ASSESSMENT OF MEDICAL WASTE MANAGEMENT DURING THE COVID-19 PANDEMIC

Assessment of Medical Waste Management During the COVID-19 Pandemic

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Abbreviations

COVID-19	Coronavirus Disease 2019
GTC	Guanidinium Thiocyanate
HCFs	Health Care Facilities
HCN	Hydrogen Cyanide
HWO	Healthcare Waste Officer
labs	laboratories
MoHSP	Ministry of Health and Social Protection
MW	Medical Waste
NGO	Non-Governmental Organization
PCR	Polymerase chain reaction
PPE	Personal Protective Equipment
RAT	Rapid Antigen Test
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
UNDP	United Nation Development Program
WHO	World Health Organization

Initial Information

1.1. Context

The COVID-19 pandemic, also known as the coronavirus pandemic, was first identified in December 2019 in Wuhan, China. The World Health Organization declared the outbreak a Public Health Emergency of International Concern in January 2020 and a pandemic in March 2020. It is an ongoing pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). As of 5 January 2021, more than 85.6 million cases have been confirmed, with more than 1.85 million deaths attributed to COVID-19.

On 30 April 2020, Tajikistan officially announced 15 confirmed cases of COVID-19. As of 3 January 2021 there have been 13.182 confirmed cases of COVID-19 with 89 deaths[1]. As the number of confirmed cases in the country rapidly increase day by day and hospitals brace for a surge in patients with COVID-19, treatment facilities in Tajikistan are facing a challenge in managing COVID-19 contaminated medical waste, that includes bodily fluids, used PPE and other potentially hazardous materials, as the volume of medical waste increases exponentially with patients and healthcare workers utilizing more medical supplies and disposable PPE as compared to business as usual.

While healthcare facilities may be prepared to clinically treat a patient with COVID-19, logistically hospitals are unprepared to safely treat, store and dispose of COVID-19 contaminated medical waste - putting the wider community and environment at risk. The Ministry of Health and Social Protection of the Republic of Tajikistan issued detailed guidelines on how hospitals should care for patients with pneumonia and COVID-19 related symptoms. Yet, no practices for appropriate handling, packaging and transporting items contaminated with COVID-19 are adopted at the healthcare sector level and thus, are not applied by most of the treatment facilities.

In the frame of "Addressing COVID-19 environmental hazards through Improving Medical Waste Management in Tajikistan" project, UNDP aims to support Government's efforts to establish a system for effective handling of COVID-19 medical waste in healthcare facilities and reduce human and environmental impact of the pandemic. The project incorporates both short- and medium-term responses on medical waste management.

1 Source: WHO Health Emergency Dashboard,
WHO (COVID-19) Homepage, https://covid19.who.int/region/euro/country/tj (05.01.2021)

1.2. Purpose, Scope and Methodology of this assessment

The purpose of this project task is to assess and propose recommendations to deal with medical waste management (MWM) problems efficiently and prevent the potential impact to the health of the people and the environment – with focus on COVID-19 waste generated in health care facilities (HCFs) and laboratories (labs). These include the legal framework, the waste management processes in the facilities, roles and responsibilities for healthcare personnel responsible for the handling and disposal of the waste streams at the point of generation in the health facilities. The outcome of this assessment is to contribute to formulating a more sustainable medical waste management system in Tajikistan during emergency situations like the outbreak of SARS-CoV-2.

The target HCFs and labs of this assessment have been identified by the Ministry of Health and Social Protection (MoHSP). All target facilities are either conducting COVID-19 tests, diagnosis or are providing health services to COVID-19 patients. The target facilities embraced public as well as private facilities.

A specific questionnaire has been developed in collaboration with the national UNDP team, the international consultant and the NGO Peshsaf. The interviews have been conducted by the NGO Peshsaf in November / December 2020 and consisted of two parts:

1. Gathering of general information through face-to-face interviews, and
2. Onsite visit of the institutions.

The questionnaire is structured into the following areas:

A) General information (name of facility, location, number of beds etc.)

B) Responsibilities/documentation/training

C) Generated Medical Waste classes

D) Standard Medical Waste processes

- **a.** Packaging, labeling
- **b.** Collection, transportation
- **c.** Storage
- **d.** reatment and disposal

E) Specific COVID-19 Waste Management procedures

Furthermore, questions on the existing infrastructure and available waste equipment were raised, which can be used at later stage to plan for additional support for the facilities by the UNDP project. This is not subject of this assessment report.

Please note the questionnaire was targeting mainly general waste, infectious waste, sharp waste, pharmaceutical waste and chemical waste, as these are the waste kinds which are potentially generated by the treatment of COVID-19 patients or by testing procedures.

The questionnaire can be found in Annex 7.3.

1.3. General information on the assessed facilities

In the following the institutions which have been included into this assessment are listed and specifics highlighted. All health facilities treated or treat COVID-19 patients except Kulyob Hospital. **15 Hospitals and 4 laboratories have been assessed.** All hospitals institutions are central hospitals on district / city level, of which 4 are clinical institutions. Two hospitals include regional polyclinics, and 4 Hospitals include district polyclinics.

The table below shows that the assessed 15 medical institutions provided medical service to 17,205 persons infected with SARS-CoV-2 or pneumonia in April to November 2020. Furthermore, 11,261 Rapid Antigen Tests and 11,685 PCR Tests have been conducted.

Note: in the survey the availability of labs to conduct PCR tests included the availability of labs either in the hospitals or external specialized hospital.

GENERAL INFORMATION ON HEALTH FACILITIES (TABLE 1)

Name: 1) **State central institution "Istiklol"**
Region: **Dushanbe**
Number of beds: **650**
Bed occupancy rate: **95%**
Number of treated patients in 2020: **1686**

COVID-19 testing 2020
Number of Rapid tests: N/A
Number of PRC tests: **500**
Lab capacity for PCR tests: **330** per day

Name: 2) **City Clinical Children Infectious Diseases Hospital (Chapaev)**
Region: **Dushanbe**
Number of beds: **200**
Bed occupancy rate: unknown
Number of treated patients in 2020: **2939**

COVID-19 testing 2020
Number of Rapid tests: **750**
Number of PRC tests: **750**
Lab capacity for PCR tests: **150** per day

Name: 3) **National Republican Medical Central Hospital (Karabolo)**
Region: **Dushanbe**
Number of beds: **1070**
Bed occupancy rate: unknown
Number of treated patients in 2020: **25335**

COVID-19 testing 2020
Number of Rapid tests: N/A
Number of PRC tests: N/A
Lab capacity for PCR tests: N/A

Name: 4) **City Clinical Infectious Diseases Hospital (Zaravshon)**
Region: **Dushanbe**
Number of beds: **390**
Bed occupancy rate: unknown
Number of treated patients in 2020: **1 116**

COVID-19 testing 2020
Number of Rapid tests: **1116**
Number of PRC tests: N/A
Lab capacity for PCR tests: **10** per day

Name: 5) **State central institution named after Akhmedov**
Region: **Dushanbe**
Number of beds: **442**
Bed occupancy rate: **100**
Number of treated patients in 2020: **20000**

COVID-19 testing 2020
Number of Rapid tests: **9000**
Number of PRC tests: **9000**
Lab capacity for PCR tests: **300** per day

Name: 6) **Bokhtar District Hospital**
Region: **Khatlon**
Number of beds: **610**
Bed occupancy rate: **48,1**
Number of treated patients in 2020: **11461**

COVID-19 testing 2020
Number of Rapid tests: **40**
Number of PRC tests: **20**
Lab capacity for PCR tests: **200** per day

Name: 7) **Dangara District Hospital**
Region: **Khatlon**
Number of beds: **295**
Bed occupancy rate: **95%**
Number of treated patients in 2020: **7000**

COVID-19 testing 2020

Number of Rapid tests: N/A
Number of PRC tests: N/A
Lab capacity for PCR tests: N/A

Name: 8) **Kulyab District Hospital**
Region: **Khatlon**
Number of beds: **412**
Bed occupancy rate: **75**
Number of treated patients in 2020: **12499**

COVID-19 testing 2020

Number of Rapid tests: N/A
Number of PRC tests: N/A
Lab capacity for PCR tests: N/A

Name: 9) **Tursunzade City Hospital**
Region: **Districts Republican Subordination**
Number of beds: **531**
Bed occupancy rate: **85%**
Number of treated patients in 2020: **20 086**

COVID-19 testing 2020

Number of Rapid tests: N/A
Number of PRC tests: N/A
Lab capacity for PCR tests: N/A

Name: 10) **Shahrinav District Hospital**
Region: **Districts Republican Subordination**
Number of beds: **201**
Bed occupancy rate: **83%**
Number of treated patients in 2020: **6 000**

COVID-19 testing 2020

Number of Rapid tests: **155**
Number of PRC tests: **155**
Lab capacity for PCR tests: **20** per day

Name: 15) **Vahdat Central City Hospital**
Region: **Districts Republican Subordination**
Number of beds: **662**
Bed occupancy rate: **88%**
Number of treated patients in 2020: **20000**

