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Rapid Assessment:

Healthcare Waste Component of Global Fund HIV/AIDS and TB Projects

in Bosnia and Herzegovina

Rapid Assessment: Healthcare Waste Component of Global Fund Projects in Bosnia and Herzegovina

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



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Author:

Jan-Gerd Kühling, Environment and Hygiene Consultant
ETLog Health GmbH, kuehling@etlog-health.de

Rapid Assessment Series Editor: Dr. Christoph Hamelmann

UNDP contact: Dr. Christoph Hamelmann, christoph.hamelmann@undp.org

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Abbreviations

ART	Antiretroviral Therapy	NGO	Non-governmental organization
ARV	Antiretroviral	NTP	National TB Programme
BSL	Biosafety level	OST	Opioid substitution therapy
CCM	Country Coordinating Mechanism	PIU	Project Implementation Unit
DOTS	Directly Observed Treatment, Short-course	PPP	Public private partnership
EU	European Union	PR	Principal recipient
FDC	Fixed-dose combinations	PWID	People who inject drugs
GF	Global Fund to Fight AIDS, Tuberculosis and Malaria	SES	Centre of Sanitary Epidemiological Surveillance
HBV	Hepatitis B Virus	SOP	Standard operating procedure
HCV	Hepatitis C Virus	SR	Sub-recipient
HIV	Human Immunodeficiency Virus	STI	Sexual transmitted infection
HSS	Health system strengthening	SSI	Small scale incinerator
IDU	Injecting drug use	SW	Sex worker
IEC	Information, education, communication	TP	Trust points
LFA	Local Fund Agent	TB	Tuberculosis
MARP	Most at risk population	UNDP	United Nations Development Programme
M&E	Monitoring and evaluation	WEEE	Waste of electrical and electronic equipment
MoH	Ministry of Health	WHO	World Health Organization
MoHSW	Ministry of Health and Social Welfare		
NFM	New Funding Model (of the GF)		

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The assessment included an onsite visit in Bosnia and Herzegovina from 2 to 6 December 2014. During the assessment, several UNDP GF projects sites have been visited and stakeholder from the Federation of Bosnia and Herzegovina and the Republika Srpska interviewed. I would like to extend my gratitude to all the individuals and institutions that contributed to the planning and execution of this assessment and would like to acknowledge the valuable input of the following participants, without whom this research would not have been possible:

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1 Executive Summary

As in other countries, UNDP has been a strategic partner of the Global Fund to Fight AIDS, Tuberculosis and Malaria (GF) in Bosnia and Herzegovina acting as interim 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 was conducted in Bosnia and Herzegovina.

This report outlines the results of the assessment which was carried out in the frame 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 are therefore crucial for the further development and improvement of the toolkit.

The assessment in Bosnia and Herzegovina was conducted from 2 to 6 December 2014 and concentrated on the GF HIV/AIDS and TB grants. Both grants are in the second phase and will be executed from 2013 to 2015. Most likely, there will be no future GF grants in Bosnia and Herzegovina.

The results showed that both grants included activities to reduce risks and possible negative environmental impact from the project activities. Some shortcomings in these activities could be identified and should be rectified. While specific budget lines for the purchasing of waste collection items (sharps containers) exist, dedicated budgets to cover treatment and disposal costs for hazardous waste do not exist and costs are covered by the overheads of the drop-in centers. The assessment further identified the high dependence of the HIV/AIDS and TB grants on the national healthcare waste infrastructure.

In Bosnia and Herzegovina, the healthcare waste infrastructure is underdeveloped. Treatment capacities for the treatment of chemical and pharmaceutical waste do not exist or are not fully explored. Generally all chemical and pharmaceutical waste, if not disposed of together with the household waste or disposed of via the sewage line, is collected by waste hauling companies and exported for treatment and disposal. Also, the treatment capacities for bio-hazardous waste (infectious waste and sharps) are highly limited and not sufficient for the country. As this waste is difficult to export due to its specific characteristics, the majority of the waste is disposed of untreated on the often unsecured dumpsites causing public health risks.

If future waste from HIV/AIDS, TB and other healthcare related activities shall be treated and disposed of in a safe and environmentally friendly way, major efforts and larger investments are needed. It is recommended that future healthcare waste strategies shall not be developed under consideration of political aspects but should be more needs driven. Alternative investment strategies should be considered to reduce barriers for the involvement of the private sector. To reduce political barriers, multilateral organizations should be included in the development process. Monitoring and reporting systems for healthcare waste should be strengthened in order to improve sustainable and effective solutions.

2 Assessed Projects

UNDP is a long-term partner of the GF and acts in several countries, including Bosnia and Herzegovina, as interim 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, there are plans to develop a waste management toolkit to support grant planners, grant reviewers/approvers, implementers and others in better and safer healthcare waste management.

To better understand the current situation, assessments on the existing healthcare waste management systems are being carried out. The results of the assessments will be used to improve the impact, the applicability and the practicability of the planned healthcare waste management toolkit for GF practitioners.

The assessment of the GF grants implemented in Bosnia and Herzegovina by UNDP as PR was conducted in the first week of December 2014. The objective was to assess the current and planned waste management practices of the following projects¹:

HIV/AIDS: BIH-910-G03-H

Name: “Scaling up Universal Access for Most at Risk Populations in Bosnia and Herzegovina”:

The first case of HIV was registered in Bosnia and Herzegovina in 1986. By the end of 2014 the country had registered 266 people living with HIV. The goal of the programme supported by this grant is to reduce HIV transmission and improve HIV treatment, care and support in the country. This programme will target the following groups that have been identified as being at higher risk of becoming infected with HIV: PWID,

MSM, SWs and their clients, cross-border migrants, migrant workers, internally displaced persons, refugees and prisoners, as well as the Roma population and youth who are not referred to specifically as target groups in the National HIV Strategy. The activities funded by this grant will build on those funded under the Round 5 grant to help ensure that HIV prevalence remains below 1 percent in the general population – a key outcome under the current national strategy – and to improve quality of life for people living with and affected by HIV.

Service delivery areas:

- ▶ Prevention
 - ▷ Counselling and testing
 - ▷ Programmes for specific groups
- ▶ Supportive environment
 - ▷ Stigma reduction in all settings
- ▶ Treatment
 - ▷ ART and monitoring
- ▶ HSS
 - ▷ Health workforce
- ▶ Other
 - ▷ Support to people living with HIV

The HIV Project is carried out in the 2nd Phase of HIV R9 Grant during the period year 2013 (Y3) to year 2015 (Y5).

Tuberculosis: BIH-T-UNDP

Name: “Strengthening of DOTS Strategy and Improving National Tuberculosis Programme, Including Multidrug Resistance and Infection Control, in Bosnia and Herzegovina”

The TB burden in Bosnia and Herzegovina is moderate in comparison with other countries in the

¹ All information has been taken from the GF webpage

WHO European Region. The goal of the programme supported by this grant is to cost-effectively reduce the TB burden, which has remained steady in recent years, and further consolidate and fortify National Tuberculosis Programme efforts aimed at its sustainable reduction. The programme continues and further develops activities initiated under the Round 6 grant. It is also aligned with national objectives for strengthening the governance and coordination of health systems and for the further development of primary health care and family medicine, among other reform efforts. The main beneficiaries of this grant will be TB and multidrug-resistant TB patients, ethnic minorities and Roma populations, prisoners and migrants, and other vulnerable populations living in poor conditions. The population at large will also benefit from a decrease in TB and from strengthened health systems.

Service delivery areas:

- ▶ HSS
 - ▷ Health workforce
- ▶ Other
 - ▷ Improving diagnosis
 - ▷ High-risk groups
 - ▷ Multidrug-resistant TB
 - ▷ Community TB care
 - ▷ High quality DOTS

The TB project is carried out as single stream of funding and is in the second phase, the implementation period includes the years 3-5 (from 1st October 2012 until 30 September 2015). Table 1 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, Bosnia and Herzegovina
Local Fund Agent	United Nations Office for Project Services, Bosnia and Herzegovina

3 Background Information

Key Country Data:

Full Name: Bosnia and Herzegovina
Total Population (2012)*: 3,834,000
Area:** 51,197 sq km
Life expectancy at birth m/f (years)(2012)*: 75/80
Infant mortality rate (2014):** 5.84 deaths/1000 live births
Hospital bed density (2010):** 3.5 beds/1000 population
GDP - per capita (PPP)(2013 estimate):** \$8,300
Total expenditure on health as % of GDP (2011)*: 9.9

Bosnia and Herzegovina² consist of the two entities Federation of Bosnia and Herzegovina and the Republika Srpska. In addition, the Brčko District is a neutral, self-governing administrative unit, under the sovereignty of Bosnia and Herzegovina and formally part of both entities. Each entity has its own flag and coat of arms, its own government, president,

parliament (Federation) and assembly (Republika), its own police force, customs, and postal system. Its land border with neighbouring Montenegro, Serbia and Croatia is 1,459 km long, and has a coastline of only 23.5 km. The country's terrain is expressly highland and mountainous, with an average altitude above sea level of 500 m.

