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**Rapid Assessment:**  
*Healthcare Waste  
Component of Global  
Fund HIV/AIDS Projects*  
**in Uzbekistan**

## Rapid Assessment: Healthcare Waste Component of Global Fund HIV Projects in Uzbekistan

### Supplement to the Healthcare Waste Management Toolkit for Global Fund Practitioners and Policy Makers



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## Abbreviations

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ACSM	Advocacy, communication and social mobilization	NGO	Non-governmental organization
ART	Antiretroviral therapy	PIU	Project Implementation Unit
ARV	Antiretroviral (medicine)	PMCT	Prevention of mother-to-child transmission
CCM	Country Coordinating Mechanism	PPP	Public private partnership
DOTS	Directly Observed Treatment, Short-course	PR	Principal recipient
GF	Global Fund to Fight AIDS, Tuberculosis and Malaria	PWID	People who inject drugs
HBV	Hepatitis B Virus	SES	Centre of Sanitary Epidemiological Surveillance
HCV	Hepatitis C Virus	SOP	Standard operating procedure
HIV	Human Immunodeficiency Virus	SR	Sub-recipient
IDU	Injecting drug use	STI	Sexual transmitted infection
IEC	Information, education, communication	SSI	Small scale incinerator
LFA	Local Fund Agent	SW	Sex worker
MARP	Most at risk populations	TP	Trust points
MandE	Monitoring and evaluation	TB	Tuberculosis
MoE	Ministry of Environment	UNDP	United Nations Development Programme
MoH	Ministry of Health	WEEE	Waste of electrical and electronic equipment
NFM	New Funding Model (of the GF)	WHO	World Health Organization

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The assessment included an onsite visit in Uzbekistan from 4 to 8 November 2013. At that time several UNDP GF projects sites have been visited and relevant stakeholder interviewed. I would like to extend our gratitude to all the individuals and institutions that contributed to the planning and execution of this assessment.

Special thanks are also extended to the UNDP country office in Tashkent which hosted the assessment and provided the local organization of the interviews and site visits, especially to Mr. Stefan Priesner (UN Resident Coordinator), Mr. Jaco Cilliers (Deputy Resident Representative), Flora Salikhova (National Officer on Public Health), Abduvakkos Abdurahmanov (Head of Environment and Energy Unit) and Mr. Zakir Kadirov (Project Manager of the GF project).

# 1 Executive Summary

UNDP has been a strategic partner of the Global Fund to Fight AIDS, Tuberculosis and Malaria (GF) for the last 10 years and has acted as interim principal recipient of last resort for countries in which the GF cannot identify a national principal recipient (PR) for its grants. In order to deepen the understanding of the environmental impact caused by waste created through its GF project implementations an onsite assessment of GF health projects with UNDP PR-ship will be conducted in Uzbekistan, Tajikistan and Zimbabwe.

This report outlines the results of the assessment in Uzbekistan which was carried out in the context of the development of a toolkit to improve the planning and implementation of better healthcare waste systems in future projects. The lessons learned from this assessment were therefore crucial for the further development of the toolkit.

The assessment in Uzbekistan was conducted from 4 to 8 November 2013 and concentrated on the GF HIV/AIDS grants which are consolidated in a “Single Stream of Funding”. Phase 1 of this consolidated grant will end in 2013 but will be extended by one year. A second phase for the following years will be developed under the New Funding Model (NFM) of the GF. The assessment includes a detailed review of all provided documents from the Phase 1 and of the previous application of Phase 2. Furthermore interviews with all relevant governmental and non-governmental stakeholders, as well as the visit and interview of different Sub-Recipients were conducted.

The waste management system, especially the healthcare waste management system is in an early development stage in Uzbekistan. The legal framework for waste management is at the moment reviewed by the government. For healthcare waste a complete legal framework has not yet been developed. However,

several activities are ongoing or planned by the government to improve the situation. UNDP and other development partners are working to improve the current waste situation in order to reduce possible public health and environmental risks.

Also, within the UNDP managed GF health projects, first activities on the safe management of healthcare waste were already implemented. These activities included the setup of a system to recollect used syringes from PWID and also the provision of new incinerators to improve the regional healthcare waste treatment infrastructure in the five oblasts where the GF HIV programme is implemented. In addition to this, the project provided technical assistance for the development of draft guidelines for healthcare waste management SOPs and carried out some trainings.

The assessment of the currently implemented national healthcare waste system and the applied healthcare waste practices showed several opportunities for improvement. To streamline this, setting up a national strategy for the future management, as well as the safe and environmentally optimized disposal of healthcare waste, is recommended. This national strategy should be accompanied by a practical development and implementation plan.

Likewise, the analysis of the GF HIV project discovered several opportunities for the future improvement of the healthcare waste management system. The identified opportunities might not only be relevant for the GF HIV programme in Uzbekistan, but generally for GF funded health programmes including for programmes in other countries. Therefore, some of the recommendations of this report can be used universally and will be included in the future toolkit for waste management. Other recommendations are context specific and aim directly at improvements for

the situation in Uzbekistan. This includes especially recommendation for the establishment of a strategic framework for and coordination mechanism of all ongoing healthcare waste activities in Uzbekistan.

At the request of some of the interviewed stakeholders, a short chapter was included in this assessment report to provide first and basic information about how a national strategy for the treatment of healthcare waste could be designed. This strategy is just a starting point and is not exhaustive, but needs to be completed and expanded as several relevant issues have not yet been included such as capacity building, monitoring and financing aspects.

To start up the improvement process for healthcare waste, it is recommended to form a working group in order to set up a national healthcare waste master plan. This working group should be under the leadership of the Ministry of Health but should be supported by the relevant development partners, including UNDP. As several donors are planning to include waste management as part of their projects, strong coordination among the development partners is recommended. For GF grant projects, and especially for projects planned under the new funding model, it is recommended to include healthcare waste management as a critical system strengthening component.

Within the master plan yet to be developed, the strategies for the future treatment of healthcare waste can be determined and development plans for the sustainable set up of needed waste logistics and treatment infrastructure should be included. The future waste toolkit will include strategies which will provide recommendations on how to quantify and qualify the expected waste streams created by the grant, and how to manage these under consideration of existing or non-existing national healthcare waste systems and legal frameworks. This recommendation will include procurement advice, waste segregation, collection and disposal/recycling and will also provide recommendations for the budgeting of waste management activities.

To be able to include and fund healthcare waste management within the new funding model (NFM) of GF, it is recommended to include the environmental aspect in the national strategic plan / investment case. It must be included at the latest in the “concept notes” to be provided. In addition, the NFM provides that high-impact, well-performing programmes can compete for additional funding over and above the amount of indicative funding allocated to each country; improved waste management and environmental performance should be prioritized for such additional funding.

In regard to the national strategic plan on HIV/AIDS, it should not be forgotten that, according to WHO the unsafe disposal of healthcare waste (for example, contaminated syringes and needles) contributes to the further spread of HIV and poses public health risks. WHO estimates that injections with contaminated syringes cause 5% of all new HIV infections<sup>1</sup>.

<sup>1</sup> Source: <http://www.who.int/mediacentre/factsheets/fs281/en/>

## 2 Assessed Projects

UNDP is a long-term partner of the Global Fund to Fight AIDS, Tuberculosis and Malaria (GF) and acts in several countries, including Uzbekistan, as interim principal recipient (PR). The implementation of the programmes often results in the generation of different types of waste which have a possible negative environmental and public health impact. To minimize these impacts and to include sustainable environmental strategies, it is planned to develop a waste management toolkit to support grant planners, grant reviewers/approvers, implementers and others in better and safer waste management.

To better understand the current situation, assessments on the existing waste management systems were carried out in three countries. The results of the assessments will be used to improve the applicability and practicability of tools to be developed.

The assessment of the GF grants implemented in Uzbekistan by UNDP as PR was conducted in the second week of November 2013. The objective was to assess the current and planned waste management practices of the following projects:

### **HIV/AIDS: UZB-311-G06-H**

Name: “Continuing Scale Up of the Response to HIV in Uzbekistan, with Particular Focus on Most-at-Risk Populations”:

The programme funded by this grant builds on the activities initiated and results achieved under the Round 3 HIV and AIDS grant in Uzbekistan to further develop and strengthen the national response to HIV. The programme goal is to prevent the spread of HIV into the general population by reducing its impact on the most vulnerable populations, including people who inject drugs, sex workers and men who have sex with men. The programme has four objectives:

- i. Scale up coverage and increase quality and comprehensiveness of HIV prevention services for most-at-risk populations;
- ii. Scale up treatment, care and support for people living with HIV;
- iii. Strengthen the health system;
- iv. Create an enabling environment for effective scale-up of HIV prevention, treatment, care and support services.

The grant is implemented by a partnership of government and civil society organizations.

### **Service delivery areas:**

- ▶ Prevention
  - ▷ Behavioural Change Communication - Community Outreach
  - ▷ Prevention of mother-to-child transmission (PMTCT)
- ▶ Treatment
  - ▷ Prophylaxis and treatment for opportunistic infections
  - ▷ Antiretroviral treatment (ART) and monitoring
- ▶ Other
  - ▷ Health system strengthening

(Note: This project is now a consolidated project – see UZB-H-UNDP)

### **HIV/AIDS: UZB-H-UNDP**

#### **(No specific name)**

Continuing scale-up of the response to HIV with particular focus on most-at-risk populations and strengthening systems and capacity for universal access to HIV prevention, diagnosis, treatment and care in Uzbekistan.



