minds of practitioners. The expansion of single-use equipment, combined with the unpredictability of care needs, reinforces the perception that waste is inherent and difficult to mitigate.

Stock management deprioritized under pressure

This theme also intersects with earlier findings on logistical constraints. In the rush of emergency care, maintaining accurate inventory records and preventing stock obsolescence becomes particularly challenging.

“Every time I opened a kit box, there was no updated tracking file… and people would say, ‘Well, we were in an emergency.’ Every time, I found expired or soon-to-expire items."

This quote captures a key tension: the imperative to act quickly often undermines best practices in stock monitoring, which can later translate into waste, either through expiry or duplication.

Theme 5: Areas for improvement and recommendations

This final theme compiles the main improvement points mentioned by participants throughout the interviews. These suggestions touch on both strategic and operational aspects of kit use and waste management in humanitarian contexts.

Need for greater collaboration and harmonization among actors

Several participants emphasized the importance of pooling resources and working in synergy, particularly in contexts where multiple health actors operate in the same areas.

“Some NGOs are too focused on working solo, while in certain regions, it would make sense to say: ‘Look, we’re the same actors in the same zones, let’s pool our resources.’”

“We’d like to bring together the major NGOs working in health, MSF, MDM, etc., to align our approaches. Right now, we all work in silos. Each manages small volumes, but collectively, this could justify more structured systems.”

The fragmentation of efforts and lack of shared logistics or procurement strategies is seen as a missed opportunity to optimize operations and reduce waste.

Need for better training on field realities and kit use

Some challenges identified earlier, including misuse, underuse, or rejection of kit contents, are seen as preventable through better preparation and training of healthcare professionals.

“There needs to be better knowledge of the kits. For instance, knowing the International Nonproprietary Names instead of commercial names used in countries of origin.”

Field staff may arrive unfamiliar with available products, protocols, or tools, which reduces the effectiveness of interventions and increases the risk of waste.

Lack of awareness around medical waste management

Another recurring issue is the insufficient training on medical waste handling, both for expatriate staff and local personnel.

"Sometimes, it was hard to know where and how to destroy waste without polluting the soil or endangering beneficiaries, or ourselves."

"Local staff need to be trained and properly sensitized, especially when it comes to sharps being thrown anywhere."

Several participants expressed concern that, without clear protocols and training, the management of dangerous waste, such as needles or expired medications, remains inconsistent and potentially hazardous.

Better risk analysis and needs assessment

One participant highlighted the need to strengthen the capacity of medical coordinators, especially in risk analysis and planning.

"We need better training for medical coordinators in risk assessment."

Improved pre-crisis analysis and field evaluation would likely result in better-adapted kits and reduced volumes of unused materials.

Improve stock management tools

A number of participants mentioned the limits of manual or Excel-based systems, which are still commonly used to track medical stocks.

"We often rely on Excel files, where it's easy to miss something. It's not like software that flags expired items, you can mistype a date and miss it completely."

Several participants suggested that digitizing and automating inventory management would reduce human error, improve reordering precision, and ultimately help prevent both shortages and overstocking.

IV. Discussion

The objective of this study was to explore how humanitarian actors perceive the role of standardized Emergency Health Kits (EHKs) in the production of medical waste in

humanitarian contexts, and how their composition, usage, and associated logistical practices contribute to this phenomenon.

The analysis highlighted several recurring patterns: the normalization of medical waste in care delivery, logistical and human resource barriers to sustainable practices, challenges related to waste treatment and accountability, and a perceived lack of coordination and awareness across humanitarian settings.

This discussion will explore four main analytical axes:

- The tension between standardization and field realities
- Logistical and organizational barriers to sustainability
- The management and responsibility of medical waste
- Key recommendations to promote more sustainable practices

While the participants reported using a variety of kits, including customized ones, most of these remained based on the WHO kit structure (such as the IEHK, or Cholera and Ebola kits) and followed similar design principles. As such, they can be considered comparable in terms of composition, objectives, and operational constraints, allowing for a unified analysis across respondents.

Standardization vs. field realities: a predictable trade-off

Participants came from organizations with different operational models, some engaged in rapid, short-term emergency deployments, others in more stable, long-term healthcare programs. This distinction heavily influenced how kits were used and perceived.

In acute emergencies, actors generally rely on pre-positioned kits like the IEHK. These kits are praised for enabling rapid deployment and broad coverage. However, their standardized nature, designed to cover a wide range of basic health needs, inevitably leads to partial use, and therefore to waste.

“It’s expected that part of the kit won’t be used. But the major part is useful, and you can’t afford to wait or customize in a crisis.”

In such contexts, actors often reorder full kits, even when only a few items are needed. Because individual item ordering is rarely possible, unused supplies may accumulate and are later donated to local health facilities. These donations are generally seen as positive, though their long-term utility remains uncertain (e.g. molecules that may not be adapted, risk of diversion…).

In longer-term settings, participants described more flexible systems, including adjusted orders, reuse of remaining items, or the presence of pharmacists for better supply assessment.

The absence of trained pharmacists in emergency missions was seen as a risk for over-ordering, especially when medical staff must estimate needs without adequate tools or training.

Finally, perceptions of waste varied. Medical staff often focused on packaging or single-use items and frequently reported that most medicines were used. In contrast, logistics or WASH professionals pointed to significant volumes of expired or unused items. These diverging perceptions reflect a broader issue: the lack of data. As one participant noted, producing data on unused supplies is sensitive and could harm an organization's image with donors.

Logistical and organizational barriers to sustainability

Participants repeatedly highlighted the logistical complexity of managing kits, especially large ones like the cholera kit. Storage was frequently cited as a challenge: several anecdotes described spoilage due to humidity, flooding, or pests. While anecdotal, these stories suggest that inappropriate storage can lead to significant losses in fragile settings.

