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COURSE “HEALTH SERVICE WASTE MANAGEMENT”

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ABOUT THE COURSE

In the hospital environment, the waste produced is high and can pose serious risks. Improper disposal increases operating costs and puts the health of workers and the population at risk and directly impacts the environment. The course aims to train health professionals in the correct management of health waste, promoting the adoption of appropriate and safe practices for health and the environment.

MODULES

- ✓ MODULE I - Introduction and concepts
- ✓ MODULE II - Health Services Waste Classification
- ✓ MODULE III - Health Services Waste Management and Health Services Waste Program
- ✓ MODULE IV - The Biosecurity in the Health Services Waste

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MODULE I

Waste from health services is an important part of total urban solid waste, not necessarily because of the amount generated, but because of the potential risk, they pose to health and the environment.



MODULE II

The benefit of correctly classifying waste from health services is to enable its correct handling by the generators, without posing risks to workers, collective health, and the environment.



MODULE III

In the Health Services Waste Management Program, actions are established for the correct management of waste from all services related to health care.



MODULE IV

The adoption of Biosafety norms in health work is fundamental for the safety of workers, whatever their area of activity because risks are always present.



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Presentation of the Health Services Waste Management Course, available on the Edmodo Platform, through the address: new.edmodo.com

PRESENTATION

Welcome to the course "**MANAGING HEALTH SERVICES WASTE**".

- **TEACHING PLAN** - The course is organized into four modules that will be carried out at a distance in this digital learning environment. They are: MODULE I - Introduction and concepts of health services waste (HSW); MODULE II - Classification of HSW; MODULE III - Management of HSW and Health Services Waste Management Program (HSWMP); MODULE IV - Biosafety in HSW.
- **CREDIT HOUR** - 40h
- **AUDIENCE** - Estudantes e/ou profissionais da área da saúde.
- **SYLLABUS / PROGRAM CONTENT** - Introduction and concepts about HSW, HSW Classification, HSW Management, HSWMP and Biosafety in HSW.

SKILLS AND COMPETENCES:

- **GOALS:** Train students and/or health professionals to think about good HSW management; Train students and/or health professionals to carry out good HSW management.
- **PEDAGOGIC RESOURCES:** Edmodo (web access or via APP (application)). Broadband internet access. Scientific articles. E-books in PDF.

HEALTH SERVICE WASTE MANAGEMENT

MODULE I

➤ INTRODUCTION AND CONCEPTS:

In health services, the waste produced is exorbitant and poses serious risks to the environment. In this sense, one of the problems that has deserved special attention is the way in which these residues are being segregated and their final destination, because when they are not handled and disposed of correctly, they increase operational costs and put the health of the worker and the community at risk. According to Salomão et al (2008), the main objective of segregation is to create an organizational culture of safety that minimizes waste and reduces the amount of infectious waste produced.

In this sense, one of the problems that has deserved special attention is the generation of waste by the various activities developed in health care spaces. Currently the final destination of waste is a major challenge to be faced, especially for managers. In order to avoid problems related to the generation of waste that is harmful to the health of the population and contamination of the environment, organizations must adopt adequate disposal policies and risk management.

In this way, public policies and legislation related to the management of waste from health services were created, which are concerned with the sustainability of the environment and the preservation of the population's health (BRASIL, 2007). Although they represent a small portion of the total waste generated in a community, they are responsible for the spread of various diseases, putting at risk not only health service workers but also the population, if not managed properly.

This is a great challenge to be faced and has been assuming great importance in recent years. The term "hospital waste" was used in a general way, even when they were not produced in hospitals. It is currently called by the name of Health Services Residues (RSS), where all establishments that provide health services are inserted.

The actors involved in this HSW management process must be guided by a trained team, which knows the norms and routines of the Hospital Infection Control Commission (HICC), thus, the training of workers, according to RDC n. .306/04, must be carried out by the services that generate waste from health services.

However, in practice, the nursing professional is the main actor involved in the care procedures for clients, both in the administration of medication, as well as in the performance of dressings, puncture of venous accesses, carrying out probe passages, blood transfusions, thus, the largest number of waste generated within a hospital unit or in clinics and outpatient clinics is the responsibility of nursing, hence the importance of training these professionals regarding the correct segregation of these materials.

Law 12,305 in its article 13, item I, subitem g, defines waste from health services as: waste generated in health services as defined in regulations or standards established by the bodies of Sisnama (National Environment System) and SNVS (National Health Surveillance System).

The HSW is all that resulting from activities performed in services related to human or animal health care, including home care services and field work; analytical laboratories of health products; morgues, funeral homes and services where embalming activities are carried out (thanatopraxy and somato-conservation); forensic medicine services; drugstores and pharmacies, including handling ones; teaching and research establishments in the health area; zoonosis control centers; pharmaceutical distributors; importers, distributors and producers of materials and controls for in vitro diagnostics; mobile health care units; acupuncture services; tattoo services, among others. (Resolution No. 358 of the National Environment Council – CONAMA).

Laws, Rules and Regulations:

The HSWMP is referenced by the following regulations:

- Resolution 222 of March 29, 2018, which deals with good practices in the management of waste from health services.
- Resolution of the Collegiate Board of Directors of the National Health Surveillance Agency - ANVISA - RDC No. 306 Electronic Workbook HSWMP Course - Health Services Waste Management Plan page 7 of December 07, 2004, which indicates technical regulations for the management of waste from health services.