Figure 1:
Bosnia and Herzegovina, administrative divisions

The Federation of Bosnia and Herzegovina comprises 51% of the land area of Bosnia and Herzegovina, and is home to about 62% of the country's total population. The Federation is highly de-centralized and divided into ten cantons (Una-Sana, Tuzla, Zenica-Doboj, Bosnian Podrinje, Sarajevo, Posavina, West Herzegovina, Herzegovina-Neretva, Central Bosnia and Canton 10), which are then subdivided into municipalities. The cantons serve as the second-level units of local autonomy and each canton has its own government headed by the Premier and its own ministries.



² 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 November 2014 unless otherwise indicated

The health administration of the Federation is also decentralized, with each of the ten cantonal administrations having responsibility for the provision of primary and secondary healthcare through their own ministries. The central MoH of the Federation, located in Sarajevo, coordinates cantonal health administrations at the Federation level.

The Republika Srpska is centralized and divided directly into municipalities. Also the authority over the

health system is centralized, with planning, regulation and management functions held by the MoHSW in Banja Luka.

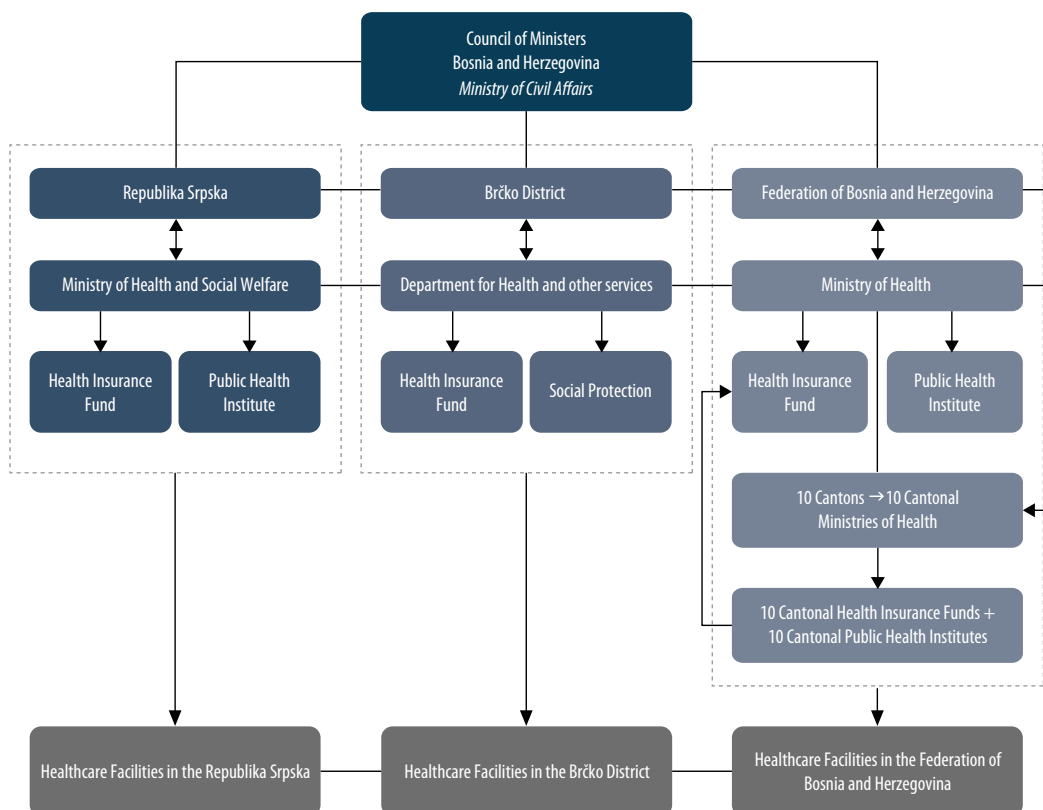
The District of Brčko provides primary and secondary care to its citizens.

Table 2 and Figure 2 provide further summaries about the health system in Bosnia and Herzegovina. The GF grants cover the entire country.

Table 2: Healthcare levels and facility structure in Bosnia and Herzegovina

	Federation of Bosnia Herzegovina (10 cantons)	Republika Srpska (centralised)	Brčko District (centralised)
Tertiary healthcare	Tertiary medical centres	Tertiary medical centres	-
Secondary healthcare	General hospitals Cantonal hospitals	General hospitals	General hospital
Primary healthcare	Health care centers (Dom Zdravlja) Dispensary (Ambulanta)	Health care centers (Dom Zdravlja) Dispensary (Ambulanta)	Health care centers (Dom Zdravlja) Dispensary (Ambulanta)

Figure 2: Organizational structure of health system in Bosnia and Herzegovina



3.1 Ministries of Health in Bosnia and Herzegovina

3.1.1 Ministries of the Federation of Bosnia and Herzegovina

The Federation has 11 MoHs: one at the Federation level and one in each of the ten cantons. The Federal level MoH has virtually no authority over the ten cantonal operations. By law, its role is limited to functions that cannot be executed at the cantonal level such as border/customs inspections and legislation development. It further coordinates cantonal health administrations at the Federation level. The MoH functions at the Federation level include

- ▶ health policy development for the Federation of Bosnia and Herzegovina,
- ▶ monitoring and evaluation of the population's health,
- ▶ planning of medical facilities, including capacity building of institutions,
- ▶ development and regulation of compulsory insurance,
- ▶ regulation of the public health safety network and supervision of health inspections, by itself or through other agencies.

The stated duties of the Federal MoH also include supervising health institutions, although this function has not been put into practice and is exercised mainly by the cantonal ministries. The Inspectorate of Healthcare Settings is separated from the MoH and is currently dysfunctional as an independent institution.

The MoHs of the 10 cantons are in charge of creating health legislation for the canton, advising on technical matters and implementing regulations. Their work is focused on the cantonal hospitals, health centres, ambulancias and other cantonal health institutions. The cantonal ministries are also responsible for electing members to the managing board of health institutions located at the Federation level.

By law, the authority over health sector operations resides with the cantonal authorities, including service delivery, revenue/insurance collections, expenditures, policy, planning, and others. Each canton operates its own health insurance fund, its own healthcare facilities

including hospitals, dom zdravljas (health centres), and ambulancias (health posts).

The budget for health interventions on canton level originates from the cantonal insurance fund, which is responsible for the salaries of the staff in the healthcare facilities, for infrastructure, equipment and running costs. The cantonal insurance funds contribute with a defined percentage to the Federation of Bosnia and Herzegovina Health Insurance and Reinsurance Fund. Although the cantonal ministries are autonomous health insurance fund budget holders, they often have limited budgets, have limited capacity and represent small populations, giving them limited leverage to exercise real control over their cantonal health systems.

3.1.2 Ministry of Health and Social Welfare of the Republika Srpska

The MoHSW of the Republika Srpska is centralized with regard to administrative, regulatory and fiscal responsibilities. The MoHSW regulates entity-wide functions such as

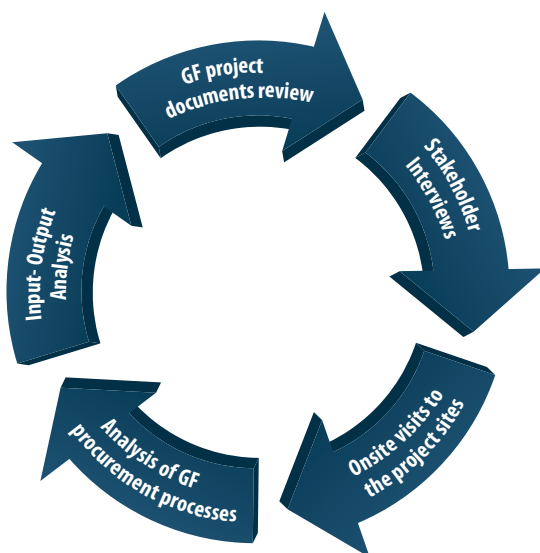
- ▶ disease prevention and health promotion,
- ▶ monitoring of health status and needs of the population,
- ▶ health care organization,
- ▶ professional training and specialization of health professionals,
- ▶ health and sanitary inspection,
- ▶ supervision and audit of health institution and professional performance;
- ▶ health insurance and health care finance from public revenues,
- ▶ production and distribution of medicines, poisons and narcotics, as well as medical equipment and aid devices,
- ▶ control of alimentary articles and general products.

The MoHSW also supervises and administers the social insurance and social care system, which includes pension and disability insurance for all occupations; social care of family and children; and activities of social organizations and associations.

3.2 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 was on waste streams, waste amounts, available waste treatment systems and disposal options in Bosnia and Herzegovina and the current procurement processes. Additionally, key project documents were provided prior to the onsite activities by the PIUs of the UNDP country office in Bosnia and Herzegovina.