Stock management also emerged as a weak point. Despite handling large volumes of sensitive medical supplies, many teams relied on simple Excel files to monitor inventory and expiration dates. No standardized software or digital solution was used across settings. This lack of digital infrastructure echoes the findings of Zarei et al. (2022), who emphasized the importance of digital tools in strengthening supply chain efficiency and reducing waste in humanitarian contexts.

"A single typo in a date column, and you miss a product's expiration. That's how waste happens."

The absence of pharmacists, and poor handovers between teams exacerbate the problem. When kits are prepositioned but forgotten, unused stock accumulates without accountability. In short-term deployments, medical staff are often responsible for stock management, even though their priority is clinical care, not logistics. This raises a human resources issue, the fact that managing medical inventory at scale requires dedicated and trained personnel.

Another recurrent theme was the lack of familiarity with the kits' contents. Staff unfamiliar with international drug names or standard field equipment may avoid using certain items, either due to mistrust or incompatibility with their usual practice. This can contribute to underuse and waste, even when the materials are technically adequate.

Medical waste management and accountability gaps

Waste management practices varied widely depending on the country and context. In some settings, teams had to comply with existing national protocols and facilities, even when those systems were weak or poorly enforced. In others, especially where no waste management

infrastructure existed, teams resorted to basic solutions: burn pits, burial, or substandard incineration.

"Most of the time, we don't use real incinerators, just burners that don't reach the right temperature. So we think we're incinerating, but we're not."

Budget constraints often limited proper disposal. In some cases, waste accumulated in containers until funding became available. Some participants suggested that organizations are reluctant to discuss waste openly, for fear of appearing inefficient to donors.

Another important issue was the post-mission donation of unused kits. While framed as a good practice, participants admitted that these donations are often unsolicited, mismatched with actual needs, and rarely tracked. According to some, this raises ethical concerns: if the kits are not used, they may become waste elsewhere, and no one remains accountable. These concerns are aligned with Patil et al. (2020), who argued that medical donations are frequently inappropriate for recipients' needs and often result in unusable or misused supplies.

"We think we've solved the problem by donating. But we've just transferred the burden."

Inadequate waste treatment also creates risks of diversion and resale of medical products on parallel markets, especially when expired or unusable items are not properly destroyed. Participants stressed that poor waste management is not just an environmental issue, it can also endanger public health and trust in humanitarian action.

Lastly, packaging was often mentioned. While some praised the use of bulk formats and recyclable cardboard, others criticized the presence of unnecessary plastic. Overall, packaging was seen as an area where further optimization could reduce waste without compromising safety.

Recommendations and paths toward sustainable practices

Several participants offered concrete ideas for improving waste management and kit use:

- Improved coordination and mutualization between NGOs, especially in overlapping operational zones. Shared knowledge and pooled resources could enable better needs assessments and reduce duplication.
- More flexible resupply systems, including regional stockpiles or item-based ordering options, could help limit overordering and unnecessary waste.
- Improving training at all levels. Locally hired staff often lack knowledge of medical waste risks, while deployed staff may be unaware of the materials and practices specific to degraded humanitarian settings.

- Better tools for stock management, including digital platforms, could reduce errors and improve reactivity.
- Greater transparency and data collection: current practices lack visibility on what is used, discarded, or donated. Without reliable data, it is impossible to design evidence-based improvements.
- Revisiting packaging strategies: while progress has been made, further efforts to reduce plastic or explore reusable materials could contribute to lower environmental impact.

Strengths and Limitations

This study presents several limitations. First, it did not focus on a specific country or organization, which limits contextual depth. Second, the sample size was modest, though diverse: participants included medical staff, pharmacists, logisticians, and one WASH expert. However, WASH and logistics perspectives were underrepresented, despite their key roles in waste management. Third, the study relied entirely on self-reported data, no direct observation or field audits were conducted. This limits the ability to verify practices or compare them across settings.

Nonetheless, the strength of this research lies in the diversity of perspectives, the exploration of a relatively under examined topic, and the richness of the qualitative data collected.

Conclusion and Future Directions

The issue of medical waste in humanitarian settings is increasingly acknowledged as a challenge, but remains insufficiently studied. By focusing on the link between emergency health kits and waste production, this research contributes to a better understanding of how humanitarian practices may unintentionally generate environmental and ethical concerns.

As several participants and authors have noted, the lack of data and transparency is a major barrier. Before structural change can occur, more systematic documentation of what is used, wasted, and donated is needed.

Ultimately, integrating waste management into the design, deployment, and evaluation of humanitarian medical interventions will be essential to building more accountable, sustainable, and context-sensitive practices.

V. Conclusion and public health implications

This study sought to explore the perceived link between standardized Emergency Health Kits (EHKs) and the generation of medical waste in humanitarian contexts. Drawing on qualitative

interviews with healthcare professionals, pharmacists, logisticians, and WASH experts, the findings highlight a complex interplay between standardized design, field realities, logistical constraints, and the ethical and environmental implications of medical waste.

While EHKs remain indispensable tools for rapid response and coverage of essential health needs and are perceived as the best option, their standardized and prepackaged nature can contribute to avoidable waste, particularly when deployed without precise needs assessments or when resupply is based on rigid kit structures. In many cases, the absence of adapted stock management tools, trained personnel, and post-use accountability further exacerbates these challenges. Moreover, divergent practices in waste treatment across countries, limited funding, and fragmented coordination between actors hinder the implementation of sustainable waste management strategies.

Participants acknowledged that waste is, to some extent, considered inevitable, especially in emergency settings where care delivery takes precedence. However, several improvement levers were identified, including better field training, more adaptable procurement systems, greater coordination and mutualization between humanitarian actors, and stronger investment in data collection and stock tracking systems. Enhancing awareness among both international staff and local personnel regarding medical waste risks was also emphasized as a crucial step toward more responsible practices.

The public health implications of unmanaged medical waste are significant. Beyond environmental pollution and health risks for local populations, inadequate waste handling can also compromise the trust and legitimacy of humanitarian actors. Advocacy toward donors is therefore essential to ensure that waste management is planned and financed as an integral part of humanitarian health responses. This research therefore calls for a shift in humanitarian practices, toward models that integrate environmental accountability without compromising on care quality and speed.