COVID-19 testing 2020

Number of Rapid tests: N/A
Number of PRC tests: **1000**
Lab capacity for PCR tests: **200** per day

Name: 11) **Varzob District Hospital**
Region: **Districts Republican Subordination**
Number of beds: **100**
Bed occupancy rate: **43%**
Number of treated patients in 2020: **1200**

COVID-19 testing 2020

Number of Rapid tests: **200**
Number of PRC tests: **200**
Lab capacity for PCR tests: **300** per day

Name: 12) **Fayzobod District Hospital**
Region: **Districts Republican Subordination**
Number of beds: **175**
Bed occupancy rate: **45%**
Number of treated patients in 2020: **4000**

COVID-19 testing 2020

Number of Rapid tests: N/A
Number of PRC tests: **60**
Lab capacity for PCR tests: **50** per day

Name: 13) **Gissar District Hospital**
Region: **Districts Republican Subordination**
Number of beds: **217**
Bed occupancy rate: unknown
Number of treated patients in 2020: **14000**

COVID-19 testing 2020

Number of Rapid tests: N/A
Number of PRC tests: N/A
Lab capacity for PCR tests: N/A

Name: 14) **Rudaki Central regional hospital of Chorgulteppa jamoat, Zarnisor village**
Region: **Districts Republican Subordination**
Number of beds: **236**
Bed occupancy rate: unknown
Number of treated patients in 2020: **10170**

COVID-19 testing 2020

Number of Rapid tests: N/A
Number of PRC tests: N/A
Lab capacity for PCR tests: N/A

GENERAL INFORMATION LABORATORIES (TABLE 2)

Name: **Sanitary epidimiology station laboratory**
Location: **Dushanbe**
Public / Private

Kind of test
Rapid Antigen : -
PCR: +

Name: **General city diagnostic center Nurafzo LLC**
Location: **Dushanbe**
Public / **Private**

Kind of test
Rapid Antigen : +
PCR: +

Name: **Laboratory Asri 21, LLC Samira-Service**
Location: **Dushanbe**
Public / **Private**

Kind of test
Rapid Antigen : +
PCR: -

Name: **LLC Diamed**
Location: **Dushanbe**
Public / **Private**

Kind of test
Rapid Antigen : +
PCR: +

Photos 1, 2: Laboratory "Diamed", equipment for analyzes, control over the quality of laboratory work is carried out by a senior laboratory assistant.

1.4. Potential waste generated during COVID-19 activities

COVID-19 or SARS-CoV-2 specific waste is generated during medical care of COVID-19 patients, by conducting COVID-19 tests and by the diagnosis in the labs (Polymerase Chain Reaction (PCR)). In the following the potential waste kinds generated by the different activities are outlined.

A) Medical services to COVID-19 patients in the wards or Intensive Care Unit (ICU)

Potential waste generated:

- **Non-hazardous waste:** packaging materials,
- **Potential infectious waste:** waste which was in contact with the patient (swaps, intubation tubes, bandages, PPE, food from the patient, etc.)
- **Sharp waste:** Needles, syringes, intravenous needles etc.

B) Different test procedures:

1. Rapid Antigen Tests (RAT) in the inpatients or outpatient departments.

Potential waste generated:

- **Non-hazardous waste:** Packaging material, user instructions
- **Potential infectious waste:** test swaps, extraction buffer solution, the test itself

2. 2. PCR test including PCR diagnosis in a laboratory: The PCR test is conducted similar to the RAT - a nasopharyngeal or oropharyngeal swab, nasal swab, or nasal wash/aspirate specimen collected from individuals who are suspected of COVID-19 infection. This specimen is packaged in accordance with the manual, labelled and transported to the lab, which is conducting a PCR test. The PCR test is intended for the qualitative detection of nucleic acid from the SARS-CoV-2.

Potential waste generated:

- **Non-hazardous waste:** packaging material, user instructions
- **Potential infectious waste:** viral transport media, plastic vials, reaction tubes, pipette tips etc.
- **Chemical waste:** PCR cartridges, which contain Guanidinium Thiocyanate (GTC) to facilitate extraction of DNA and RNA from cells and prevent nucleic acid destruction by enzymes which is considered as a hazardous chemical.

The services provided by the assessed hospitals and labs are summarized in tables 1 and 2.

Legal Framework related to Medical Waste in Tajikistan

The management of Medical Waste (MW) is subject in various legal documents available in the Republic of Tajikistan. Some legal / strategic documents are linking MW management in general others are outlining specific requirements and needs. In the following a summary of the most important legal documents on international and national level are outlined. Detailed assessments on the legal framework has been conducted beside others by WHO.

The Republic of Tajikistan signed different international conventions which are relevant for the management of healthcare waste, like the Rotterdam [4], Vienna [7] and Stockholm [6] Conventions and an agreement on transport of dangerous waste. The "Basel Convention of the Control of Transboundary Movements of Hazardous waste and their Disposal" [1] and the Minamata Convention on Mercury [3] have not been signed yet

In 2021 the "Health Protection Strategy of the Republic of Tajikistan until 2030" was developed. It defines strategic directions of the health sector reform, identifies further ways to develop the health sector to protect the health of the population and guides the country's national priorities reflected in the Constitution, the National Development Strategy. The Strategy defines strategic / program goals and objectives. Effective health care management is highlighted as one of the strategic goals!

In the strategy on "Public health services and development healthy lifestyle" focuses on disease prevention, health promotion and longevity, and sets specific objectives and activities to achieve the set goals. One goal is to "strengthening the leadership and training role of the Ministry of Health and Social Protection in improving health and waste management in medical institutions, both in the health sector and abroad. To achieve this goal the following activity regarding waste management is outlined:

- **development of epidemiological control standards for ...effective waste management in medical institutions in accordance with the guiding principles of the WHO.**

The Health Code of the Republic of Tajikistan, adopted on May 30, 2017, No. 1413 regulates public relations in the field of health care and is aimed at implementing the constitutional rights of citizens and protecting health is an important document in the health sector of the Republic of Tajikistan. Various strategic papers and plans are available. Healthcare waste management is mentioned in the Health Strategy, the Environmental Action Plan, the Strategy on Waste Management and different immunization strategies like the Multi Year Plan on Immunization [8][11]. A policy and strategy / action plan on healthcare waste management on national level is not available.

Also, the legal framework is tackling the management of healthcare waste management in different level of detail. The law on production and consumption of waste [9] is outlining the requirements for waste in general. It is not getting into detail nor is followed up by furthermore detailed laws or regulations regarding healthcare waste. The "National Guideline for Tuberculosis infection control in Tajikistan" [10] is providing brief guidance on the collection and disposal of waste from Tuberculosis (TB) patients.

The main documents in this area are the "Regulation on the procedure of safe drug destruction" [12] and the "SANITARY REGULATIONS AND NORMS 2.1.7.020-09: Rules of collection, storage and disposal of health facility wastes" [13], which are outlining procedures in detail. These rules directed to all health facilities, organizations engaged in collection, storage, transportation of health care wastes and organizations designing and operating the devices for wastes treatment, neutralization, and fields for solid wastes burial.

The SAN-PIN 2.1.7.020-09 has been revised in 2019 with the support of WHO and is currently in the approval process. In this document the rules for collection, storage, processing, disposal, and removal of all types of waste health care facilities are defined. It is the most specific document regarding healthcare waste management in the country. Furthermore, in this document also responsibilities, capacity building and monitoring are outlined. Specifics on the management of waste during pandemic situations are not included in the current version.

Based on epidemiological and toxicological hazardous level all medical wastes are divided into 4 classes like shown in the table below.

TABLE 3

Medical waste classes in accordance with the current san-pin

Class A	Non-hazardous materials
Class B	Hazardous infectious materials (Class 3-4 microorganisms)
Class C	Especially hazardous infectious materials (Class 1-4 microorganisms)
Class D	The wastes which similar to the industrial wastes due to their structure (pharmaceutical and chemical waste)
Class E	Radioactive wastes

The microorganisms grouped into the specific classes based on the Tajik regulation is provided in the annex.

On the 19th of March 2020, the "Tajikistan COVID-19 country preparedness and response plan" has been approved by the MOHSP. It was developed in collaboration of ministries, departments, relevant committees and agencies, international donors and development partners. It describes the objectives, policies and actions for the response as well as the structure, authorities and responsibilities. The aim is to make the response systematic, coordinated, and effective. One of the 10 priority areas of this plan is "infection prevention and control".

In this area the plan calls for:

- Sustaining and upgrading the waste management and
- Mobile incinerators for regional levels.

The plan was established to react effective in the first phase of the outbreak (4 month) and calls for a long-term preparedness and response plan.

General Medical Waste Management

Although the focus of this assessment is the management of waste related to COVID-19, it is important to understand the general MWM procedures, as the COVID-19 waste is part of the all over waste stream and is inserted into the available waste management structure and processes. Therefore, in the following the general standard MWM of the 15 assessed facilities is outlined. Specifics on COVID-19 waste is outlined in Chapter 5.

