

A large, abstract purple graphic on the left side of the page, consisting of a thick curved line that forms a large loop, with a smaller circle above it and a long, sweeping line extending from the loop towards the top right corner.

## **Establishment of Medicines Waste Management and Disposal System in Ethiopia: a Report on Progress and Achievements**

**December 2012**



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Systems for Improved Access  
to Pharmaceuticals and Services



## **Establishment of Medicines Waste Management and Disposal System in Ethiopia: a Report on Progress and Achievements**

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## **About SIAPS**

The goal of the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program is to assure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. Toward this end, the SIAPS result areas include improving governance, building capacity for pharmaceutical management and services, addressing information needed for decision-making in the pharmaceutical sector, strengthening financing strategies and mechanisms to improve access to medicines, and increasing quality pharmaceutical services.

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## ACRONYMS

EPA	Environment Protection Authority
FMHACA	Food, Medicines and Healthcare Administration and Control Authority
FMOH	Federal Ministry of Health
HF	Health Facility
HSDP	Health Sector Development Plan
PFSA	Pharmaceutical Fund and Supply Agency
RHB	Regional Health Bureau
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SPS	Strengthening Pharmaceutical Systems
USAID	US Agency for International Development
TOR	terms of reference
WHO	World Health Organization

## EXECUTIVE SUMMARY

In the process of ensuring availability of medicines to the population, there is a possibility that these medicines may be damaged or expire and become unsafe for use. In addition, medicines left over from patients and those identified to be defective may accumulate over time adding to the stock of unsafe for use medicines. The lack of safe handling and timely disposal of these products can be a threat to public health.

In Ethiopia, there is a huge accumulation of medicines waste as a result of the absence of good pharmaceutical management practices and the shortage of appropriate disposal facilities. This has led to repeated complaints from health facilities in public and the private sector. In many of the public health facilities, quite a large proportion of the space at the medicines store is occupied by expired and unfit for use pharmaceuticals—this aggravates the store’s space shortage. Moreover, the lack of clear directives and guidelines has proved frustrating to professionals at public and private health facilities as to what to do with the existing stock of unfit for use pharmaceuticals. Those limited number of facilities that are trying to dispose these products often use unproven and at times dangerous disposal methods that could be detrimental to the environment and health of the public.

In response to this challenge, FMHACA developed “Medicines Waste Management and Disposal Directive” and a national strategic framework for its effective implementation with technical assistance from Strengthening Pharmaceuticals Systems (SPS) Program and its follow-on, the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program, both funded by the US Agency for International Development (USAID). These documents were both enhanced through a continuous and wider stakeholder consultation process. This directive has been developed taking into account the current mandate given to FMHACA. The private sector involvement in the provision of medicines waste disposal services is well acknowledged by this directive. The directive has also clearly outlined as to how a safe disposal system should be established and operated in Ethiopia. This document, the first of its kind in Ethiopia, provides clear guidance and direction on the management of medicines waste disposal.

Following the finalization and publication of the directive and its implementation framework, the documents were publicized to all relevant stakeholders. Accordingly, five regional popularization workshops were organized at different locations covering all regions of the country. The new directions of the regulatory authority in relation to medicines waste disposal and the roles and responsibilities of relevant stakeholders in implementing and enforcing a safe medicines waste disposal system were presented and discussed at these events. Almost 300 participants drawn from the 5 larger regions participated in these workshops and overall consensus was reached on the way forward. Stakeholders then developed their course of action regarding the new disposal directive upon return to their work places.

The feedback obtained from most workshop participants indicates that the variety of options recommended in the directive, ranging from simple to complex technologies, provides an opportunity to identify/select the methods that are appropriate, feasible, and affordable depending on the size/type of institution in question and the nature of medicines waste generated.

The stakeholders who participated in all events pointed out that the issuance of the directive is timely, given the existing challenges and promised to contribute towards its proper execution. The advanced disposal methods are also perceived as a proactive measure to establish capacity for a safe and sustainable disposal system in the country.

In summary, the development and dissemination of the medicines waste directive has made all stakeholders aware of the safe and proper management of medicines wastes. Moreover, following publication of the directive, but before its dissemination, some institutions have already started exploring various options to deal with disposal of existing wastes. For instance, some health facilities in Tigray region have utilized the services of a cement factory for disposal of accumulated medicines waste. Some private hospitals in Addis Ababa have already secured appropriate technology to deal with their own wastes. Having recognized the potential for future business, some private institutions have also showed interest to invest in a proper pharmaceutical disposal system. Overall, the directive has been positively embraced by the stakeholders. So existing opportunities should be taken to lay down the foundation for establishment of safe and environmental friendly medicine waste disposal mechanisms that could even be used as a benchmark to the other sectors.



## INTRODUCTION

Medicines are substances intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease. They are indispensable products in the course of health care service delivery. Continuous availability of quality assured medicines is crucial for uninterrupted delivery of health care services. Accordingly, the appropriate management of medicines is one of the key functions of the health care delivery system.

However, while working to ensure that adequate quantities of medicines are available, some medicines may expire or be damaged before they are used, making them unsafe for use. In addition, medicines left over from patients and those identified to be of defective quality may accumulate over time adding to the stock of unsafe medicines. The resulting stock piling of these unfit for use medicines is usually called medicines waste. The lack of safe handling and timely disposal of these products can be a threat to public health.

The continued accumulation of medicines waste may create administrative burdens and can be a threat to the environmental and health of the public. Improper disposal may be hazardous if it leads to contamination of water supplies used by nearby communities or wildlife. Expired medicines may come into the hands of scavengers and children if a landfill is insecure. Pilfering from a stockpile of waste medicines or during sorting may result in expired medicines being diverted to the market for resale and misuse. Most medicines after expiry become less effective and a few may develop a different adverse drug reaction profile. In general the main sources of health risks as a result of medicines waste are contamination of drinking water, air pollution caused by release of toxic pollutants, endangered aquatic life due to non-biodegradable chemicals, and reuse of expired medicines.

The Ethiopian situation is not different from the rest of the world and there are large volumes of medicines waste accumulation across the pharmaceutical supply chain. The lack of clear directives and guidelines has resulted in continued frustration to professionals at public and private health facilities as to what to do with the existing stock of unfit for use pharmaceuticals. This has forced some health facilities to follow disposal practices that are hazardous to the environment and health of the public. Therefore, there was an urgent need for systems and policy directions to guide the management of medicines waste.

Having acknowledged the challenges and risks involved, the USAID funded program, Strengthening Pharmaceuticals Systems (SPS) and its follow on Systems for Improved Access to Pharmaceuticals and Services (SIAPS), was requested by the mission to assist the government of Ethiopia in establishing systems for managing medicines waste disposal. Accordingly, SPS and its follow on SIAPS program provided financial and technical assistance to the Food, Medicines and Health Care Administration and Control Authority (FMHACA) of Ethiopia in developing such a system.

Based on the mandate given to FMHACA through proclamation no. 661/2009, the collaborative effort resulted in the development of a medicines waste management and disposal directives. To

guide the effective implementation of the directives, a national strategic framework on medicines waste management and disposal was developed

The directive has acknowledged multiple feasible alternatives for managing medicines waste disposal including the private sector providing medicines waste disposal services, which was not allowed previously. The directive has also clearly outlined as to how safe disposal systems should be established and practiced in the country. This document is the first of its kind in Ethiopia providing a thorough guidance and direction on the management of medicines waste disposal.

These policy documents were developed after a series of consultative workshops among the key stakeholders selected from different institutions including the Ethiopian Environment Protection Authority, Addis Ababa City Administration Solid Waste Management Agency, Pharmaceutical Fund and Supply Agency (PFSA), Federal Ministry of Health (FMOH), and Regional Health Bureaus (RHBs). Following its development and printing, FMHACA collaborated with SIAPS to hold five workshops in Bahir Dar, Hawassa, Adama (2 workshops for stakeholders from Oromia and Addis Ababa), and Mekele for the key regional stakeholders so as to familiarize them with the directive and facilitate its proper implementation.

## **DEFINING THE SYSTEM AND ESTABLISHING CONSENSUS**

The development of appropriate policy and legal document for safe and sustainable disposal of medicines waste was long overdue. There hasn't been much prior experience in dealing with safe management of such type of wastes. As a result, there was confusion and lack of clarity as to how to address the subject. The only reference available was the draft medicines disposal guideline which was a replica of guideline developed by the World Health Organization (WHO). The draft guideline was meant to serve as a guide for disposal of medicines donated in and after emergencies during conflict and natural disasters but served as an important reference to developing the new guidelines.