- Resolution of the National Council for the Environment – CONAMA – No. 358 of April 29, 2005, which indicates how the treatment and final disposal of waste from health services should be. Regulations must consider intra and extra establishment situations. Both Resolutions deal with specific issues of HSW Management, sometimes reinforcing topics, sometimes complementing information. These are documents that must be read and understood by all those responsible for the waste generated and by those who, in some way, have contact with them.

ANVISA Resolution No. 306:

This resolution replaces Resolution RDC No. 33 on the management of waste generated in health services. The goals are:

- preserve public health and the quality of the environment, considering the principles of biosecurity;
- employ technical, administrative and regulatory measures to prevent accidents, preserving public health and the environment;
- consider the health services as responsible for the correct management of all the RSS generated by them, meeting the legal norms and requirements, from the moment of its generation to the final destination;
- encourage segregation at the time and place of its generation;
- reduce the volume of hazardous waste and the occurrence of occupational accidents, among other benefits to public health and the environment.
- make technical information available to health establishments, as well as to health surveillance agencies, on the appropriate techniques for managing HSW, its management and inspection.

ANVISA Resolution No. 358:

Electronic Workbook HSWMP Course - Health Services Waste Management Plan page 8. This resolution replaces CONAMA Resolution No. 283 regarding the treatment and final disposal of HSW. Its objective is to preserve public health and the quality of the environment, regulating the management of waste from health services. Their goals are:

- the minimization of occupational risks and the protection of the health of workers and the population in general;
- encouraging the minimization of waste generation, reuse and recycling;
- the segregation of waste at the time and place of its generation;
- encouraging joint solutions for treatment and final disposal and the adoption of preventive actions, which are less costly than corrective ones.

Other relevant standards:

The resolutions cite norms from the Brazilian Association of Technical Norms – ABNT – which deal with technical references to be followed. These standards can be purchased through the ABNT website (<http://www.abnt.org.br>). They are:

- NBR 9.191 - Plastic bags for packaging waste - Requirements and test methods;
- NBR 7,500 - Identification for land transport, handling, movement and storage of products; • NBR 12.235 - Storage of hazardous solid waste;
- NBR 12,810 - Collection of waste from health services;
- NBR 10004 - Solid waste - Classification;
- NBR 14.652 - Collector-transporter of waste from health services - Construction and inspection requirements - Group A waste;
- NBR 14.725 - Safety data sheet for chemical products
- NBR 13.853 - Collectors for sharps or sharps health services waste - Requirements and test methods. And there are also the norms of the National Nuclear Energy Commission - CNEN - NE 6.05 or NE 3.01, among other important.

Resolution RDC Nº 222

In 2015, a public consultation was carried out on what should be changed in RDC No. 306/2004, in view of the need to update this legislation in view of Law No. 12,305/2010, which talks about the National Solid Waste Policy.

Through this public consultation, RDC nº 222 was prepared by ANVISA, which was published on March 29, 2018 and talks about good practices in waste management in health services.

❖ Curiosity: What actually changed between RDC nº 306/2004 and RDC nº 222/2018?

See the main changes:

- Especificação – Specification of the sanitary landfill for waste with the risk classification for the environment and society.
- The review of the concept of waste in health services, covering extra-hospital units and also home care.
- For home care, the waste can be transported by the professional who generates the waste as long as it is in a rigid, watertight container that does not allow it to tip over during transport to the place intended for proper disposal.
- For health services that only produce Group D waste (common), instead of preparing the HSWMP, a document can be prepared informing this practice and requesting validation from the local health surveillance.
- Radioactive waste must follow the CNEN recommendations.
- For the preparation of the HSWMP, an expected amount of waste per group must be estimated, in addition to considering the cleaning of transport cars, waste shelter, pest control and environmental license.
- Group A waste must not exceed 2/3 of its capacity or change the bag every 48 hours.
- The schedule and routine of internal collection of the waste must be described and its transport from the temporary shelter to the external shelter must be done in an appropriate transport car.
- The collection car with more than 400 liters must have a valve to allow the internal cleaning of the container.
- The identification of temporary and external waste shelters must have the corresponding identification, if the utility room or purge room has conditioned waste, it must contain the following identification: temporary waste shelter.
- Only non-hazardous chemical packaging can be sent for recycling.
- Prohibition of recapping and disconnecting needles.
- Mandatory subjects for the training of the hygiene team with evidence of training: biosafety, PPE and CPE, waste segregation, location and transport of waste, personal hygiene, employee behavior in the face of accidents (if any), notion of infection control, evaluation and control of the HSWMP.
- Anyway, many changes that are actually applicable and will help the infection control professional to direct their actions in daily practice, both in process audits and in technical visits in the health institutions where they work.

Table 1: List of the main technical standards of ABNT (Brazilian Association of Technical Standards) on Waste from Service.

Standard	Lays down
NBR 7.500	Risk and handling symbol for transport and material storage
NBR 7.501	Dangerous vehicle transport terminology
NBR 7.503	Emergency form for transporting dangerous goods
NBR 7.504	Envelope for transporting dangerous goods
NBR 8.285	Completion of the emergency form for the transport of hazardous waste
NBR 9.190	Classification of plastic bags for packaging
NBR 9.191	Specification of plastic packaging bags
NBR 12.897	Terminology of waste from health services
NBR 12.808	Health service waste
NBR12.809	Handling of healthcare waste
NBR 12.810	Collection of waste from health services
NBR 13.853	Collectors for waste from health services sharps and sharps

Source: own authorship

MODULE II

➤ HSW CLASSIFICATION

Figure 1: HSW classification table according to ANVISA 2016

HSW Classification (ANVISA, 2004)	Nature
Group A	Biological waste or with the presence of these that may present a risk of infection
Group B	Waste of a chemical nature with risk of contamination to the environment or impact on public health
Group C	Radioactive waste
Group D	Common waste that does not pose a risk to humans or
Group E	Sharps or scarifying waste