**Service delivery areas:**

- ▶ Prevention
  - ▷ Behavioural Change Communication - Community Outreach
  - ▷ Blood safety and universal precautions
  - ▷ Prevention of mother-to-child transmission (PMTCT)
  - ▷ STI diagnosis and treatment
- ▶ Treatment
  - ▷ Prophylaxis and treatment for opportunistic infections
  - ▷ Antiretroviral treatment (ART) and monitoring
- ▶ Care and Support
  - ▷ Care and support for the chronically ill
- ▶ Health System Strengthening
  - ▷ Service delivery
  - ▷ Health Workforce

The following table shows the management structure of the GF projects:

**Table 1: Management structure – GF projects**

Position	Organization
Fund Portfolio Manager	Global Fund
Country Coordination Mechanism	National stakeholders and development partners
Principal Recipient	UNDP, Uzbekistan
Local Fund Agent	PricewaterhouseCoopers, Uzbekistan

**Note:** Since 2012, the above mentioned projects have been combined in a Single Stream of Funding (SSF). The grant name of the SSF remained UZB-H-UNDP. The consolidated Phase 1 ran from 01.01.2012 until 31.12.2013. The CCM request for renewal was submitted in July 2013 and the consolidated grant cycle Phase 2 was planned to cover the period from 01.01.2014 until 31.12.2016. Recently, a decision was taken that the Phase 1 will be extended by one year and that the second phase for the following years will be developed under the NFM of the GF.

All information has been taken from the Global Fund webpages: <http://portfolio.theglobalfund.org/en/Grant/Index/>

# 3 Background Information

## Key Country Data:

**Full Name:** Republic of Uzbekistan  
**Total Population (2009)\*:** 28,541,000  
**Area\*\*:** 447,400 sq km  
**Life expectancy at birth m/f (years)(2009)\*:** 66/71  
**Infant mortality rate (2012)\*\*:** 20.51 deaths/1000 live births  
**Hospital bed density (2009)\*\*:** 4.5 beds/1000 population  
**GDP - per capita (PPP)(2012 estimate)\*\*:** \$3,600  
**Total expenditure on health as % of GDP (2011)\*:** 5.4

Uzbekistan<sup>2</sup> is located in Central Asia, north of Turkmenistan and south of Kazakhstan. It consists of 12 provinces (viloyatlar), 1 autonomous Republic (respublika), and 1 city (shahar). Uzbekistan gained independence on the 1st September 1991 (from the Soviet Union). The GDP (purchasing power parity) is \$106.4 billion (2012) and the growth rate is about 8.2%. The Global Fund is active in all its three key areas, with a concentration on HIV/AIDS and TB, and a smaller malaria project. The ongoing grants include:

- Response to HIV in Uzbekistan, with Particular Focus on Most-at-Risk Populations
- Strengthening of the Achieved Results and Supporting Measures on Elimination of Malaria in Uzbekistan
- Consolidating and Expanding DOTS Framework in Uzbekistan by Scaling up the Management of Drug-Resistant Tuberculosis

The HIV/AIDS Round 3 grant started in 2004, targeting the most-at-risk populations (MARPs). This includes people who inject drugs (PWIDs), sex workers (SWs) and men who have sex with men (MSM). The work was continued through the Rolling Continuation Channel (RCC) and

was supplemented with a further grant, focused on Health Systems Strengthening (HSS), under Round 10.

Since January 2012, these two grants have been combined into the Single Stream of Funding (SSF), worth USD \$22.7 million in the first two years. The SSF Global Fund grant is implemented by the United Nations Development Programme (UNDP) as an interim PR. The assessment concentrated on the environmental aspects, particularly the healthcare waste management system, of this particular SSF Programme, implemented by UNDP.

## 3.1 Assessment strategy

Before traveling to the country, the consultant conducted a review of relevant and publicly available GF grant documents. The focus of the analysis were expected waste streams, waste amounts, available treatment systems and disposal options in Uzbekistan and the current procurement processes. Additionally, key project documents were provided prior to the onsite activities by the Project Implementation Unit (PIU) of the UNDP country office in Uzbekistan.

<sup>2</sup> All country data provided in this chapter are sourced from the following:

\* World Health Organization Country Data (<http://www.who.int/countries/en/>)

\*\* Central Intelligence Agency's The World Factbook (<https://www.cia.gov/library/publications/the-world-factbook/geos/as.html>) – current as accessed by the consultant in 2013 unless otherwise indicated

**Figure 1: Assessment methodology**

In Tashkent, the consultant worked closely together with the UNDP country office in order to receive further information relevant to the project. Several stakeholder interviews were conducted with the GF grant practitioners, including PR and Sub-Recipients (SR), the government and its agencies, the CCM and also with the WHO and the new Health Project 3, financed by the World Bank.

Furthermore, project sites and implementing organizations (NGO's, Republican Centre to Fight AIDS, Republican Centre of Sanitary Epidemiological Surveillance (SES), Institute of Haematology and Transfusion) were visited in order to receive direct information and impressions of the project operations and the awareness and opinions of the project staff.

## 3.2. Provided and reviewed project documents

The following documents were reviewed as part of the assessment:

- A. Downloads from GF webpage
  - a. Grant Performance Report
  - b. Amended and Restated Programme Grant Agreement 1
- B. Project documents provided by the UNDP PMU
  - c. UZB-H-UNDP: Detailed Budget 2012-2013 (including procurement plans)
  - d. Detailed-Budget-II Phase\_final\_30072013 (including procurement plans)
  - e. Proposal Round 10
  - f. RCC proposal Uzbekistan, Submission 9 Feb 2010
  - g. Request for Renewal Template Section v30 July 2013
  - h. SSF Performance Framework 2 phase final
  - i. SSF PF 1-2 HIV UZB-MnE: 26-03-2012

# 4 Legal Framework

## 4.1 International conventions

The assessment of relevant international conventions for healthcare waste management showed that

Uzbekistan so far has only signed the Basel Convention and the Montreal Protocol:

**Table 2: Status of ratification of international conventions**

Name of Convention	Status of ratification	Year
Basel Convention: Technical Guideline on environmentally sound management of biomedical and healthcare waste (UNEP 2003)	Accession <a href="http://www.basel.int/Countries/StatusofRatifications/PartiesSignatories/tabid/1290/Default.aspx">http://www.basel.int/Countries/StatusofRatifications/PartiesSignatories/tabid/1290/Default.aspx</a>	07/02/1996
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	<a href="http://www.pic.int/Countries/Statusofratifications/tabid/1072/language/en-US/Default.aspx">http://www.pic.int/Countries/Statusofratifications/tabid/1072/language/en-US/Default.aspx</a>	-
Vienna Convention for the protection of the Ozone Layer and its Montreal Protocol on substances that deplete the Ozone Layer	Accession <a href="http://ozone.unep.org/new_site/en/treaty_ratification_status.php?treaty_id=andcountry_id=169andsrchcrit=1andinput=Display">http://ozone.unep.org/new_site/en/treaty_ratification_status.php?treaty_id=andcountry_id=169andsrchcrit=1andinput=Display</a>	Both on 18.05.1993
Stockholm Convention on Persistent Organic Pollutions (POPS), Stockholm	<a href="http://chm.pops.int/Countries/StatusofRatifications/tabid/252/Default.aspx">http://chm.pops.int/Countries/StatusofRatifications/tabid/252/Default.aspx</a>	-
ADR, European Agreement concerning the International Carriage of Dangerous Goods by Road (UNECE)	<a href="http://www.unece.org/trans/danger/publi/adr/legalinst_53_tdg_adr.html">http://www.unece.org/trans/danger/publi/adr/legalinst_53_tdg_adr.html</a>	-
Minamata Convention on Mercury (UNEP 2013)	<a href="http://www.mercuryconvention.org/Countries/tabid/3428/Default.aspx">http://www.mercuryconvention.org/Countries/tabid/3428/Default.aspx</a>	-

## 4.2 National legal healthcare waste framework

Currently, the legal framework for healthcare waste management is under development. While in the past the SanPin № 600 “On observation of sanitary, hygienic, anti-epidemic and disinfection conditions in medical facilities of the Ministry of Health of the Republic of Uzbekistan” from 29 December 2007 has been the relevant document, this SanPin was

withdrawn and replaced by a new one. However, the new SanPin does not include the healthcare waste sector as this sector is planned to be covered by a separate SanPin. The final draft of this regulation has been developed and was ready for final review. According to the Chief State Sanitary Doctor the issuing of the regulation can be expected this year. Other relevant legal documents include

1. The Law of the Republic of Uzbekistan On State Sanitary Control (1992, art. 10, 11, 19, 21, 29);

2. The Law of the Republic of Uzbekistan On Citizen Healthcare (1996, art. 3, 13, 34);
3. The Law of the Republic of Uzbekistan On Waste (2002, art. 8);
4. The Law of the Republic of Uzbekistan On Atmospheric Air Protection (1996, art. 4, 11, 21, 22);
5. The Law of the Republic of Uzbekistan On Water and Water Use (2009, art. 8, 40, 41).

The “Law of the Republic of Uzbekistan On Waste” is currently under review, and it is expected that an updated version will soon be published. It is planned that the revised version will include a chapter on healthcare waste management, which was provided by the Ministry of Health. However, this chapter is still under discussion. It is expected that the new law will also include a clearer definition of the different waste streams.

# 5 Assessment of the Healthcare Waste Situation

## 5.1 Input-output analysis

Of the seven objectives of the on-going GF grant, the following four objectives are of special relevance for healthcare waste management:

- ▶ HIV prevention services for most-at-risk populations (MARF);
- ▶ Scale up treatment, care and support for people living with HIV;
- ▶ Strengthen the health system;
- ▶ Create an enabling environment for effective scale-up of HIV prevention, treatment, care and support services.