Prior to 2009, the then Drug Administration and Control Authority (DACA) used to have dual responsibilities with regard to medicines waste disposal: regulating disposal practices and providing disposal services for retail pharmacies and other pharmaceutical companies upon their request. The practice was simple—landfill that doesn't consider the safety of the environment and health of nearby community or burning using incinerators made locally from bricks which do not generate the required temperature to safely destroy wastes.

As per the new proclamation, FMHACA has been mandated to ensure the safe disposal of medicines waste. In this role, FMHACA had been limited to providing regulatory oversight. But to properly regulate the disposal of medicines, it was necessary to develop a detailed directive on the matter. In 2010, FMHACA requested SPS to provide technical and financial support with developing a directive in accordance with the new mandate. Since USAID/Ethiopia was also interested in this area, SPS committed the required resources and a senior expert was seconded to FMHACA to support the activity.

The FMHACA leadership held discussions to agree on the basic principles underlying the new directive and its scope of application. SPS took the technical lead in developing the draft directive as per the consensus established with FMHACA leadership. After several months of work, a draft directive on the management and disposal of medicines waste was developed. Once the draft was finalized, FMHACA and SPS thoroughly discussed how this directive can be put into action and reached consensus on how to prepare a national framework to guide its effective implementation across the country.

### **Development of Legal Frameworks**

The technical experts drawn from SIAPS and FMHACA conducted a thorough desktop review and reviewed many documents on best practices worldwide, including WHO's Guidelines for Safe Disposal of Unwanted Pharmaceuticals in and after Emergencies and Tanzania's Guidelines for Safe Disposal of Unfit Medicines and Cosmetic Products. Experiences of the United Kingdom and South Africa that best fit the Ethiopian context were identified and adapted. Finally, a draft directive was presented to FMHACA management for review. The draft included the following fundamental principles—

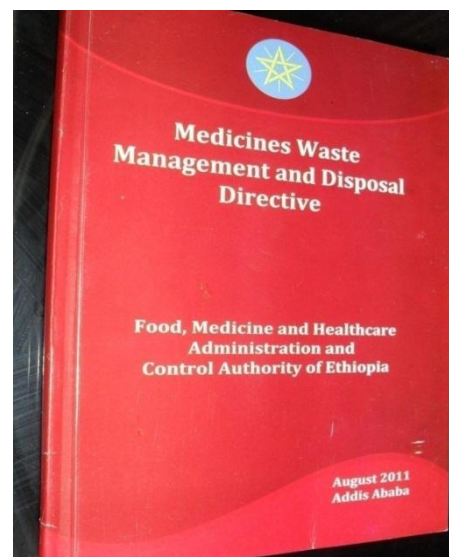
- **The new directive should allow and encourage the involvement of the private sector in providing disposal services to different health institutions and pharmaceutical supply chain actors based on a transparent licensure requirement and procedure.** This principle is adopted from the best practices observed from the Addis Ababa City Administration's municipal waste management practices. In addition to disposal services provided by the City Administration, the private sector was found to provide services in disposing solid and liquid wastes to the residents of Addis Ababa and different city organizations. Experiences from the United Kingdom and South Africa were also taken into consideration.
- **Health facilities, medicines manufacturers, importers, and distributors should have the right to establish their own disposal facility that fulfills all the requirements for safe disposal of medicines waste.** The principle is accepted because the country currently lacks private firms that operate disposal facilities and this may lead to further accumulation of medicines waste. So the involvement is open to everyone as far as they comply with the requirements.
- **Medicines wastes should be managed and disposed by those who generated them.** Any health facility; medicines manufacturer, importer, or distributor; retail pharmacy; or any institution managing and using pharmaceuticals should be responsible for disposing of medicines in a way that is safe for the public and environment either through its own disposal facility or through a contractor.
- **Any disposal facility and disposal practice should be licensed and approved by an appropriate regulatory organ.** Federal and regional level regulatory bodies are responsible to make sure that disposal of medicines is safe for the public and the environment.
- **The standards for government are the same as those for privately owned health facilities or pharmaceutical suppliers or manufacturers during implementation of the new directive.** Everyone should be governed equally and the new directive is applied to all of them.
- **Medicines waste management and disposal practices should be standardized to minimize risks.**
- **The health of the public and the environment should be protected from any risks associated with medicines wastes and its disposal.**

Overall consensus among FMHACA management on these basic principles took several months of discussions. The first draft was further refined by stakeholders selected from the Ethiopian Environment Protection Authority, Addis Ababa City Administration Solid and Liquid Waste Management Agency, PFSA, FMOH RHBs, private import/distributors, professional associations, universities, and selected public/private health facilities.

Finally, on August 12, 2011, FMHACA management approved the directive to be part of the country's legal framework. Entitled "Medicines Waste Management and Disposal Directive," it covers the following areas—

- Introduction
- General Provisions about Medicines Waste
- Provisions regarding Medicines Waste Management and Disposal System
- Accepted Disposal Methods
- How to Store, Sort and Transport Medicines Waste
- Types of Medicines Waste and Their Disposal Methods
- Miscellaneous Provisions

In this directive, health institutions and other establishments which generate medicines waste were granted a one-year grace period to make the necessary preparations. After the expiry of this grace period, the new directive will become law as per the country's legislations.



## **Development of National Strategic Framework**

During the consultation period, FMHACA management was seriously concerned on how the new directive would be effectively implemented. This was because the current medicines waste disposal practice is far behind the requirements indicated in the new directive. There is still huge expectation that FMHACA will be responsible for disposing of medicines waste as it used to do under DACA. Then two recommendations emerged for this serious concern. The first was development of a national strategic framework that stipulates the most appropriate strategies and the roles and responsibilities of different stakeholders in implementing these strategies. The second was popularization of the new directive to all relevant stakeholders especially to regional health bureaus, regional health regulatory bodies, and environment protection authorities and health facilities.

Accordingly, SIAPS has supported FMHACA in developing the national strategic frameworks that facilitates the effective implementation of the new disposal directive. Many consultative meetings and one national workshop were held to make sure that the roles and responsibilities of different stakeholders are in line with their institutional mandates. In addition, these meetings and workshop helped contribute to developing effective strategies in establishing safe and sustainable medicines waste management and disposal system in the country. However, this national strategic framework is not yet approved as FMHACA still believes that it requires one consultative meeting with key players, such as the FMOH, RHBs, city administrations like Addis Ababa and Environment Protection Authorities, to better clarify the mandates, roles, and responsibilities of each institution.

The framework has identified the following strategies—

- Build human resource capacity
- Mobilize resources
- Set up medicines waste logistics
- Develop communication for advocacy and behavioral change
- Implement medicines waste minimization, reuse, and recycling
- Establish disposal facilities at logistically appropriate sites
- Establish national and regional committees for medicines waste management and disposal coordination
- Develop interim strategy to deal with existing accumulated medicines waste

At present, FMHACA is slated to pay for all the required effort in finalizing this strategic document and take the overall leadership in implementing the new directive.

### **Popularization of the New Disposal Directive and the Draft National Strategic Frameworks**

As part of the short-term plan for expediting implementation of the new disposal directive, FMHACA conducted a series of popularization workshops (annex A) along with relevant stakeholders located in different regions in the country. Among the six workshops planned by the authority, five of them were conducted in major regions of the country with almost 300 participants attending (annex B).



Photo by: Meressa Woldegabriel

*Participants gather during the workshop held at Mekelle, Tigray Regional State*

## **Objectives of the Popularization**

- Familiarize stakeholders on how to protect public health and the environment by ensuring safe disposal of medicines waste
- Introduce stakeholders to cost-effective safe disposal methods based on international best practices and country context
- Familiarize stakeholders working at different levels with their roles and responsibilities
- Emphasize the importance of complying with the national disposal directives
- Promote the involvement of the private sector in medicines waste management and disposal services
- Strengthen monitoring and evaluation system for medicines waste management and disposal practices

## **Regional Commitments**

The first round popularization workshop was conducted at Bahir Dar for stakeholders the Amhara Regional State June 14–15, 2012. The workshop was officially opened by Mr. Ayelign Mekonnen, head of the Amhara Regional State Health Bureau. In his opening speech, Mr. Ayelign said that medicines waste disposal has become a serious challenge to the region. He expressed his belief that the new directive and its implementation will help the region in mitigating challenges.