Source: own authorship

I - GROUP A: Waste with the possible presence of biological agents that, due to their characteristics of greater virulence or concentration, may present a risk of infection.

a)A1

1. cultures and stocks of microorganisms; residues from the manufacture of biological products, except blood products; disposal of live or attenuated microorganism vaccines; culture media and instruments used for transfer, inoculation or mixing of cultures; waste from genetic manipulation laboratories

2. waste resulting from the health care of individuals or animals, with suspicion or certainty of biological contamination by risk class 4 agents, microorganisms with epidemiological relevance and risk of dissemination or causing an emerging disease that becomes epidemiologically important or whose transmission mechanism be unknown

3. transfusion bags containing blood or blood components rejected due to contamination or poor conservation, or with an expired expiration date, and those resulting from incomplete collection;

4. leftovers of laboratory samples containing blood or body fluids, containers and materials resulting from the health care process, containing blood or body fluids in free form.

b)A2

1. carcasses, anatomical parts, viscera and other residues from animals subjected to experimentation processes with inoculation of microorganisms, as well as their bedding, and the corpses of animals suspected of carrying microorganisms of epidemiological relevance and with risk of dissemination, which were submitted or not to anatomopathological study or diagnostic confirmation

c)A3

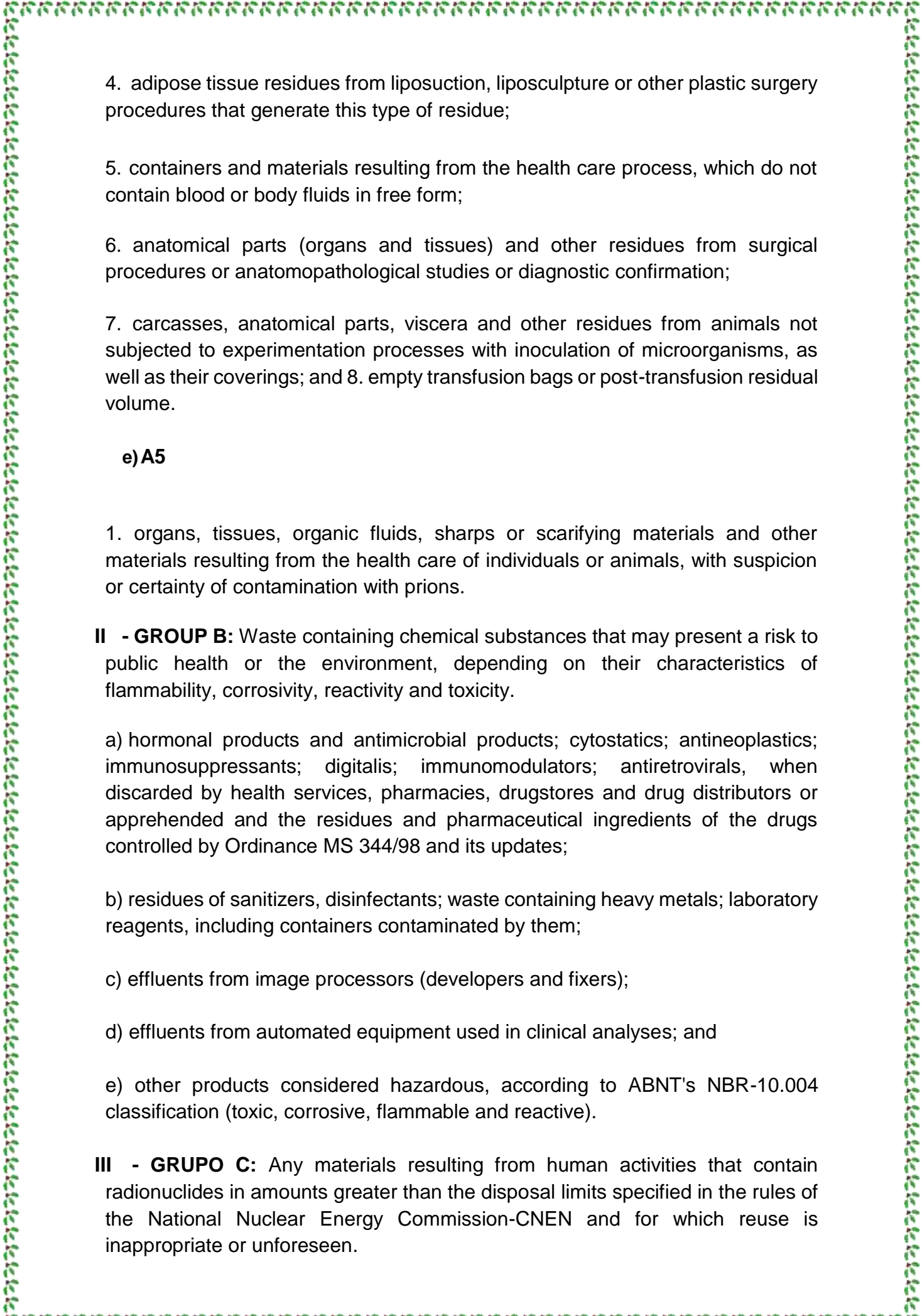
1. anatomical parts (limbs) of the human being; fertilization product without vital signs, weighing less than 500 grams or height less than 25 centimeters or gestational age less than 20 weeks, which have no scientific or legal value and have not been requested by the patient or family

d)A4

1. arterial lines, intravenous and dialyzer kits, when discarded;