3.1. Responsibilities and Training

The "duty of care" principle stipulates that any person handling or managing wastes or related equipment is ethically responsible for using the utmost care in that task. Based on this principle, everyone who is generating, or handling waste is responsible – from cradle to grave. However, it is important that specific persons are designated to have the allover responsibility for the management of waste in a health facility. WHO is naming these persons "Healthcare Waste Officers" (HWO) [5]. The allover responsible person is in a health facility including MWM is the Chief Doctor or the Deputy Chief Doctor. Furthermore, in all hospitals at least one person has been identified to be responsible for the planning, implementation and monitoring of MWM during the daily routine work. In the most cases the Chief Nurse is responsible for the management of waste inside the facility – there were two exemption in which this issue is supervised either by a doctor-epidemiologist or a nurse. The management of treatment and disposal facilities on the hospital premises outside the building is mainly in the hands of the Chief Engineers.

The staff identified by the Chief Doctor to be interviewed were mainly male. From the point of view of representativeness, the gender composition of the interviewees is conspicuous, as almost 80 % of all staff in medical institutions are women. It is important to note that men, at their core, constitute a strong backbone of the management structure. In the assessed facilities almost 100 % of activities concerning the control of medical waste, including the process of collecting, sorting and storing waste, falls on women.

To the question about the completed and certified training on medical waste management for the responsible persons on MW management (HWO), the answer was affirmative in 12 medical institutions, and only in 3 medical institutions employees did not take a special educational course. We additionally asked about the availability of a document / certificate confirming the acquired knowledge and found that in all assessed institutions no one took special courses on medical waste control. The entire professional development system is based on the knowledge of the senior medical staff or the experience of the head nurse. Only sanitary books can be provided as supporting documents.

Regular training programs on MW of senior medical personnel have 9 out of 15 medical institutions. The educational program is conducted by oral instructions that are made by the chief physician or head of the department when planning the work of the institution / department. Specific training agenda, materials or manuals are not available.

3.2. Waste Generation and Classification

All facilities are generating non-hazardous waste (Class A), as well as infectious and sharp waste (Class B). 13 out of 15 generated also pathological Class B waste. Almost all facilities reported to generate also highly infectious waste due to the COVID-19 situation (Note: this is outlined in more detailed in chapter 3.2).

The generation of pharmaceutical waste (Class D) like expired medicines is quite uncommon due to limited availability, high costs and effective use. It was stated that usually, procurement is done through tendering procedures and hospitals know their needs very well. 6 of the 15 facilities stated to generate and segregate small amounts from time to time.

In accordance with the received information only 4 out of 15 facilities are aware that chemical waste (Class D) like mercury containing bulbs or thermometer is generated.

3.3. Packaging and Labelling

The availability of bins and bags as well as adequate labelling was observed during the site visit in the facilities. The use of waste bins and sharp boxes are common practice in the visited institutions. All 15 facilities are experiencing shortages of bags, sharp containers, and gloves. The bags or bins are not color coded in the most facilities, but in the kind of waste is written on the bins in 13 of 15 facilities.

11 out of 15 facilities use poster to show the segregation of Class A and Class B waste – some facilities had poster illustrating the complete logistic chain from segregation to disposal. Other waste classes are not mentioned. The facilities with missing posters indicated the urgent need of such.

Photo 3. Example: Kulob city hospital, special racks - trolleys for collecting and transporting honey waste of class A, B, C.

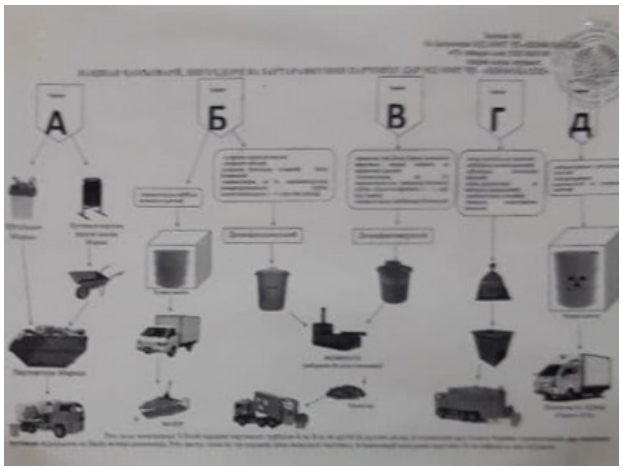


Photo 4. Example: National Medical Center "Shifobakhsh", poster with information on the separation of waste by class.

3.4. Storage

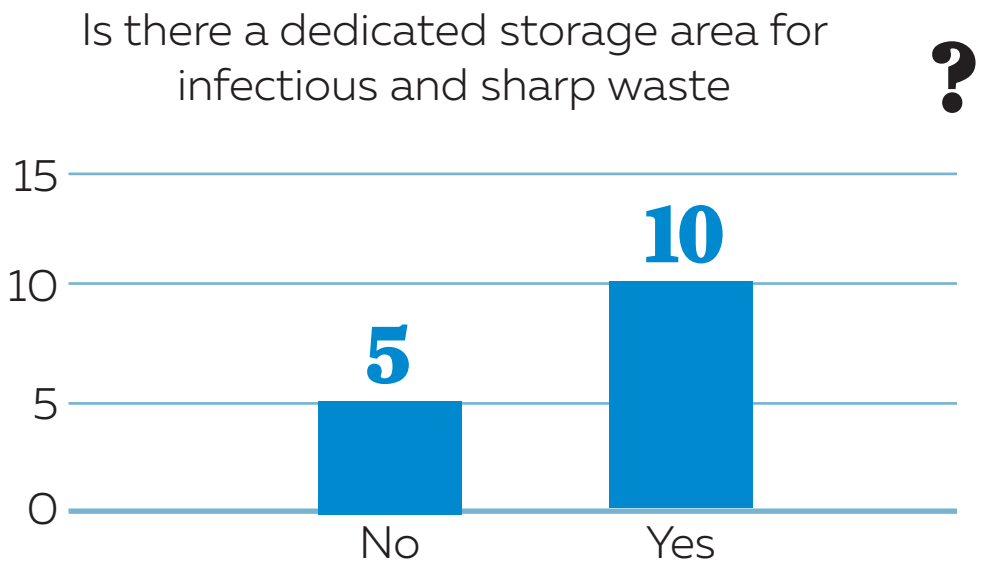
In general, separate waste storage areas should be available at least for non-hazardous Class A waste and infectious Class B waste.

Class A: Only 9 out of 15 institutions had dedicated storage areas for non-hazardous waste. It appeared that the availability of adequate Class A storage areas was mainly depending on the size of the hospital and the year of construction. The waste was stored in open container – in some places the containers were located in housing areas outside the hospital premises, posing risk to the public.

Class B: Only 10 out of 15 institutions had a specific storage room for infectious and sharp waste. 8 of the existing storage rooms seemed to be safe, as these were enclosed, ventilated and inaccessible to unauthorized persons..

TABLE 4

NUMBER OF AVAILABLE STORAGE AREAS FOR INFECTIOUS AND SHARP WASTE



As mentioned in Chapter 3.2 on the generation of waste, only 4 facilities were aware that they are generating Chemical waste (Class D) but only 1 is segregating and storing this kind of waste in a special area in the medicine storage room. Based on the experience of the international consultant all facilities are generating chemical waste like chemicals from the lab, mercury containing bulbs, thermometers, and sphygmomanometer – but only 1 out of 15 is collecting and storing these separately.

3.5. Treatment and Disposal

Treatment and disposal methods differs in terms of the kinds of waste generated. In the following the specific definitions of waste "treatment" and waste "disposal" in accordance with WHO guidance are given, as these are used in that form in this report.

WHO defines the treatment and disposal of waste as follows [5]:

- Treatment: Any method, technique or process for altering the biological, chemical, or physical characteristics of waste to reduce the hazards it presents and facilitate, or reduce the costs of, disposal. Examples are chemical disinfection, incineration, or composting.

- Disposal: Intentional burial, deposit, discharge, dumping, placing, or release of any waste material into or on any air, land, or water. Disposal is undertaken without the intention of retrieval. Examples are landfilling, encapsulation or burial in a pit.

In the assessed hospitals, non-hazardous waste **(Class A)** is collected by the municipality and disposed on the local dumpsite. The collection frequency differs from daily, twice a week or on demand.

The current SAN-PIN on Medical waste (under revision) calls for treatment of Class B infectious waste by chemical disinfection before disposal. This process is internationally considered as unsafe and is updated in the revised but not approved SAN-PIN. Due to this situation, 14 out of 15 facilities do not follow this procedure of pre-treatment by chemical disinfection – only 1 is still using this treatment method and is then disposing the waste together with Class A non-hazardous waste. Almost 50 % of the facilities (7 out of 15) are using their own one-chamber incinerator, 1 facility uses open burning for the treatment of infectious and sharp waste. The remaining ash from the 7 incinerators is disposed in an unlined pit on the premises of the hospitals. In 6 facilities specific companies are collecting the infectious Class B waste, which seems to be treated at the dumpsite and is then disposed on the dumpsite – specific information on the procedure outside of the hospitals is not available.