The second round workshop was conducted at Hawassa for state stakeholders from the Southern Nations and Nationalities Regional State September 20–21, 2012. The workshop was officially opened by Mr. Kare Chawicha, head of the Southern Nations and Nationalities Regional State Health Bureau. Mr. Kare stated that the region is working hard in achieving the goals stated by the country's Growth and Transformation Plan and the Health Sector Development Plan (HSDP) IV. In doing so, medicines waste minimization and economic use of resources is key. Mr. Kare said that there are medicines unfit for use, which have accumulated at different levels of the health care system, that need to be removed. Therefore, there should be a safe disposal system in our region that protects the environment and our society. However, as he pointed out, disposal has become a serious and complicated regional challenge that needs to be properly managed. Mr. Kare expressed his belief that the new directive and its implementation will help the region in mitigating the challenges. Finally, he said that after the familiarization meeting, participants should work accordingly when they go back to their workplaces.

The third round popularization workshop was conducted at Adama for state stakeholders from the Oromiya Regional State during October 5–6, 2012. The workshop was officially opened by Mr. Bedlu Hailemariam, head of the Oromiya Regional State Health Bureau Regulatory Core Process. Mr. Bedilu told attendees that the country is moving forward in implementing the



Growth and Transformation Plan and HSDP is the main agenda for the region's health sector. Under HSDP IV, quality service delivery is one of the key areas of strategic intervention, he said. Ensuring, the supply of quality medicines and its rational use are important areas that the health work force has to work hard to achieve. In doing so, generation of medicines waste is unavoidable and requires safe waste disposal practices. This has been addressed by the new medicines waste management and disposal directive which should be welcomed by the region. Mr. Bedilu recommended that participants work in compliance with the new directive issued by FMHACA at their work places.

The fourth round popularization workshop was conducted at Adama for stakeholders from Addis Ababa City Administration and partial Oromiya Region in October 8–9, 2012. The workshop was officially opened by Sr Yeshialem Bekele, Standard Setting Team Leader of FMHACA.



Photo by Yeshialem Bekele

*Addis Ababa Participants Attending the Workshop During the Fourth Round Workshop*

The fifth round popularization workshop was conducted at Mekelle on October 20–21, 2012, with a target audience of stakeholders drawn from different sectors, mainly health, of the Tigray Regional States. The workshop was officially opened by Mr. Zemenfeskidus Hadgu, head of the Tigray Regional State Health Bureau Regulatory Core Process. Mr. Zemenfeskidus told the audience that the public is demanding strong health regulation. Ensuring the proper and safe disposal of medicines waste is an important regulation which need due attention. There is a serious concern that medicines are being disposed in unprofessional manner which has adverse effect on the environment and public health. Mr. Zemenfeskidus stressed that the region expects a lot from the participants and advised all to forward their valuable workshop inputs toward implementing a safe medicine disposal system in the region.



## **Presentations and Discussions**

Proclamation no. 661/2009, the new disposal directive, the draft national strategic frameworks, medicines waste problems, and international experiences with medical waste management were presented to participants. The workshops were conducted in an interactive manner so that participants could discuss the magnitude of the existing problems, best practices if any, their views on the feasibility of the new directive, and what has to be done to move forward in accordance with the directive. Participants at different sites presented a number of questions and comments. The participants' question and suggestions, and the organizers' responses are summarized below.

## **Questions and Answers**

**Q.** What is an appropriate organ mentioned on page 5 of the new directive?

**A.** As defined by the directive, it is a regulatory body authorized to execute regulatory functions at the regional, zonal, and district levels.

**Q.** What should a health facility do when medicines expire after this directive is implemented? What practical interventions will be taken as a result of this directive?

**A.** The directive encompasses simple to advanced disposal facilities. Therefore, after sorting of medicines waste and choosing the best available option in terms of their current capacity and resources, health facilities can dispose of their waste. For hazardous wastes, they can securely and separately store them until safe disposal system is in place.

**Q.** What is approved by an appropriate body at the health facility level to execute appropriate disposal of medicines waste?

**A.** The appropriate body approves the disposal facility available at the health facility and type of medicines waste to be disposed by the selected disposal method. This regulatory practice will have multiple purposes. It regulates what is actually disposed and whether the disposal practice is safe to the public and environment.

**Q.** Understanding the fact that there is no disposal firm that is readily available to carry out appropriate disposal at this time, does that make sense requesting us to follow the new directive?

**A.** It is true that the regions have no disposal facility that meet the required standards. However, the purpose of this popularization is to execute simple but safe disposal techniques until the region will have the required disposal facility as per the new directive. In addition, this directive gives opportunity for the private sector to engage in providing disposal services and this has to be promoted in the regions.

**Q.** You have told us incomplete combustion pollutes air and simple landfill pollutes underground water. So what can we do?

- A. Yes, incomplete combustion of some pharmaceuticals is not allowed because of safety reasons. This doesn't mean that there is no other option allowed by the directive. There are multiple safe disposal options, such as encapsulation, that can be implemented at health facility level.
- Q. Is it possible to recycle pharmaceuticals so that waste can be reduced?
- A. No, this is not allowed as there will be physicochemical changes in the state of the pharmaceuticals which ultimately affects their level of safety and efficacy.
- Q. Who will cover the disposal expenses if we agree to return medicines waste to the respective suppliers?
- A. Health institutions will be responsible unless there is a different arrangement for such services from the supplier.
- Q. Enforcing the new directive may lead to more accumulation of medicines waste as most of the methods prescribed are not practical. How can we solve the existing problem?
- A. This question was thoroughly discussed and the agreement was that in addition to incineration and sanitary engineered landfill, there are other possible options for institutions to use if there is commitment. So the take home message was that health institutions should try their level best to practice those methods which are less complicated. These simple techniques will significantly reduce the accumulated medicines waste and the fear is partly unjustified.
- Q. Can we have minimum design or plan for disposal facility either from federal or regional level so that it will be simple to negotiate on investment?
- A. FMHACA will discuss the issue with the FMOH. However, regions need to work with their own facility construction departments and FMOH to get a generic design.
- Q. What is expected from medicines suppliers and manufacturers in implementing this directive?
- A. They are expected to have their own disposal facility or should contract out this service to a licensed disposal firm.
- Q. There is a large amount of laboratory chemical waste in a number of schools. How can we safely dispose of it?
- A. In collaboration with relevant stakeholders, the region has to be responsible for getting a licensed disposal facility that can manage such chemicals. In addition, procurement of such chemicals should take into account the disposal problems.
- Q. Near expiry date medicines are being delivered to health facilities by PFSA and this has become the major cause of waste accumulation. What can we do about this?
- A. The regional health bureau should have regular discussion with PFSA so that problems due to inefficient management practices at health facilities or PFSA will be minimized. There should be strong partnership among the region and PFSA not only to minimize waste but also to have safe disposal facility within the region.

## **Comments and Suggestions**

- Participants have expressed concerns on how to sort out or categorize medicines based on the risks involved as proposed by the directive. However, if they refer to the “Safety Data Sheet” for each medicine, it will be much simpler.
- Local production of high temperature incinerators should be considered in collaboration with the private sector and other concerned government agencies.
- Waste treatment by encapsulation and then landfill seems the safest among those simple disposal techniques and health facilities should start their disposal practice by this method.
- The department of medical services of the regional health bureau has to be on board and take this responsibility, especially when assigning budget for disposal.
- Sewers should not be used for disposal purposes as we do not have a well designed sewerage system. If existing sewage systems are used, the rivers and underground water may end up polluted by medical waste.
- High temperature incineration is the best method and the region should work on its own or in collaboration with other stakeholders such as private importers/distributors, manufacturers, and PFSA to establish such facilities.
- Personal protective equipment should be readily available during sorting and disposal efforts and the region and health institutions should be responsible for making this equipment available.
- Illegal medicines are not recognized as medicines waste by the new directive and this has to be considered during the next edition.
- We have witnessed the accumulation of medicines waste for more than 12 years in a hospital. This indicates a lack of accountability and inefficient regulatory bureaucracy. The regional health bureau has to take the lead to solve this chronic problem.
- The grace period of the new directive has to be extended. This is because the directive needs a lot of capacity building activities.
- Participants suggested the following approaches—
  - Collect data on medicines waste as per the form indicated by the new directive
  - Report this data to higher level and organize the data in a way that expresses the region’s problems.
  - Segregate medicines waste based on their appropriate disposal method.