2. filters for air and gases aspirated from the contaminated area; filtering membrane for hospital and research medical equipment, among others;

3. Leftovers of laboratory samples and their containers containing feces, urine and secretions, from patients who do not contain or are suspected of containing Risk Class 4 agents, and do not present epidemiological relevance and risk of dissemination, or disease-causing microorganism emerging that becomes epidemiologically important or whose transmission mechanism is unknown or with suspected contamination with prions;

- 
4. adipose tissue residues from liposuction, liposculpture or other plastic surgery procedures that generate this type of residue;
 5. containers and materials resulting from the health care process, which do not contain blood or body fluids in free form;
 6. anatomical parts (organs and tissues) and other residues from surgical procedures or anatomopathological studies or diagnostic confirmation;
 7. carcasses, anatomical parts, viscera and other residues from animals not subjected to experimentation processes with inoculation of microorganisms, as well as their coverings; and 8. empty transfusion bags or post-transfusion residual volume.

e) A5

1. organs, tissues, organic fluids, sharps or scarifying materials and other materials resulting from the health care of individuals or animals, with suspicion or certainty of contamination with prions.

II - GROUP B: Waste containing chemical substances that may present a risk to public health or the environment, depending on their characteristics of flammability, corrosivity, reactivity and toxicity.

a) hormonal products and antimicrobial products; cytostatics; antineoplastics; immunosuppressants; digitalis; immunomodulators; antiretrovirals, when discarded by health services, pharmacies, drugstores and drug distributors or apprehended and the residues and pharmaceutical ingredients of the drugs controlled by Ordinance MS 344/98 and its updates;

b) residues of sanitizers, disinfectants; waste containing heavy metals; laboratory reagents, including containers contaminated by them;

c) effluents from image processors (developers and fixers);

d) effluents from automated equipment used in clinical analyses; and

e) other products considered hazardous, according to ABNT's NBR-10.004 classification (toxic, corrosive, flammable and reactive).

III - GRUPO C: Any materials resulting from human activities that contain radionuclides in amounts greater than the disposal limits specified in the rules of the National Nuclear Energy Commission-CNEN and for which reuse is inappropriate or unforeseen.

a) this group includes any materials resulting from research and teaching laboratories in the health area, clinical analysis laboratories and nuclear medicine and radiotherapy services that contain radionuclides in amounts greater than the elimination limits

IV - GRUPO D: Waste that does not present a biological, chemical or radiological risk to health or the environment, and can be treated as household waste.

a) sanitary paper and diapers, sanitary pads, disposable pieces of clothing, patient food waste, material used in antisepsis and hemostasis of venoclysis, IV set and other similar items not classified as A1

b) food leftovers and food preparation;

c) leftover food from the cafeteria;

d) waste from administrative areas;

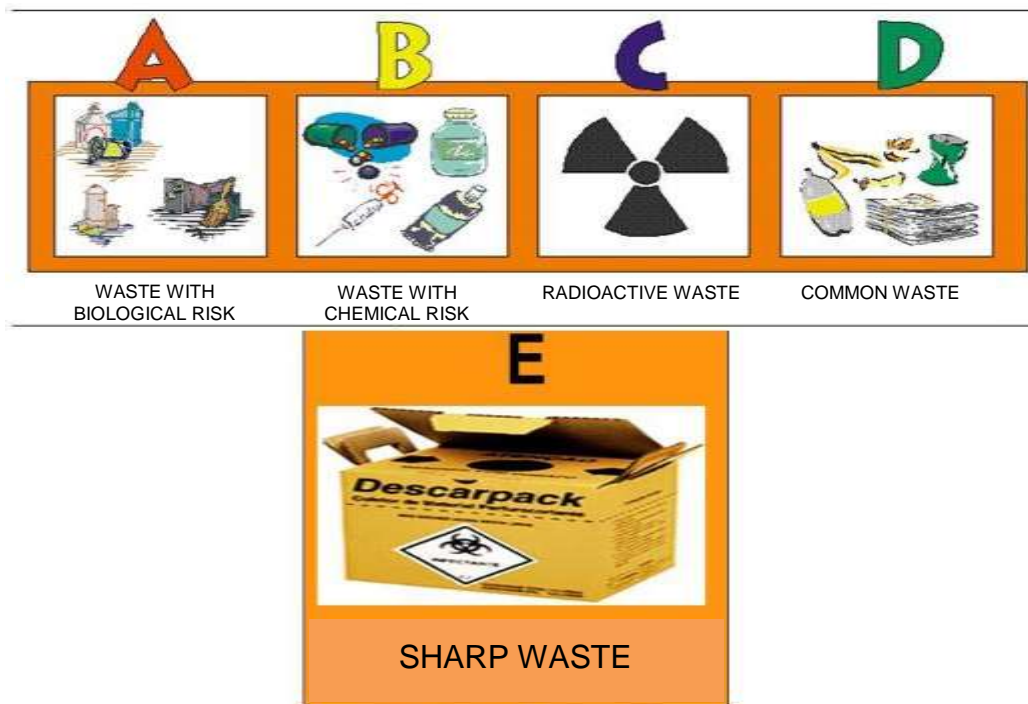
e) waste from sweeping, flowers, pruning and gardens; and

f) gypsum waste from health care.

V - GRUPO E: Sharps or scarifying materials, such as: razors, needles, scalpels, glass ampoules, drills, endodontic files, diamond tips, scalpel blades, lancets; capillary tubes; micropipettes; slides and coverslips; spatulas; and all broken glassware in the laboratory (pipettes, blood collection tubes and Petri dishes) and the like.