Like mentioned in chapter 3.1.2. pharmaceutical waste (Class D) is only segregated in 6 of the 15 hospitals. One of the 6 is either burning it in an oven or dispose it together with the non-hazardous waste. The remaining 5 facilities stated that this waste is collected by specialized companies. The further handling of the waster by the specialized companies is not known

3.6. Documentation, Recording and Financing

Although all hospitals had designated staff for the management of Medical Waste (HWO), there was no writing job description on the duties and task of this position available. Training certificates or training participation lists are not documented.

On the question of available written instructions or guidance on medical waste, 3 of 15 referred to the current SAN-PIN on Medical waste and 12 stated to have developed their own written instructions, which is linked to the order of the Ministry of Health and Social Protection of the Population No. 5, 428, No. 389 and No. 1119 (Resolution №1119 of 27.12.2014 "On strengthening measures to prevent nosocomial infections in health care facilities of the Republic of Tajikistan").

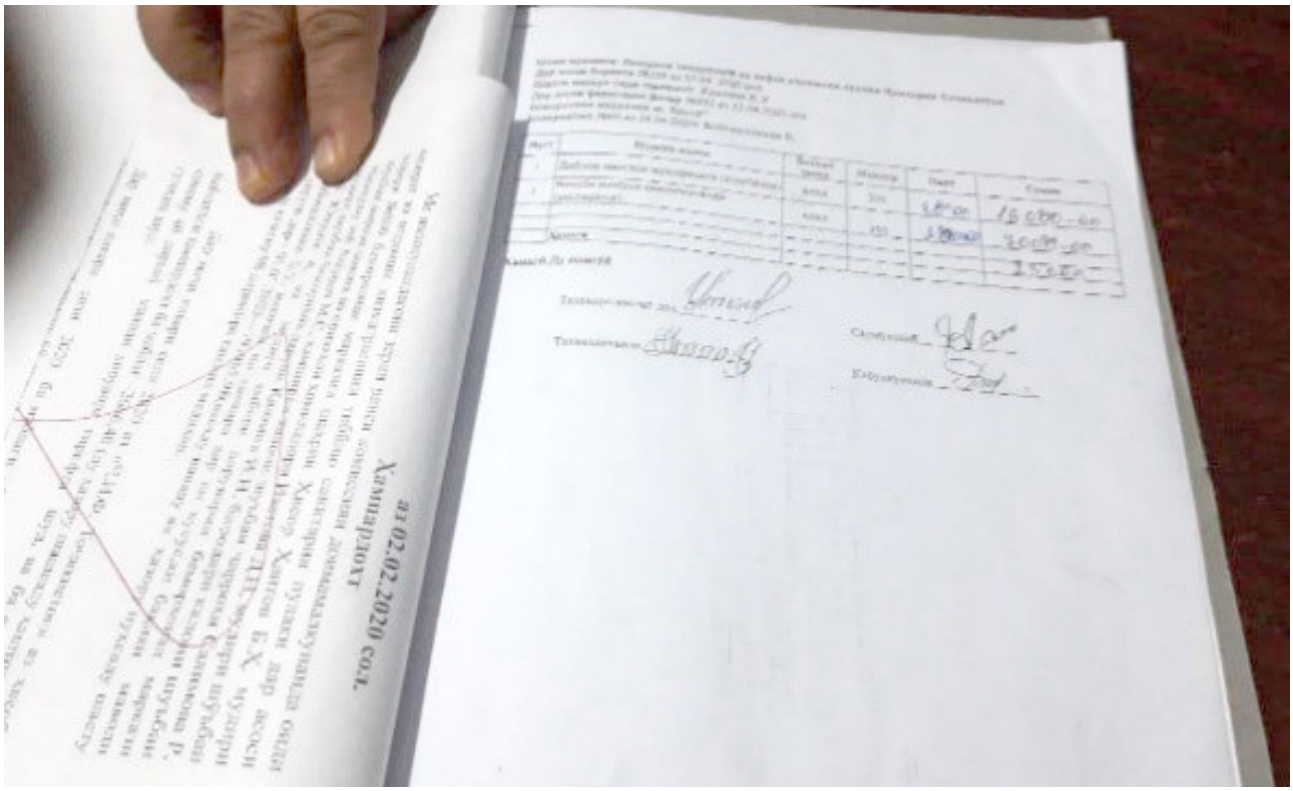


Photo 5: Central city hospital of the city of Gissar, overhead documents for obtaining PPE.

Most assessed facilities (13 out of 15) had records on the generated waste. However, the gathered information does not provide reliable data on the amounts of waste of the different classes. The available data base is not evaluated or further utilized to receive a deeper understanding on the fluctuation of waste amounts and needed waste treatment and disposal capacity.

All 15 facilities stated that there is a lack of budget to operate and maintain the waste management system in the hospitals in a safe manner. It needs to be mentioned that that most medical institutions can provide paid services based on Order No. 600.

COVID-19 specific waste management

4.1. Hospitals

4.1.1. Medical care of COVID-19 patients

Like outlined in Chapter 1.3, 12 out of 15 hospitals treated COVID-19 patients at the time of the survey. However, 1 hospital admitted patients during the first wave of the outbreak (April – June 2020) but are not taking patients at the time of the survey. 1 hospital did not admit any COVID-19 patients neither it conducted testing, as all cases are referred to another hospital.

Most hospitals are classifying waste from COVID-19 patients as highly infectious (Class C) but do not have any specific bins or bags for the segregation. Furthermore, the further handling including treatment and disposal is following the Class B waste procedures of the hospitals, like outlined in chapter 3.1.

4.1.2. Testing procedures

9 out of 15 hospitals conducted either Rapid Antigen Tests (RAT) or / and PCR tests. 7 facilities are conducting PCR tests and 6 facilities conduct RATs. The hospitals with available laboratories for PCR testing stated that the waste is classified as Class B infectious waste – but it was observed during the onsite visit, that no B-waste containers were available. The handling of such waste was similar with the infectious waste in the wards: either chlorination or incineration.

4.1.3. Instructions on COVID-19 waste handling

Almost all assessed hospitals are aware on the risk and harmfulness of waste that is generated as a result of testing patients or providing medical care to persons infected with SARS-CoV-2. Out of the 13 hospitals assessed, which are currently admitting COVID-19 patients or have admitted patients during the first COVID-19 wave, 12 stated to have specific guidelines for the classification and management of medical waste – 1 does not have any instructions.

10 out of 12 hospitals stated that they received written instruction on COVID-19 waste management from the MoHSP – 2 hospitals developed their own internal instructions.

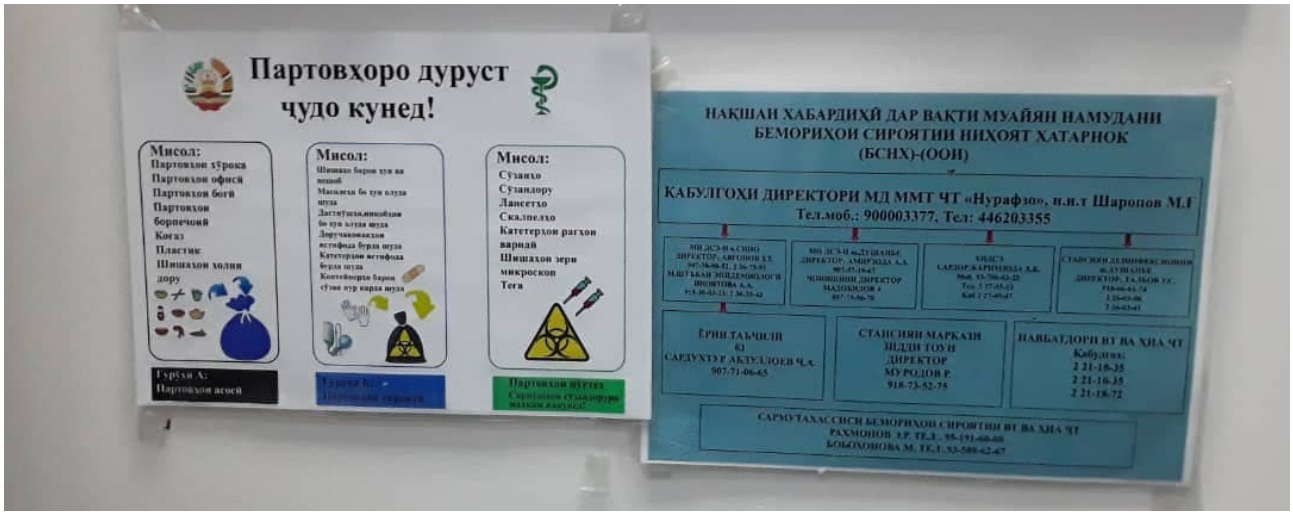


Photo 6: Dushanbe City Clinical Infectious Diseases Hospital, poster with instructions on the management of medical waste.