While the sample size was limited and geographical contexts were not examined in detail, this study still provides valuable insights into an aspect of humanitarian health logistics that has received little attention so far. Further research should build on this foundation, focusing on country-specific practices, cost-benefit analysis of sustainable interventions, and the role of donors in shaping environmentally responsible strategies.

Ultimately, the responsible use of emergency health kits must go hand in hand with a commitment to minimize harm, both to patients and to the environments in which humanitarian actors intervene. Strengthening mutualization between actors and reinforcing advocacy with donors will be key levers to address storage, disposal, and training challenges, while ensuring more sustainable humanitarian health interventions. Addressing the challenge of medical

waste is not only a logistical imperative but also an ethical one, central to the long-term sustainability and integrity of humanitarian healthcare systems.

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List of Annex

Annex 1:

IEHK 2024 - BASIC MODULE (outreach of 1'000 Population/3 months)			
	(IEHK 2024 BASIC) UNIT, MEDICINE AND RENEWABLES (1.1)		
#	Item description	UOM	Qty
1	Albendazole 400mg	chewable tablet	200
2	Omeprazole 20 mg	capsule	500
3	Amoxicillin 250mg	tab / capsule/ dispersible tab	3000
4	Amoxicillin 500mg	tab / capsule/	1000
5	Permethrin 5% creme or lotion *	creme 30g / lotion 100ml	20
6	Chlorhexidine gluconate, solution 5%	1 litter	1
7	Ferrous sulphate + folic acid, tab 200mg+0.4mg	coated tablet	4000
8	Miconazole, cream 2%	tube 30g	20
9	Ibuprofen, 200 mg	coated tablet	6000
10	ORS (oral rehydration salt) 20.5g for 1 litre	sachet 20g	200
11	Paracetamol,100mg *	dispersible tablet	1000
12	Paracetamol, 500mg	tablets	3000
13	Tetracycline hydrochloride 1% , eye ointment*	tube 5 g	50
14	zinc sulphate 20 mg base oral use dispersible tablet blisters	dispersible tablet	1000
15	Povidone iodine, solution 10%	200 ml bottle	12
16	Bandage,elastic,woven or non-woven, 6-8cmx5m,roll.	roll	150
17	Bandage,gauze,6-8cmx5m,roll	roll	50
18	Compress, gauze,woven or non-woven, 10x10cm,non-sterile	pcs	500
19	Cotton wool,500g,roll,non-sterile	roll	2
20	Gloves, exam, nitrile*,medium ,disposable	pcs	200
21	Gloves, exam, nitrile*,large ,disposable	pcs	200
22	Soap, toilet ,bar, approximately 110g,wrapped	pcs	10
23	soap dish + lid	pcs	1
24	Tape, adhesive, zing oxide,2.5cmx5m	roll	30
25	Medicines ziplock bag with pictogram, size 8-10cm X 15-20cm	bag	2000
26	Health card	card	500
27	Plastic bag, for healthcard, A5 , snap-lock fastening	bag	500

5 * Permethrin,could be replaced by Benzyl benzoate lotion 25% 1 litter if available and accepted by end users

11 * If paracetamol 100mg dispersible tab not available can swicth to tablets (not DT=

* If Tetracycline is not available it could be replaced with Gentamycin 0.5% eye ointment to treat conjunctivitis and Erythromycin 0.5% for Chlamydial and Gonococcal

13 Ophthalmia Neonatorum

20/21 * Gloves, latex could be used in case of shortage and upon country request, caution for allergic reaction

(IEHK 2024 BASIC) UNIT, MALARIA (1.2)			
#	Item description		Qty
30	Artemether + Lumefantrine, tab 20mg +120mg , 6 x 1 tablet disp.	6 x 1 tablet disp. Box30	5
31	Artemether + Lumefantrine, tab 20mg +120mg , 6 x 2 tablet disp.	6 x2 tablet disp. Box30	1
32	Artemether + Lumefantrine, tab 20mg +120mg , 6 x 3 tablet	6 x 3 tablet disp/tablets. Box30	1
33	Artemether + Lumefantrine, tab 20mg +120mg , 6 x 4 tablet *	6 x 4 tablet Box30	6
34	Malaria rapid test kit, for detection of Malaria HPR2/pLDH (pf/pan) in human blood.*	RDT unit	1900
35	Safety box 5 liters foldable / flat pack	unit	2
36	Biohazard bag ,5-50L,polypropylene, biohazardous materials, yellow, biohazard sign	unit	10

33 * CoArtem 20+120mg 6X4 tablets higher dosage 80/480 mg could be used along with training to avoid confusion.

* **Countries with high prevalence of HRP2/3 deletions** (currently mainly observed in the Horn of Africa): In areas where ≥5% of P. falciparum cases are missed due to negative RDTs resulting from pfhrp2/3 deletions, WHO recommends a shift away from exclusive HRP2-based RDTs and alternative tests should be used. Updated general guidance on which tests to procure is available on the GMP web page via the following link: https://www.who.int/teams/global-malaria-programme/case-management/diagnosis/rapid-diagnostic-tests/selection-and-procurement;
https://www.theglobalfund.org/media/5891/psm_qadiagnosticsmalaria_list_en.pdf