- Dispose of those wastes that only require simple disposal methods.
- Separately store hazardous chemicals and communicate to the regional health bureau and FMHACA for regional and national interventions.
- Work hard to minimize medicines waste.
- Sensitize others about this directive.
- Establish a reporting system that produces data and reports on regular basis—this should be part of the monitoring and evaluation system.
- Supply chain management system has to be improved significantly.

## **Regional Experiences**

In Addis Ababa, medicines waste was accumulated for almost five years from more than 500 retail pharmacy outlets. This happened because of lack of a responsible body to carry out the disposal operation in a safe manner. Regarding medicines waste accumulated by the City Health Bureau, all medicines waste was disposed of using open air burning method at Gumruk site around Kality and Gelan, which are very close to the residents of the city. This happened because of the lack of appropriate disposal facility that meets the accepted level of standards. Yekatit 12 Hospital also explained that the hospital is disposing medicines by same method at its own compound but there is serious public complaints about this method. Other private hospitals had reportedly requested disposal services from this hospital. But the management refused the request because of the inappropriate disposal method they are using and the public grievances. After this popularization, participants noticed that the current practice is against the interest of the public health and unsafe to the environment.

Some private hospitals like St. Gabriel, Kadisco, and MCM (Korea) General Hospitals have installed smokeless high temperature incinerators. They reported that other private hospitals are also trying to procure such incinerators from abroad.

FMHACA Tigray branch in collaboration with the regional health bureau and Mossobo Cement Factory has disposed of expired medicines which was stored for almost five years (2008–2012 E.C.) in retailer pharmacies, hospitals and by distributors.

The branch office is now working with Addis Pharmaceutical Factory to implement the new directive and the factory has disposed medicines waste in accordance with the directive. The factory has practiced encapsulation, built a septic tank to specifically handle medical waste, and have used the inertization process. They have also promised to provide technical assistance to the region when the need arises. The head of the quality control laboratory of the factory has attended this workshop and told us that technical limitations in sorting of medicines in accordance with their disposal method may be minimized by referring to the safety data sheet of each pharmaceutical/chemical that

can be found on the internet. The experience of Ayder Hospital was also raised and discussed. They tried encapsulation waste treatment and disposal process and found it practical.

## **Planning after Popularization**

Participants were asked to identify key intervention areas for detail planning and input for future planning at federal and regional levels.



Photo by: Getahun Sisay

*One group of participants working on the planning process during popularization workshop held at Bahir Dar, Amhara Regional State*

After series of discussions, most have agreed on the following interventions and recommended the corresponding stakeholders appropriate for the intervention. Table 1 below indicates the different areas of interventions identified at the planning sessions during the five workshops.

**Table 1. Plans Proposed During Five Regional Workshops**

<b>Interventions</b>	<b>Activities</b>	<b>Responsible Body</b>
Create awareness among concerned bodies	<ul style="list-style-type: none"> <li>▪ Sensitization meetings</li> <li>▪ Brochures printing and distribution</li> <li>▪ Mass media</li> </ul>	RHB, District Health offices, EPA, FMHACA
Execute medicines waste disposal using simple and safe disposal methods as per the directive	<ul style="list-style-type: none"> <li>▪ Collect information on the type and volume of medicines waste</li> <li>▪ Sort medicines waste</li> <li>▪ Select feasible but safe disposal methods</li> <li>▪ Secure disposal budget</li> <li>▪ Inform appropriate regulatory organ and execute disposal</li> </ul>	HF, Woreda Health Office, RHBs
Distribute adequate copies of the new directive	Estimate demand for having the new directive at regional, zonal, and woreda levels	RHBs, FMHACA
Waste minimization: Establish effective and efficient medicines supply management system	<ul style="list-style-type: none"> <li>▪ Proper selection and quantification</li> <li>▪ Minimize storage points</li> <li>▪ Demand driven ordering</li> <li>▪ Frequent ordering</li> <li>▪ Inventory management</li> </ul>	RHB, PFSA, HF, Woreda health office
Establish government owned disposal facilities	<ul style="list-style-type: none"> <li>▪ Feasibility study</li> <li>▪ Consensus among stakeholders</li> </ul>	RHB, EPA, Municipality, PFSA
Establish public private partnership to have private disposal firms	<ul style="list-style-type: none"> <li>▪ Manage medicines waste information</li> <li>▪ Conduct consultative meetings</li> <li>▪ Avail investment incentives</li> </ul>	RHBs
Establish regional committee which will evolve into a regional disposal unit	<ul style="list-style-type: none"> <li>▪ Prepare terms for reference for the regional committee</li> <li>▪ Facilitate the execution of committee's responsibility and lead the regional disposal operations accordingly</li> </ul>	RHBs head and regulatory head
Build human resource capacity	<ul style="list-style-type: none"> <li>▪ Identify gaps regarding expertise on medicines waste disposal</li> <li>▪ Explore training opportunities</li> <li>▪ Allocate resource for capacity building</li> <li>▪ Establish team of experts on medicines waste disposal at RHBs</li> </ul>	RHB, universities, FMHACA, HF
Set up sustainable financing	<ul style="list-style-type: none"> <li>▪ Advocate to secure support</li> <li>▪ Establish fee based disposal service</li> <li>▪ Contain cost</li> </ul>	FMOH, FMHACA, RHB and HFs

**Table 2. Number of Participants and Regional Coverage**

<b>No</b>	<b>Name of Region</b>	<b>Number of participants (facilitators and support staff are excluded)</b>
1	Amhara Regional State	52
2	Southern Nations and Nationalities Regional State	64
3	Oromiya Regional State	56
4	Addis Ababa City Administration and Partial Oromiya	66
5	Tigray Regional State	59
Total Number of Participants		297





## **THE WAY FORWARD**

The way forward is formulated based on the input obtained from participants in the five popularization workshops.

### **Medicines Waste Information**

According to reports from the workshop participants, there is huge accumulation of medicines waste in the country. However, adequate and reliable information with regard to the volume and type of medicines waste accumulated has to be made available to make informed decisions on subsequent interventions. This will help to disclose the magnitude of the problem in terms of concrete figures. Ultimately, the information will help concerned bodies to allocate budget for safe disposal practices. The private sector will be also motivated if there is reliable information that justifies the feasibility of capital investment on disposal facility in Ethiopia. Therefore, information should be generated using the tools recommended by the new directive.

### **Short-Term Solutions**

There are a number of options recommended by participants to minimize the existing problems. Regions can organize a campaign for medicines waste disposal once per year. In brief, the campaign may work as follows—

1. A campaign coordinating body has to be established at each regional health bureau. Information on medicines waste has to be generated to make the operation effective.
2. The campaign office mobilizes financial, technical, and material resources from the region itself, FMOH, FMHACA, PFSA, partners, importers and distributors, and environment protection agencies.
3. Then a landfill site may be developed at logistically feasible and safe locations. The number of landfill sites may vary depending on the landmass and volume of medicines waste being generated.
4. At the same time, safe storage place has to be made available at disposal sites.

Based on the information collected, a team of experts from health facilities will then dispose of the waste using simple but safe disposal practices allowed by the new directive such as waste immobilization by encapsulation.

### **Explore Long-Term Solutions**

The regional health bureau and PFSA should serve as information hub for medicines waste. Based on this information, the government will need to disseminate and market the information to attract the private investors for the establishment of fee-based sustainable disposal facilities

across the nation. In this case, PFSA, private medicines importers/distributors, manufacturers, and larger hospitals are potential candidates for this investment. Even stand-alone disposal firms may come to this sector and invest, depending on its feasibility and the incentive packages made available by the regional government. In any case, the health sector has to promote the private sector's and PFSA's involvement in this area of intervention.

## **Management and Leadership**

The national strategic framework for implementing the new directive dictates the establishment of national and regional committees that will lead and oversee the process of installing safe waste disposal system in the country for a certain period of time. This committee has to work out the function of a regional level health waste disposal coordinating unit and get the endorsement of the RHBs' senior management. In addition, it will play advocacy and resource mobilization roles until a permanent body takes over the responsibility. Once the regional units for health waste management and disposal are in place, the committees will phase out. Then these regional units will work out the human resource development issue—a big concern at this time—and the management system for disposal operations. To establish a sustainable disposal system in the country, institutions which generate waste should dispose medicines in compliance with the new directive and regulatory units in regions are expected to regulate the disposal practice in accordance with the new directive.