Figure 3: Assessment methodology



During the visit, the consultant worked closely with the UNDP country office in order to receive further information relevant to the project. Several stakeholder interviews were conducted in the Federation of Bosnia and Herzegovina and the Republika Srpska with the GF grant practitioners, including PR and SRs, different governmental authorities on various level, the Bosnia and Herzegovina Ecofunds and the WHO.

Furthermore, project sites (e.g. TB BSL-3 laboratories), implementing organizations and different healthcare facilities were visited in order to receive direct information and impressions of the project operations and the awareness and opinions of the project staff.

3.3 Provided and reviewed project documents

The following documents were reviewed as part of the assessment:

- A. Downloads from the GF webpage
 - a. Programme grant agreements: Scaling up Universal Access for Most at Risk Populations in Bosnia and Herzegovina; Strengthening of DOTS Strategy and Improving National Tuberculosis Programme, Including Multidrug Resistance and Infection Control, in Bosnia and Herzegovina
 - b. Grant performance reports: Renewal Scorecard Bosnia and Herzegovina HIV/AIDS; Renewal Scorecard Bosnia and Herzegovina Tuberculosis
- B. Project documents provided by the UNDP PIU
 - a. HIV/AIDS: Scaling up Universal Access for Most at Risk Population in Bosnia and Herzegovina (BIH-910-G03-H)
 - ▶ annex - programme grant agreements
 - ▶ procurement and supply management plan
 - ▶ performance framework: Indicators, targets and periods covered
 - ▶ detailed budget
 - b. TB: Strengthening of DOTS Strategy and Improving National Tuberculosis Programme, Including Multidrug Resistance and Infection Control, in Bosnia and Herzegovina (BIH-T-UNDP)
 - ▶ annex - programme grant agreements
 - ▶ annex – analysis of TB wards in the Republika Srpska
 - ▶ procurement and supply management plan
 - ▶ performance framework: Indicators, targets and periods covered
 - ▶ detailed budget

4 Legal Framework

4.1 International conventions

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

Bosnia and Herzegovina has so far signed all major Conventions and the Montreal Protocol, with the exemption of the Minamata Convention.

Table 3: Status of ratification of international Conventions

Name of Convention	Status of ratification	Year
Basel Convention: Technical guidelines on environmentally sound management of biomedical and healthcare waste (UNEP 2003)	Accession http://www.basel.int/Countries/StatusofRatifications/PartiesSignatories/tabid/1290/Default.aspx	16/03/2001
Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade	Accession http://www.pic.int/Countries/Statusofratifications/tabid/1072/language/en-US/Default.aspx	19/03/2007
Vienna Convention for the protection of the ozone layer and its Montreal Protocol on substances that deplete the ozone layer	Succession http://ozone.unep.org/new_site/en/treaty_ratification_status.php?treaty_id=&country_id=169&srchcrit=1&input=Display	Both on 01/09/1993
Stockholm Convention on persistent organic pollutions (POPS)	Ratification http://chm.pops.int/Countries/StatusofRatifications/tabid/252/Default.aspx	30/03/2010
European Agreement concerning the international carriage of dangerous goods by road (ADR) (UNECE)	Succession http://www.unece.org/trans/danger/publi/adr/legalinst_53_tdg_adr.html	01/09/1993
Minamata Convention on mercury (UNEP 2013)	- http://www.mercuryconvention.org/Countries/tabid/3428/Default.aspx	-

4.2 National legal healthcare waste framework

Currently, the legal framework for healthcare waste management is under development and it is planned to update the relevant guidelines and regulations in both entities.

Bosnia and Herzegovina: Law on Medicinal Products and Medical Devices (2008):

This law regulates the management of pharmaceutical waste. Article 93 defines pharmaceutical waste. Article 94 requires the safe disposal and specifies the responsibility of the Ministry of Civil Affairs to issue more detailed instructions. Article 95 specifies that costs for waste disposal have to be borne by the owner of the waste (polluter pays principle).

Bosnia and Herzegovina: Rule book on the disposal of pharmaceutical waste (2011):

The rule book was developed by the Ministry of Civil Affairs, based on article 94 and article 123 of the Law on Medicinal Products and Medical Devices (2008). This rule book defines methods of disposal of pharmaceutical waste, as well as categories of pharmaceutical waste. Furthermore, it defines obligations of all parties involved in the process.

Bosnia and Herzegovina (Republika Srpska): Law on Waste Management (2013):

This Law defines all types and classification of waste, waste management planning, waste management operators, responsibilities and obligations in the waste management sector and/or related activities, waste management organization, management of special waste, the licensing process, the cross-border movement of waste, reporting standards on waste and related databases, funding methods for a sustainable national waste management, supervision and monitoring standards, and other important issues for waste management on the territory of the Republika Srpska.

Bosnia and Herzegovina (Brčko District): Law amending the Law on Waste Management (2009):

This Law amends some provisions prescribed by the Law on Waste Management (Official Gazette 25/2004 and 19/2007).

Bosnia and Herzegovina (Federation): Law on Waste Management (2003) – amended in 2009:

This Law outlines the general principles for the prevention of waste production, recycling, processing and re-using, for the extraction of secondary raw materials from the waste and for safe waste disposal. It specifies that waste means any substance or object which the holder discards or intends, or is required to discard. The provisions of this Law does not apply to the radioactive waste, gaseous effluents emitted into the atmosphere and waste water.

Bosnia and Herzegovina (Federation): Regulations on Medical Waste Management (2008):

The regulation was jointly issued by the Federal Minister of Environment and Tourism and the Federal MoH. It introduces the appointment of a healthcare waste officer for healthcare facilities, the establishment of waste committees and requests the development of healthcare waste management plans. It provides a classification system for different type of healthcare waste and specifies the requirements for collection and storage.

Other laws and regulations include:

Federation of Bosnia and Herzegovina:

- ▶ Rules on waste categories, No. 09/05
- ▶ Ordinance on issuing permits for small business activities in waste management, No. 09/05
- ▶ Ordinance on the necessary conditions for the transfer of obligations with manufacturers and vendors to system operators for waste collection, No. 09/05
- ▶ Regulations defining the treatment of hazardous waste that is not on the list of waste or which content is unknown, No. 09/05
- ▶ Ordinance on the content of the adaptation plan management for existing plants for treatment or waste disposal and activities undertaken by the competent authority, No. 9/05
- ▶ Regulation on the types of financial guarantees to ensure cross-border transport of hazardous waste, No. 41/05
- ▶ Regulation of financial and other guarantees to cover the cost of risks from possible damage, cleaning procedures and after closure, No. 39/06
- ▶ Regulation of selective gathering, packaging and labelling of waste, No. 38/06
- ▶ Regulation, which regulates the obligation of reporting operators and waste producers on the implementation of the program of surveillance, monitoring and record keeping under the terms of the license - Federation BiH No. 31/06
- ▶ Regulation on the form, content and procedure of notification of important characteristics of products and packaging by the manufacturer, No. 6/08
- ▶ Regulations on animal waste and other non-hazardous materials of natural origin that can be used for agricultural purposes, No. 8/08
- ▶ Ordinance on packaging and packaging waste, No. 88/11

- ▶ Ordinance on the management of waste from electrical and electronic equipment, No. 87/12
- ▶ Ordinance on amendments to the Ordinance on packaging and packaging waste, No. 28/13
- ▶ Regulation on fees for plastic bags of 14.01.2014

Republika Srpska:

- ▶ Law on Environmental Protection (Official Gazette of Republika Srpska, numbers 28/07 and 41/08)
- ▶ Law on Health Care (Official Gazette of Republika Srpska, number 106/09)
- ▶ Ordinance on Conditions for Work of Facilities Intended for Waste Incineration (Official Gazette of Republika Srpska, number 39/05)
- ▶ Ordinance on Waste Categories, with catalogue (Official Gazette of Republika Srpska, number 39/05)
- ▶ Ordinance on Waste Categories, Characteristics of Waste which Render it Hazardous, Activities of Recovery of Components and Disposal of Waste (Official Gazette of Republika Srpska, number 39/05)
- ▶ Ordinance on Types of Waste and Activities of Waste Management Requiring Authorization (Official Gazette of Republika Srpska, number 39/05)
- ▶ Ordinance on Healthcare Waste Management (Official Gazette of Republika Srpska, number 90/06)

5 Assessment of the Healthcare Waste Situation

5.1 Input-output analysis - HIV/AIDS grant

The overall goal of the HIV/AIDS grant is to reduce HIV transmission and improve HIV treatment, care and support in Bosnia and Herzegovina. In there were 102 persons with HIV on antiretroviral therapy in Bosnia and Herzegovina. It was decided that ARV medicines will be provided directly by the government in the future.

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

- ▶ Maximize coverage of effective HIV prevention and care among MARPs;
- ▶ Ensure appropriate prevention, treatment, care and support for people living with HIV and AIDS.