Relevant healthcare waste streams are to be expected for Objectives I and II. As Objective III and IV are mainly capacity strengthening objectives, the main input is human power and office materials; therefore the expected output is mainly general office waste. In addition to the four main objectives (which are also included in the CCM request for renewal), the 2012-2013 grant period (consolidated Phase 1) included the objective:

*“Enhancing capacities and systems on infection control for prevention of transmission, procurement, supply and management of health products and consumables for HIV prevention, diagnosis and treatment”.* This objective was not part of the request for renewal for the consolidated phase 2.

As this objective of Phase 1 includes a component on waste management, it was separately analysed.

### 5.1.1 General activities – management and support

In addition to medical related products, the inputs of the grant included the set up and operation of different offices, the procurement of office consumables

and investment products (computer, furniture), the procurement or hiring of transport equipment (cars, etc.) and the equipping and operation of (cooled) warehouses.

Output from these general activities will be general, non-hazardous and hazardous office waste like cartridges, waste electrical and electronic equipment (WEEE), disposable and reusable packing materials, waste from spillages, and waste from the maintenance of the transportation equipment (including used tyres, used oil, etc.).

### 5.1.2 Analysis of the objective on HIV prevention services for most-at-risk populations

In order to reach this objective, the following relevant material input is needed:

- ▶ Input for the infection prevention among PWID:
  - ▷ Condoms; syringes (2 and 5 ml); swabs; gloves for outreach workers; used syringe containers; IEC materials
- ▶ Input for the infection prevention among SW;
  - ▷ Male and female condoms; information, education and communication (IEC) materials
- ▶ Input for the infection prevention among men who have MSM;
  - ▷ Male condoms; IEC materials
- ▶ Input for the provision of STI diagnosis and treatment for MARF groups:
  - ▷ Pharmaceutical products (see list in the attachment), gynaecological sets, gloves.

The expected waste outputs from the first objective are:

- ▶ General, non-hazardous waste
  - ▷ Packing waste (cardboard, foil, etc.)
  - ▷ Paper waste
  - ▷ General office waste (unsorted)

- ▷ Used condoms
- ▷ Expired or unusable products, non-hazardous (e.g. syringes, condoms, etc.)
- ▶ Hazardous waste
  - ▷ Infectious waste (contaminated swabs, syringes, gynaecological sets)
  - ▷ Sharp waste (used syringes)
  - ▷ Pharmaceutical waste (expired STI drugs)

### 5.1.3 Analysis of the objective on treatment, care and support for people living with HIV

In order to achieve this objective, the following relevant inputs are needed:

- ▶ Input for the effective distribution of ARV drugs
  - ▷ Pharmaceutical products (see list in the attachment)
- ▶ Input for the provision of OI prophylaxis and treatment
  - ▷ Pharmaceutical products (see list in the attachment); X-ray films for TB diagnostics
- ▶ Input for the procurement of medical products and consumables (CD4 and PCR supplies)
  - ▷ Diagnostic products (see the list in the attachment)
- ▶ Input for the provision of PMTCT services
  - ▷ Diagnostic products, education and communication (IEC) materials

The expected waste outputs from the second objective are:

- ▶ General, non-hazardous waste
  - ▷ Packing waste (cardboard, foil, etc.),
  - ▷ Paper waste
  - ▷ General office waste (unsorted)
- ▶ Hazardous waste
  - ▷ Infectious waste (contaminated swabs, minor)
  - ▷ Pharmaceutical waste (expired or unusable drugs and diagnostic kits)

### 5.1.4 Analysis of the objective on enhancing capacities and systems on infection control

In order to reach this objective, the following relevant inputs are needed:

- ▶ Ensure supply of essential disposable equipment to key healthcare facilities:
  - ▷ Disposable products (see list in the attachment), information, education and communication (IEC) materials

- ▶ Improve systems for hospital waste management
  - ▷ Waste collection material, waste treatment plants, information, education and communication (IEC) materials

The expected waste outputs from this objective are:

- ▶ General, non-hazardous waste
  - ▷ Packing waste (cardboard, foil, etc.) from the disposables
  - ▷ Paper waste
- ▶ Hazardous waste
  - ▷ Infectious waste (contaminated disposable products such as blood bags, arterial lines, etc.)
  - ▷ Sharp waste (lancets, catheters, needles, etc.)
  - ▷ Chemical waste (Ash from the hospital incinerator)

## 5.2 Generated and expected waste quantities

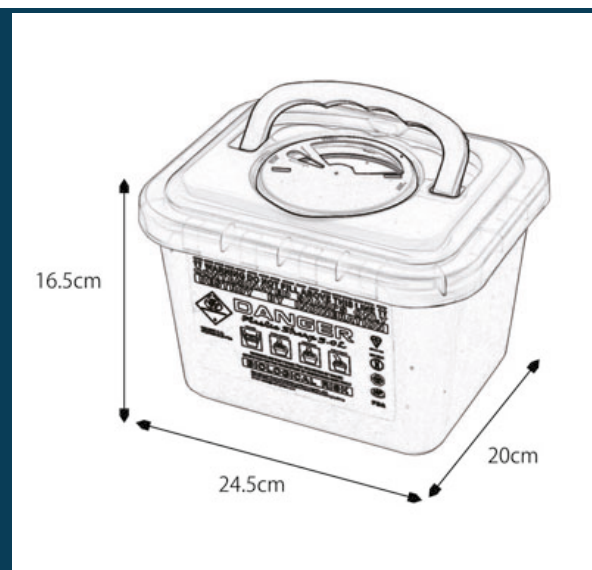
Currently in the GF HIV project a waste recording system has not been considered during the project planning and is therefore not part of the project processes. In line with this, there is no “return” system for expired or unwanted pharmaceuticals in place. Only estimations of the generated waste amounts can be made. Disposable products were partly included in the infection control component of the Phase 1 and will not be included in Phase 2. However, in both phases, the supply of syringes for PWIDs and the supply of sharps containers are included; therefore calculation of generated sharp waste amounts in Phase 1 and to be expected sharp waste quantities in Phase 2 can be done.

### 5.2.1 Estimation of generated sharp waste – phase 1 - IDU

One objective of the programme is HIV prevention services for most-at-risk populations. This includes PWIDs. To avoid the further spread of HIV among PWIDs due to sharing of syringes and needles, each PWID is provided, per year, with 170 syringes (2ml) and 55 syringes (5ml) – both sizes include needles adding to a total of 225 needles. Additionally, per 100 syringes one sharps container is provided. The weight of 2 ml syringes is about 0,65 kg per 100 pcs and about 0,832 kg for 100 pcs of 5 ml syringes.

**Figure 2: Sharp waste container used in Uzbekistan**

Capacity	5.0L	
Product Size	Length	24.5cm
	Width	20cm
	Height	16.5cm
Carton Size	51x42x29.5cm	
Quantity in one Carton	24pcs	
G.W. / N.W.	7.5KGS / 6.5KGS	



The average weight per needle is 1g. For the collection of sharps, plastic made containers are provided. The weight per empty 5 litre container is about 0,27 kg.

Per PWID and per year, this would be 1.105 kg of 2ml syringes, 0.458 kg of 5 ml syringes, 0.225 kg for needle and 0.607 kg for the sharps container. In total, it would be 2.395 kg per PWID per year. Considering the usage of swabs and some remaining blood in syringes, it can be estimated that per PWID about 2.5 kg of sharp waste will be generated.

Based on the document: “CCM Request for Renewal”, in 2012 the minimum package of services for PWID was provided to 24,952 PWIDs (118.8% of the targeted PWID), and for 2013 it is expected to be more than 25,000.

Based on the figures above, the amount of sharp waste generated by the delivery of needles and syringes from PWIDs in Phase 1 is:

- ▶ 62.38 tons in 2012; and
- ▶ More than 62.5 tons in 2013.

### 5.2.2 Estimation of generated sharp waste – phase 2 - IDU

According to the summary budget of Phase 2, the amount of products provided per PWID will remain the same. However, it is expected that the number of PWIDs to be served will increase to up to 32,000 in 2016. Accordingly, the amount of waste will increase.

According to the Republican Centre to Fight AIDS of the Ministry of the Republic of Uzbekistan, the treatment cost of sharp waste in Tashkent is currently about 6,000 Som per kg of waste (about 2,7 US\$). Considering that all sharp waste would have to be treated in this incinerator, a budget of about 200,000 US\$ would be needed per year.

Assuming that the sharp waste is incinerated in the soon to be installed incinerators (please refer to 5.3.4) at least about 20,000 litres of diesel will be needed per year to incinerate this waste.

**Table 3: Estimation of sharps waste generation – SERVICES PROVIDED TO PWID (2014-2016)**

2014		2015		2016	
PWID targeted	Sharp Waste [ton/year]	PWID targeted	Sharp Waste [ton/year]	PWID targeted	Sharp Waste [ton/year]
28,000	70	30,000	75	32,000	80



## 5.3 Current waste management procedures within the programme

During the assessment, several interviews with the PR and different SRs were held. Based on the statements of the different organizations, on the on-site and other observations including previous healthcare waste assessments, an overview of the typical waste management practices in the GF HIV/AIDS grant in Uzbekistan is provided in the following section.

### 5.3.1 Waste management procedures for supporting activities

The waste management procedures for waste from supporting activities (office operation, warehouse operation, etc.) follow the general Uzbekistan waste practices. Typically, all generated waste is collected and disposed of via the household waste system on the landfill. Specific waste management systems for generated hazardous waste during provision of supporting services are not implemented. Landfills in Uzbekistan are very basic and do not follow international standards in regard to protection, management and operation. Environmental impact of these dumpsites has to be considered as significant, as toxic waste compounds can leak into the soil and into the groundwater, and greenhouse gases are emitted.