## ANNEX A. SAMPLE WORKSHOP SCHEDULE

<b>Popularization Workshop on Medicines Waste Management and Disposal Directive and Its Implementation Framework</b> <b>Organized by the Ethiopian Food, Medicine and Health Care Administration and Control Authority in Collaboration with Systems for Improved Access to Pharmaceuticals and Services with financial support from the U.S Agency for International Development</b>			
Time	Session	Presenters/ Organizers	Moderators/Facilitators
<b>DAY 1</b>			
8:30–9:00 AM	Registration	FMHACA-USAID/SIAPS	NA
9:00 –9:10 AM	Welcome and Opening Address	Ato Kare Chawicha, SNNP Regional Health Bureau Head	Mengistu Legesse, FMHACA Branch
9:10 –9:40 AM	Proclamation no. 661/2009 in Brief	Yeshialem Bekele, FMHACA Head Office, Standard Setting Team Leader	Mengistu
9:40 –10:20 AM	Overview of the Medicines Waste Management and Disposal Directives	Ajema Bekele, FMHACA Expert	Mengistu
10:20–10:50 AM	Tea /Coffee Break	USAID/SIAPS	NA
10:50 –11:30 AM	Part Two: Medicines Waste Management and Disposal System	Ajema Bekele	Mengistu
11:30–12:30 AM	Discussion	Yeshialem & Ajema	Mengistu
12:30–1:30 PM	Lunch Break	USAID/SIAPS	NA
1:30 –2:00 PM	Part Four: Sorting, Storing and Transporting Medicines Waste	Ajema	Mengistu
2:00 –2:30 PM	Discussion	Ajema	Mengistu
2:30–4:00 PM	Country Experience on Medicines Waste Management	Edmealem Ejigu, Senior Program Advisor, USAID/SIAPS	Mengistu
4:00 – 4:30 PM	Tea/Coffee Break	USAID/SIAPS	NA
4:30 – 5:30 PM	Part Three: Disposal Methods	Edmealem	Mengistu
<b>DAY 2</b>			
8:30–9:30 AM	Parts Five and Six of the New Directive	Edmealem	Mengistu
9:30 –10:00 AM	Discussion	Edmealem	Mengistu
10:00–10:30 AM	Tea /Coffee Break	USAID/SIAPS	NA

## **Popularization Workshop on Medicines Waste Management and Disposal Directive and Its Implementation Framework**

**Organized by the Ethiopian Food, Medicine and Health Care Administration and Control Authority in Collaboration with Systems for Improved Access to Pharmaceuticals and Services with financial support from the U.S Agency for International Development**

<b>Time</b>	<b>Session</b>	<b>Presenters/ Organizers</b>	<b>Moderators/Facilitators</b>
10:15-10:45 AM	Overview of the National Framework for Medicines Waste Management and Disposal	Yeshialem Bekele	Mengistu
10:4 –11:15 AM	Discussion	Yeshialem	Mengistu
11:1 –12:30 AM	Strategic and Institutional Frameworks and Monitoring and Evaluation System	Edmealem	Mengistu
12:30–1:30 PM	Lunch Break	USAID/SIAPS	NA
1:30–2:30 PM	Strategic and Institutional Frameworks and Monitoring and Evaluation System, continued	Edmealem	Mengistu
2:3 – 4:00 PM	Planning exercises and presentation	Edmealem	Mengistu
4:00 –4:30 PM	Tea /Coffee Break	USAID/SIAPS	NA
4:30 – 5:00 PM	Way forward and closing	SNNPRHB/FMHACA	

## ANNEX B. LIST OF PARTICIPANTS IN THE FIVE ROUNDS OF WORKSHOP

### 1. List of Participants in Bahir Dar, Amhara Region (June 15–16, 2012)

Full Name	Occupation	Region/ Zone	Facility/ City	Telephone/ Mobile
Edmealem Admassu	Process owner	B/Dar	RHB	0913240192
Kiros Terefe	CEO	Gondar	Gondar Hospital	0918350579
Endalkachew Admassie	Pharmacist	Gondar	Gondar Hospital	911959148
Abinet Arega	Druggist	S. Gonder	D/Tabor	918379651
Ashagrie Abere	Pharmacist	S. Gonder	D/Tabor Hospital	910174296
Gedu W/Seuassie	Curative Officer	Gondar	Gonder Town Health Office (H/O)	918789738
Yenenesh Abera	Pharmacist	Gondar	Gonder Town H/O	0918735385
Yalew Kassie	Health commodity officer	Gondar	Gonder Town H/O	918734632
Getachew Nigatu	Pharmacy Head	S/Wollo	Dessie Hospital	910905114
Zawuya Mohammed	Curative Rehabilitative officer	B/Dar	B/D C/ad/H/O	918700143
Getaneh Beleyegn	Food & Medicine Inspector	B/Dar	B/D EFMHACA	0918011024
Minilik Mesfin	Food & Medicine Inspector	S.Gonder	ZHD	0918011024
Asnake Gelaye	Regulator	Awi	Awi ZHD	0918743316
Melese Demsie	Regulator	B/Dar	B/D Adminst	0918707779
Fasikaw Getenet	EFMHAC Ins	B/Dar	B/D EFMHACA	0913466964
Tesfaye Ali	Health H/T officer	S/Wollo	South wollo HZD	0913167482
Ayalew Yimam	Health H/T officer	S/Wollo	South wollo HZD	0923658101
Mohammed Tefera	C/R/Officer	S/Wollo	D/City H/office	0914298729
Yimer Tasew	Regulator	S/Wollo	D/City H/office	0914737036
Eyerusalem Tadesse	Officer	S/Wollo	D/City H/office	0914766008
Seid Tesfaw	CEO	S/Wollo	Dessie Hospital	
Getachew worku	CEO	N/Shewa	D/Berhan	
Haile Yirga	HO	N/Wollo	North Wollo ZHB	0912888040
Kidist Mekonnen	CFR Officer	D/Markos	East Gojjam ZHD	0920171778
Habtam Desowegn	Druggist	N/Wollo	Woldia Hospital	0920182416
Missganaw Bogale		B/Dar	B/D-Town	0918784409
Essa Endris	Pharmacist	N/Wollo	Woldia Hospital	0921115184
Hussen Usman	Pharmacist	S/Wollo	Oromiya ZHD	0910146894
Melaku Girma	Env.Health	S/Wollo	Oromiya ZHD	0913475594
Zemenu Siyoum	Druggist	East Gojam	East Gojam H.D	0913449884
Addisu Bzlachew	MPH/RH	East Gojam	East Gojam H.D	0917830211
Temesgen Yiheneh	Physician (CCO)	S/Gonder	D/Tabor Hospital	0923426541
Lema Tefera	Pharmacist	S/Gonder	D/Berhan Hospital	0911906433
Negalign chekol	Pharmacist	Awi ZHD	Awi ZHD	912862857
Mengesha Belay	Pharmacist	S/Wollo	S.wollo ZHD	913106865
Mesfin Geto	Forecasting Build Off	S.wollo	PFSA-Dessie	910098978

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<b>Full Name</b>	<b>Occupation</b>	<b>Region/ Zone</b>	<b>Facility/ City</b>	<b>Telephone/ Mobile</b>
Tilahun Getie	Pharmacist	W.Gojam	W.Gojam Z.D	918001445
Assefa Zewdie	EHO	W.Gojam	W.Gojam	0918800402
Tesfa Mekonnen	EHO	B/Dar	B/D	923539543
Tibebu Engida	HO	B/Dar	RHB	918718093
Yibeltal Yihenew	Pharmacist	B/Dar	Felege Hiwot Hosp	920425320
Andargie Atenaf	CEO	B/Dar	Felege Hiwot Hosp	0918780398
Abebe Worku	Officer	S.Gonder	S.Gonder HD	0918715615
Berhan Shifraw		B/Dar	B/D city Adm	0918705216
Yimegnushal Bekele		B/Dar	B/D city Adm	0918717488
Hussien Adem	City Expert	B/Dar	B/D	0918727986
Meseret Dries	City Expert	B/Dar	B/D	0910317779
Askale Kassa	CRCP Off	B/Dar	ARHB	0918700414
Asmamaw Zeleke	Inspector	B/Dar	FMHACA	0912042585
Mengistu Enalew	A/Director	B/Dar	FMHACA	0911893854
Abdisa Mengesh	Branch Mnger	B/Dar	PFSA-Dessie	0913810345
Mulugojam Asmare	Regulation officer	B/D	RHB	0918782468