34

(IEHK 2024 BASIC) UNIT, EQUIPMENT (1.3)			
#	Item description		Qty
37	Basin, kidney, stainless steel, 800-900ml	pce	1
38	Bottle,plastic,1L,w/screw cap	pce	3
39	Bottle,plastic,250ml,wash bottle	pce	1
40	Bowl, stainless steel,150-200ml	pce	1
41	Brush, hand, scrubbing, plastic	pce	2
42	Pail,with bail,handle and lid ,polyethylene,10 L or 15L,	pce	2
43	Scissors,Deaver,140mm,straight, blunt	pce	2
44	Surgical instruments, dressing set	set	2
45	Thermometer,clinical,digital,32-43 Celsius	pce	5
46	Tray, dressing, stainless steel,300mmx200mmx30mm	pce	1
47	Water container, PVC/PE, with tap, collapsible,10 L or 15L	pce	1
48	Book,exercise,A4 size, 100 pages	book	4
49	Pad, note ,plain, A4, A5 or A6 size 100 sheets	pad	10
50	Pen, ball-point, blue	pen	10
51	Mid Upper Arm Circumference (MUAC) measuring tape, infant/ newborn	unit	2
52	Blanket survival, 220 x 140 cm, silver /gold	unit	2
53	Counting triangle pharmacy	unit	1

IEHK 2024 - SUPPLEMENTARY MODULE (outreach population of 10'000 people for 3 months)			
(IEHK 2024 SUPPLEMENTARY) UNIT, MEDICINE, ORAL (2.1)			
#	**Item description**	**UOM**	**Qty**
1	Acetylsalic.ac.75-100mg , gastro resistant tablets	tablet / sachet	1500
2	Amlodipine 5mg	tablet	500
3	Amoxicillin + clavulanic acid 875 mg (as trihydrate) + 125 mg (as potassium salt)	tablet	2000
4	Ascorbic acid, 250mg	tablet/ chewable tab	4000
5	Beclomethasone 100mcg /dos. inhalation (aerosol)	Inhalation (aerosol)	75
6	Bisoprolol 5 mg	tablet	2000
7	Cefalexin 250 mg *	tablet	2000
8	Clotrimazole, pessary 500mg	pessary	100
9	Doxycycline, 100mg	tablet	3000
10	Enalapril 5 mg	tablet	5000
11	Folic acid 5mg	tablet	1000
12	Furosemide 40 mg	Tablet / scored tablets	500
13	Glyceryl trinitrate 500mcg sublingual tablet*	tablet	100
14	Hydrochlorothiazide 25mg	solid oral dosage form	1000
15	Metformin hydrochloride, 500-850 mg , tab	tablet	3000
16	Methyldopa, 250mg	tablet	100
17	Metronidazole, 500mg	tablet	5000
19	Misoprostol 200mcg	tablet	40
20	Nystatin oral suspension 100,000IU/ml	BOT-30ml	50
21	Prednisolone, 5mg	tablet	1000
22	Retinol (vitamin A), 200,000IU	capsule	4000
23	Salbutamol 100 micrograms (as sulphate) per dose	Inhalation (aerosol)	75
24	Silver sulfadiazine, cream 1%	tube, 50g	30
25	Sodium dichloroisocyanure (NaDCC), 1.67g	Tablet effervescent	1200

7 *Cefalexin 250mg could be replaced by Cloxacillin 250mg , quantity remains the same

13 * Glyceryl Trinitrate 500mg sublingual tablets can be replaced by Glyceryl Trinitrate Spray 400 micrograms/metered dose, sublingual spray if disruption in the supply (note that the spray is considered as UN DG)

(IEHK 2024 SUPPLEMENTARY) UNIT, MEDICINE, INJECTABLE (2.2)			
#	**Item description**	**UOM**	**Qty**
26	Ampicillin, 500 mg, powder for injection, vial	vial	100
27	Atropine, 1mg/ml,	1ml/ampoule	50
28	Benzathine benzylpenicillin, 2.4 million IU (≈ 1.8 g) in vial.	Vial /5 ml	50
29	Benzyl penicillin, 5 million IU (3g) /vial, inj*	Vial/ 5ml	250
30	Calcium gluconate, inj. 100mg/ml	10ml/ampoule	10
31	Ceftriaxone, 1g, powder for inj (wt/solvent)	vial	800
32	Compound solution of Sodium lactate (Ringer lactate), inj solution,	500ml bag	200
33	Epinephrine (Adrenaline) 1mg/ml,	1ml/ampoule	50
34	Furosemide, inj 10mg/ml	2ml/ampoule	20
35	Gentamycin 40mg/ml, 2ml ampoules	2ml/ampoule	100
36	Glucose 5%, inj solution	500ml bag	100
37	Glucose 50%, inj solution (hypertonic)	50ml/vial	100
38	Heparin sodium (5'000 UI/ml), inj	vial 5 ml	25
39	Hydralazine, 20mg, powder for inj	amp	20
40	Lidocaine 1% inj	10-20ml/vial	50
41	Magnesium sulphate,inj 500mg/ml	10ml/ampoule	30
42	Hydrocortisone 100mg, powder for inj (as succinate)	vial	50
43	Protamine 10mg/ml	5ml amp	10
44	Naloxone, inj 0.4 mg/ml	1ml/ampoule	10
45	Tranexamic acid 100 mg/mL injectable	amp	20
46	Vitamin K (Phytomenadione) 2mg/0.2ml or 10mg/ml*	amp	30
47	Water for injection	10ml/plastic vial	2000
48	IV giving set ,Y-site, sterile, s.u. with needle 21G	unit	300
49	SET, INFUSION, paediatric, precision, with burette set sterile, s.u.	unit	30

29 *Benzyl penicillin, 5 million IU (3g) /vial, inj . Could be replaced with procaine penicillin G in case of supply issue

46 *Vit K dosage 10mg/ml need job aid to make sure that the correct dose administrated

(IEHK 2024 SUPPLEMENTARY) UNIT, MEDICINE, MENTAL HEALTH (2.3)			
#	**Item description**	**UOM**	**Qty**
50	Biperiden 2mg	tablet	400
51	Carbamazepine 200mg	scored tablet	2200
52	Biperiden 5mg /ml	amp	5
53	Fluoxetine 20 mg, as hydrochloride	tablet	2000
54	Haloperidol 5mg, tablet	Tablet / scored tablets	1300
55	Haloperidol 5mg/ml, inj	1ml/ampoule	20
56	Haloperidol decanoas 50mg/ml *	1ml/ampoule	5