Figure 2: Classification of Waste from Health Services

Classification of Health Services



Source: Farmaceuticodigital, 2016.






B- HSW DISPOSAL PROCESS

The management of RSS goes through different stages: segregation, packaging, identification, storage, collection, transport, treatment and final disposal. The definition of each of these steps, according to ANVISA RDC No. 306/04, is described below:

- **Segregation:** consists of separating waste at the time and place of its generation, according to a classification previously adopted for these wastes, taking into account their physical, chemical and biological characteristics.
- **Packaging:** consists of the act of packaging segregated waste in bags or containers impermeable to puncture, rupture and leakage. The bags must be contained in washable, resistant material containers with a lid provided with an opening system without manual contact. Cutting or scarifying residues - group E - must be packaged separately, at the place of their generation, immediately after use, in a rigid yellow container with the symbol of infection according to NBR 13.853 of ABNT, watertight, puncture-resistant, breakage and leakage, waterproof.

- **Identification:** consists of a set of measures that allow the recognition of the residues contained in the recipients, providing information for the correct HSW management. The identification must be displayed on the packaging bags, on the internal and external collection containers, on the external and internal transport containers and in the storage places, using symbols, colors and phrases, meeting the parameters of ABNT NBR 7,500. The symbology used by HSW groups is represented in the table below:

Figure 3: Symbology of Waste from Health Services

				
GROUP A Biological risk	GROUP B Chemical Risk	GROUP C Radioactive Waste	GROUP D Recyclable Common Waste Has its own rating	'GROUP E Sharp Materials

Source: trilhoambiental.org

- **Internal storage:** consists of the temporary storage of containers containing the waste already conditioned in the place close to the generation, aiming at speeding up collection within the establishment and optimizing the displacement between the generating points and the point destined to be available for external collection. The rooms must have smooth and washable walls and floors with artificial lighting, with a minimum area of 2m².
- **External storage:** consists of storing the waste in their respective appropriate collection containers, in an exclusive environment until the external collection stage is carried out with easy access to collection vehicles.
- **The collection and internal transport of RSS:** consists of the transfer of waste from the points of generation to a place destined for temporary storage or external storage, with the purpose of making it available for collection. It is at this stage that the process becomes visible to the user and the general public, as waste is transported on collection equipment (collection carts) in common areas.

- **The HSW collection and external transport:** consists of removing the HSW from the waste shelter (external storage) to the treatment unit or final disposal in accordance with NBR 12,810. Removal must be carried out safely through the use of techniques that guarantee the preservation of packaging conditions and the integrity of workers, the population and the environment.
- **Treatment:** consists of the application of a method, technique or process that modifies the inherent characteristics of the waste, reducing or eliminating the risk of contamination, preserving the quality of the environment, the safety and health of the worker. CONAMA Resolution No. 237/97 provides for the treatment systems of HSW in accordance with environmental licensing on the control and inspection of sanitary surveillance and the environment. One of the main methods of HSW treatment of the so-called infectious waste are: autoclaving, microwaves and incineration. These thermal treatment processes are alternative technologies used for the decontamination of these wastes that will later be sent to the normal urban solid waste circuit, without causing any risk to public health (ANVISA, 2006).
- **Final disposal:** consists of disposing of waste on the ground according to technical criteria for construction and operation and state environmental licensing. It is the last stage of the management of RSS, from which the residue will no longer undergo any type of handling (ANVISA, 2006; CASTRO, 2007).
- It can be carried out using the following processes: sanitary landfill, class I hazardous waste landfill (for industrial waste), controlled landfill, dump or dump and ditches.
 - **Sanitary landfill:** is a process used to dispose of waste on the ground in a safe way, aiming to protect the environment and public health. The final destination of the infectious portion of the HSW, after being submitted to treatment systems, must be carried out in sanitary landfills licensed by the state environmental control agency.

According to ABNT - NBR 8419/84 the sanitary landfill is the final disposal method of all common or treated waste. It consists of disposing of these wastes on the ground, based on engineering criteria and operational standards, in order to avoid damage to human and environmental health, unlike the "open dump", which end up generating serious problems for the environment and the population in general (CASTRO, 2007 p. 38).

Final Destination of HSW according to ANVISA Resolution No. 306/04

Types of waste	Final Destination
Group A1 Waste	They must be sent to a licensed sanitary landfill or duly licensed place for final disposal of waste from Health Services. Those at risk of contamination must undergo prior treatment, according to their type.
Group A2 Waste	Burial in an animal cemetery.
Group A3 Waste	Burial in a cemetery or treatment by incineration or cremation, before final disposal.
Group A4 Waste	Some may be sent without prior treatment to a properly licensed site for final disposal of HSW, others require prior treatment.
Group A5 Waste	They must be submitted to specific treatments and arranged in sanitary landfills.
Group B Waste	They must be disposed of in hazardous waste landfills when in solid state, and must not be sent for final disposal in landfills when liquid, and must undergo specific prior treatment, eliminating their danger.
Group C Waste	They must comply with the requirements defined by CNEN.
Group D Waste	When possible, use the reuse, recovery or recycling process, or sent to the sanitary landfill.
Group E Waste	They must be stored in watertight, rigid and sound collectors, resistant to breakage, cutting or scarification; those that present biological contamination must be treated before being sent to a sanitary landfill.