Waste management plans for office operation or warehouse operation are so far not introduced. Next to the obligatory recycling requested by the government, no further recycling or reusing activities are implemented or supported. Specific instructions for waste management from car maintenance do not exist. A system for the management of WEEE.

### 5.3.2 Analysis of waste management procedures during HIV prevention services

For general, non-hazardous waste, no specific waste management system has been established yet. The waste is collected and disposed via the normal household waste collection system of Uzbekistan.

For hazardous sharp waste, a syringe exchange programme was established to avoid the cross contamination of HIV among drug users who share syringes. The approach has at the same time the positive effect of opening the possibility for safe disposal of used and potentially hazardous syringes.

PWIDs have the possibility to return used syringes at the “trust points” (TP) in exchange for new syringes. The TPs are supplied with sharps containers. After filling the sharp containers, the filled sharps containers are disposed of by either incineration in a central facility (e.g. Tashkent) or by burning in one of the smaller ovens (rural areas).

The TP reported shortcomings in the supply of sharps containers and that they face problems during the burning of the filled sharps containers, as especially the more simple waste burners are not able to create enough heat to melt and ignite the container. Sharps containers were planned for the collection of up to one hundred 2 ml or 5 ml syringes. The TP reported that due to a change of used drugs (usage of desomorphine “crocodile” instead of heroin) the PWIDs prefer the usage of 10 ml syringes which are filling up the sharps containers more quickly.



*Sharps container, used for the collection of syringes*

Potentially infectious waste such as used swabs, etc. is currently collected together with the sharp items in the sharps containers. Waste bags for the collection of infectious waste are not available.

For expired pharmaceuticals or other expired items, currently no return system exists. All interviewed stakeholders claimed that so far no pharmaceuticals or condoms expired or were received damaged or unusable. In healthcare settings, potentially infectious wastes such as used gynaecological sets are treated as other waste generated in the healthcare setting. No training on waste management

is currently provided or foreseen for the SRs. Monitoring of the generated waste from the GF activities does not take place. A budget for the disposal of the generated hazardous and non-hazardous waste is not provided.

### 5.3.3 Analysis of waste management procedures during treatment, care and support for people living with HIV

No specific system for the collection of non-hazardous waste has so far been established. For hazardous waste, sharps containers are provided for the collection of syringes and lancets. The containers are collected and disposed of via one of the established treatment methods for infectious waste in Uzbekistan. A system for the collection and return of pharmaceutical waste has not been implemented. Training for health workers and supporting staff is not provided.

Monitoring of the generated waste from the GF activities does not take place by the project. A budget for the disposal of the generated hazardous and non-hazardous waste is not provided. The Republican Centre to Fight AIDS of the Ministry of the Republic of Uzbekistan reported having a contract with a central incinerator operator in Tashkent and is paying about 2,7 US\$ for the treatment of 1 kg of waste. Payments are covered through the project. Vehicles of the national AIDS centre are used for transportation of the infectious waste to the treatment centre.

### 5.3.4 Analysis of waste management procedures introduced for the enhancing of capacities and systems on infection control

The activities related to the improvement of infection control of the consolidated Phase 1 also included a component on healthcare waste management. According to the original proposal, it was planned to carry out the following activities:

1. Introducing regulations on hospital waste management;
2. Developing and disseminating SOPs for medical waste segregation, handling and transportation;
3. Training Healthcare Facility (HCF) staff on implementing the SOPs;
4. Installing incinerators in 10 locations to cover the requirements of all five oblasts;

5. Training specialists to supervise efficient use of incinerators;
6. Introducing systems for collection of waste from all HCFs and transporting it to the regional level centres where incinerators are installed.



*Purchased incinerator for the treatment of healthcare waste*

In 2013, a consultant was hired to support the development of regulations on hospital waste management. In the frame of this work, a training programme was also developed and training was provided once for about 20 people from the Ministry of Health (planned as a training of trainers (TOT) session). Additionally, some SOPs were developed<sup>3</sup>.

Due to a shortage of budget, only 5 incinerators (instead of 10) will be set up. The incinerators are already purchased and will be installed shortly in selected healthcare facilities, one in each of the five project regions (Andijan, Namangan, Samarkand, Tashkent and Ferghana City). The receiving healthcare facilities will be responsible

<sup>3</sup> Technical assistance in the development of the training module on medical waste disposal in the Republic of Uzbekistan, Gyulyara Efendieva, 25.02.2013.

for the selection and setup of suitable places to house the equipment. Training on the operation and maintenance of the incinerators will be provided by the supplier. Support for setting up the collection system will not be provided, as no funds will be available for waste management activities in the years after 2013. Due to lack of funds, a budget for the financing of the recurrent cost from the operation of the incinerator (fuel, maintenance, etc.) is not available.

The selected incinerator (LDF-150) will be supplied by the company “Shandong Better Environmental Protection Equipment” from China. The incinerator will be a simple two-chamber system with a capacity of 100 to 150 kg per batch. Fuel consumption is stated by the manufacturer to be approximately 7-10 kg/hour. Considering a batch time of 3-4 hours, the fuel consumption is assumed to be about 0,25 kg/kg (= 0,25 litre of diesel per kg of waste) of waste. The incinerator is not equipped with a more advanced flue-gas treatment system, so de-ashing will have to be carried out manually.

## 5.4 Current healthcare waste disposal practices in Uzbekistan

Due to the still comparably small amounts of disposable products used in healthcare facilities, the amount of general waste generated during healthcare activities is low. The waste is normally dumped in waste pits (especially in rural areas) or is picked up by transport companies and dumped on basic landfills (Tashkent city). The waste collected in pits is burned periodically, to reduce the waste volume.

For potentially infectious waste and sharp waste, some healthcare facilities are following the old sanitarian rules by disinfecting the infectious waste with chlorine solution. Outside Tashkent City, in addition to brick-made incinerators (De-Montfort type) and open burning, self-made incinerators made from metallic drums or pipes are used to combust the waste on the hospital compound. Incineration of healthcare waste in this type of Small Scale Incinerators (SSI) within the boundary of Tashkent City is prohibited by the Ministry of Environment. It was reported that it is not possible to burn plastic sharps containers in these types of basic incinerators due to the high temperature

required to melt and ignite the hard plastic. It was reported that the ovens are however able to burn the cardboard sharps containers. If sharps containers are not available, needles, etc. are collected in plastic water bottles and are encapsulated and disposed of on a landfill (Tashkent) or in a waste pit on the facility compound (rural area).

The majority of infectious waste, especially disposable products and syringes, are soaked in a 0.5 % chloride



Top photo: Simple incinerator, used in rural areas  
Bottom photo: Chemical disinfection of waste

solution for 10 minutes for decontamination. According to national regulations, the procedure of disinfection of syringes includes:

1. Soaking up and spouting of chlorine solution (repeated three times)
2. Separation of the needle from the syringe body (by hand)
3. Collection of needles in a re-used water bottle
4. Soaking of plastic parts (syringes and tubes) in chlorine solution for 10 minutes

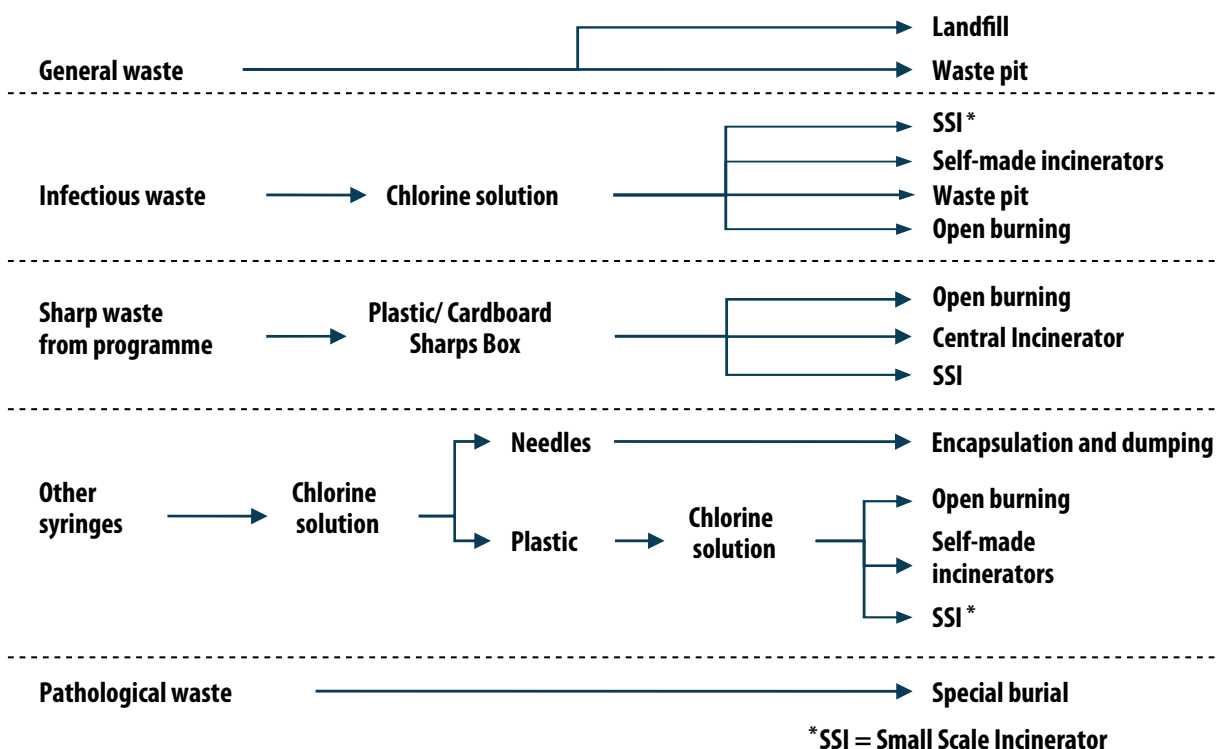
Highly infectious waste such as cultures and stocks from research and medical analyses laboratories (belonging to the SES) are decontaminated by steam (autoclave) and

incinerated afterwards. In Tashkent, highly infectious waste generated by the republican SES is autoclaved within the laboratory and incinerated in a two-chamber-incinerator.