Relevant healthcare waste streams can be expected in the process of the following activities:

- ▶ Needle and syringe exchange programmes through drop-in-centres and outreach workers;
- ▶ OST through methadone and detox centres, including expanding access to OST services for prisoners;
- ▶ HIV testing and counselling through traditional VCT centres and through mobile VCT agreements;
- ▶ Comprehensive HIV and AIDS care, treatment and support including ART and supportive services in public and private sector facilities;

Other planned activities such as the revision of key national guidelines for HIV testing and treatment, work with religious communities, community-based policy and advocacy activities are mainly capacity strengthening activities. The main input is human

power and office materials; therefore the expected waste output will be mainly general office waste.

5.1.1 General activities – management and support

During Phase 2 of the program (years 2013-2015) a major part of activities are office based and will include the strengthening of institutional and technical capacity at the national level, the fostering of strategic planning and coordination, the improving of information management systems, and working towards enabling legislative and policy frameworks. The physical input of the grant includes the set up and operation of different offices, the procurement and usage of office consumables and equipment (computers, furniture) and the procurement or hiring of transportation equipment (cars, etc.).

Output from these general activities will be general, non-hazardous and hazardous office waste like cartridges, waste of 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.).



Storage of pharmaceuticals in Sarajevo

5.1.2 Analysis of the objective to maximize coverage of effective HIV prevention and care among most-at-risk populations

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

- ▶ Input for harm reduction kits (6,839 beneficiaries)
 - ▷ alcohol pads, sterile water, bags, heparin gel, latex tourniquet, syringes (1 and 2 ml); syringe containers 0,3 l and 0,6 l; syringe cardboard box 5 l; IEC materials
- ▶ Input for the infection prevention among SWs
 - ▷ condoms; hygienic package (tampon, wet wipes, antibacterial solutions); IEC materials
- ▶ Input for the infection prevention among MSM
 - ▷ male condoms; IEC materials
- ▶ Input for the opioid substitution therapy (OST)
 - ▷ pharmaceutical products (see list in the attachment), gynaecological sets, gloves.
- ▶ Input for the rehabilitation of OST centres
 - ▷ different equipment (furniture, air conditioning, phones, etc.)

The expected waste *outputs* from this 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.)
 - ▷ construction and demolishing waste from rehabilitation works
- ▶ Hazardous waste
 - ▷ infectious waste (contaminated swabs, syringes, hygienic articles)
 - ▷ sharps waste (used needles)
 - ▷ pharmaceutical waste (expired OST – minor amounts)

3 Note: in this grant, no ARVs will be supplied

5.1.3 Analysis of objective on appropriate prevention, treatment, care and support for people living with HIV and AIDS³

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

- ▶ Input for the administration of hepatitis B vaccines
 - ▷ pharmaceutical products (see list in the Annex)
- ▶ Input for the provision of HIV tests
 - ▷ various health products (see list in the Annex)
 - ▷ diagnostic products (see the list in the Annex)
- ▶ Input for the provision of HIV tests
 - ▷ diagnostic products (see the list in the Annex)

The expected waste *outputs* from this objective are:

- ▶ General, non-hazardous waste
 - ▷ packing waste (cardboard, foil, etc.),
 - ▷ paper waste
 - ▷ general office waste (unsorted)
- ▶ Hazardous waste
 - ▷ infectious waste (contaminated swabs, minor)
 - ▷ sharps waste (used lancets, minor)
 - ▷ pharmaceutical waste (expired or unusable drugs and diagnostic kits)

5.2 Input-output analysis – TB grant

The GF supports the fight against TB in Bosnia and Herzegovina through a single grant that merged the Round 9 proposal with the Round 6 grant and is administered by UNDP. The goal of the grant is to support the National TB Programme (NTP) in reducing the burden of TB in a cost-effective and sustainable way. The grant has six objectives of which the following are of special relevance for waste management:

- ▶ Strengthening the NTP management, including TB medicines management, monitoring and evaluation at all administrative levels
- ▶ Improving TB lab services and infection control countrywide in accordance with international standards
- ▶ Improving TB control among Roma and other population groups with limited access to healthcare
- ▶ Ensuring and maintaining access to the TB programme for vulnerable groups.

Relevant healthcare waste streams can be expected in the process of the following activities:

- ▶ Strengthening the foundations for the national TB programme
- ▶ Implementing quality measures for all laboratories in Bosnia and Herzegovina including reconstruction and renovation of BSL 1, 2, and 3 laboratories
- ▶ Renovation of selected TB wards
- ▶ Screening and referral of vulnerable populations through outreach workers

Other planned activities such as the implementation of the electronic reporting system for TB management and training of selected personnel on MDR-TB case management are mainly capacity strengthening activities. The main input is human power and office materials; therefore the expected waste output will be mainly general office waste.

5.2.1 General activities – management and support

Like for the HIV/AIDS grant, also during the Phase 2 of the TB programme (years 2013 - 2015) a major part of activities is office based. The physical input of the grant includes the set up and operation of different offices, the procurement and usage of office consumables and investment products (computers, furniture) and the procurement or hiring of transportation equipment (cars, etc.).

Output from these general activities will likewise be general, non-hazardous and hazardous office waste like cartridges, WEEE, disposable and reusable packing materials, waste from spillages, and waste from the maintenance of the transportation equipment.

5.2.2 Strengthening NTP management, improving TB control, ensuring and maintaining access to the TB programme for vulnerable groups

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

- ▶ First and second line anti-TB medicines:
 - ▷ pharmaceuticals (see list in the Annex)
- ▶ Liquid media with supplements
 - ▷ BD Bactec MGIT tubes tube and supplement kit

- ▷ BD Bactec PZA tubes and kits
- ▷ BD Taxo test strips
- ▶ Rapid diagnostic tests
 - ▷ different consumables for HAIN testing

The expected waste *outputs* from this objective are:

- ▶ General, non-hazardous waste
 - ▷ packing waste (cardboard, foil, etc.)
 - ▷ paper waste
 - ▷ general office waste (unsorted)
- ▶ Hazardous waste
 - ▷ infectious waste (e.g. waste from microbiological testing)
 - ▷ pharmaceutical waste (expired / unusable anti-TB medicines)

5.2.3 Reconstruction and improvement of TB lab services and renovation of TB wards

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

- ▶ Health equipment
 - ▷ different equipment such as coagulator, microscope, centrifuge, bio-safety cabinets, autoclaves, and others.
- ▶ Health products
 - ▷ different laboratory consumables such as chemicals for staining, one-way products (different tubes, pipettes), gloves and minor equipment as bottles, flasks, glass breakers, and others;
 - ▷ diagnostic products (see the list in the Annex)

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
 - ▷ highly infectious waste (e.g. laboratory waste)
 - ▷ chemical waste (used reagents, etc.)

5.3 Generated and expected waste quantities

For both grants (HIV/AIDS and TB) a standardized recording system for the quantities and types of waste generated has not been established. Exemptions are the recording of expired pharmaceuticals. Responsibilities are not clearly defined but in practice the SRs and beneficiaries of the grants have to deal with it to the largest degree. The SR involved in the HIV/AIDS grants signed disposal contracts for the destruction of used syringes and keeps records about it.

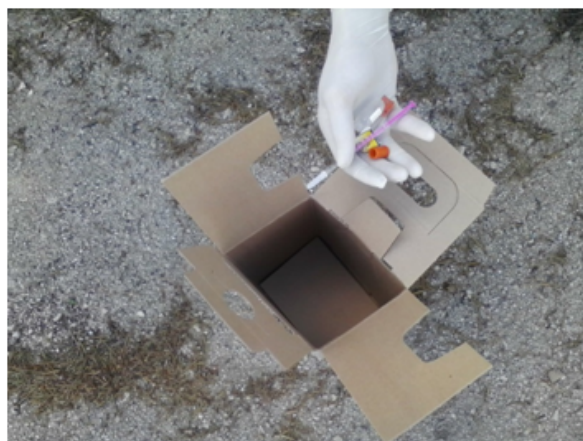
5.3.1 Estimation of generated waste – HIV/AIDS grant

One objective of the HIV grant is the support of a needle exchange programme. About 698,000 needles and syringes will be procured in 2014 and 978,000 in 2015. The return rate is expected to be > 80%, including collection of needles and syringes during outreach activities at common injection places. For the collection, 5,500 safety containers are supplied (5 l safety box, 0,3 l and 0,6 l sharps container per year.

The weight of sharps containers is about 0,06 kg for the 0,3 l, 0,1 kg for the 0,6 l sharps container and 0,3 kg for the 5 l safety box. The total weight per 5,500 pieces is estimated to be about 850 kg. The weight of 2 ml syringes is about 0,65 kg per 100 pieces and about 0,31 kg for 100 pieces of 1 ml syringes⁴. Considering that used syringes will contain some liquids, an average weight of 0,5 kg is assumed per 100 pieces.

Based on the procurement plan, the total amount of sharps waste (needles, syringes, safety boxes) will be about 3,6 tons in 2014 and 4,7 tons in 2015.

The disposal cost for an SR is on average 4 BAM (2.04 €) per kg of sharps waste. It can be assumed that the SR will have to spend about 14,400 BAM (7,365 €) in 2014 and 18,800 BAM (9,616 €) in 2015 for the disposal of this waste. A separate budget line for the disposal does not exist; costs are covered through the general office budget.