Author formatting

- Landfill of hazardous waste (class I) - industrial landfill - procedure used for the final disposal of chemical waste in the soil in order to reduce environmental impacts and damages or risks to public health.
- Dumpster or dump – inadequate procedure characterized by the simple discharge of residues on the ground without the guarantee of protection to the environment and health. This process favors the appearance of undesirable vectors, bad smells, contamination of surface and underground waters, presence of waste pickers, risk of explosions (production of CH₄-methane gases) due to waste degradation.
- Controlled landfill (improved dump). In this system, the residues are discharged into the soil, with a layer of inert material, daily. This form does not avoid pollution problems, as it lacks drainage systems, treatment of liquids, gases, waterproofing, etc.

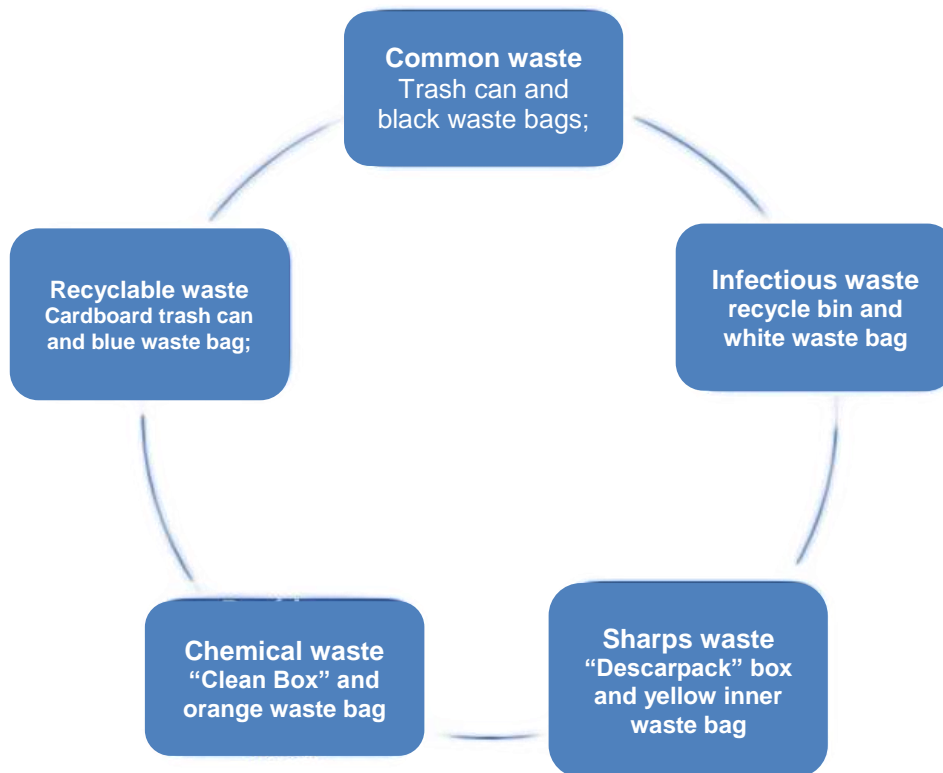
- Septic ditches - This technique is called the Special HSW Cell, which consists of waterproofing the soil (ABNT Standard). It is a procedure used in small municipalities, but many professionals are not properly qualified, which can lead to **risks to the health of the worker** and contamination of the soil and groundwater, also putting the **environment at risk**.

Important: Health Risk is the probability of adverse health effects related to human exposure to physical, chemical or biological agents, in which an individual exposed to a certain potentially dangerous agent, present in urban solid waste, examples:

- Pressurized bottles (when the bottle is broken, toxic or carcinogenic products are released, which can pollute the water or dissipate into the atmosphere).
- Batteries and batteries: release heavy metals (mercury, cadmium, lead and zinc).
- Chemical component residues, such as light bulbs, contain mercury, when the glass is broken, mercury is released in the form of vapor into the atmosphere and, under the action of rain, it precipitates in the soil, in concentrations above the natural standards.
- High-tech electronic components (chips, fiber optics, semiconductors, cathode ray tubes, batteries) can release arsenic and beryl, lead, mercury and cadmium.
- Waste from paints, pigments and solvents.
- Remains of paints or pigments, based on lead, mercury or cadmium, and organic solvents.
- Pesticides packaging, pesticides (insecticides, fumigants, rodenticides, herbicides and fungicides) represent disease, injury or even death, within a given period of time or age.
- **Risk to the Environment** - the potential for contamination of soil, surface, and underground waters due to the release of HSW in dumps or controlled landfills is highlighted, which also poses risks to waste pickers, mainly through injuries caused by cutting and/or perforating materials, and by ingestion of contaminated food, or aspiration of contaminated particulate matter in suspension. And, finally, there is the risk of air contamination, given when HSW are treated by the uncontrolled incineration process that emits pollutants into the atmosphere containing, for example, dioxins and furans, not to mention soil and groundwater contamination.

Disposal of waste in bins and bags:

Figure 4: Disposal of Waste inside bags and bins.



Source: file.ambiente.sp.gov.br

MODULE III

➤ MANAGEMENT OF HEALTH SERVICES WASTE AND HSWMP:

In 2006, ANVISA and the Ministry of the Environment created the HSWMP manual, based on RDC ANVISA No. 306/04 and CONAMA Resolution No. 358/05, with the objective of minimizing the problems arising from the management of RSS, favoring recycling, reduction of risks in the area of environmental sanitation and public health. The HSWMP is the document that points out and describes the actions related to solid waste management.

Management comprises actions related to decision-making in administrative, operational, financial, social and environmental aspects and has in integrated planning an important instrument in waste management in all its stages - generation, segregation, packaging, transport, until disposal final -, making it possible to establish in a systematic and integrated way, in each one of them, goals, programs, organizational systems and technologies, compatible with the local reality. According to RDC ANVISA No. 306/04, HSW management consists of a set of planned and implemented procedures, based on scientific and technical, normative and legal bases.