4.1.4. Generated waste amounts

All medical institutions stated the government assistance during the Covid-19 pandemic is continuously provided. Available information on received disposable PPE can be found in the annex. Additional assistance is provided locally from international organizations, individuals and NGOs. 4 out of 15 medical institutions could provide the exact amount of humanitarian aid and supplies from the MoHSP.

It can be assumed that the amount of waste is increasing due to the additional treatment of 17,205 patients on COVID-19 and pneumonia and the 11,261 Rapid and 11,685 PCR tests in 2020. Like outlined in chapter 1.4 the following waste might increase:

- **Class A:** non-hazardous waste like packaging material
- **Class B / C:** infectious and sharp waste like PPE, testing kits, swaps, intubation tube, food etc.
- **Class D:** Chemical waste (PCR cartridges)

Like outlined in chapter 3.1.2 the data on waste generation split into the different classes cannot be considered as reliable, therefore we asked the interviewees on their experience of the change in waste amounts of the different classes during the COVID-19 pandemic in their hospitals. 13 out of 15 hospitals provided information. These hospitals – including the one, which did not admit any COVID-19 patients or conduct COVID-19 test pointed out that the waste increased in 2020:

- **Class A:** estimated increase in average about 90 %
- **Class B:** estimated increase in average about 93%
- **Class C:** estimated increase in average about 97 %
- **Class D:** increase in 3 facilities but without any specific data

This would result in an allover increased waste generation of about 280 % - which seems to be very unlikely. Further research is needed.

Photo 7: Kulob city. Regional multidisciplinary clinical hospital named after A. Khaknazarov, a special tank for the collection of class B waste.

4.2. COVID-19 Tests in Laboratories

4 laboratories which do testing on COVID-19 have been assessed: 1 state owned and 3 private ones.

4.2.1. Responsibilities and Training

All 4 laboratories have a specialist who is personally responsible for the management of hazardous waste. In the state laboratory of SES, functions are divided between shifts and in each shift a responsible person has been assigned.

Responsible personnel in 3 out of 4 laboratories do not have special training and education on medical waste. It was highlighted that the trained MW experts from the one private lab are specially invited to conduct trainings on MWM to other labs and interested parties.

4.2.2. Waste management procedures

The classification of COVID-19 waste differs between public and private facilities: 1 lab is classifying all waste generated as Class B (infectious) and the others are separating Class A and B. All labs stated that no chemical waste Class D are generated.

State and private facilities are using different procedures of COVID-19 waste packaging, treatment and disposal:

- The SES State Laboratory places the generated COVID-19 waste in containers, then it is collected in a separate yellow bag, which is labelled, if bags are available. From here it is collected for burning at the National Center of Medicine Karabolo. The disposal method of the hazardous ash is not known by the lab workers.
- Private laboratories have not changed waste collection practices since the start of the pandemic. In all three private laboratories, infectious waste is placed into a plastic container (infectious waste) or sharp box (sharp waste) with disinfectant, then the box is sealed collected externally. The Unitary Enterprise of Housing and Communal Services are collecting the waste from 2 labs for treatment / disposal. The collection is irregular – either on demand or every 6 months. 1 lab is sending the waste to National Center of Medicine Karabolo, as the is located on their premises, for daily treatment: Chlorinated waste is burned.

2 of the 4 labs have designated and safe storage places for Class B infectious waste – the other 2 do not have any waste storage facility for Class B waste.

4.2.3. Documentation, recording and financing

The labs are following either the SAN-PIN on Medical waste or Order No. 5. Specific instructions for the management of COVID-19 waste are only available at the SES owned lab. 2 private labs stated that the waste amounts are recorded by type – the others don't.

1 private lab has information poster on waste segregation:

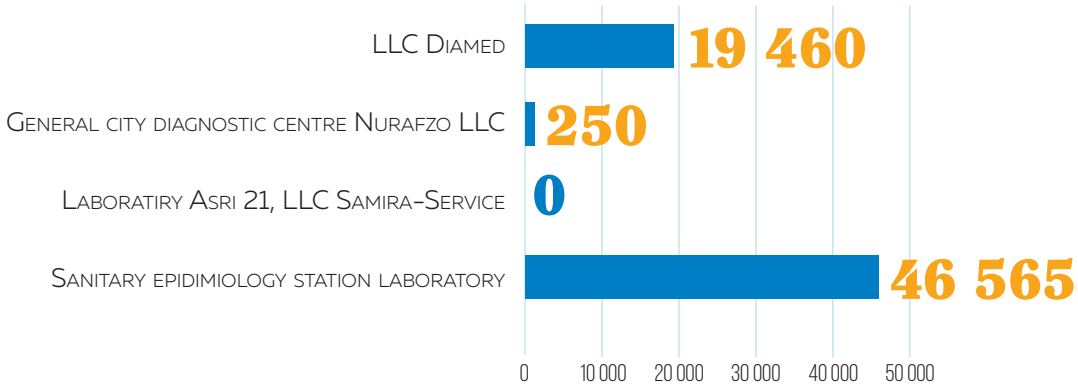
All 3 private labs allocate annual budget for waste management - including the collection, treatment, and disposal of waste by external companies. The state owned one does not have a specific budget line – the waste in incinerated for free in another public facility – other costs like waste bags and sharp container are not considered in the budget.

4.2.4. Waste generation related to COVID-19 testing

3 of the 4 laboratories are conducting PCR tests. 1 private lab is conducting only RATs and no PCR tests. At the time of this assessment the labs reported to have conducted 66,275 PCR tests (within 11 months: Jan-Dec 2020). It must be considered that the data provided by Diamed laboratory is available from June to November 2020 (6 months), as before the data was not separately collected by type of analysis. The state laboratory of the SES conducts PCR diagnosis for referrals of local clinics for free. They do also external PCR tests, which are is relatively inexpensive, and therefore the public is making increasing use of it. The 3 private laboratories conducted RATs in 11 months of 2020.

TABLE 5

Number of pcr tests in the assessed laboratories in 11 months of 2020



Based on the expected waste generated by COVID-19 testing outlined in chapter 1.4, it can be assumed that the following additional waste was generated in the labs:

- **Class A:** non-hazardous waste like packaging material
- **Class B / C:** infectious and sharp waste like PPE, testing kits, buffer solution, pipettes etc.
- **Class D:** Chemical waste (PCR cartridges)

Conclusions

Based on the assessment results areas of improvement and missing links have been identified. Although this project is focusing on waste management related to COVID-19, the general waste management in the assessed facilities must be considered, as the waste management is a holistic system, and the COVID-19 waste is flowing into the standard waste procedures of the facilities.

5.1. COVID-19 related waste procedures

The main areas identified for improvement include: :

A) Information, Awareness and Knowledge

B) Equipment and Infrastructure

C) Data management and documentation

A) Information, Awareness and Knowledge

The SAN-PIN on medical waste is the core document for the waste handler. This document is under revision. Currently manual chemical disinfection is still a valid methodology waste in the SAN-PIN to treat infectious. Therefore, some facilities still use manual chemical disinfection before disposal, although this is not considered as a safe decontamination process for infectious waste like stated in WHO guidance:

Chemical treatment of solid infectious waste is potentially problematic due to the variability of chemical efficacy based upon load characteristics and the generation of toxic liquid waste. The speed and efficiency of chemical decontamination depends on operational conditions, including the type of chemical disinfectant used, its concentration, the contact time between the disinfectant and the waste, the extent of contact, the organic load of the waste, operating temperature, and factors that may affect the efficacy of the disinfectant such as humidity and pH. Manual systems using chemical disinfection are not regarded as a reliable method for the treatment of waste. [5]

Furthermore, the classes of waste are not clearly distinguished in the current SAN-PIN. The difference between Class B infectious and Class C extremely infectious waste is not clearly defined, therefore no standard segregation procedures are applied in the facilities and the difference between Class B and C waste is defined internally. The SAN-PIN on Medical Waste need to be finalized and approved as soon as possible.

The same situation applies for chemical waste. The waste generators are not knowledgeable on the definition of chemical waste and the related classification, packaging, storage and treatment / disposal options. To improve this situation, a national chemical waste system including treatment and disposal should be established. As the chemical waste amounts generated by the health system are comparatively small, it is recommended to insert this waste stream into the national level chemical management system.

All facilities have one or two appointed responsible persons for medical waste management.

However, specific training, clear duties and responsibilities are not formally defined. WHO is calling the person a "Healthcare Waste Officer" [5]. These persons should be certificated and the training including refresher training should institutionalized in the designed educational facilities. In accordance with WHO the head should appoint a waste management officer who will have overall responsibility for developing a facility-based medical waste management plan, and for the day-to-day operation and monitoring of the waste management system. In Tajikistan this would be in the most cases the "Head Nurse" for the internal management. In Tajikistan responsible persons would be in the most cases the "Head Nurse" for the management of waste inside the health facility and the "Chief Engineer" for the management of waste outside the hospital building including storage, treatment and disposal.