56 * Haloperidol decanoas 50mg/ml amp. will be included if the procurement supply chain is secured ,it can be replaced by Fluphenazine 125 mg/5 mL decanoas

	(IEHK 2024 SUPPLEMENTARY) UNIT, MEDICINE, CONTROLLED (2.4)		
#	Item description		Qty
57	Ketamine inj 50mg/ml	10ml/vial	25
58	Diazepam 5mg	Tablet	240
59	Diazepam inj 5mg/ml	2ml/ampoule	200
60	Midazolam 5mg/5ml or 15mg /3ml	ml / amp	100
61	Intranasal Mucosal Atomization Device	unit	50
62	Morphine, inj 10mg/ml	1ml /amp	50
63	Morphine 10 mg, IR	tablet (Immediate release)	200

59 * From MHGAP: Midazolam is administered buccally or intranasally at a dose of 5-10 mg for adults and 0.2 mg/kg for children. A concentration of 15 mg/3 ml is preferable to keep the volume manageable. Similarly, for an intramuscular injection, a concentration of 15 mg/3 ml is more suitable than 5 mg/5 ml

	(IEHK 2024 SUPPLEMENTARY) UNIT, MEDICINE, COLD CHAIN (2.5)		
64	Intermediate-acting Insulin, injection 100 IU/ml (Human Insulin NPH 100 IU/ml) vial of 10ml	vial 10 ml	20
65	Soluble Insulin, injection 100 IU/ml, (Human Insulin R 100IU/ml) vial of 10 ml	vial 10 ml	20
66	Oxytocin, inj 10 IU/ml	amp	200

	(IEHK 2024 SUPPLEMENTARY) UNIT, MALARIA (2.6)		
#	Item description		Qty
67	Artesunate injection 60mg /ml each box contains : - One vial of Artesunate (as Artesunate acid) powder for Injection,60mg - One ampoule of 5% Sodium bicarbonate. - One ampoule of 0.9% Sodium Chloride Injection	vial	500
68	Disposable Syringe 5 ml (with a graduation of 6ml)	unit	1700
69	Disposable Syringe 2 ml (for the addition of Nacl)	unit	500
70	Disposable Syringe 10 ml	unit	500
71	Needle,disp,18G-21G (0.8x40mm) sterile	unit	1200
72	Needle,disp,23G(0.6x25mm) sterile,	unit	400
73	Needle,disp,25G(0.5x16mm) sterile	unit	400
74	Safety IV catheter for IV injection 20-22G , with port (adult) safety	unit	200
75	Safety IV catheter for IV injection 24G , with port (children) safety	unit	200
76	Safety box for used syringes/needles, 5 liters foldable / flat pack	unit	25
77	3-WAY STOPCOCKS with extension tubing (tap, 3 way, with extension about 10cm)	unit	10
n/a	Poster A3 for reconstitution of Artesunate in French	unit	1
n/a	Poster A3 for reconstitution of Artesunate in English	unit	1
n/a	Poster A3 for reconstitution of Artesunate in Portuguese	unit	1

67 * the following PQ products MA051, MA135,MA152, MA 168 of Artesunate injection 60mg /ml are available as of July 2024. Depending on the manufacturing process the API comes with 1 or 2 solvent, adjuvants or diluent. Note that reconstitution posters/job aids are available for both options. . For more information, please refer to paragraph on Supplementary Malaria unit.

n/a * Ensure alignment of procured product with educational material. Reference to be made to

	(IEHK 2024 SUPPLEMENTARY) UNIT, MEDICINE, PEP (2.7)		
#	Item description		Qty
77	Lamivudine (3TC) + Tenofovir (TDF)+ Dolutegravir (DTG), 300mg+300mg+50mg, tablet 3FDC	tablet 3FDC	1500
78	Abacavir (ABC)+ Lamivudine (3TC) 120mg +60mg dispersible tablet 2FDC	dispersible tablet 2FDC	600
79	Dolutegravir (DTG) , 50 mg (children 20-30kg) tablet	tablet	300
80	Dolutegravir (DTG)* , 10 mg (children > 20kg) tablet	dispersible tablet	60 or 90
81	Azithromycin, oral suspension 200mg/5 ml bottle, 15 ml	bottle, 15ml or 30ml	10
82	Azithromycin, tablets 250mg tablet	tablet	200
83	Cefixime (as trihydrate), powder for oral suspension, 100 mg/5 ml bottle, 15ml or 60 ml	bottle, 15 ml or 60ml	10
84	Cefixime, tablets 200mg* tablet	tablet	100
85	Ceftriaxone 1g, powder for injection	powder inj	10
86	Doxycycline 100mg	tablets	1000
87	Erythromycin 250mg/5ml or Erythromycin 125mg/5ml	bottle 100ml	5
88	Levonorgestrel*, tablets 1.50mcg (or 2X 0.75mcg)	tablet	50
89	Pregnancy test unit	test unit	50

78-79 when PQed and available it could be replaced with 3FDC Abacavir (sulphate)/Dolutegravir (sodium)/Lamivudine Tablet, Dispersible

80 * DTG 10mg box of 60 or 90 can be supply depending on the market availability.