Goal:

Its goal is to minimize the generation of waste and provide them with a safe, efficient management, aiming at the protection of workers, the preservation of health, natural resources and the environment. With planning, the adequacy of handling procedures, the signaling system and the use of appropriate equipment, it is not only possible to reduce risks, but also to reduce the amounts of waste to be treated and, also, promote the reuse of a large part of the themselves by the segregation of a good part of the recyclable materials, reducing the costs of their treatment and final disposal, which are normally high.

HSW generators:

Liquid solid waste or semi-solid waste is generated by various human or animal health care establishments. RDC ANVISA No. 306/04 and CONAMA Resolution No. 358/05 define the following establishments as such: • Home care and fieldwork services; Analytical laboratories of health products; The morgues, funeral homes and services where activities with health waste generators are carried out. Legal medicine services; drugstores and pharmacies, including handling ones; Teaching and research establishments in the health area; Zoonosis Control Centers; Pharmaceutical distributors, importers, distributors and producers of materials and controls for in vitro diagnostics; Mobile health care units; Acupuncture services; Tattoo services, among others.

Responsibilities:

Health service establishments are responsible for the correct management of all the RSS generated by them, and it is up to public bodies, within their competence, to manage, regulate and supervise. Although the direct responsibility for the HSW

lies with the health service establishments, as they are the generators, by the principle of shared responsibility, it extends to other actors: the public power and the companies of collection, treatment and final disposal.

With regard to aspects of biosafety and accident prevention - preserving health and the environment - it is up to ANVISA, the Ministry of the Environment, SISNAMA, with the support of the Health Surveillance of states, municipalities and the Federal District, as well as to regional environmental agencies, urban cleaning agencies and the National Nuclear Energy Commission - CNEN: regulate the correct management of HSW, guide and supervise compliance with this regulation.

HSWMP (Health Services Waste Management Plan).

It is the document that points out and describes the actions related to the management of solid waste, observing its characteristics and risks, within the scope of the establishments, contemplating the aspects related to the generation, segregation, packaging, collection, storage, transport, treatment, and final disposal, as well as such as actions to protect health and the environment.

Step by step for HSWMP deployment:

1) Step 1 is problem identification:

- Preliminary knowledge of the problem
- Preliminary work plan
- Board approval

2) Definition of the work team:

- Responsible for the defined HSWMP.
- Team composed and trained

3) Mobilization of the organization:

- Knowledge, by all employees, of the importance of managing the HSW and what the HSWMP is.
- Employee involvement in the execution, implementation and maintenance of HSWMP.

4) Diagnosis of the waste situation:

- Report containing the analysis of the current situation of the health service regarding the management of HSW and identification of critical, semi-critical and non-critical situations.

5) Definition of goals, objectives, implementation period and basic actions:

- Defined goals, objectives and periods for carrying out the HSWMP.
- Report containing all proposed actions, indicating resources and time for implementation.

6) Program development:

- Elaborate HSWMP
- Defined form of evaluation
- Document containing report validated by the manager

7) Program evaluation:

- HSWMP evaluated
- Modifications, adaptations and rectifications
- Implemented proposals

❖ **IMPORTANT: A good indicator should be:**

- SENSITIVE: able to record different types of changes in a given period of time.
- SPECIFIC: assigned to an objective/result. The same indicator can usually only be used once.
- MEASURABLE: either in quantitative or qualitative terms.
- FEASIBLE: the data necessary for its reading are available and can be obtained in the necessary time and through resources proportional to the objective to be measured.
- PLAUSIBLE: Measured changes are directly linked to HSWMP interventions.
- RELIABLE: when used by several people, in the same identical context, it achieves the same result.

8) Implementation of HSWMP: for a good performance it is essential to observe:

- The availability of financial resources.
- If the technical team is qualified.
- The commitment of all employees, starting with the top management to the least representative services.

MODULE 4-

Biosafety in Health Services Waste

➤ **Definition:**

"The set of knowledge directed towards actions to prevent, minimize or eliminate risks inherent to research, production, teaching, technological development and service provision activities, which may compromise the health of man, animals, plants and the environment or the quality of the work developed." (FIOCRUZ BIOSAFETY MANUAL).

➤ **Historical context:**

- 1970s – genetic engineering manipulation procedures, pathogen manipulation – protection of researchers from biohazard agents;
- 1980s/90s – AIDS virus (HIV): care in health services (sterilization, single use, disposables, etc.);
- Biosafety Law: 11,105/2005: inspection and safety rules (OGMs) and derivatives, creates the CNBS, restructures CTNBio and provides for the National Biosafety Policy;
- Currently: covers all risks; action on several fronts; educational actions.

➤ **Biosafety and occupational health:**

- Regulatory Norms (NR) of the Ministry of Labor and Employment (MTE): NR 05: Internal Accident Prevention Commission;
- NR 06: Individual Protection Equipment;
- NR 07: Occupational Health Medical Control Programs (PCMSO);
- NR 09: Environmental Risk Prevention Programs (PPRA); NR 15: Unhealthy Activities and Operations;
- NR 17: Ergonomics;
- NR 32: Safety and Health at Work in Health Establishments

1) Biological hazards:

Biological risk is considered to be the probability of an adverse event occurring due to the presence of a biological agent. The necessary prerequisites for the development of an infectious disease are: presence of the infectious agent; sufficient number of agent; susceptible host; gateway for the agent to the host, which must be present or created.