A waste disposal system for chemical and pharmaceutical waste from healthcare facilities is not available. This waste is normally disposed of together with the household waste.

In Figure 3, the general method of disposal for the different healthcare waste streams in Uzbekistan is outlined. Table 4 shows the corresponding healthcare waste classification used in Uzbekistan.

**Figure 3: Current disposal scheme of the healthcare waste streams**



**Table 4: Healthcare waste classification system, Uzbekistan – based on the old SanPin № 600**

<b>Class A Non-hazardous</b>	<b>Class B Hazardous</b>	<b>Class C Extremely hazardous</b>	<b>Class D Wastes, close to industrial wastes</b>
<ul style="list-style-type: none"> <li>▶ Waste not contaminated with biological fluids of patients, infectious diseases patients, including non-toxic wastes.</li> <li>▶ Food wastes of all health facilities, except infectious diseases hospitals (including skin and STI diseases hospitals), TB clinics.</li> <li>▶ Furniture, broken diagnostic equipment, which don't contain toxic elements.</li> <li>▶ Non-contaminated paper, construction wastes etc.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Potentially contaminated wastes.</li> <li>▶ Materials and instruments contaminated with excretions, including blood, patients' fluids,</li> <li>▶ Pathological wastes (patients' tissues, organs etc.).</li> <li>▶ All wastes from infectious diseases unit of hospitals (including food wastes).</li> <li>▶ Wastes of biological labs, working with micro-organisms of group 3 – 4 of pathogens.</li> <li>▶ Bio-wastes of animal research laboratories</li> </ul>	<ul style="list-style-type: none"> <li>▶ Materials, which were in contact with patients having highly contagious infections</li> <li>▶ Wastes of laboratories, working with micro-organisms of group 1 - 4 of pathogens.</li> <li>▶ Wastes from microbiology research.</li> <li>▶ Wastes of patients having anaerobic infections.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Expired medicine, wastes of medication and diagnostic materials.</li> <li>▶ Disinfectants.</li> <li>▶ Cytostatic and other chemicals.</li> <li>▶ Equipment and instruments containing mercury.</li> </ul>

# 6 Findings and Recommendations

## 6.1 Recommendations, generally applicable to all GF-financed health programmes

### a) Need of SOP and budgets for the return of unusable products (damaged, expired, etc.)

**Current situation:** Procedures (incl. protocols) to return distributed but unwanted or unusable medical and non-medical products by the SR, end-user, etc. do not exist. If a SR detects that products are damaged or close to expiration, or if products are no longer required, they will have to dispose of it on their own.

**Justification/impact:** As the recipients of products do not have the possibility to return the unwanted or unusable products, they depend on the locally available waste disposal infrastructure which might be unsuitable. The disposal of normally small amounts of waste will create comparable high cost. A budget for the disposal normally does not exist, which might result in the inadequate, unsafe and environmental risky disposal of waste.

**Recommended activities:** To develop instructions on how to return supplied products if required, and to include budgets for the disposal of the unwanted products.

### b) Strengthen the reverse logistic systems for IDU waste

**Current situation:** Systems to recollect used syringes and needles are introduced and sharps containers are supplied. However, a systematic approach for the collection and disposal of filled sharps containers (including a budget for disposal) does not exist.

**Justification/impact:** Without support, the organizations collecting the used needles will dispose of them to the best of their ability and within their financial possibilities. If resources are missing or if

disposal possibilities are missing, this might result in the inadequate, unsafe and environmentally risky disposal of this waste.

**Recommended activities:** To develop standard operation procedures on the collection and disposal of filled sharps containers and to include financial resources for the disposal of the waste.

### c) Review the sharps containers to be supplied, and take user feed-back into consideration

**Current situation:** Users of sharps containers cannot influence the type of sharps container supplied.

**Justification/impact:** Different sharps containers have different requirements in the treatment system. Strong plastic containers might be a good solution for more advanced treatment systems but might create problems during treatment in more simple systems, especially in countries with basic incinerators.

**Recommended activities:** Select cardboard made sharps-containers (which fulfil the WHO quality standards) as a standard solution. Supply plastic made containers only in special cases based on justified demand by the end-user.

### d) Review the calculation of sharps containers

**Current situation:** The standard way of calculation for the required amount of sharps containers is 100 syringes per 5L container. This calculation is based on experience from vaccination projects. However, the situation is that syringes used by PWIDs are often larger (e.g. 5ml or 10ml) and containers are filling up more rapidly.

**Justification/impact:** Larger syringes result in the faster filling of sharps containers. An undersupply of sharps containers might be the result and workers have

to use inadequate containers which might not fulfil the required safety standards.

**Recommended activities:** To calculate with maximum 50 syringes per 5L sharps container for sharp waste generated by IDU.

#### e) Include disposable products for waste collection (waste bags)

**Current situation:** In projects, often only sharps containers for the collection of syringes are included, while no items for the collection of infectious waste (e.g. strong yellow bags) or for household waste (e.g. black bags) are supplied.

**Justification/impact:** As bags are missing, infectious waste such as used swabs, etc. are either disposed of in sharps containers, are disposed of in self-procured bags which sometimes do not fulfil quality requirements or are collected without bags. This results in the faster filling of sharps containers and in hygiene risks during waste collection.

**Recommended activities:** To include the supply of waste bags for infectious waste and normal waste in health programmes.

#### f) Develop practical, short SOP for selected operations (e.g. disposal of syringes, incineration of waste, spill management, accident response, etc.)

**Current situation:** Guidelines or SOP for waste management procedures do not exist.

**Justification/impact:** Without clear and practical guidance, sub-recipients and others will manage generated waste in an unsystematic “as good as possible” way which might not fulfil all safety aspects.

**Recommended activities:** To develop clear guidance on basic operation procedures in line with international recommendations.

#### g) Development of warehouse waste management plans

**Current situation:** Waste management plans for the managing of waste in warehouses, including practical and safety instructions (such as spillage plan, etc.), do not exist.

**Justification/impact:** Warehouses create large amount of packing waste (e.g. transport packing, etc.) which should be adequately managed. Stored materials include hazardous and non-hazardous materials and procedures should be available outlining what to do with expired and or damaged materials, waste from spillages, etc.

**Recommended activities:** To ensure the development and implementation of waste management plans for the operation of warehouses.

#### h) Strengthening of recycling and reusing of waste at warehouses, etc.

**Current situation:** The waste from warehouses is disposed of without further planning. Systems to collect and to reuse or to recycle waste are not officially implemented.

**Justification/impact:** Warehouses create large amounts of waste which can be recycled including cardboard and plastics. Reusing of these products (e.g. pallets) or at least recycling is not officially introduced.

**Recommended activities:** To request all warehouses to set up at least a basic recycling programme and to report the amount and types of recycled materials.

#### i) Development of a waste management plan for office operation, including car maintenance

**Current situation:** The programme offices do not have a waste management system. All generated waste is disposed of via the normal household waste system.

**Justification/impact:** The operation of the offices will create waste which could be recycled (e.g. paper waste, etc.) but also waste with potential environmental impacts, such as used oil from car maintenance or old or damaged electrical or electronic equipment, including batteries (WEEE).

**Recommended activities:** To introduce basic guidelines for the environmentally friendly operation of project offices.

## 6.2 Context specific recommendations for the GF programme in Uzbekistan at national level

### a) Reactivation of the governmental healthcare waste working group

**Current situation:** In the past a governmental working group on healthcare waste existed, however this working group no longer exists.

**Justification/impact:** Due to the absence of the working group it is difficult for the MoH to provide required feed-back for the review of the national waste law and the development of a national healthcare waste strategy and plan stopped.

**Recommended activities:** To suggest and support the reactivation of the governmental healthcare waste working group.

### b) Support the setup of an donor coordination group for healthcare waste (UNDP, WB, WHO, KfW)

**Current situation:** Different organizations (including UNDP, WB, WHO, KfW, etc.) were active, are active or will be active in the field of healthcare waste.

**Justification/impact:** In the past different activities were carried out on healthcare waste management. Some activities of donors (e.g. guideline development and training development) overlapped or duplicated efforts. Possible synergies were not always utilized.

**Recommended activities:** A donor coordination group on healthcare waste should be established (e.g. under the leadership of UNDP) and should meet regularly (e.g. every 2 months) to discuss achievements, on-going and planned activities and to coordinate future investments.

### c) Support the development of a national healthcare waste strategy and development plan

**Current situation:** A national strategy which describes the envisaged future system does not exist and investments do not always follow a uniform plan.

**Justification/impact:** As no national development plan exists, investments are uncoordinated and possible synergies between the different projects are not utilized leading to the development of different strategies.

**Recommended activities:** To support the development of national healthcare waste strategy, preferably by the line ministries of Uzbekistan in close cooperation with the donor coordination group.

### d) Participate in the development of a national logistics and treatment system for healthcare waste

**Current situation:** No clear system for the collection, treatment and final disposal of healthcare waste exists. Centralized treatment solutions only partly exist in Tashkent but not in other parts of the country.