84 * Cefixime 200mg could be replaced with Cefixime 400mg depending on the market availability

88 * Levonorgestrel, could be 1X 1.5mcg or 2X 0.75mcg

	(IEHK 2024 SUPPLEMENTARY) UNIT, RENEWABLES (2.8)		
#	Item description		Qty
90	Apron,protection,plastic,disposable*	unit	100
91	Catheter,Foley,CH12,sterile,disposable	unit	10
92	Catheter,Foley,CH14,sterile,disposable	unit	5
93	Catheter,Foley,CH16,sterile,disposable	unit	5
94	Clamps Umbilical Sterile	unit	100
95	Compress, gauze, non woven 10x10cm,4 plies, non-sterile , woven or non-woven materials	unit	2000
96	COMPRESS, PARAFFIN, 10 x 10 cm, sterile	unit	100
97	Compress,gauze,10x10cm, 12 plies, sterile, woven or non-woven materials	unit	1500
98	Elastic bandage 5-7 cm X 5m , elastic	unit	50
99	Gloves, exam, nitrile* ,medium ,disposable	pcs	100
100	Gloves, exam, nitrile*,large ,disposable	pcs	100
101	Gloves, exam, nitrile*,small,disposable	unit	100
102	Gloves,surg,6.5,sterile,disposable,pair	unit	50
103	Gloves,surg,7.5,sterile,disposable,pair	unit	150
104	Gloves,surg,8.5,sterile,disposable,pair	unit	50
105	Gynaecological gloves, size 7.5 , pairs, sterile	unit	25
106	Indicator, TST (Time, steam, temperature) Control spot	unit	300
107	Lubricant, water based or silicone oil sterile, unidose, 5g*	unit	100
108	Medical paper tape 2.5cm X 5 m	unit	12
109	Medicines Ziplock bag with pictogram, size 8-10cm X 15-20cm	unit	1000
110	NASOGASTRIC TUBE, ENFit tip, s.u., 40-60 cm, CH08, light blue (baby)	unit	20
111	NASOGASTRIC TUBE, ENFit tip, s.u., 40-60 cm, CH10, black (infant)	unit	50
112	Needle, scalp vein,25G (0.5 x 19 mm) , bevel sterile, disposable	unit	300
113	Needle,disp,18G(1.1x40mm) sterile	unit	2000
114	Needle,disp,21G(0.8x40mm) sterile	unit	1500
115	Needle,disp,23G(0.6x25mm) sterile	unit	1500
116	Needle,disp,25G(0.5x16mm) sterile	unit	100
117	Needle,spinal,22G(0.7x40mm), bevel , sterile, disposable	unit	25
118	Paper sheet, crepe 50-60cmX50-60cm for sterilization pack	unit	100
119	Razor safety single use	unit	100
120	Safety box for used syringes/needles, 5 litters	unit	50
121	Safety Cannula,IV short,18G (1.3 x 45 mm) sterile, disposable, single use	unit	100
122	Safety Cannula,IV short,22G (0.8 x 25 mm) sterile, disposable single use	unit	50
123	Safety Cannula,IV short,24G (0.7 x 19 mm) sterile, disposable single use	unit	50
124	3-WAY STOPCOCKS with extension tubing (tap, 3 way, with extension about 10cm)	unit	10
125	Salem Tube, double-lumen cylinder aspirating/feeding,CH16,conical tip, sterile, disposable	unit	10
126	Scalpel blade,ster,disp,no.22	unit	100
127	scalpel handle n#4	unit	2
128	Sterilization indicator tape /autoclave steam indicator tape,19mm x 50m	roll	1
129	Suture, non absorbable 3/0, needle ½ or 3/8 , 20 - 25 mm cutting or reverse cutting	unit	144
130	Suture, non-absorbable 5/0, needle ½ or 3/8, length 13-16mm taper	unit	36
131	Syringe Insulin, 1ml with needle 8-12mm graduated 100 Units	unit	400
132	Syringe,disposable,10ml,sterile	unit	600
133	Syringe,disposable,1ml,sterile	unit	200
134	Syringe,disposable,20ml,sterile	unit	100
135	Syringe,disposable,2ml,sterile	unit	700
136	Syringe,disposable,5ml,sterile	unit	2000
137	Syringe, feeding, 20ml,enfit, sterile	unit	50
138	Syringe, feeding, 50ml,conical tip, sterile	unit	10
139	Tongue depressor, wooden, disposable	unit	500
140	Urinary drainage bag, non-return valves, and emptying system (tap), sterile , 2000ml	unit	10
141	Urinary drainage bag hook hanger	unit	10
142	Urine test strips for ketones, glucose and protein	unit	100

(IEHK 2024 SUPPLEMENTARY) UNIT, EQUIPMENT (2.9)			
#	Item description		Qty
143	Basin, kidney, stainless steel,825ml	unit	2
144	Bowl, stainless steel,180ml	unit	2
145	Brush,hand,scrubbing,plastic	unit	2
146	Battery,R6 alkaline AA sze,1.5V	unit	12
147	Drawsheet,plastic,90x180cm	unit	2
148	Filter,drinking,candle,10-80L per day	unit	3
149	Forceps,artery,Kocher,140mm,straight	unit	2
150	Otoscope set, cased with spare battery and spare parts	unit	1
151	Adult Digital Fingertip Pulse Oximeter for professional use with spare battery,R6 alkaline AA sze,1.5V	unit	1
152	Scale (only),infant,spring type,25kg x 100g*	unit	1
153	Weighing trousers for scale infant spring, or sling for use with the scale	unit	1
154	Scale, electronic, mother/child,150kgx100g	unit	1
155	Scissors,Deaver,140mm,straight,sharp/blunt	unit	2
156	Sphygmomanometer,(adult),aneroid, manual with adult and children cuffs (minimum)	unit	4
157	Sterilizer,steam 24 Liters	unit	1
158	Stethoscope,binaural,complete	unit	4
159	Stethoscope,foetal,Pinard	unit	1
160	Stove, kerosene, single-burner, pressure	unit	1
161	Surgical instruments, delivery & episiotomy set	unit	1
162	Surgical instruments, dressing set	unit	5
163	Surgical instruments, suture set (abces)	unit	2
164	Mid Upper Arm Circumference (MUAC) measuring tape, infant/ new-born	unit	50
165	Tape, measure, vinyl-coated,1.5m.	unit	5
166	Thermometer,clinical,digital,32-43ºC	unit	10
167	Timer,60 min	unit	1
168	Tourniquet, latex rubber, or cotton with bucket 75cm	unit	4
169	Tray,dressing,ss, size range: 300-480x200-330x20-30mm	unit	1
170	Pill cutter	unit	1
171	peak flow meter	unit	1

151 * Scale, infant,spring type,25kg x 100g, can be repalced with baby scale (more expensive).