The waste management officers should be part of the infection prevention and control or WASH team of the health facility. Regular training and sufficient staffing are fundamental to improving and maintaining medical waste management in HCFs. It should be closely developed and delivered in tandem with training on infection prevention and control.

The SARS-CoV-2 Virus is a new infectious agent. Therefore, the specific management of COVID-19 waste need to be defined and standardized. Clear and standardized instructions on COVID-19 waste are needed to establish a safe system during the pandemic situation. These should be provided by MoHSP, distributed to all health facilities and enforced by SES.

It is recommended to follow the WHO guidance on handling COVID-19 waste like outlined in the interim guidance "Water, sanitation, hygiene, and waste management for SARS-CoV-2, the virus that causes COVID-19" issued on the 29 July 2020[2] :

"Best practices for safely managing health-care waste should be followed, including assigning responsibility and sufficient human and material resources to segregate, recycle and dispose of waste safely. There is no evidence that direct, unprotected human contact during the handling of health-care waste has resulted in the transmission of the COVID-19 virus. Health care waste generated from facilities treating COVID19. Patients is no different than waste coming from facilities without COVID-19 patients. Additional treatment or disinfection beyond existing safe waste management recommendations are not needed."

WHO is classifying COVID-19 waste from infected patients as infectious and not "highly" infectious waste and calls to enforce standard waste management procedures in hospitals using the standard segregation scheme for waste generated by COVID-19 activities:

I. Non-hazardous waste e.g. packing, food waste, disposable hand drying towels

II. Infectious waste from confirmed COVID-19 cases like bandages, intubation tubes, PPE, etc as well COVID-19 Rapid Antigen Tests and related PPE.

III. Sharp Waste like hypodermic, intravenous or other needles; auto-disable syringes; syringes with attached needles

2 https://www.who.int/publications/i/item/WHO-2019-nCoV–IPC-WASH-2020.4

IV. Pathological (infectious) waste like human tissues, organs or fluids; body parts; foetuses; unused blood products

In laboratories additional highly infectious waste and chemical waste might be generated:

- Highly infectious waste such as laboratory cultures and microbiological stocks related to COVID-19. This waste needs to be pretreated at the place of generation by e.g. autoclaving before it is inserted into the standard waste system of the labs (normal infectious waste).
- Chemical waste like GTC containing cartridges.

B) Equipment and Infrastructure

The assessment showed that shortages of waste equipment and disposables like waste bags, sharp container, PPE and waste segregation poster is experienced in most public facilities. Color coding of bags to ease the segregation at the source is not available. This poses an additional risk to the staff, patients and visitors. Reliable procurement of sufficient waste disposables is essential for a safe waste management system in health facilities. To establish a sustainable MWM system a clear and annual available financing system need to be established.

Some assessed facilities were lacking separate and safe storage of non-hazardous Class A and infectious Class B waste. Some facilities used the public housing area outside the facility for storage before it is collected. General non-hazardous waste should be stored and kept for collection to the communal landfill/dumpsite or communal waste incinerator. It should be collected at least every week. The storage area should be enclosed, paved and connected to a public road. The infectious and sharp waste storage place must be identifiable as an infectious waste area by using the biohazard symbol. Floors and walls should be sealed or tiled to allow easy cleaning and disinfection. Storage times for infectious waste (e.g. the time gap between generation and treatment) should not exceed the following periods: 72 hours in winter/48 hours in summer.

Another issue is the unsafe treatment of waste by low temperature incinerators or open burning and the disposal of the ash in unsecured pits. Burning of waste with low temperature release a wide variety of pollutants, including dioxins and furans, into the atmosphere. Pollutants vary according to the composition of the waste. Bottom ash residues are also generally contaminated with dioxins, leachable organic compounds, and heavy metals and have to be treated as hazardous waste. The ash should be disposed in the ground in safe ash pits, which are enclosed without the risk pollute the soil or the water sources. In accordance with the Basel Convention, it is recommended that waste treatment techniques which minimize the formation and release of chemicals or hazardous emissions should be given priority. In general, the decontamination of infectious and sharp waste by steam (e.g. by autoclaving) or other non-burn technology should preferably be used in the treatment of infectious waste. Incineration of waste should follow the requirements of the Stockholm Convention.

Stockholm Convention: Best available technology should be used to achieve an emission of lower than 0 .1 ng toxic equivalents (TEQ)/m³ of dioxins and furans. It is stated that primary measures for incinerators are two burning chambers (850°C/1100°C), auxiliary burner, 2 seconds' residence time of air in the second chamber, sufficient oxygen content, and high turbulence of exhaust gases. The primary measures described here should be a minimum standard.

C) Data Management and Documentation

Hospitals are recording the generated waste amounts. The evaluation of the gathered data from the hospitals showed that the data are not or only partly separated by waste classes and are neither consistent nor reliable. It is recommended to establish a national wide waste recoding and documentation system at least for infectious and sharp waste. The process of waste assessment provides an opportunity to improve current practices, sensitize health workers about waste, and determine the potential for waste minimization. Implementing rigorous segregation can avoid over-sizing of equipment and result in cost savings. The data should be collected and evaluated on national level.

An approach to calculate the additional waste generation during the COVID-19 pandemic by using the data of the additional PPE and disposables provided by the MoHSP and other organizations, to calculate the theoretic mass / volume of the generated waste by the input-output methodology.

5.2. Health and Environmental Impacts

Hazards and Risks associated with MW and the related environmental health impacts that need to be controlled. In 2004, WHO commissioned a screening-level health risk assessment for exposure to dioxins and furans from small-scale incinerators. The study found that the expected practice with small-scale incinerators resulted in unacceptable cancer risks under medium usage (two hours per week) or higher. Flue gases from low temperature waste incinerators may have an impact on people living and working close to a treatment site.

The health risk is most serious where an incinerator is improperly operated or poorly maintained. If poorly controlled, emissions from waste incinerators may cause health concern from particulates (associated with increased cardiovascular and respiratory mortality and morbidity); volatile metals, such as mercury and cadmium (associated with damage to the immune system, neurological system, lungs and kidneys); and dioxins, furans and polycyclic aromatic hydrocarbons (which are known carcinogens but may also cause other serious health effects) [5]. Incinerator ash may contain elevated concentrations of heavy metals and other toxic items, and the ash provides ideal conditions for the synthesis of dioxins and furans, because it is often exposed for a long time to a temperature range of 200–450 °C [5].

The presence of incinerators on the premises of a hospital or other health facility should be planned or calculated by the environmental authorities based on the dispersion coefficient. The calculation should consider the indicators of the "wind rose" (wind diagram).

The manual decontamination of infectious waste by chlorine-based solutions is still practiced in Tajikistan – not at least as it is still a requirement in the SAN-PIN on Medical waste. Like mentioned this procedure is not considered as a safe method to decontaminate waste but is also poses a risk to the health and environment. Disinfectants are often hazardous and toxic, and many are harmful to skin and mucous membranes. However, chlorine can cause pollution through reacting with organic chemicals in liquid wastes to create toxic organochlorines. If materials such as infected plastics have been soaked in chlorine before incineration, the amounts of chlorinated dioxins and furans produced will be elevated.

Numerous nucleic acid amplification preparation protocols and commercial products, including PCR assays for S HIV, HCV, SARS-CoV-2 and others, use Guanidinium Thiocyanate (GTC) to facilitate extraction of DNA and RNA from cells and prevent nucleic acid destruction by enzymes. If present, GTC is either pre-sealed inside the PCR cartridge or is present in an external reagent vial (lysis buffer) to be added to the patient sample for loading into the cartridge. GTC is considered as a hazardous chemical and need to be handled as such. This waste need be treated in a high temperature incinerator to ensure that no hydrogen cyanide (HCN) gas is generated. HCN is a rapid-acting lethal agent that inhibits aerobic respiration at the cellular level, preventing cells from utilizing oxygen.

Photo 8: National Medical Center "Shifobakhsh", incinerator on the territory of a medical institution.

Photo 9: National Medical Center "Shifobakhsh", a place where ash after incineration of medical waste is stored.

Recommendations

6.1. General Recommendations

Based on the assessment results, the following general recommendations have been elaborated to improve the medical waste management system in Tajikistan:

1 Improvement of the Legal framework on MWM

a. Finalization and approval of the SAN-PIN on Medical Waste (considering the requirements of international Conventions, WHO guidance and emergency situations).

b. Providing instruction on the management of COVID-19 waste, train medical staff and enforcement of the instructions.

c. Providing clear and detailed instructions or SOPs for each waste class: Segregation, collection, internal transport, storage, treatment, and disposal.

d. Elaborating of a national Medical Waste Management Strategy (e.g. for 5 years).

2 Development of contingency plans for pandemic and epidemic situation which considers MWM

3 Establishing of a sustainable financing system for Medical Waste Management for primary, secondary and tertiary medical services. The system should consider the involvement of the private sector. The following performances could be included in a performance-based financing system / per capita financing:

a. Waste segregated in different classes and adequate bins and bags are available.

b. Hazardous and non-hazardous waste is stored separately in safe storage places not accessible to the public.

c. Non-hazardous waste is safely and regularly collected and disposed.

d. Hazardous waste is treated and disposed adequate, safe and environmentally friendly.