**Justification/impact:** As no system is in place, waste generators dispose of waste as best as they can and set up their own treatment solutions. Monitoring and supervision of these mushrooming systems is not possible and environmental impact assessments do not take place.

**Recommended activities:** To develop a national waste treatment strategy which provides clear advice for waste generators on where and how to treat the different waste streams. Include the national logistic and treatment system in the national healthcare waste strategy and development plan. Ensure that the strategy will be implemented by the relevant authorities and donor organizations.

### e) Include the incinerators to be supplied in the national healthcare waste strategy

**Current situation:** The GF programme is about to install 5 incinerators, one in each of the project oblasts. As waste management will not be included in the next GF project financing round, no budget is available for the coverage of recurrent cost and for the setup of a waste collection system. It is unclear how these incinerators will be operated by the recipients.

**Justification/impact:** The incinerators to be supplied could help to improve the healthcare waste situation, however as no budget for the operation and maintenance of the incinerators is allocated, there is a high likelihood that the incinerators will only partly



be utilized and that, due to missing maintenance, the systems might be soon out of order.

**Recommended activities:** To include the 5 incinerators in the national waste treatment strategy and ensure that maintenance and operation will be included in the activities of other projects (e.g. the World Bank financed Health 3 project).

#### f) Discourage the chemical decontamination of class B and class C waste

**Current situation:** The generated waste is partly treated by following outdated operational procedures for the decontamination of reusable items.

**Justification/impact:** The treatment of waste by following the outdated procedures is resulting in high risk for occupational accidents during the manipulation of the waste products, including the transmission of blood borne diseases such as HIV. The soaking of the waste in the chlorine solution cannot guarantee safe treatment of the waste. The usage of the large amounts of chlorine is creating health problems among the workers and creates environmental problems during the disposal of the disinfectant.

**Recommended activities:** To discourage hospitals from treating waste by chlorine disinfection and to raise awareness on the environmental and health problems of these procedures.

#### g) Evaluate the possibilities for the disposal of larger quantities of class D waste in cement kilns

**Current situation:** High temperature waste treatment facilities for the disposal of difficult to treat waste such as chemicals or pharmaceuticals do not exist in Tashkent.

**Justification/impact:** As no other opportunity exists, chemical and pharmaceutical waste is often disposed of via the sewage system, is disposed of together with household waste or is disposed of in inadequate treatment facilities. This way of disposal might create environmental impacts. In other countries this type of waste often is treated in existing cement kilns. The feasibility of this solution has not yet been researched in Uzbekistan.

**Recommended activities:** To investigate the possibility of disposing class D waste in the existing incinerators by for example using a Public-Private-Partnership (PPP) approach as is currently being tested by UNDP for household waste.

#### h) Develop a simple maintenance system for incinerators

**Current situation:** A maintenance system for the supplied incinerators does not exist.

**Justification/impact:** Without existing instructions and a maintenance system, it is expected that the lifetime of the incinerator might be not much longer than the time of the warranty period.

**Recommended activities:** To develop at least a basic maintenance system including clear instructions for the needed daily, weekly, monthly, quarterly and yearly maintenance. To ensure the availability of necessary spare-parts, and to clear the responsibilities for the carrying out of maintenance work. To clarify the responsibility for monitoring the maintenance activities.

## 6.3 Basic recommendations for establishing a national health care waste system in Uzbekistan

As the assessment showed, an adequate infrastructure for the treatment and disposal of hazardous healthcare waste is not yet in place in Uzbekistan. Instead of setting up a waste treatment strategy only for the GF programme, the support for setting up a national treatment system in cooperation with other stakeholders is recommended. The waste system by the GF programme shall be integrated in this system. The following section provides basic recommendations for the setup of a national healthcare waste treatment strategy.

### 6.3.1 Development of a healthcare waste treatment vision

Example: By 2017, over 80% and by 2025, all hospitals will have their own waste treatment system or will have access to a central system that meets the standards of the Ministry of Health.

A legal framework document for the implementation of this vision, which is currently under revision by the Ministry of Health, shall be the future regulation on healthcare waste management in Uzbekistan. This regulation will institute systems and procedures for the classification, segregation, collection, transportation, storage, treatment and disposal of all type of healthcare waste.

Looking at the expected waste quantity, waste quality and the complexity of the handling of these waste streams, it is clear that as the health services become more complex, so will the generated waste. These increasingly complex waste streams will be found particularly in larger facilities at the secondary and tertiary service level. In the following figure, this correlation is displayed:

**Figure 4: HCW quantity and quality by service level**

Type of hospital	District level	Provincial level	Central level	Quantity & Quality per facility
Primary level hospital				Low quantity, few waste streams
Secondary level hospital				Higher quantity, more waste streams
Tertiary level hospital				Large quantity, several waste streams

### 6.3.2 Development of a healthcare waste stream strategy

For setting up a HCW treatment strategy, it is necessary to identify the different kinds of waste generated by the healthcare sector and to cluster them in so-called “waste streams”. This will enable a possible common transport and/or treatment for the main waste streams, will ease handling and will reduce cost. For certain main waste streams (e.g. for chemical waste) a further sub-division of the main waste stream is necessary due to safety or other reasons. For Uzbekistan, the following 5 main waste streams can be defined:

- ▶ “Non-risk, household like healthcare waste“ – Class A waste: means all solid and liquid healthcare waste generated by the healthcare sector, which creates no higher risks for humans, animals and the environment than domestic waste (waste generated by households). There are three subgroups:
  - ▶ Liquid non-risk waste: Waste water from the hospital sewage system.
  - ▶ Recyclable waste: Separately collected non-risk waste such as paper, plastics, glass, metal etc. which can be recycled.

- ▶ Other non-risk mixed waste: waste which can be disposed of in a sanitary landfill without further treatment.

Collection of these waste streams is carried out together with the household waste.

- ▶ “Bio-hazardous waste“ - Class B +C waste: means any solid or liquid waste, which is likely to be contaminated with pathogen agents. The waste contains infectious waste, sharps, and highly infectious waste. “Sharps” waste needs to be packed in rigid and sealed containers. “Highly infectious waste” is waste which must be pre-disinfected in the hospital. It excludes any waste, which could be considered as pathological waste (human body parts). The liquid waste shall be treated in the same way as the solid waste and might need solidification. The bio-hazardous waste stream shall either be incinerated or shall be sterilized by an accepted steam treatment system prior to disposal on a landfill.
- ▶ “Chemical waste“ – Class D waste: means all liquid and solid chemical and pharmaceutical waste

and pressurized containers, which are generated in a hospital. Given that in hospitals up to 100 different kinds of chemical waste are generated, the waste stream must be broken down in several sub waste-streams (clustering of chemicals with similar characteristics). The strategy and method of division into the sub-streams depends on the final treatment technologies available. Given the same characteristics as industrial hazardous waste, this waste stream might be treated and disposed of together with industrial hazardous waste. The possibility of co-incineration in cement kilns should be checked.

- ▶ “Pathological waste“ – Class B: means any solid or liquid waste, which can be considered as human body parts. This special stream has to be handled under consideration of ethical and religious aspects. The pathological waste is to be collected and removed by special organizations.
- ▶ “Radioactive waste“ - Radioactive waste shall be managed under consideration of the special regulation on radioactive materials.

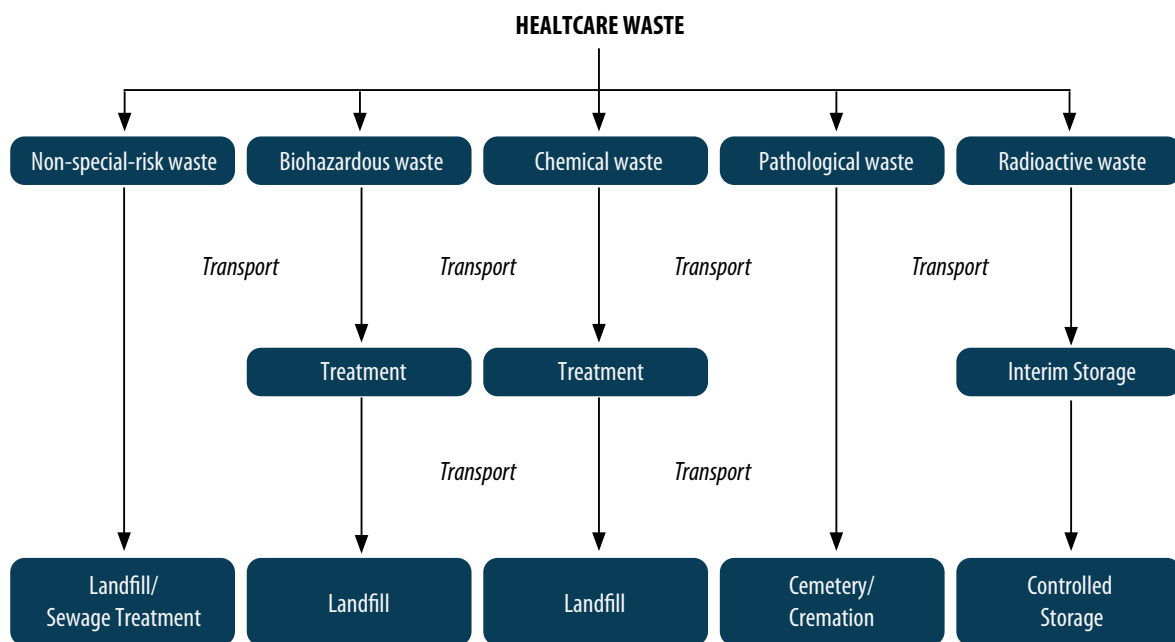
### 6.3.3 Treatment of healthcare waste - general strategy

The general strategy for the treatment of solid healthcare waste from all healthcare facilities in Uzbekistan as well as from the different grant projects shall be based on the healthcare waste stream strategy as outlined in Figure 5.