## 2. List of Participants in Hawassa, SNNPR (September 21–22, 2012)

Full Name	Occupation	Region/ Zone	Facility/City	Telephone/ Mobile
Yohanis Fasil	Druggist	SNNPR	Teddy Wholesale	0916057224
Abinet Aman	Pharmacist	SNNPR	Kembata ZHD	0911076744
Darigwo Ahmed	Pharmacist	SNNPR	RHB	0913908477
Shemse Mustefa	Regulatory Process	SNNPR	Silte ZHD	0913244375
Mehabub Nuri	Regulatory Process	SNNPR	Silte ZHD	0913935215
Dawit Hankara	NA	SNNPR	NA	NA
Gezahegn Geremew	Pharmacist	SNNPR	Keffa ZHD	0912042948
Behailu Desita	Pharmacist	SNNPR	Gamogoffa ZHD	0910300143
Dejen Nurse	Head Pharmacist	SNNPR	Mizan Aman Hospital	0912933358
Belete Teshome	Health Officer	SNNPR	Keffa ZHD	0917824906
Endaleegn Sileshi	Regulatory Process	SNNPR	Segen ZHD	0912225977
Metekiya Begajo	Lab Technologist	SNNPR	Dauro ZHD	0917832624
Frew Wolde	Expert	SNNPR	Segen ZHD	0913688932
Mintesinot Desta	Pharmacist	SNNPR	Adare Hospital	0916028655
Gelana Urgessa	Pharmacist	SNNPR	South Omo ZHD	0913112452
Seble Daba	Pharmacist	SNNPR	Dubbo St. Mary Hospital	0911139912
Abrham Abeto	Manager	SNNPR	Dubbo St. Mary Hospital	0911772417
Kebede Hadera	Health Officer	SNNPR	Hadiya ZHD	0911742623
Tigu Gebre	Regulatory Expert	SNNPR	Guragi ZHD	0913202792
Kebede Taye	Nurse	SNNPR	Gamo Goffa ZHD	0927050853
Ashireka Abdella	Regulatory Coordinator	SNNPR	Benchmaji ZHD	0917825889
Jemal Ahmed	Health Service Expert	SNNPR	Benchmaji ZHD	0913623934
Mirinda Mellese	Regulatory Expert	SNNPR	Benchmaji ZHD	0917719356
Asres Zinabu	Druggist	SNNPR	Dauro ZHD	0924826616
Temesgen Desta	Health Officer	SNNPR	Masha ZHD	0912169233
Markos Fola	Pharmacists	SNNPR	Dauro ZHD	0911710077
Ashebir Yeshewalu	Druggist	SNNPR	FMHACA	0911111214
Kaleb Terefe	Pharmacist	SNNPR	SNNP RHB	0911411199
Atnafu Girsha	Health Officer	SNNPR	Mizan Hospital	0911571067
Kibret Ambaye	Health Officer	SNNPR	Guragi ZHD	0911944266
Muzemil Mohammed	Regulatory Expert	SNNPR	Guragi ZHD	0911030038
Zerihun gebre	Regulatory Expert	SNNPR	South Omo ZHD	0916400084
Samrawit Hailu	Nurse	SNNPR	Gediyo ZHD	0911910959
Yibeltal Assefa	Health Service Expert	SNNPR	South Omo ZHD	0916400084
Derebie Ayanu	Pharmacist	SNNPR	Soddo Hospital	0911905519
Mohammed Yasin	Regulatory Expert	SNNPR	Siltie ZHD	0916272016
Admasu Arisha	CEO	SNNPR	Yirgalem Hospital	0916580429
Minaleshewa Lemma	Druggist	SNNPR	Yirgalem Hospital	0920569228

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<b>Full Name</b>	<b>Occupation</b>	<b>Region/ Zone</b>	<b>Facility/City</b>	<b>Telephone/ Mobile</b>
Dr. Demeke Dawit	CCO	SNNPR	Soddo Hospital	0912870448
Mewuba Shamu	Health Officer	SNNPR	SNNP RHB	0912030267
Ethiopia gashaw	Pharmacist	SNNPR	LYSTRA Wholesale	0911758709
Fikirte Assefa	FBE	SNNPR	Regional Environ Bureau	0913727444
Dr. Mebrat Deribe	Dentist	SNNPR	Adare Hospital	0911654063
Teshale Menebo	Nurse	SNNPR	Hadiya ZHD	0911099676
Temesgen Eromo		SNNPR		
Abrham Miju	Health Officer	SNNPR	Gediyo ZHD	0926020148
Buno Tona	Lab Technologist	SNNPR	Gediyo ZHD	0913369345
Thomas Toyana	Health Officer	SNNPR	Gammo Goffa ZHD	0916873446
Wondwosen Argaw	Regulatory Expert	SNNPR	Segen ZHD	0913271155
Alemayehu Achiko	Regulatory Expert	SNNPR	Kembata ZHD	0911056154
Kassahun Girma	Environmental Health	SNNPR	SNNP RHB	0913047221
Aknaw Kawze	MPA	SNNPR	Jinka Hospital	0911992332
Markos Danozt	Pharmacist	SNNPR	Hawassa ZHD	0910137395
Marilign Anawtie	Pharmacist	SNNPR	PFSA	0912968194
Abrham Anan	Health Officer	SNNPR	Sidam ZHD	0911995890
Tsegaye Yisehak	Logistician	SNNPR	Wolaita ZHD	0911534863
Andemo Anjelo	Health Officer	SNNPR	Sheka ZHD	0923346507
Kassahun Mulu	Environmental Health	SNNPR	Wolaita ZHD	0911921226
Gudura funte	Health Offiecr	SNNPR	Hawassa ZHD	0911957120
Madebo Mena	Health Officer	SNNPR	Wolaita ZHD	0924333156
Amdetsion Abera	MLT	SNNPR	Hadiya ZHD	0912047011
Tesfu Negussu	Pharmacist	SNNPR	BK Pharma	0911370045
Mengistu	Branch Head	SNNPR	FMHACA	NA
Karie Chawicha	RHB Head	SNNPR	SNNP RHB	NA



### 3. List of Participants in Adama, Oromia ( October 5–6, 2012)

Full Name	Occupation	Region/Zone	Facility/City	Telephone/ Mobile
Abdella Kassa Rori	Pharmacist	AA	ORHB	0912-363684
Abdulaziz Shemsi	H.O	Bale	Bale Zonal Health Dept.	0913-334289
Abeba Guluma Korbu	BSC Nurse	Bale	Ginnir Hospital	0912-159872
Abiy Tekle Argo	Env. Health	W/Arsi	W/Arsi ZONE	0912-252912
Ahmed Abduraheman Haji	Pharmacist	Bale	Bale Z/H/D	0911-562304
Alemu Girma Feyissa	CEO	Arsi	Abomsa H C	0913-037434
Aliye Abdurahman	BSC Nurse	W/Harerge	W/Harerge	0912-138724
Elizabeth Dugassa Jilch	Pharmacist	E/Shewa	Adama NAZ. WOH	0912-036530
Gemechu Bedasso	HO	W/Arsi	W/ARSI ZONE	0911-334845
Geno Aman Gelchu	Expert	Arsi	Arsi Zonal Health Dept.	0913-485220
Getahun Olikeba Reta	MPH	W/Shewa	Zonal Health Dept.	0912-300734
Kebebush Mekonta Wake	Pharmacist	Oromia	Bushoftu	0913-174205
Molu Dime Fayo	Pharmacist	Borena	Yabello Hospital	0911-767869
Mulugeta Argaw Negaya	SANI.	E/Shwa	E/Sheaw Zonal	0910-259307
Solomon Tamene Daba	BSC Nurse	E/Harerge	E.Harerge Z/H/O	0920-681855
Tegene Teklu Mitiku	Pharmacist	Borena	Borena Zonal Health Dept.	0913428663
Tesfaye Feyissa Dadi	Pharmacist	Arsi	Asella Town H.O.	0913-236595
Tsegaye Abebe H/Mariam	Pharmacist	Arsi	Abomsa H.C.	0911-800584
Wassu Gedefaw Ali	Pharmacist	Aa	FMHACA	0912-057274
Yada Degefa Regassa	Pharmacist	Bale	Ginnir Hospital	0917-0120147
Abdi Legesse Dadi	Pharmacist	W/Arsi	SH/REF/Hospital	0911-435465
Abdulahi Jeylan Dheko	Pharmacist	W/Harerge	Chiro Hospital	0913-335261
Bekele Aga Senbeto	Pharmacist	Bale	Robedan W.SALE	0911-459029
Bizuayehu Gemene Gudeta	Pharmacist	ARSI	Asella Hospital	0912-209198
Boneya Liben Guyo	ENV.	Negelle	Borena Zonal Health Dept.	0916-323839
Deresse Dejene H/Mariam	CEO	Bale	Bale Robe Hospital	0923-033495
Desta Bucheno	H.O	Negelle	Gujii Zonal HO	0916-850176
Digile Oda Gambela	BSC Nurse	Negelle	Gujii Zonal HO	0910-167160
Dr. Belachew Dhimma	MD	ARSI	Asella Hospital	0910-304815
Ebrahim Kedir Siraj	Pharmacist	Bale	Bale Robe Hosp	0911-984136
Fikadu Getachew Meferssa	Pharmacist	Gujii	Negele Borena Hospital	0913-745885
Gudisa Derabe	H.O	Arsi	Arsi Zonal H/D	0913-485220
Hedato Hassena Below	CEO	W/Arsi	SH/REF/Hospital	0911-925680
Hussen Roba Yade	Pharmacist	E/Shewa	Adama Town HO	0911-828506
Ibsaa Mohammed Idris	Druggist	E/Harerge	Deder Hospital	0915-043989
Nuru Kadu Ulu	CEO	Dodola	Dodola Hospital	0911-751118
Sheleme Dilgasa Gadissa	HEALTH EVT.	AA	ORHB	0911-971510
Tadesse Jobira Wakjira	Pharmacist	Shashemene	Ashemene H.O	0911-459029
Teklu Zerihun Mengistu	H.O.	AA	ORHB	0911-744258