4 Institutionalizing of education and training on MWM in medical universities and medical schools for the medical staff and establish a "HWO" system including a certification system..

a. All medical staff should be knowledgeable on the correct handling of waste generated in medical facilities. This knowledge should be provided as part of the courses on infection control.

b. The HWO should be part of the infection prevention and control or WASH team of the health facility. Regular training and sufficient staffing are fundamental to improving and maintaining MWM services in health-care facilities. It should be closely developed and delivered in tandem with training on infection prevention and control. Specific training should be provided to the HWOs including a certification system – regular refresher training should be mandatory.

5 Setting up of a mandatory quantitative documentation of hazardous waste (in kg) for each medical institution, including the evaluation of the data by the Agency on Statistics (approval is required at the level of the Agency on Statistics under the President of the Republic of Tajikistan and the Committee for Environmental Protection under the Government Republic of Tajikistan). Keeping quantitative records, will help to obtain information on the volume of hazardous waste generation in the Republic of Tajikistan, improve the monitoring system in this area, as well as keep records of the generation of greenhouse gases in the country (pursuant to the laws of the RT "On Environmental Monitoring" and the Framework Convention UN "On Climate Change)."

6 Establishing of a Chemical Waste Management system on national level and insert chemical waste from medical facilities into this system.

Photo 10: National Medical Center "Shifobakhsh", a poster with information on the separation of waste by classes in accordance with the current SanPiN.

6.2. Further support of international partner

6.2.1. UNDP Tajikistan

The activities of the UNDP project on medical waste management, can be divided in short and midterm phases. The aim is to provide assistance to the MoHSP to improve the safe and environmental sound management of medical waste in the country – with focus on COVID-19 waste.

Short term (2021)

- Provide input to the revised SAN-PIN on MWM: additional chapters on waste generated during vaccinations and emergency situations.
- Calculation / recording of generated waste amounts related to COVID-19 activities.
- Capacity Development
  - **Development of training materials and tools based on BAT and BEP (Stockholm convention and WHO guidance)**
  - **Provide training on MWM related to COVID-19 (>=500 health workers)**
- Develop specific Policy Briefs on MWM related to pandemic situations.
- Planning on MWM equipment and infrastructure
  - **Identifying of needed MWM equipment and infrastructure for target facilities**
  - **Development of specifications in accordance with international conventions (BAT)**
  - **Construction of needed infrastructure**
  - **Initiation of the Procurement Process**

Possible mid-term activities (2022)

- Extension of project activities:
  - **Construction of necessary MWM infrastructure**
  - **Procurement and commissioning of equipment including training on the job**
  - **Ongoing training and refresher training**
  - **Providing further support to other health facilities and laboratories on BATs**
- Support of the government to institutionalise the training on HCWM
  - **Inserting of HCWM in the curricula of medical schools, medical universities and Qualification Institute**
  - **Establishment of a „Healthcare Waste Officer" System in the country (including certifications and regular refresher trainings)**

6.2.2. Possible entry points for international partner

It is recommended to establish a standard coordination and streamlining platform of MWM activities conducted by different organizations like:

- **UNDP:** Addressing COVID-19 environmental hazards through improving Medical Waste Management in Tajikistan
- **WHO:** Supported MoH to revise the SANPIN on MWM (2019 – ongoing process) and MWM project related to COVID-19 in collaboration with JICA
- **KfW:** MCH support in Khatlon Oblast and support of TB-Machiton Hospital in collaboration with MSF

Support of the Government to develop:

- A Crisis management system on national and regional / district level.
- Long term COVID-19 country preparedness and response plan based on the current one approved in March 2020.
- Emergency Preparedness strategy for different epidemic / pandemic scenarios.
- Conduct onsite emergency exercises / drills on specific pandemic / epidemic situations.
- Support the government to establish a sustainable recording and financing system on MWM
- Support the government to establish a national chemical waste management system.
- Support of the government to institutionalize the training on MWM to
  - **Insert state of the art MWM in the curricula of medical schools, medical universities, and Qualification Institute.**
  - **Establish a „Healthcare Waste Officer" System in the country (including certifications and regular refresher trainings).**
- Support the government to develop a sustainable national MWM financing system.

6.3. Way forward

The following activities will be followed up in the first half of the year (2021):

1. Stakeholder workshop to present the findings of the assessment (February)

2. Supporting the finalization of the SAN-PIN revision by providing input on MWM during vaccinations and emergency situations (Jan – February)

- Providing input on a new chapter on waste from vaccination activities including planning (Evaluate current capacity, Selection of MW methods, development of vaccination waste strategy) and implementation.
- Providing input on a new chapter on waste management during outbreaks, which calls for the development of a national emergency plan for preparedness, response and recovery specific on MWM during an outbreak and outlines the steps to plan and implement such a plan. The chapter should include the classification of pathogens in Risk Groups (1-4) in accordance with international guidance and considers also examples of classification of pathogens regarding the Risk Group and Rout of transmission.

3. Development of a training concept on MWM and setting up of MWM trainings in the project hospitals (April). The concept will be elaborated by the NGO Peshsaf in close collaboration with the international waste expert and will be based on national and international guidance. It is envisaged to train more than 500 medical workers and waste workers. All assessed target facilities will be included in the training. Duration of training is 3 hours for each facility. Training topics include:

1. Risks related to MWM
2. Legal background on Medical waste (SAN-PIN)
3. General rules for waste segregation and collection in medical units
4. General requirements for on treatment and disposal of waste
5. Specific COVID-19 waste management considerations

4. Environmental protection. Organization of disinfection of waste and reusable equipment.

5. Development of Policy Briefs on MWM (May) like:

- Standard procedures on the segregation, collection, transport, storage, treatment and disposal of infectious and sharp waste in medical facilities.
- COVID-19 waste management procedures in medical facilities

6. Planning on waste equipment and infrastructure support (April - June) in collaboration with the MoHSP and the financial possibilities of the project like providing of disposables and waste treatment equipment based on international requirements (BAT).

Photo 11: State institution. Medical center named after Akhmedov #1 in Dushanbe. Safety box for sharp instruments of classes B and C

Photo 12: State central institution "Istiklol", interview with hospital medical staff during the study

Annexes

7.1. Bibliography

International documents

1. Basel Convention: Technical Guideline on environmentally sound management of bio-medical and healthcare waste; UNDP 2003
2. European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), EU / UNECE 1957
3. Minamata Convention on Mercury; UNEP 2013
4. Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; UNEP 2004
5. Safe Management of wastes from health-care activities; WHO 2014
6. Stockholm Convention on Persistent Organic Pollutions (POPs); UNEP 2004
7. Vienna Convention for the protection of the Ozone Layer and its Montreal Protocol on substances that deplete the Ozone Layer; UNEP 2009

National Documents

8. Comprehensive Multi Year Plan 2011-2015 (Immunization), 2010
9. Law on Production and Consumption Waste No. 44
10. National Guideline for Tuberculosis infection control in Tajikistan, 2009
11. Plan for introduction of inactivated polio vaccine into the national immunization program in Tajikistan, 2014
12. Regulation on the procedure of safe drug destruction No. 370
13. Rules of collection, storage and disposal of health facility wastes – Sanitary Regulations and Norms No 5, 2.1.7.020, 2009
14. TAJIKISTAN COVID-19 COUNTRY PREPAREDNESS AND RESPONSE PLAN (approved by MoH in March 2020)

7.2. Microorganisms Group 1 to 4 (in accordance with the regulation of Tajikistan)

Class 1 – non pathogen
Escherichia coli, Lactobacilli.

Class 2
Viral hepatitis, Flue-A, Laima disease, Salmonella, Measles, HIV.

Class 3
TB, Anthrax, Western Nile virus, Yellow fewer.

Class 4
Marburg Virus, Ebola Virus, Lassa Virus, Pox, Plague.