Collection of sharps waste by outreach workers

For the provision of HIV and HCV tests, various rapid tests will be used. Each test will require the usage of one lancet, which will have to be disposed of as sharps waste. In addition, each test requires the usage of various one-way products (e.g. single-use test device, developer solution, specimen collection loops). Estimating that per test 0.1 kg of waste will be generated on average, the total amount of waste will be about 1.5 tons in 2014 and 1.75 tons in 2015. Estimated costs are 6,000 BAM (3,070 €) in 2014 and 7,000 BAM (3,580 €) in 2015.

Table 4: Projected quantities of HIV and HCV rapid tests for the HIV grant

Type	Quantity 2014	Quantity 2015
HIV rapid blood tests	5,475	7,529
HIV rapid oral tests	4,459	5,496
HCV rapid oral tests	4,760	4,430
Total	14,694	17,455

For HBV vaccination, 3 doses are needed for adults. Considering the planned vaccination of 1,050 PWID in 2014 and 1,260 in 2015, about 7,000 used needles and syringes will be generated. Considering again an average weight of 0.8 kg per 100 used needles and syringes (safety box and used needle/syringe) about 56 kg of waste will be generated at a disposal cost of around 224 BAM (114.5 €).

⁴ Source: SAAPP (FZC) LLC

5.3.2 Estimation of generated waste – TB grant

The first main source of waste generated through the TB grant will be from expired or unusable medicines (first and second line) and from the TB testing of patients. Especially the management of medicines for patients with drug-resistant TB creates problems in countries with low number of patients as a high risk exists to over- or underestimate the required quantities of second line medicines.

Also natural disaster might result in the generation of pharmaceutical waste. In May 2014, Bosnia and Herzegovina was struck by floods of unprecedented magnitude. Over 20 municipalities were affected. The PMU received reports from the Republika Srpska SRS Entity Drug Manager that two pharmacies in Doboje and Samac were afflicted by the flood. According to this report, the following drugs were damaged and disposed of:

- ▶ RHE (Rifampicin 150mg/Isoniazid 75mg/Ethambutol 275mg) – 1,906 tablets
- ▶ RH (Rifampicin 150mg/Isoniazid 75mg) – 424 tablets

The second main source of hazardous waste (mainly infectious waste) will originate from the operation of TB laboratories and TB wards. Data about this waste do not exist as these are either under reconstruction or are operated by partner organizations.

5.4 Current waste management procedures within the HIV/AIDS and TB programme

To identify the current waste management practices, several interviews with the PR (HIV/AIDS and TB) and a number of SRs and beneficiaries were held. Based on the statements of the different organizations, on the on-site assessments and on information from previous healthcare waste assessments, an overview of the typical waste management practices in the GF HIV/AIDS and TB grants in Bosnia and Herzegovina is provided.

Generally the PR acts based upon the Quality Assurance Plan and the prevailing national legislation. Pharmaceutical waste management is implemented

based on the law on medicinal products and medical devices and the subsequent article 66 para 9 - Regulations on management of pharmaceutical waste (Official Gazette BiH 23/11). SRs who are implementing needle exchange programs have to identify a site for the disposal and destruction of sharps waste are required to have a valid contract with an entity for the relevant waste management services. Additionally SRs implementing needle exchange programs are bound to use safety boxes or sharps containers when collecting and handling used needles and syringes (sharps), and to store the boxes in the safe and secure location until ready for final disposal. Within the TB program, autoclaves for the on-site treatment of infectious waste from laboratory activities are supplied.

5.4.1 Waste management procedures for supporting activities

During activities supporting the implementation of project objectives (office operation, warehouse operation, etc.), generated waste will be managed in accordance with the general national waste practices. Activities such as the introduction of recycling are supported if available; however, in most cases all waste is collected and disposed of as general waste. Specific waste management systems for generated hazardous waste (batteries from office operation, toner cartridges and fluorescent lamps) are only partly implemented. The majority of landfills in Bosnia and Herzegovina are very basic and do not follow international standards in regard to protection, management and operation. Waste management plans for office operation or warehouse operation are not introduced. A system for the management of WEEE is yet to be introduced in Bosnia and Herzegovina.

5.4.2 Analysis of waste management procedures within the HIV/AIDS grants

The HIV/AIDS grant supports the waste treatment and disposal system of the SRs mainly through the supply of sharps containers and indirectly by covering the disposal costs of collected sharps under the general office budget.

Generated general waste in the drop-in centres or in the healthcare facilities which provide rapid testing for HIV and HCV is handled as domestic waste and disposed by using the municipal waste services.

An effective system is in place for the collection and disposal of used sharps from PWID. According to the SRs interviewed, the return rate of syringes is > 80%. The sharps waste from PWID is collected at drop-in centres in supplied safety boxes (5 l safety box, corrugated cardboard, WHO standard) or in 0.3 l or 0.6 l sharps containers (mainly used by outreach workers). A slight oversupply of the sharps containers was reported, however they are generally considered as practical during outreach work by the SRs.

To reduce risks for the public caused by discharged syringes and needles, the outreach workers carry out periodically clean-ups of public places which are frequently visited by PWID. During these cleaning up campaigns, 5 l safety boxes are used to collect the used syringes and needles. Special gloves to prevent needle-stick accidents are not available but are considered necessary to reduce risks.

For the disposal of the collected sharps from the regular activities and campaigns, the SRs signed disposal contracts with specialized and licensed disposal companies which collect on demand. A special budget line for the disposal of the generated



Storage of returned syringes from PWID in a drop-in centre

hazardous and non-hazardous waste does not exist. The supervision and monitoring of the disposal companies by the responsible authorities is limited.

Waste generated during HIV or HCV testing is separated into general waste and infectious waste. For infectious waste disposal, the waste system of the respective healthcare facility is used. Considering the lack of infectious waste treatment capacity in Bosnia and Herzegovina, it has to be assumed that the majority of the infectious waste will be disposed of untreated at the landfills. In case that liquid hazardous waste will be generated, this will be disposed of via the sewage system. Unusable test kits will be disposed of in accordance with the local regulations. Training on healthcare waste management was not provided.

5.4.3 Analysis of waste management procedures within the TB grants

The TB grant supports the waste treatment and disposal system of the TB laboratories by providing the necessary equipment (autoclaves) to the TB laboratories. Costs for the disposal of expired or unusable pharmaceuticals are expected to be covered by the government. Costs for the disposal of waste from the TB wards and laboratories are expected to be covered by the respective institution.

To improve infection control within the project, new autoclaves for the treatment of infectious waste generated at BSL-2 and BSL-3 laboratories were supplied. For the BSL-3 laboratories (located in Sarajevo and Banja Luka), double-door autoclaves have to be used with an airtight cross contamination seal system and exhaust gas filtration. While in the BSL-3 laboratory in Sarajevo these requirements were fulfilled, the autoclave supplied in Banja Luka showed some shortcoming and was under review at the time of the assessment. For the monitoring and evaluation of the waste treatment systems, no uniform standard exist among the laboratories. Also the final disposal differs, as in Banja Luka decontaminated waste is disposed of with non-hazardous waste, while in Sarajevo decontaminated waste has to be disposed of as infectious waste.

Infectious waste generated by the TB wards will be managed in accordance with the existing proceedings for waste in the respective healthcare facility. In Sarajevo the waste will be treated in the existing



Autoclaves for decontamination of waste in BSL-3 (left) and BSL-2 (right) laboratories

treatment plant, in Banja Luka this will be handed over to a company for disposal. Regular monitoring of the treatment and disposal system by the responsible authorities is limited. Liquid chemical waste from the laboratories such as liquids used for staining or liquid reagents is disposed of via the sewage system. For selected solid chemical waste (fluorescent lamps) a special collection system exists.

In case of expired or unusable pharmaceuticals, or other expired solid hazardous items, they are collected and handed over to a licensed disposal company. As no treatment and disposal facility for this type of waste exist in Bosnia and Herzegovina, the disposal company is collecting and exporting this type of waste for treatment and final disposal. The majority of the waste is treated in either Austria or the Czech Republic. As the exporting country (Bosnia and Herzegovina) as well as the receiving countries are signatory to the Basel Convention, the international monitoring system for the control of transboundary movements of hazardous wastes has to be applied.

5.5 Current healthcare waste treatment and disposal practices in Bosnia and Herzegovina

5.5.1 Main findings

As the legal analysis showed, in both entities of Bosnia and Herzegovina regulations for the management of healthcare waste exist. Healthcare facilities are

struggling to implement these regulations; especially the treatment and disposal of hazardous waste shows a number of shortcomings. Both treatment and adequate disposal options especially for bio-hazardous waste are limited and the majority of the bio-hazardous waste is disposed of on landfills without pre-treatment (decontamination).