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<b>Full Name</b>	<b>Occupation</b>	<b>Region/Zone</b>	<b>Facility/City</b>	<b>Telephone/ Mobile</b>
Zegeye Yirgu Beyene	Pharmacist	Dodola	Dodola Hospital	0911-006000
Akalewold Abrham Toke	H.O.	Borennna	B/Hora Hospital	0911-949411
Aklilu Senbeta	Pharmacist	Bale	Boinz W/SALE	0911-821396
Assefa Eshete G/Kidan	Pharmacist	Bale	Onewaye W/SALE	0923-033078
Beshir Mohammed Geleto	Pharmacist	W/Harerge	Gelemso Hosp.	0912-258517
Challa Abraham	CEO	Harerge	Bisidimo Hospital	0922-790041
Danieal Zeleke Demissie	ENV.	E/Shewa	E/SH/Z/H/OFFICE	0911-042657
Demerow Asemu Bedane	Pharmacist	E/Shewa	Shallom Hospital	0911-944977
Dhenge Bon Kosi	Pharmacist	Borennna	Yabello Hospital	0912-015288
Elias Micheal Yuya	CEO	W/Harerge	W/H Gelemso Hospital	0911-571650
Hiskeyas Belege Yemiru	Pharmacist	W/Harerge	W/H/ZHO	0913-214881
Mohammed Abdurahman	CEO	E/Harer	Deder Hospital	0913-929565
Mulugeta Oleka Enkassa	Pharmacist	AA	ORHB	0911-971510
Rahima Ibrahim	Expert	AA	FMHACA	091271-0824
Workiyee Tadesse Wodajo	H.O.	Bushoftu	BUSH.TOWN .HO	0911-960336
Zerfu Dejene	BSC Nurse	E/Shewa	E/SH/Z/H/OFFICE	0911-924057
Wondwosen Zemedkun	Pharmacist	E/Shewa	Adama Hospital	0911-569842

**4. List of Participants in Adama, Addis Ababa and Part of Oromia (October 8-9, 2012)**

<b>SN</b>	<b>Full Name</b>	<b>Occupation</b>	<b>Region/ Zone</b>	<b>Facility/ City</b>	<b>Telephone/ Mobile</b>
1	Abey Hamda Geda	Store Drug & Medical	A.A	Arada Sub City	0912-809936
2	Adane Wotango	Pharmacy	A.A	Kirkos Sub City	0911-008336
3	Adisu Atomsa	Pharmacy	Oromia	Dembi Dolo Hospital	0913-760874
4	Alemayehu Abdisa	Pharmacy	Oromia	Zonal Health Department	0913-231073
5	Alemayheu Negash	CEO	A.A	Tirunesh Bejing Hospital	0911-641194
6	Alemu Hellemo	Regulatory	A.A	Yeka Sub City	0920-439189
7	Asefa Ayehu Obta	Expert	A.A	FMHACA A.A	0912-135849
8	Asherka Negash	Drugist	A.A	Betezata General Hospital	0911-096256
9	Awel Sheh Isa	Regulatory	Oromia	Jima Zone Regulatory	0917-804290
10	Awoke Achenaki	Regulatory	A.A	Kolfe Sub City	0924-434749
11	Bedria Hassen	Regulatory	A.A	Woreda 7	0923-925128
12	Bezanew Mulugeta	Health Office	A.A	Bole Sub City	0911-420318
13	Biniam Shume	Pharmacy	A.A	Yekatit 12 hospital	0913-087098
14	Bitew Kefyalew	Regulatory	A.A	Kolfe Keranio Sub City	0911-862800
15	Bizuwork Haile	Inspector	A.A	Gulele Health office	0913-102397
16	Daniel Birhanu	Licence	A.A	Yeka Sub City	0911-020909
17	Degefa Dhengesu	Inspector	A.A	Lideta Sub City	0912-090879
18	Dr Nebiat Asmare	Deputy Director	A.A	St Gebreal Hospital	0911-216999
19	Edessa Diriba	Pharmacy	SW/ Shoa	Tulu Bolo Hospital	0911-829562
20	Elias Afework	Pharmacy	A.A	Addis Ababa Health Be	0913-139871
21	Elsabet Adane Mola	Licence	A.A	Lideta Wo 7	0923-808946
22	Firezewud Getachew	Pharmacy	A.A	Zewuditu Hospital	0910-053228
23	Fitsum Kiflu	Pharmacy	A.A	MIH	0911-351734
24	Getu Daba Sime	Pharmacy	Oromia	expert Regulatory	0911-956222
25	Haimanot Ayele	Regulatory	A.A	Kolfe Sub City	0911-855786
26	Haimanot Feseha	Regulatory	A.A	Kirkos Sub City	0912-030985
27	Hana Likas	Pharmacy	A.A	Tirunesh Bejing	0911-304865
28	Hana Samuel	Pharmacy	A.A	Korea Hospital	0918-778588
29	Haregewoin Mulgeta	Pharmacy	A.A	N/Silk Lafto Subcity	0911-959363
30	Hatoluf Melkamu	Regulatory	Oromia	West Shoa Zone	0911-989135
31	Haymanot Agene	Sont	A.A	Akaki Sub City	0911-629079
32	Kitesa Debelo	Regulatory	W/Wolga	Zonal Health Department	0917-852189
34	Manie Zewudie Sr	Pharmacy	A.A	Kirkos Sub City	0920-033050
35	Melaku Mekonen	Pharmacy	A.A	Police Hospital	0913-488157
36	Meseret Mengiste	Env Popu.Inspector	A.A	Yeka Sub City	0911-433436