7.3. Questionnaire Health Facilities

QUESTIONNAIRE

"Assessment of the potential of medical and preventive organizations (MPO) in the field of medical waste management"

Hello, my name is _____. I work for a UNDP project on medical waste management during the COVID-19 pandemic. Your answers will help the MoHSP develop a medical waste disposal system. We guarantee the anonymity and confidentiality of your answers. No data about you will be disclosed, and the results of the assessment will be presented in a special form without specifying addresses and names. The interview consists of two parts:

1. **General information through oral interviews, and**
2. **Direct inspection of the institution.**

General information

1. Date of interview _____
2. Name: _____
3. Position: _____
4. Gender: Female ☐ Male ☐
5. Oblast/District/City: _____
6. Medical institution name: _____
7. Institution type:
   - 7.1. Central Hospital/Polyclinic ☐
   - 7.2. Specialized hospital ☐
   - 7.3. Regional Hospital/Polyclinic ☐
   - 7.4. District Hospital/Polyclinic ☐
   - 7.5. PHC /Medical center/Paramedic ☐
   - 7.6. Other: ☐

8. Number of beds: 8.1. Total number of beds: _____

8.2. Annual rates of bed fund use: (% of the total number of beds)
_____

9. Number of inpatients: _____/ year

Responsibilities/Documentation/Training:

10. Is there a designated employee for the disposal of medical waste at your institution? Yes ☐ No ☐

10.1. If yes: This employee's title _____

11. Has this employee received specialized training in medical waste management? Yes ☐ No ☐

12. Is there a regular training program on waste management approaches for medical personnel (doctors, nurses)? Yes ☐ No ☐

13. Is there a regular training program on waste management approaches for technical (support) personnel (equipment maintenance engineers, technicians, cleaners, crematorium workers, etc.)? Yes ☐ No ☐

13.1. If yes, who is being trained _____ (position)

14. What document regulates waste disposal in your institution?

14.1. No document ◻

14.2. Sanitary rules, norms ◻

14.3. Separate written instructions ◻

14.4. Other _____

15. Do you keep records of the volumes of different categories of medical waste? Yes ◻ No ◻

15.1 If yes, please provide information (photos of acts)

16. Do you have an adequate budget for waste disposal? Yes ◻ No ◻

Medical waste categories:

16. Types of hazardous waste that are collected separately at your institution (multiple answer possible)

16.1. General waste (A) ◻

16.2. Stabbing/Syringes (B) ◻

16.3. Infectious waste (B) ◻

16.4. Pathological waste (B) ◻

16.5. Hazardous infectious waste (C) ◻

16.6. Chemical wastes (D) ◻

16.7. Pharmaceutical waste (D) ◻

COVID-19 Waste Disposal Procedures:

17. Is testing for COVID-19 conducted at your institution? Yes ◻ No ◻

17.1. If yes, what tests:

17.1.1. Express tests ◻

17.1.2. PCR tests (in laboratories) ◻

17.2. If yes, how many COVID-19 tests were conducted in 2020?

17.2.1. Express tests _____

17.2.2. PCR tests _____

17.3. If yes, are there procedures for waste classification/management of such testing? Yes ◻ No ◻

17.3.1. If yes, are there separate formal procedures? Yes ◻ No ◻

17.3.2. If yes, please describe **what types of waste** are collected and how the subsequent disposal takes place (express tests, testing equipment, samples, PPE, etc.):

PCR tests (samples, cartridges for PCR equipment such as GenExpert, etc.)

18. **Does the hospital accept COVID-19 patients?**

Yes □ No □

18.1. If so, how many COVID-19 patients were treated in 2020? _____

18.2. If yes, are there procedures for the classification / management of waste obtained during testing:

Yes □ No □

18.3. If there are special procedures, they are:

18.3.1. provided by the MoHSP □

18.3.2. internal □

18.4. If procedures have been specifically developed, please describe the specific disposal of waste generated from PCR **tests**, such as needles/syringes, PPE, samples, PCR cartridges (classification, special waste handling, treatment/disposal):

18.5. If there are special procedures, please describe the specific ways of handling waste generated during the treatment of patients with COVID-19, e.g. needles/syringes, PPE, blood-contaminated tissue, droppers, tubes (classification, waste management, treatment/disposal) :

19. Did you receive additional PPE, etc. as part of measures to prevent COVID-19? Yes □ No □

19.1. If yes, please indicate what types and quantities (photo of the transfer)

№	Name	Quantity
19.1.1	Masks	
19.1.2	Disposable suits	
19.1.3	Reusable suits	
19.1.4	Gloves	
19.1.5	Protective glasses	

20. Has the volume of waste increased during the pandemic? Yes □ No □

20.1. If yes, what categories of waste have increased?

20.1.1. A (general) □

20.1.2. B (infectious / stabbing) □

20.1.3. C (dangerous infectious) □

20.1.4. D (chemical, pharmaceutical) □

20.2. If yes, please indicate the amount of increase in waste (in percent)?

20.2.1. A____%

20.2.2. B____%

20.2.3. C____%

20.2.4. D____%

Waste collection / transportation:

21. Do you use color coding for waste separation in your healthcare institution? Yes □ No □

22. Do you use textual guidelines to segregate waste in your healthcare institution (e.g. waste category is indicated on bins)? Yes □ No □

23. Have you posted posters on the walls indicating the need for waste segregation to raise awareness of health care waste management? Yes □ No □

24. Do you use plastic waste collection bags: Yes □ No □

24.1. If yes, do you have enough plastic bags? Yes □ No □

24.2. Do you have enough containers for sharp objects? Yes □ No □

Waste storage

25. Is there a dedicated storage area for non-hazardous waste **(Class A)**? Yes □ No □

25.1. If yes: how safe is the storage space (have special waste containers, fences, etc.)?

Safe □ Not safe□

25.2. Is there a dedicated storage area for infectious and stabbing waste **(Class B)**?

Yes □ No □

25.3. If yes: how safe is the storage space (dedicated, tiled, ventilated, specially marked)?
Safe □ Not safe□

26. Is there a dedicated storage facility for chemical waste **(Class D)**? Yes □ No □

26.1. If yes: how safe is the storage space (special room, tiled, ventilated, specially marked)?
Safe □ Not safe□

27. Is there a dedicated storage facility for pharmaceutical waste **(Class D)**? Yes □ No □

Treatment and disposal

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28. How often general waste is collected **(Class A)**? Yes □ No □

28.1. If yes - how often:

28.1.1. Daily □

28.1.2. Weekly □

28.1.3. Monthly □

28.1.4. As needed □

28.1.5. Other: _____

28.2. How general waste is disposed of:

29.2.1. Garbage open pit □

29.2.2. Closed pit (underground) □

29.2.3. Burned in an open pit and disposed of □

30. How class B waste is disposed of?

30.1. Disposed of as general waste □

30.2. Collected by a special company □

30.3. Other _____

31. Is chemical disinfection (chlorination) carried out to decontaminate infectious and sharp waste? Yes □ No □

32. Is Class B waste incineration practiced? Yes □ No □

32.1 If yes, then:

32.1.1. Burned over an open fire □

32.1.2. There is a combustion chamber □

32.1.3. Single chamber combustion system - production date _____ □

32.1.4. Dual chamber combustion system - production date _____ □

33. What happens to the ash?

33.1. Buried in the ground □

33.2. Disposed of in general waste □

33.3. Collected separately and given to a special company □

33.4. Other _____

34. Is there an autoclave and/or a microwave oven for disposal? Yes ☐ No ☐
    34.1. Brand _____
    34.2. Size (liters) _____
    34.3. Production date _____
35. How is chemical waste disposed / treated?
    35.1. not applicable (no chemical waste) ☐
    35.2. Liquids: draining to the sewer system ☐
    35.3. solid waste: disposed of with Class A waste ☐
    35.4. Collection from the company? (Company name _____) ☐
    35.5. Other _____
36. How is pharmaceutical waste disposed/treated?
    36.1. not applicable (no pharmaceutical waste) ☐
    36.2. Together with Class A waste ☐
    36.3. Burn ☐
    36.4. Collection from another institution/company/MoHSP ☐
    36.5. Other _____

Future needs - existing infrastructure / communications

In case of additional support in the form of hazardous waste management equipment from UNDP, it is important to obtain the following information:

37. Is there a special place for placing waste neutralization equipment (e.g. crematorium / autoclave): Yes ☐ No ☐
38. Is there an uninterruptible power supply (there are cases of power outages)? Yes ☐ No ☐
39. Is there a source of uninterrupted water supply? Yes ☐ No ☐
40. Types of fuel available:
    40.1. Diesel ☐
    40.2. Gas ☐
    40.3. Biomass ☐
    40.4. No ☐
    40.5. Other_____
41. Are there sufficient funds for self-management of waste? Yes ☐ No ☐
42. What is the tallest building near a health institution? ____ meters
43. What is the groundwater level? _____ meters

Suggestions and comments

7.4. Additional PPE supply for the COVID-19 response provided by MoHSP to pilot hospitals in 2020

14 out of 15 hospitals provided data on the COVID-19 response disposable PPE supply provided by the MoHSP:

Kind of PPE	Pieces
Face shield, medical-insulated disposable face shields (anti-fogging); Material: PET + sponge; Product size: 0.2 * 310 * 230mm; Product weight: 27g	202,420
Mask, medical, Disposable surgical mask, Type: Flat ear mask, Mask size: 17.5 * 9.5cm, 3-layer protection, effective isolation, Bacteria filtration efficiency ≧ 95%	420,000
Disposable gloves	82,510
N95-grade aerosol respirator, N95 professional face shield (or equivalent)	81,190
Disposable isolation gown (non-sterile), Fabric: SMS non-woven fabric, Purpose: waterproof and dustproof, anti-epidemic barrier, Application: can be used in outpatient settings, ward, laboratory, and other non-sterile places in medical institutions	23,300
Disposable. protective special clothes 1 st.	3,530
Protective clothing with a hood (Overalls of the 2nd degree, for the red zone)	13,500
Insulation robe	1,050