“Non-risk waste” shall be handed over to the local environmental service companies for disposal in sanitary landfills.

“Bio-hazardous” waste such as infectious waste and filled sharps container can be collected together. If highly infectious waste shall be added to this waste stream it must be pre-treated prior to disposal as bio-hazardous waste. Bio-hazardous waste is typically the largest hazardous healthcare waste stream (by volume and by weight); it has a low density (about 120 kg/m<sup>3</sup>) and the storage time is limited (biological active waste). Therefore, the economic benefits of a central solution compared to an on-site solution is often limited due to the additional transportation costs (e.g. the break-even point of the onsite treatment of bio-hazardous waste from an 100 bed hospital will be about 50-100 transport km - depending on the infrastructure/road conditions).

**Figure 5: Main healthcare waste streams and possible treatment strategy**



“Chemical waste”, including pressurized containers, has a higher density and can be stored for a longer term (several months up to years if needed) to accumulate for a more efficient transport. Transport for longer distances is also feasible, if the specific safety requirements for the different types of hazardous chemical waste are considered (see e.g. United Nations Recommendations on the Transport of Dangerous Goods). As the treatment and disposal of hazardous chemical waste is typically technically more demanding than the treatment of biohazardous waste, an on-site treatment might only be possible in large healthcare facilities for selected chemical waste types (e.g. pharmaceuticals, certain chemicals) and which are equipped with advanced, high temperature incinerators (in Uzbekistan currently not existent).

The challenge for the setup of a sustainable and advanced hazardous healthcare waste solution is therefore less a technical challenge and more a logistical and management one. Funding is another key challenge. Uzbekistan is currently introducing tariffs for waste and it can be expected that in the future, the “polluter pays” principle for waste management will become more important. Consequently, it must be expected that in the future, the disposal cost will have to be paid by the waste generators (the hospitals) – which means that it will be actually paid by the patients / tax payers. Considering that the cost for the management of biohazardous waste is high, it might be a high burden for the hospitals to allocate and find resources for this - and might prove unaffordable for some. All selected strategies should strive to be financially sustainable in the long term without donor support.

Aspects to be considered are therefore:

- ▶ Can the selected strategy be managed by the hospital?
- ▶ Can the selected strategy be operated by the hospital?
- ▶ Can the selected strategy be maintained by the hospitals?
- ▶ Can the selected strategy be financed by the hospital/patient?

In Figure 6, a sample strategy for Uzbekistan is displayed and described. The strategy follows the following main principles:

- I. All hazardous healthcare waste streams generated in a hospital should be included, not only infectious waste and sharps;
- II. Chosen treatment or management solution must fulfil environmental standards, even for rayon clinics / hospitals in more remote areas;
- III. Economic based decision whether waste should be treated on-site or in a central system. However, if economically acceptable, on-site solution should be preferred due to lower transportation risk;
- IV. Following the “referral system”: if the waste treatment is more complicated, it should be done at a higher level hospital with sufficient capacity and right equipment. For example a rayon hospital might not be the right place for the treatment of halogenated solvents.

#### Short description of the strategy:

All hazardous waste is segregated, collected and stored as requested by the future regulation. Small healthcare settings such as feldschers, family practitioners and others will transport all their hazardous waste to the nearest primary level hospital for treatment or for further transfer.

A rayon hospital will operate a storage place for the different hazardous waste streams. If a transport of bio-hazardous waste to the next city rayon level hospital or to a centralized treatment plant is economically not feasible, the waste might be decontaminated by using an autoclave system. In that case, the decontaminated biohazardous waste will be disposed of together with the other non-risk waste. The generated hazardous chemical waste must always be stored in the interim and should be transported from time to time (e.g. once per 6 month) to the next level hospital (referral system). Treatment of hazardous chemical waste at a primary level hospital should not be permitted.

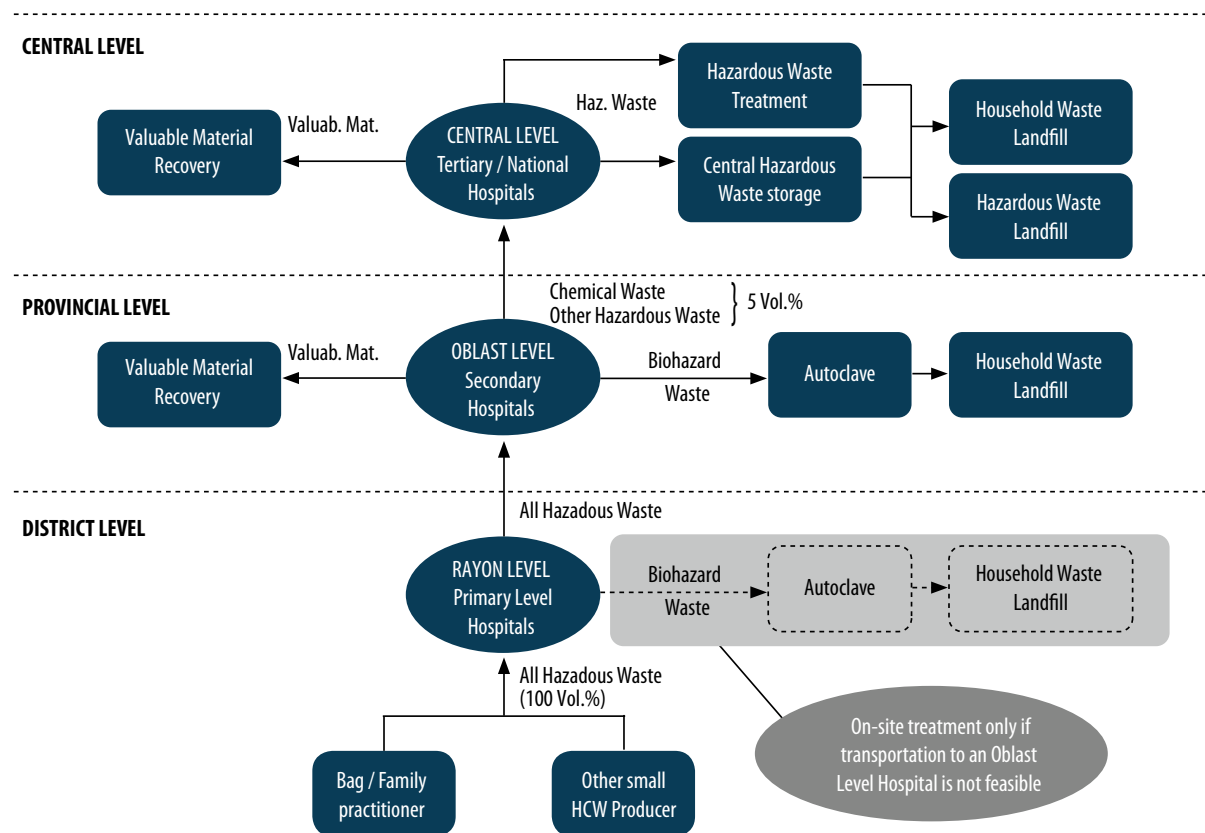
A secondary level hospital is storing and managing its own hazardous waste and the waste received from primary level hospitals that are located in the surrounding area. If possible, all hazardous healthcare waste shall be transported to the next tertiary level hospital or to the next centralized treatment plant. Only if this is not feasible (especially for biohazardous waste) the hazardous waste might be decontaminated or incinerated.

The strategy will correspond with the already existing system for the collection of used syringes from the PWIDs. The TPs as minor waste generators and collection points will transfer the collected syringes to the next hospital. Here the waste will be either temporary stored and together with the sharp waste from the hospital transported to the next level for

treatment or, if the hospital has its own treatment equipment, the waste from IDU will be treated together with the waste from the hospital.

All waste which is not treated in the oblast hospital (mainly chemical waste, pharmaceutical waste) shall be accumulated and periodically transported to a tertiary