A recent study of the Public Health Institute of the Federation of Bosnia and Herzegovina also highlighted several shortcomings⁵. The study showed that the situation of healthcare waste management is best at the tertiary healthcare level and gets worse at the lower levels with hardly any existing healthcare waste management at primary level. Over 50% of the infectious healthcare waste is disposed of together with municipal waste. If infectious waste is treated, 56% of the waste generators use steam based sterilization processes and 25% apply burning methods. Other waste generators did not state the type of treatment process they applied. If incinerators are used, these are generally of a more simple type, do not reach high temperature and do not apply any flue gas treatment and control system.

During the assessment, a number of healthcare waste facilities were visited to analyse the current waste practices of the different waste streams. The main findings are summarized in the following.

Non-hazardous, general waste

Municipal non-hazardous waste is segregated and collected in containers, which are regularly emptied

by the municipal waste service. Only a few secured and safe landfills do exist, e.g. only 3 sanitary landfills in the Federation of Bosnia and Herzegovina. The informal sector is collecting valuable materials at the unsecured landfills. Recyclables are not segregated in the healthcare facilities as recycling systems for paper, glass or plastic are so far not available.

Infectious waste including sharps items

Infectious waste is segregated in the facilities and collected in colour coded plastic bags. Sharps waste is segregated into proper plastic or cardboard safety boxes or in plastic water bottles if no other options are available. The sharps waste is treated together with the other infectious waste.

The infectious waste is treated by incineration, open burning, autoclaving or chemical disinfection. In some facilities, infectious waste is not segregated and the mixture of general and infectious waste is disposed of as municipal waste.

Pathological waste

Pathological waste is separately collected and handed over to funeral services who typically dispose it of on special sites at cemeteries. Minor parts might be treated by autoclaving or incineration.

Pharmaceutical waste

Pharmaceutical waste generated from healthcare activities consists mainly of expired medicines and medicines damaged during transportation. While importers and private pharmacies in Bosnia and Herzegovina enforce the return of expired medicines to the suppliers by including it as a contract requirement, other healthcare facilities are collecting and storing pharmaceutical waste. After a sufficient amount is collected, the disposal is contracted to one of the licenced waste disposal companies who export the waste to Austria, Italy or Germany.

Chemical waste

Mercury containing solid chemical waste is segregated and stored in designated storage facilities, ready for collection. Some solid chemical waste is disposed of via the municipal waste stream collection. Like for

pharmaceutical waste, there is no possibility to dispose of chemical waste in Bosnia and Herzegovina. For liquid chemical waste, a collection system for the fixing baths from radiology departments exists (recycling of the silver). Other chemical waste and used disinfectants are disposed of via the sewage system.

Radioactive waste

Radioactive waste is under the responsibility of the regulatory authority of the entities, which use the recommendations and guidelines provided by the International Atomic Energy Agency (IAEA) for the management of radioactive waste. The waste is classified based on its type and level of radioactivity. Three main sources of radioactive waste are recognized within healthcare facilities:

- ▶ Research activities: large quantities of waste with low levels of radioactivity
- ▶ Clinical laboratories for radio-immunological analyses: relatively large quantities of waste with low levels of radioactivity
- ▶ Laboratories of nuclear medicine that generate relatively small but highly radioactive quantities of waste.

Figure 9 outlines the general methods of disposal for the different healthcare waste streams in Bosnia and Herzegovina.

5.5.2 Sample treatment systems for bio-hazardous waste

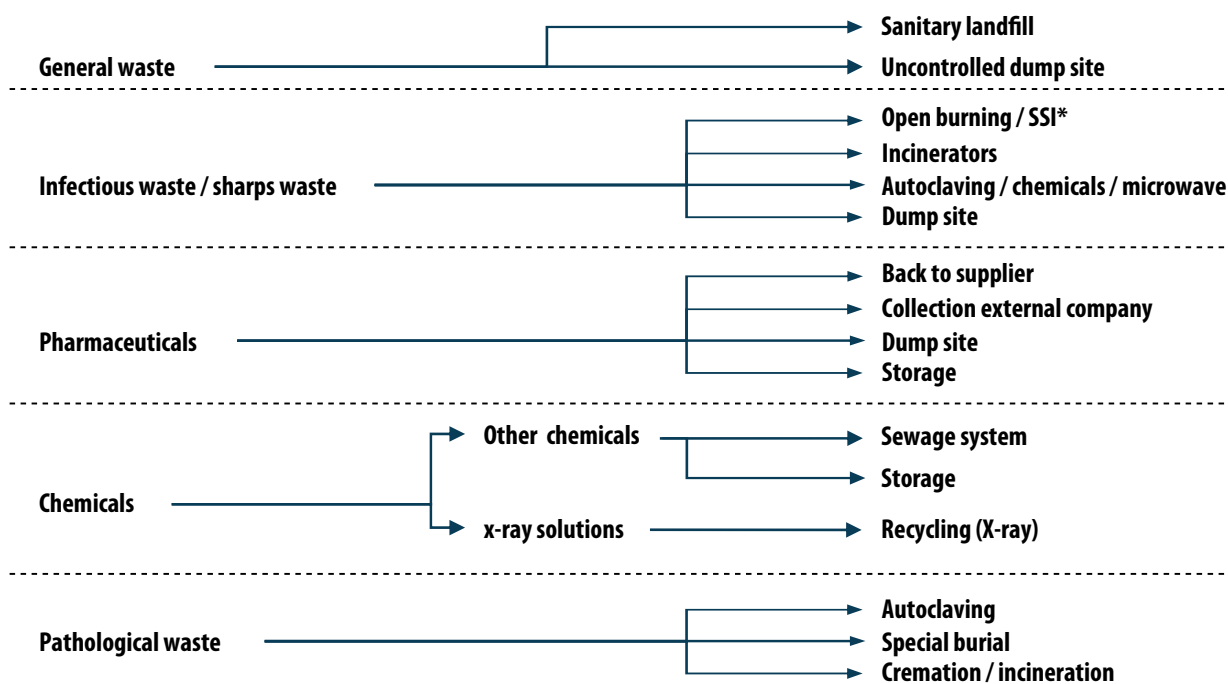
For the treatment of bio-hazardous waste (infectious waste and sharps), only 4 main installations exist in Bosnia and Herzegovina. Due to this limited treatment possibilities and capacities, it has to be assumed that by far the majority of bio-hazardous waste is disposed of untreated at the existing landfills. Of the 4 existing installations, 2 were visited during the assessment.

Clinical Centre, University of Sarajevo

In 2008, the Clinical Centre was part of a pilot project on healthcare waste management by the cantonal MoH. For the waste treatment, the hospital received one steam disinfection system and a shredder for grinding the waste after disinfection. The system is intended to

5 Vilic-Svraka, A. Medical waste management in the Federation of Bosnia and Herzegovina – results of the survey. Public Health Institute of Federation Bosnia and Herzegovina 2014. Presentation

Figure 4: Current disposal scheme of healthcare waste streams



*SSI = Small Scale Incinerator

treat the entire waste of the Centre; however, capacity is not sufficient and the hospital plans to install a second system. Accordingly the Centre does not offer waste treatment services to other healthcare facilities. The Centre is satisfied with the treatment system; problematic are only the comparable high costs for the plastic bags in use (polypropylene). Shredding of the waste was a precondition to receive the operation permit.

In accordance to the cantonal regulation each healthcare facility has to appoint a responsible person for healthcare waste management and to set up a waste management plan for the facility. The Clinical Centre is following this rule.

General Hospital Doboj Sveti Apostol

The General Hospital Doboj is a regional hospital with over 600 beds and a catchment area of about 300,000 people. Infectious and non-infectious waste is segregated in yellow and black bags. Sharps are collected in empty plastic water bottles. Full bottles are put into yellow bags for infectious waste. The bags are collected in wheelie bins and transported to a central treatment centre which is located on the compound of the hospital where the

infectious waste is treated by steam disinfection after shredding.

The treatment equipment, collection bins and a transport vehicle were funded by an EU project in 2006. It was planned to connect up to 110 healthcare facilities to the system. While most of the directors of the targeted healthcare facilities signed a service contract, the facilities do not provide the waste and currently the Doboj hospital treats waste from only 18 healthcare facilities located in the Republika Srpska and from 4 healthcare facilities located in the Federation of Bosnia and Herzegovina. Currently only 58% of the treatment capacity is used, mainly for waste generated by the Doboj hospital itself. The hospital offers medical institutions the waste treatment for a price of 3.20 BAM/ kg and ambulances for a price of 3.60 KM / kg.

5.5.3 Training, monitoring, inspection and reporting

A number of projects have provided training on healthcare waste management conducted by various organizations, including the WHO. Recently, a practical guideline for the operation of healthcare waste



Bio-hazardous waste treatment facility at the Clinical Centre Sarajevo: Disinfection equipment (left), shredded waste after disinfection (right)

management systems was developed. A standardized and recognized vocational training system for healthcare waste however does not exist and training is still mainly provided during medical education.