MODULE, GLUCOMETER,hospital, 1 glucometer, 1000 tests & lancets			
172	Glucometer for Hospital (with control solution for calibration)	unit	1
173	Glucose strips	unit	1000
174	Blood lancets	unit	1000
175	Lancet pen device	unit	2

Annex 2:

GUIDE D'ENTRETIEN SEMI-DIRECTIF

Sujet : Contribution des kits médicaux standardisés à la production de déchets médicaux en contexte humanitaire

Introduction

Bonjour et merci d'avoir accepté de participer à cet entretien.
Je mène une recherche dans le cadre de mon mémoire de Master sur l'impact des kits médicaux standardisés, comme les kits IEHK de l'OMS, et leur utilisation en pratique professionnelle.

L'entretien dure environ 30 à 45 minutes. Vos réponses seront traitées de manière confidentielle et anonymisée dans mon analyse. Il n'y a pas de bonnes ou de mauvaises réponses : je cherche à recueillir votre expérience et votre point de vue.
Est-ce que vous êtes d'accord pour poursuivre ? Est-ce que vous m'autorisez à enregistrer cet entretien pour ne rien perdre de vos propos?

Présentation du participant

Nom ou initiales (pas obligatoire) :

Fonction actuelle (rôle et missions):

Organisation :

Expérience en contexte humanitaire (nombre d'années ou de missions) :

Expérience spécifique avec les EHKs (ex. IEHK, ou autre)

Pays ou contextes d'intervention principaux :

Questions

1. Utilisation des EHK sur le terrain

- Quels types de kits utilisez-vous ou avez-vous utilisés ?
- Si vous avez participé à la composition des kits comment les avez-vous composés ?
- Pouvez-vous me décrire comment les kits médicaux d'urgence (comme les IEHK) sont utilisés dans les contextes où vous avez travaillé ?
- Y a-t-il des éléments du kit que vous trouvez particulièrement utiles
- Y a-t-il des éléments du kit que vous trouvez, au contraire, peu adaptés aux besoins du terrain ?
- Est-ce qu'il vous arrive de modifier le contenu des kits avant ou pendant leur utilisation (par exemple, retirer, ajouter ou remplacer certains produits) ? Si oui, pourquoi ?
- Quels sont selon vous les enjeux principaux à l'utilisation des kits sur le terrain par les équipes ?

2. Déchets médicaux associés à l'usage des kits

- Selon votre expérience, quels types de déchets médicaux les kits génèrent-ils le plus fréquemment sur le terrain ?
- Avez-vous constaté que certains produits ou emballages sont régulièrement jetés sans être utilisés ? Si oui, lesquels et pourquoi ?
- Quelles sont les principales difficultés que vous rencontrez pour gérer les déchets issus de ces kits en mission humanitaire ?

3. Améliorations possibles et perspectives

- Quel serait les changements à mettre en place pour limiter la production de déchets…
- Faudrait-il changer la conception ou la composition des kits pour limiter la production de déchets ?
- Selon vous, certains aspects logistiques (stockage, transport, formation du personnel...) pourraient-ils être repensés pour mieux gérer ou réduire les déchets médicaux ?
- Avez-vous déjà vu ou entendu parler d'initiatives intéressantes visant à rendre l'utilisation des kits plus durable ?
- Si vous deviez faire une recommandation pour améliorer l'impact environnemental des kits médicaux en situation d'urgence, laquelle serait-elle ?

Conclusion

Merci beaucoup pour le temps que vous m'avez accordé et pour la richesse de vos réponses.

Vos retours vont m'être très utiles pour mieux comprendre les enjeux liés aux déchets médicaux et à l'usage des kits dans les contextes humanitaires.

Si vous le souhaitez, je peux vous partager les résultats ou une synthèse de mon mémoire une fois finalisé. Est-ce que je peux revenir vers vous si j'ai besoin de clarifier certains éléments par la suite ?

Encore merci pour votre disponibilité

Annex 3:

https://docs.google.com/forms/d/e/1FAIpQLSesOmEiWYSoQUwqg-Fp-sOo0rtZEi_O_mG5dp2h8VfQhG1-7g/viewform?usp=sharing&ouid=110425146162565959181

Questionnaire Kits Médicaux Standardisés

Bonjour et merci de prendre le temps de répondre à ce questionnaire.

Je suis étudiante en Master 2 de Santé Publique Internationale.

Actuellement en stage au sein du Département Santé Internationales de la Croix-Rouge française, je réalise une étude pour mon mémoire de fin d'études.

Mon travail porte sur l'utilisation des **kits médicaux standardisés** (de type IEHK, kits choléra, etc.) en contexte humanitaire, et sur leur contribution potentielle à la production de déchets médicaux.

À travers ce questionnaire, je fais appel à votre **expertise et à votre expérience de terrain**. Votre contribution me sera précieuse pour enrichir cette étude. Un grand merci pour votre aide !

*Votre participation est **entièrement volontaire**. Vous pouvez choisir de ne pas répondre à certaines questions ou de ne pas terminer le questionnaire si vous le souhaitez. Les informations recueillies seront **traitées de manière strictement confidentielle et anonymisée**, et seront utilisées uniquement dans le cadre de mon mémoire universitaire.*

Le questionnaire prend environ **5 à 20 minutes** à remplir, selon le niveau de détail que vous souhaitez apporter à vos réponses.

Si vous avez des questions, ou si vous souhaitez modifier ou retirer vos réponses après envoi, vous pouvez me contacter à l'adresse suivante : safa.gouglou@croix-rouge.fr.

Encore merci pour votre participation !