**Figure 6: Sample national hazardous healthcare waste strategy, Uzbekistan**

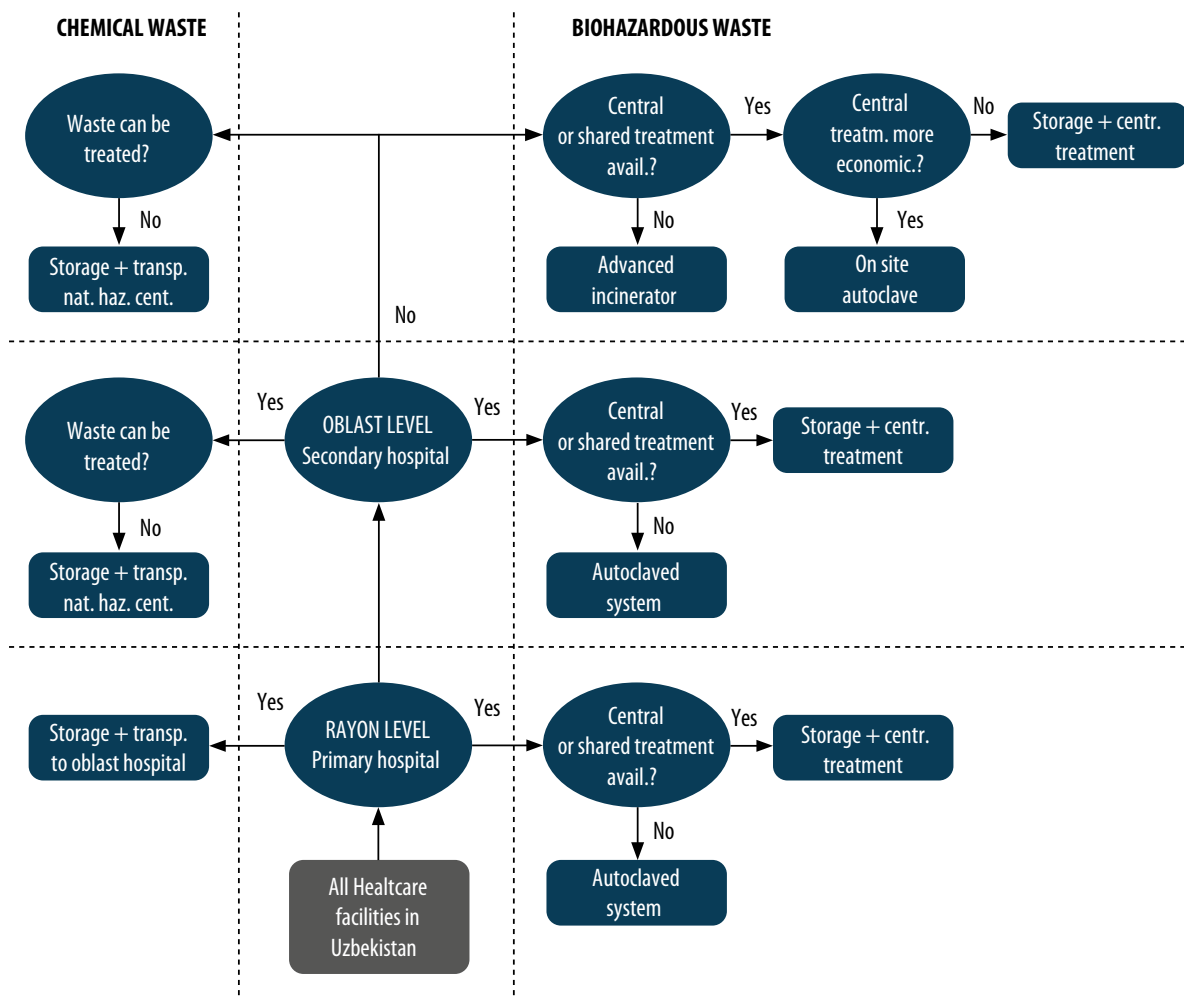


level hospital - or better directly to a centralized hazardous waste treatment plant. Only if the tertiary level hospital cannot treat its own waste or the waste received from the secondary level hospital or other hospitals in the neighbourhood, the waste shall be stored in the storage place and be transported from time to time to the next national hazardous waste treatment center. This waste, which cannot be treated, will be mainly hazardous chemical healthcare waste needing sophisticated treatment systems such as heavy metal containing chemical waste

### 6.3.4 Recommended process flow for decision making

The decision model for the treatment strategy for chemical and biohazardous waste is shown in Figure 7.

Figure 7: Process flow for decision making, solid waste



### 6.3.5 Treatment of healthcare waste – additional recommendations

Uzbekistan is on its way to introducing integrated healthcare waste management systems, and it will be necessary to collect experience in several sectors and support from other sources might be needed. In the following section, the main points of potential action are listed (in order of importance):

- ▶ Clearing of the responsibilities for the validation and testing of steam treatment systems, carrying out a pilot project, supply of necessary test equipment to the responsible authority, training of the responsible staff;
- ▶ Implementing and testing the “UN-Model regulation for the transport of hazardous materials” by using the example of UN3291 (Healthcare waste);
- ▶ Carrying out a study and if possible pilot-project on the management and treatment of photo-chemicals to gain experience on hazardous chemical waste management and treatment;
- ▶ Implementing a national monitoring and inspection system for the supervision of the implementation of the healthcare waste management system (e.g. based on the monitoring system available from WHO-EURO);

# 7 Annexes

## 7.1 Input analysis

### Objective 1 – Medicines used for STI diagnosis and treatment

- ▶ Aciclovir
- ▶ Azithromycin
- ▶ Benzathin benzylpenicillin
- ▶ Ceftriaxone
- ▶ Ofloxacin
- ▶ Clotrimazole
- ▶ Doxycycline
- ▶ Fluconazole
- ▶ Metronidazole

### Objective 2 – Medicines used for the treatment, care and support of people living with HIV

- ▶ Abacavir
- ▶ Didanosine
- ▶ Efavirenz
- ▶ Lamivudine
- ▶ Lopinavir
- ▶ Nevirapine
- ▶ Stavudine (d4T)
- ▶ Tenofovir
- ▶ Ritonavir
- ▶ Emtricitabine

### Objective 2 - Medicines for the treatment of opportunistic diseases

- ▶ Aciclovir
- ▶ Amikacin
- ▶ Amoxicillin
- ▶ Amphotericin B
- ▶ Ampicillin
- ▶ Azithromycin
- ▶ Ceftriaxone
- ▶ Ciprofloxacin
- ▶ Clarithromycin
- ▶ Clavulante
- ▶ Clindamycin

- ▶ Clotrimazole
- ▶ Co-trimoxazole
- ▶ Doxycycline
- ▶ Erythromycin
- ▶ Ethambutol
- ▶ Fluconazole
- ▶ Folic acid
- ▶ Itraconazole
- ▶ Isoniazid
- ▶ Ketoconazole
- ▶ Loperamide
- ▶ Miconazole
- ▶ Moxifloxacin
- ▶ Nalidixic acid
- ▶ Nystatin
- ▶ Primaquine
- ▶ Pyridoxine hydrochloride
- ▶ Pyrimethamine
- ▶ Rifabutin
- ▶ Sulbaktam
- ▶ Sulfadiazine
- ▶ Valganciclovir

### Objective 2 - Procurement of medical products and consumables (CD4 and PCR supplies)

- ▶ ELISA tests for PITC
- ▶ Rapid HIV tests
- ▶ Western Blot confirmatory tests
- ▶ CD4 tests
- ▶ PCR VL tests

### Enhancing capacities and systems on infection control: Ensure supply of essential disposable equipment to key healthcare facilities

- ▶ Lancets
- ▶ IV administration sets
- ▶ Infusion sets for children (butterfly needles)
- ▶ Suture threads with needle ISO - diff. sizes. Only needles needed
- ▶ Blood administration sets: non-vented for flexible



- ▶ blood bags. With Micro-Blood-Filter 40 µm. For massive transfusion. Included in 2012 budget
- ▶ Blood administration sets: non-vented for flexible blood bags. With Micro-Blood-Filter 40 µm. For massive transfusion
- ▶ Blood collection bags 450/350ml HEMAKON bags 5/6 fold
- ▶ Blood collection bags 2 fold
- ▶ Blood collection bags 3 fold
- ▶ Catheters for CVC transf. - different sizes : 20G, 22G, 24 G
- ▶ Catheters for PVC transfusions - different sizes
- ▶ Catheters for PVC transfusions – children different sizes
- ▶ Epidural (or spinal) anaesthesia sets
- ▶ Spinal needles for anesthesia
- ▶ Foley catheter for male and female (different sizes)
- ▶ Dispenser tips (different sizes)
- ▶ Automatic dispenser (different sizes)
- ▶ Rectangular BIOHAZARD waste bags 5 l.
- ▶ Dialyzers
- ▶ Arterial lines
- ▶ Venous lines
- ▶ Arterial fistula needles
- ▶ Venous fistula needles
- ▶ Double lumen catheters
- ▶ Sterile drainage tubes
- ▶ Non sterilized GLOVES sizes 7 + 7,5
- ▶ Blood test tubes 5ml and 9ml
- ▶ Sharps containers

## 7.2 Organizations and persons met

**Table 5: Stakeholders consulted during mission**

Organization	Name/Title
United Nations Development Programme	Flora Salikhova/National Officer on Public Health
Project Management Unit (PMU) of UNDP/GF Project	Mr. Zakir Kadirov/Project Manager
United Nations Development Programme	Mr. Jaco Cilliers/Deputy Resident Representative
UNAIDS	Mr. Komiljon Akhmedov/ National Professional Officer
World Health Organization	Mr. Asmus Hammerich/ WHO Representative
Ministry of Health of the Republic of Uzbekistan	Mr. Saydmurod Saydalliev/ Chief State Sanitary Doctor of the Republic of Uzbekistan, Deputy Minister of Health of the Republic of Uzbekistan.
Republican Centre to Fight AIDS of the Ministry of the Republic of Uzbekistan	Mr. Nurmat Atabekov/ Director of the Republican AIDS Centre to Fight AIDS, Coordinator of MEC
Republican Centre of Sanitary Epidemiological Surveillance	Mr. Bakhrom Almatov/Director of Republican Centre of SES
Institute of Haematology and Transfusion	Mr. Alonur Saidov/ Director of Institute
UNDP, Environment and Energy Unit	Mr. Abduvakos Abdurahimov /Head of the Unit
Joint Project Implementation Bureau	Mr. D.A. Djabriyev/Director of JPIB
NGO "Istikbolli Avlod"	Ms. Nadira Karimova/ Director
NGO "Intilish "	Ms. Tatyana Nikitina/Director of the NGO
Project Management Unit (PMU) of UNDP/GF Project	Ms. Nadira Muratova/Public Health Coordinator
Project Management Unit (PMU) of UNDP/GF Project	Ms. Tatyana Ptashnik/Consultant on Supply Chain Management
CCI Office	Mr. Shukhrat Abdullaev



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