Within the Federation Bosnia and Herzegovina, an independent inspectorate agency system was established in 2010. These inspection agencies are separated from the MoHs and should be established on all levels (Federation, cantons). The task of this inspectorate includes the monitoring of healthcare waste management on canton level; the inspectors should provide reports to the central inspectorate on the Federation of Bosnia and Herzegovina level. In cantons where no inspectorates are established, the

inspectorate of the Federation is supposed to take over, but as there is only one person appointed at this level, this task can hardly be fulfilled. Currently, inspections on healthcare waste management are only randomly carried out as part of general inspections.

In the Republika Srpska a centralised inspectorate responsible for the entire entity exists but also only randomly monitors healthcare waste management.

A reporting system for healthcare waste which includes the reporting of the waste generation rates for all healthcare waste streams, the reporting about treatment of hazardous healthcare waste streams and the reporting about the final disposal of healthcare waste is not in place.

A transport manifest system⁶ to trace hazardous waste during transportation on public streets exists, but is not used nor enforced.

5.5.4 Previous and planned improvement programmes

Several attempts were made during the period 2006 to 2010 to improve the healthcare waste situation in Bosnia and Herzegovina. In 2006 the project 'Solving of medical waste problem in City of Banja Luka' financed by the EU and supported by City of Banja Luka was carried out but concentrated mainly on capacity building aspects.



Bio-hazardous waste treatment facility at General Hospital Doboj: Steam treatment system (left), collection and transport container for infectious waste (right)

In 2008, the EU delegation carried out the 'Pre-feasibility study of implementing bio-hazardous waste management schemes in Bosnia and Herzegovina and development of programmes for introduction of bio-hazardous waste management' under the Instrument for Pre-Accession Assistance (IPA) programme. The planned follow up project however did not materialize. The UNDP in cooperation with the Spanish MDG Achievement Fund planned to carry out a project on 'Reducing public health, occupational and environmental risks associated with healthcare waste, through development and implementation of an environmentally sound healthcare waste management programme in Bosnia and Herzegovina'. Also this project did not materialize.

From 2010 until 2014 some other activities in the field of healthcare waste were planned but so far did not materialize, including the construction of a treatment plant in the city of Zenica financed by the Environmental Fund of the Federation Bosnia and Herzegovina. Overall the sector received only limited attention and support. Recently the Republika Srpska established a working group on healthcare waste management to start another attempt to solve the existing challenges, and the General Hospital Prim. Dr. Abdullah Nakas in Sarajevo has received financial support from the Federal Eco-fund to the amount of 240,000 KM (122,710 EUR) for the project 'Waste management and prevention of formation of dangerous and toxic substances in the Sarajevo Canton with adequate disposal of infectious waste'.

6 Definition of transport manifest: A transport document that serves as a tally-sheet, and gives a detailed summary of all bills of lading issued by a carrier for a particular voyage of a particular vessel or vehicle. Read more under <http://www.businessdictionary.com/definition/manifest.html#ixzz3PSSWIFUj>

6 Findings and Recommendations

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

The assessment of relevant international conventions for healthcare waste management showed that Bosnia and Herzegovina has so far signed all major Conventions and the Montreal Protocol, with the exemption of the Minamata Convention:

a) Need of budget or contract extension to allow a safe return or disposal of unusable pharmaceuticals (damaged, expired, etc.)

Current situation: Fully avoiding unwanted, unusable or expired pharmaceuticals cannot be ensured in any GF programme. Since dedicated budget lines for pharmaceutical waste disposal do not exist, the following of the regulations on the management of pharmaceutical waste (Official Gazette BiH 23/11) might be an issue.

Justification/impact: Despite the fact that responsibilities are defined within the law on medicinal products and medical devices and subsequent in the regulations on the management of pharmaceutical waste uncertainties in regard to the coverage of cost for the disposal of unwanted pharmaceuticals exist which might result in long-term storage of pharmaceutical waste which is increasing the risk of inadequate, unsafe and environmentally harmful disposal of the waste.

Recommended activities: Review and clarify donor policies and procedures related to this matter. If possible and without negative impact for other projects, include a budget line for pharmaceutical waste disposal or include a take-back duty for expired or unusable drugs for suppliers in future contracts.

b) Strengthen the disposal systems for waste from intravenous drug use

Current situation: While efficient systems for the collection of used syringes and needles are installed, a specific budget for disposal costs for the collected waste is not included in the grants and has to be paid from the general office budget.

Justification/impact: Without dedicated and transparent funding, the correct disposal of collected sharps waste might create problems for the SR. If resources are missing or if safe disposal possibilities are missing, this might result in inadequate, unsafe and environmentally risky disposal of this waste.

Recommended activities: Include a strategy and activities for the waste collection, treatment and disposal with dedicated budget lines.

c) Review the supplied sharps containers and take user feedback into consideration

Current situation: Users of sharps containers cannot influence the type of sharps containers supplied. A certain over-supply of small sharps containers is reported.

Justification/impact: For the collection of used syringes, different containers for different purposes are required – for the collection of used syringes in the drop-in centre and for the usage during outreach activities.

Recommended activities: Collect feedback from the SRs on the required type and quantity for sharps containers.

d) Address occupational health and safety risks for outreach workers during sharps collection campaigns

Current situation: Outreach workers are collecting used syringes from PWID at public places such as playgrounds. For personal protection, only thin latex gloves are available.

Justification/impact: Research has shown that the prevalence rate of HCV among PWID in Bosnia and Herzegovina is about 50%. A risk of infection through needle-stick accidents exists for outreach workers during the syringe collection campaigns.

Recommended activities: Provide needle-stick protection gloves to SRs whose outreach workers collect sharps items.

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

Current situation: In the GF grants, only sharps containers for the collection of needles or needles attached to syringes are provided, while no items (e.g. strong yellow bags) for the collection of infectious waste 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 or are disposed of with the domestic, non-hazardous waste. 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) Need of warehouse waste management plans

Current situation: Waste management plans for warehouses including safety instructions (such as spillage plan, etc.) do not exist.

Justification/impact: Warehouses create large amounts of packing waste (e.g. from packing during transport, 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: Develop and implement waste management plans for the operation of warehouses.

g) Strengthening of laboratory waste management practices through the development of SOPs

Current situation: Different practices exist for the disposal of decontaminated laboratory waste, for the monitoring of waste treatment plants and for the evaluation of waste treatment systems.

Justification/impact: Unclear and non-standardized waste management practices might result in unnecessarily-high waste management cost and create problems during inspections and accreditation.

Recommended activities: Develop and implement SOPs for the management, treatment and supervision of laboratory waste management systems.

h) Strengthen recycling and reusing of waste at warehouses

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: Request all warehouses to set up at least a basic recycling programme and to report the amount and types of recycled materials.

i) Need of waste management plans for office operations 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 office operations create waste which could be recycled (e.g. paper waste etc.) but

also waste with potential environmental impact such as used oil from car maintenance or old or damaged electrical or electronic equipment, including batteries (WEEE).

Recommended activities: Develop and implement SOPs for the environmentally friendly operation of project offices.

6.2 Context specific recommendations for the GF programme in Bosnia and Herzegovina

a) Review of the BSL-3 laboratory autoclave in Banja Luka

Current situation: Under the GF TB grants, two laboratories were equipped with autoclaves for the waste treatment. The autoclave in Banja Luka might not fulfil all requirements.

Justification/impact: BSL-3 autoclaves need a bio-seal to avoid air exchange and cross-contamination between the laboratory and the outside area. In addition the exhaust air from the treatment chamber has to undergo sterile filtration. Without fulfilling these requirements, the laboratory cannot be accredited as BSL-3 laboratory.

Recommended activities: Review the technical specifications of the provided autoclave and ask for a third party opinion on the quality of the bio-seal and the exhaust air filtration. (Note: as of 02.02.2015 this is already in progress).

b) Need for donor coordination (UNDP, WHO, EU, Eco-fund⁷)

Current situation: In the past, a number of organizations were actively supporting the establishment of a nationwide healthcare waste management system. Currently only the Eco-fund is still active in the field with one minor project.

Justification/impact: To ensure the safe treatment of hazardous healthcare waste generated by GF grant activities or by any externally funded health services, a nationwide healthcare waste management system is needed to ensure safe treatment and disposal of the generated waste.

Recommended activities: Establish a donor coordination group on healthcare waste management.

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

Current situation: A harmonized, national strategy for both entities does not exist and is hindering possible investments in this field.

Justification/impact: As no national development plan exists, investments are uncoordinated or are not executed.

Recommended activities: Support the development of a national healthcare waste management strategy through a coordinated inclusive engagement with the authorities in Bosnia and Herzegovina.

d) Need for investments in the healthcare waste field

Current situation: Currently no major investments in the healthcare waste field are planned, however the country is lacking treatment capacity for bio-hazardous waste which cannot be exported for treatment.

Justification/impact: The majority of bio-hazardous waste is either incinerated in simple incinerators or is disposed of as household waste. As most of the landfills in Bosnia and Herzegovina are uncontrolled major risks arise for example from the uncontrolled burning of the waste causing the production of dioxin and furans.