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<b>SN</b>	<b>Full Name</b>	<b>Occupation</b>	<b>Region/ Zone</b>	<b>Facility/ City</b>	<b>Telephone/ Mobile</b>
37	Mintewab Zeleke	Pharmacy	A.A	Arada Sub City	0911-025359
38	Moges Mesfin	CEO	A.A	M.I.H	0911-714878
39	Moti Muleta	ZRH	West Shoa	West Shoa Zone	0911-373095
40	Muhammed Muhaba	Expert Regulatory	Oromia	Zonal Head Department	0911-816454
41	Necho Daba	Pharmacy	A.A	Ras Desta Hospital	0911-155503
42	Petros Samson Haile	Pharmacy	A.A	St Gebreal Hospital	0911-806581
43	Roman Gizaw	Adminstrator	A.A	Betel Teacheing Hospital	0913-306353
44	S/r Yeshihareg Abate	Deputy Director	A.A	NSL Sub city	0913-509848
45	Samuel Fufa	Pharmacy	West Shoa	Ambo Hospital	0921-980482
46	Sara Daniel Mekiso	Pharmacy	A.A	Betel Hospital	0911-452928
47	Seada Mohammad	Pharmacy	A.A	A.A.H.B	0911-360430
48	Shimeles Ayele	Pharmacy	A.A	St Paul Hospital	0913-428662
49	Sintayehu Tefera	CEO	A.A	Yekatit 12 hospital	0911-888824
50	Solomon Balcha	Expert	West Shoa	WSH ZHD	0911-893223
51	Solomon Tesfaye	CEO	A.A	Ras Desta Hospital	0911-676934
52	Emebet Tarekegne	Q/M/O	A.A	Gandi M Hospital	0911-678946
53	Tajure Hambisa	Env Popu.Inspector	E/Wolega	Welega Zonal H/Office	0913-062922
54	Tariku Tesema	Regulatory	Oromia	ZHD	0922-207993
55	Tesfahun Girma	Pharmacy	Oromia	Meta Karl Hospital	0917-830786
56	Tesfaun Manye	Regulatory	A.A	Yeka Sub City	0911-772061
57	Tesfu Asmamaw	Pop Health	A.A	Ledeta Sub City	0912-119205
58	Tewodros Hailmariam	Pharmacy	Oromia	Nekemte Hospital	0912-146291
59	Tigist Adafre	Drugist	Oromia	IAB Zonal health Dep	0913-489581
60	Tigist Tesfaye	Regulatory	A.A	Kolfe Sub City	0922-538488
61	Waleligne W/Senbet	Pharmacy	A.A	Saint P/MM College	0911-792573
62	Workageneghu Degefa	Pharmacy	A.A	Bole Sub City	0911-717019
63	Yodit Aklilu	Drugist	A.A	Akaki Sub City	0927-040486
64	Yohannes Solomon	Inspector	A.A	Akaki Sub City	0911-441082
65	Zebiba Abdella	Technical Manager	A.A	Meditech Eth Import/Dist.	0911-478315
66	Zerihun Taye Bekele	Pharmacy	Oromia	Arada Helath Office	0911-092962

**5. List of Participants in Mekele, Tigray (October 20-21, 2012)**

<b>SN</b>	<b>Full Name</b>	<b>Occupation</b>	<b>Region/ Zone</b>	<b>Facility/ City</b>	<b>Telephone/ Mobile</b>
1	Asfaw Tilahun	Envir. Health	West,Kafta Humera	Kafta Regulatory	0914124143
2	Gebeyaw Abate	Envir. Health	Southern,H/Wajirat	Wajirat Regulatory	0914486746
3	Berhe Girmay	Envir. Health	Estern,K/Awlaelo	Awlaelo Regulatory	0914788171
4	Gebremeskel Teklu	Envir. Health	N/West,L/Adiabo	Adiabo Regulatory	0914583819
5	Hiwot Abreha	Bs nurse	West,Welkayit	Welkayit Regulatory	0914123907
6	Asgele G/Meskel	Drugst	Mekelle,enderta	Quiha Drugst	0914727925
7	Hadas G/Tensaie	Drugst	Mekelle,enderta	Quiha Pharmacy head	0914717350
8	G/Medhin Birhane	Drugst	N/West,Shire	Shire Pharmacy head	0914229383
9	Minachew Tesfay	Pharmacy	N/West, Shire	Guna Pharmacy head	0914750392
10	Azmera Haftu	Bs nurse	Mekelle,Semen	Mesebo cement factory	0914749714
11	Zufan G/Medhin Hagos	Lab.Tec	Mekelle,Semen	Mesebo cement factory	0914725924
12	Lkielesh Assefa Berhe	Nurse	Estern,Wukro	Wukro regulatory	0914433665
13	Hailemariam G/selassie	Nurse	S/est,S/samre	S/Samre Regulatory	0914200081
14	Teklay Aredahgn	Envir. Health	Central,L/Machew	Michew Regulatory	0920435056
15	Masresha Belay Yemer	Envir. Health	Estern,Gulomekeda	Gulomekeda Reg.	0914744420
16	Teklay Tsegay Gebru	Envir. Health	N/west T/Adiabo	T/Adiabo Regulatory	0912409577
17	G/Silassie W/Gebrieal	Nurse	Central,Ahiferom	Ahiferom Regulatory	0914763417
18	Zeratsion Fisseha	Envir. Health	Central,W/Leke	Werie Ieke Regulatory	0914162661
19	Elias Assefa Kassay	Envir. Health	Mekelle	Mekelle Regulatory	0914037222
20	Frehiwot Tesfay Tekle	Envir. Health	N/West,Asgede tsibla	Asgede tsibla	0914294978
21	Docter Tenaw Hagos	Envir. Health	Central,T/Machew	T/Machew Regulatory	0914191757
22	Daniel Beyene Tedla	Pharmacists	Mekelle,Semen	Mekelle, Wholesaler	0914701495
23	Ataklti Berhu Mekoni	Pharmacists	Mekelle,Semen	Mekelle Ayder Hosp	0914127806
24	Nebyu Aregay	Envir. Health	Central,Adwa	Adwa Regulatory	0914167770
25	Kuskam Abreham	Nurse	South,E/Mekoni	Endamokeni Regulatory	0914785613
26	Weldenugus Mehari	Chemist	Ester, Adigrat	Adigrat Addis Mfg	0914703702
27	Abrehaley Hafte	Envir. Health	N/West,T/Koraro	T/Koraro Regulatory	914778972
28	Meresa Assefa	Envir. Health	Tigray,Central,Adwa	Adwa Health office	914745103
29	Teame G/Cherkos	Envir. Health	Ester, Ganta afeshum	Gantaafeshum Reg	910891769
30	Zenbech G/Selassie	Nurse	South,Alage	Alage regulatory	914864569
31	Mulu Beyene Reda	Nurse	Estern,Adigrat	Adigrat Regulatory	914178607
32	Zeru G/Hiwot Abreha	Envir. Health	Central,M/Leke	Merebleke Reg	915522323
33	Hadush G/Hiwot	Envir. Health	Tigray,Central,N/Adie t	Adiet Regulatory	914292944
34	Nigatu Getachew	Envir. Health	Eastern,Hawzen	Hawzen Regulatory	916837492
35	Mulu Mengaw Alemu	Envir. Health	Southern,Almata	Almata Regulatory	914786157
36	Almayhu G/mariam	Pharmacy	Mekelle	Mekelle, PFSA	914014754
37	G/Mariam G/Hawerya	Pharmacy	Mekelle	Mekelle Ayder Hosp	914130698
38	Hagos G/Micheal Kassa	Sanitation	Mekelle	Sanitar Agency	914728627

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39	Zewditu Teferie	Nurse	N/West,Shire	Shire regulatory	914778295
40	Tedrowes Belay	Pharmacists	S/Eastern, Enderta	Ederta Regulatory	914746367
41	Awet Solomon Kahsay	Drugst	West,Sheraro	Sheraro Regulatory	0914776992
42	Mewael Embaye	Envir. Health	S/east,D/Temben	Degua teben Reg	0914023697
43	Abreha Tareke	Pharmacy	West,Setit Humera	Setit Humera Reg	0914099600
44	Girmay G/mariam	Envir. Health	Eastern,Erob	Erob Regulatory	0928942986
45	Yohannes Araya	Envir. Health	Eastern,Atsbiwenbert a	A/tsbi wemberta Reg	0914025006
46	Abreham Mamo	Pharmacy	Central T/abergele	Tanquabergele Reg	0914241195
47	Fetlework Molla	Nurse	Southern,Machew	Machew Regulatory	914167419
48	Birkti Meles G/Tensay	Envir. Health	Mekelle	Env. Protection Bureau	914758906
49	Kinfe Haile Desta	Envir. Health	Mekelle	Mekele, FMHACA	914268729
50	Gebrekiros Tadesse	Bs nurse	West,tseImti	Tselemti Regulatory	914782520
51	Nardos Berhe bariya	Envir. Health	Eastern,S/Tseadaem ba	S/tseadaemba Reg	914785004
52	Murts Kiros Lema	Envir. Health	Southern,R/Azebo	R/Azebo Regulatory	923302416
53	Mulugeta Teklu	Sanitar	N/West,Mdebay Zana	Medebay Zana Reg	914783079
54	Teklit Asmelash	Envir. Health	Southern,Offla	Offla Regulatory	924381863
55	Teshome Alemseged	Envir. Health	Southern,Raya Almata	Raya Almata Regy	914766089
56	Ambachew H/Micheal	H.O	Mekelle Semen	Mekle, Tigray RHB	914733128
57	W/Gerima G/Medhin	Lab.Tecnologi st	Mekelle Semen	Mekle, Tigray RHB	914732039
58	Redae G/Tsadik	Pharmacy	Mekelle Semen	Mekle, Tigray RHB	914729548
59	Mengistu Aragie	Envir. Health	Southern,Korem	Korem Regulatory	914132919