Safa

Indique une question obligatoire

1. Avez vous déjà eu une ou plusieurs expériences de déploiement avec usage de kit médicaux (IEHK ou autre)? *

   *Les kits médicaux standardisés sont les ensembles de cartons contenant des **médicaments et du matériel médical essentiels**, préparés à l'avance pour pouvoir être utilisés rapidement en mission humanitaire. Leur contenu est défini par des listes établies par l'OMS ou d'autres organisations, comme pour les kits IEHK ou choléra, par exemple.*

   Une seule réponse possible.

   - ◯ Oui
   - ◯ Non

Votre profil

2. Nom et Prénom (facultatif)

   _____

3. Fonction actuelle (rôle et missions)

   _____
   _____
   _____
   _____
   _____

4. Organisation

   Une seule réponse possible.

   - ◯ CRF
   - ◯ Autre : _____

5. Expérience en contexte humanitaire (nombre d'années ou nombre de déploiements)

   _____

6. Avez-vous déjà utilisé des kits (IEHK ou autres) ? Si oui, dans quels contextes (nombre, pays, contexte d'intervention) ?

Utilisation des Kits sur le terrain

Dans cette section, vous êtes invité·e à partager votre expérience d'utilisation des kits sur le terrain.

7. Quels types de kits avez-vous déjà utilisés ?

8. Pouvez vous décrire comment les kits ont été utilisés dans les contextes où vous avez travaillés?

9. Avez vous été amenés à participer à la composition de kits, ou à former vos propres kits ? Si oui, pouvez vous développer?

10. Y a t-il des éléments des kits que vous trouvez particulièrement utiles ?

11. Y a t-il des éléments des kits que vous trouvez, au contraire, peu adaptés aux besoins du terrain?

12. Est ce qu'il vous est déjà arrivé de modifier le contenu des kits avant ou pendant leur utilisation (retirer, ajouter ou remplacer des produits)? Si oui, pourquoi?

13. Quels sont, selon vous, les enjeux principaux à l'utilisation des kits sur le terrain par les équipes?

Déchets médicaux associés à l'usage des kits

14. Selon votre expérience, quels types de déchets médicaux les kits génèrent ils le plus fréquemment sur le terrain ?

15. Avez-vous constaté que certains produits ou emballages étaient régulièrement jetés sans être utilisés ? Si oui, lesquels et pourquoi ?

16. Quelles sont les principales difficultés que vous avez pu rencontrer pour gérer les déchets issus de ces kits en mission ?

17. Avez vous constaté une grande quantité de déchets provenant de l'usage des kits?

Améliorations possibles et perspectives

Dans cette section vous êtes invité.es à proposer des améliorations ou changements qui vous sembleraient utiles concernant les kits: leur utilisation, leur composition, ou tout autre aspect.

18. Quels seraient les changements à mettre en place pour limiter la production de déchets?

19. Selon vous, certains aspects logistiques (stockage, transport, formation du personnel…) pourraient ils être repensés pour mieux gérer ou réduire les déchets médicaux ?

20. Si vous deviez faire une recommandation pour améliorer l'impact environnemental des kits médicaux en situation d'urgence, laquelle serait elle ?

Abstract in French

Titre: Entre rapidité et durabilité: perceptions des acteurs humanitaires sur le rôle des kits sanitaires d'urgence dans la production de déchets médicaux.

Contexte: Les kits sanitaires d'urgence standardisés (EHK), tels que le kit inter-agences de l'OMS, sont au cœur des interventions sanitaires humanitaires, permettant un accès rapide à des médicaments et dispositifs essentiels. Cependant, leur composition standardisée et leurs systèmes d'approvisionnement rigides peuvent contribuer à la production de déchets médicaux, pouvant provenir d'articles non utilisés, des emballages ou des produits périmés, soulevant des enjeux environnementaux, éthiques et logistiques.

Objectif : Ce mémoire a étudié la perception qu'ont les acteurs humanitaires de la contribution des EHK à la production de déchets médicaux en contexte d'urgence, en s'intéressant plus particulièrement à leur composition, leur utilisation et aux pratiques logistiques associées.

Méthodes : Une approche qualitative a été choisie, reposant sur des entretiens semi-directifs et des questionnaires écrits, auprès de 16 professionnels de l'humanitaires, incluant pharmaciens, médecins, infirmiers, logisticiens et experts WASH. Les participants ont été sélectionnés pour leur expérience directe avec les EHKs lors d'urgences aiguës. Les données ont été analysées thématiquement selon le cadre de Braun et Clarke.

Résultats : Cinq thèmes principaux ont émergé : Adaptabilité et limites structurelles, kits servant de base essentielle mais nécessitant souvent des compléments et comportant des articles systématiquement inutilisés; Contraintes logistiques et organisationnelles, problèmes de stockage, outils de gestion de stock insuffisants, rotation rapide du personnel et responsabilités floues augmentant les risques de gaspillage; Gestion des déchets médicaux et perceptions, pratiques très variables, avec des ressources, une traçabilité et une intégration limitées dans les priorités opérationnelles ; Priorisation en contexte d'urgence, gestion des déchets reléguée au second plan face à l'urgence des soins ; et Axes d'amélioration, meilleure coordination, réapprovisionnement flexible, formation accrue et suivi numérique. Les déchets étaient souvent considérés comme inévitables, mais leur ampleur et leur impact restaient sous-estimés et peu documentés.

Conclusion: Les EHKs restent indispensables pour des interventions rapides, mais leur conception et déploiement actuels peuvent générer des déchets évitables. L'intégration de la prévention et de la gestion des déchets dans la conception, l'approvisionnement et les opérations est essentielle.

Implications de santé publique: Une gestion inadéquate des déchets médicaux peut nuire à l'environnement, mettre en danger la santé publique et éroder la confiance envers les acteurs

humanitaires. Des modèles d’approvisionnement plus flexibles, des systèmes de données renforcés et une meilleure formation pourraient favoriser des réponses plus respectueuses de l’environnement, sans compromettre la qualité ni la rapidité des soins.

Mots-clés: santé humanitaire, kits sanitaires d’urgence, déchets médicaux, logistique, durabilité, recherche qualitative