Recommended activities: Bosnia and Herzegovina is a signatory of the Stockholm Convention. UNDP has long-term experience in the development of programmes to reduce the production of unintentionally generated persistent organic pollutants

⁷ The Eco-funds are two funds for environmental protection set up in the Federation of Bosnia and Herzegovina as well as in the Republika Srpska based on the laws on ecological funds in the two entities. The ecofunds are financing environmental projects in their entities.

such as dioxin and furans from waste burning. It should be evaluated if Bosnia and Herzegovina is eligible to receive funds from the Global Environment Facility (GEF) to reduce the production of these pollutions.

e) Alternatives for the disposal of larger quantities of chemical and pharmaceutical healthcare waste

Current situation: Bosnia and Herzegovina currently has no national treatment facility for the destruction of pharmaceutical waste.

Justification/impact: As no other opportunity exists, liquid chemical and pharmaceutical waste especially is often disposed of via the sewage system or is disposed of together with household waste. If the chemical and pharmaceutical waste is collected, it has to be exported for disposal.

Recommended activities: Investigate the possibility of disposing chemical and pharmaceutical waste in cement kilns⁸.

f) Needs-based and cost-effective national healthcare waste treatment strategy

Current situation: Previous healthcare waste treatment strategies mainly followed a geographical, political approach. Planned locations for the establishment of treatment plants followed a district / cantonal concept, less a needs based approach.

Justification/impact: The example of the Dobož Hospital shows that the treatment of healthcare waste must not be necessarily done in the entity where the waste is generated. By identifying expected waste amounts and taking logistical aspects such as road conditions into consideration, a cost-effective strategy can be developed.

Recommended activities: Map healthcare waste generators including type and volume of waste they produce and develop a cost-effective collection and treatment concept which shall include all healthcare waste generators.

g) Innovative investment and operation models for bio-hazardous waste

Current situation: Existing waste treatment plants are mainly operated by healthcare facilities. Involvement of the private sector is limited to waste hauling services and private sector investments in the treatment of bio-hazardous waste are lacking. Innovative operation models do not exist that take insourcing as well as outsourcing strategies and alternative investment concepts such as leasing concepts into consideration.

Justification/impact: Innovative concepts can reduce barriers for private and governmental investments and can be a driver to explore and set up missing bio-hazardous waste treatment capacities.

Recommended activities: Investigate alternative concepts for bio-hazardous waste treatment plants, including public-private-partnership (PPP) models.

h) Strengthening of monitoring and record keeping for healthcare waste

Current situation: A monitoring system for healthcare waste hardly exist and inspections of waste generators and waste handlers are limited. Where appropriate treatment systems exist, they are often not used, less costly but environmentally problematic solutions are selected by the waste generators.

Justification/impact: An improved monitoring and record keeping system will help to ensure that healthcare waste can be traced from the point of generation to the point of treatment; it can ensure that only waste treatment solutions are selected which fulfil local requirements.

Recommended activities: Develop a monitoring and record keeping system for healthcare waste and strengthen risk-based inspections.

⁸ Existing cement kilns include the Kakanj Cement Plant (HeidelbergCement), FCL Fabrika Cementa Lukavac and others

7 Annexes

7.1 Input analysis - HIV

A. Pharmaceuticals

- ▶ Methadone hydrochlorid oral solution 150 ml
- ▶ Naloxone buprenorphine 8 mg
- ▶ Naloxone buprenorphine 2 mg

B. Health products

- ▶ Condoms
- ▶ HIV rapid tests, complete with chase buffer
- ▶ RealTime HIV-1 amplification reagent kit
- ▶ RealTime HIV-1 control kit
- ▶ RealTime PCR systems TegMan RNASE P 96-well
- ▶ Optical calibration kit
- ▶ RealTime HIV-1 calibrator kit
- ▶ Sample preparation system
- ▶ CD4 easy count kit
- ▶ Conut check beads green
- ▶ Sheath fluid for flow systems, 5 liter high purity
- ▶ Partec decontamination solution for flow systems
- ▶ Cleaning solution for flow systems
- ▶ OraQuick Advance HIV1/2 rapid antibody tests
- ▶ OraQuick HCV rapid antibody tests
- ▶ Hepatitis B vaccines
- ▶ ViroSeq HIV-1 genotype system v2.0
- ▶ Sequencing consumables kit
- ▶ PCR cleanup kit

C. Other health products

- ▶ Needles and syringes
- ▶ Harm reduction kits (alcohol pads, water for injection, citric acid, sterile single use cooker, self-seal opaque, latex tourniquet, heparin gel)
- ▶ Lubricants
- ▶ Safety boxes
- ▶ SW hygienic packs (condoms, tampon, tampon, wet wipes, antibacterial solution)

D. Non-health products

- ▶ IT equipment and services (computers, printers, software, licenses, data base development, etc.)
- ▶ Materials for rehabilitation and reconstruction of healthcare facilities including furniture
- ▶ Educational printing materials, leaflets, manuals

7.2 Input analysis - TB

A. Pharmaceuticals

1st Line:

- ▶ Rifampicin / Isoniazid / Pyrazinamide / Ethambutol (FDC)
- ▶ Rifampicin / Isoniazid (FDC)
- ▶ Rifampicin / Isoniazid / Ethambutol (FDC)
- ▶ Streptomycin
- ▶ Isoniazid
- ▶ Pyrazinamide
- ▶ Ethambutol
- ▶ Isoniazid

2nd Line:

- ▶ Kanamycin
- ▶ Capreomycin
- ▶ Amikacin
- ▶ Ethionamide
- ▶ Aminosalicylic acid
- ▶ Levofloxacin

7.3 Organizations and persons met

Table 5: Stakeholders consulted during mission

Organization	Name/Title
UNDP	Nešad Šeremet / HIV/AIDS Project Manager
UNDP	Jasmina Islambegović / TB Project Manager
UNDP	Sanjin Avdić / Energy and Environment Sector Leader
UNDP	Edin Telalagić / TB Project Associate
UNDP	Ivana Stojadinović / HIV/AIDS Procurement Associate
UNDP	Arijana Drinić / HIV/AIDS M&E Assistant
Public Health Institute, Federation Bosnia and Herzegovina	Aida Vilić-Švraka / Specialist of Hygiene and Environmental Health
Canton Sarajevo - Ministry of Physical Planning and Environment, Sector Environment	Zijada Krvavac / Assistant Minister
Canton Sarajevo - Ministry of Physical Planning and Environment, Sector Environment	Mira Grgić / Advisor for waste management
TB department and TB Warehouse in Podhrastovi, Clinical centre Sarajevo	Jasminka Maglajlić / Head of TB laboratory
TB department and TB Warehouse in Podhrastovi, Clinical centre Sarajevo	Mirzeta Arapović / FBiH Entity Drug Manager
TB department and TB Warehouse in Podhrastovi, Clinical centre Sarajevo	Senada Saka / Chief Nurse
TB department and TB Warehouse in Podhrastovi, Clinical centre Sarajevo	Džanela Bravo / Deputy Chief Nurse
UNDP Office Banja Luka	Goran Vukmir / Head of Regional Office Banjaluka
Environmental Protection and Energy Efficiency Fund of the Republika Srpska	Srđan Todorović / Director
Environmental Protection and Energy Efficiency Fund of the Republika Srpska	Željko Aleksić / Master degree in ecology
HIV and TB Projects Warehouse in Banjaluka - Krajina lijek	Jelena Đaković / Head of Pharmaceutical Department
TB laboratory Banja Luka (Public Health Institute)	Zlatka Kelečević / assistant for finances at PHI RS
TB laboratory Banja Luka (Public Health Institute)	Dragana Beronja / Main technician of the Microbiology department
Doboj Hospital Sveti Apostol	Miroslav Dragičević / Head of the technical department
Doboj Hospital Sveti Apostol	Mladen Gajić / Head of Department for Planning and Analysis
Doboj Hospital Sveti Apostol	Miloš Lazarević / Head of facilities for processing medical waste
HIV AIDS Project SR Margina	Nermin Golub / Finance Officer
HIV AIDS Project SR Margina	Belma Kahrman / PWID Drop-in operator
Clinical Centre, University of Sarajevo Technical department	Adnana Talić-Tanović / Head of the Central sterilization

Organization	Name/Title
Clinical Centre, University of Sarajevo Technical department	Zenir Šuko / Head of Technical Department
Clinical Centre, University of Sarajevo Technical department	Naida Hodžić / Head of health care Waste services
Clinical Centre, University of Sarajevo Technical department	Lejla Arnautović / Environmental Engineer
Clinical Centre, University of Sarajevo Technical department	Sanja Ferizović / Chief construction services
Ministry of Environment and Tourism, Federation Bosnia and Herzegovina	Fadila Muftić / Associate
Ministry of Environment and Tourism, Federation Bosnia and Herzegovina	Dragan Šulović / Advisor to the federal Minister for the Environment
Environmental Fund of the Federation Bosnia and Herzegovina	Safet Harbinja / Director
WHO	Boris Rebac / Project manager



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