In the literature, there are records of many accidents involving sharp residues (creation of the entrance door) with blood and other organic fluids (possible presence and concentration of the infecting agent), involving both health care personnel and cleaning and waste collection personnel, often with low resistance and no immunization.

❖ **ATTENTION:**

To reduce the risk of disease transmission through blood and body fluids, you should:

- not recapping, bending, breaking or manually removing needles from syringes;
- place the collection containers for the disposal of sharps near the place where the procedure is performed;
- discard all sharps and abrasive residues, including those that have not been used, in an exclusive, puncture-resistant container with a lid, without exceeding the limit of 2/3 of the total capacity;
- provide personal protective equipment to cleaning and waste collection personnel, in accordance with the establishment's Environmental Risk Prevention Program - PPRA, and demand its correct use (pay attention to the possibility of needles scattered on the floor);
- follow the establishment's HSWMP guidelines.

2) Physical risks

Exposure of professionals to physical agents such as, for example, extreme temperatures during the manual supply of heat treatment units and ionizing radiation, when radioactive waste is poorly packaged or stored for decay. Other physical agents are: noise, vibration, non-ionizing radiation, poor or excessive lighting and humidity. To minimize radiological exposure, the guidelines contained in the Radioactive Waste Management Program – PGRR (Waste Management Program), approved by CNEN (National Nuclear Energy Program), must be followed for installation. Continuous training, correct compliance with regulations and waste management minimize exposure to this type of risk.

3) Risks of accidents

Exposure of the team to mechanical agents or agents that cause accidents. Scalps, syringes, scalpels and scissors are constantly found next to sheets and operating room clothes in laundry rooms (as they shouldn't be in the middle of these clothes, they end up causing injury to health professionals working there). Other risks are: waste shelter with undersized physical space or inadequate physical arrangement, inadequate access to the waste shelter by external collection personnel, containers without conditions of use, the danger of fire or explosion of waste treatment equipment, absence of PPE, needles on the floor and various improvisations.

- To minimize the risk of accidents, the following recommendations must be observed:
- acquire quality personal protective equipment, with designs respecting ergonomics and in sufficient numbers for the use of cleaning personnel;
- segregate and properly package waste, especially those that can result in damage to the worker who cleans and collects it;
- install fire extinguishers as recommended by NR-23 and train the team to use them;
- carry out preventive and corrective maintenance of the physical structure of the room and the waste shelter, including hydraulic and electrical installations, the packaging containers, the internal collection car and also the storage containers;
- implement the Environmental Risk Prevention Program - PPRA, in accordance with NR-9.

4) Chemical risk

- Exposure of professionals to chemical agents, such as dust, mists, vapors, gases, mercury, chemical products in general and others. The main causes of this risk are: chemotherapeutics (cytostatics, antineoplastics, etc.), amalgamators, chemical disinfectants (alcohol, glutaraldehyde, sodium hypochlorite, peracetic acid, chlorhexidine, etc.) and medicinal gases (nitrous oxide and others). Exposure to hazardous chemical waste that is poorly packaged or subjected to treatment in inadequate facilities is also harmful to the health of workers and the population surrounding the treatment area.
- The chemical risk can be minimized by using personal protective equipment - PPE (gloves, masks, glasses and waterproof apron) suitable for handling chemical products, including disinfectants, in accordance with good practices to ensure health maintenance and the safety of people, in addition to avoiding impacts on the environment.

5) Riscos ergonômico:

Caused by ergonomic agents, such as incorrect posture, manual lifting and transport of loads and excessive work rhythm and load, which can result in various musculoskeletal disorders.

To minimize ergonomic risk, the following actions are recommended:

- organize the work environment;
- plan the frequency of internal waste collection;
- promote permanent training of the cleaning team.

CURIOSITY:

When to opt for preventive and precautionary attitudes?

- ❖ **Prevention:** when there is certainty that all risks are known in the current state of knowledge and the existence of measures to reduce, eliminate and intervene in the possible damage is recognized. Therefore, safety attitudes are adopted based on the identified risks.
- ❖ **Caution:** when it is certain that not all risks are known in the current state of knowledge and it is believed that there is a possibility of damage occurring. As an unknown risk cannot be considered non-existent, it is necessary to be more restrictive and implement measures that can predict the possible damage.

To facilitate the work of generators, the annexes of RDC 306/2004 from ANVISA contain a list of waste that must be segregated according to biological and chemical risk. Remember that radioactive waste must also be segregated from other

When to use white bag and red bag?

Both are used for the conditioning of **group A** waste, and:

Red bag: waste that must be treated, that is:

1. When there are biological agents Risk Class 4, microorganisms with epidemiological relevance and risk of spreading or causing an emerging disease that becomes epidemiologically important or whose transmission mechanism is unknown.

2. Anatomical parts and fertilization products without vital signs, intended for transport for incineration or cremation. It should be noted that the competent environmental agency may approve other alternative processes for the disposal of these wastes.

3. Waste contaminated with prions. In this case, two red bags must be used for packaging and transport for mandatory incineration. White bag: group A waste that does not need to be treated (subgroup A4) and for the reconditioning of waste that has already been treated, but whose physical characteristics have not been disrupted. When there is disruption of the physical characteristics after treatment, they can be reconditioned in a bag for group D waste, for disposal purposes.

ADEQUATE COLLECTION OF WASTE

A The identification of Health Services Residues (RSS) must be done correctly so as not to compromise the progress of activities according to the elaboration of the institution's management plan.

To this end, a survey of the main waste generated in the health sectors must be carried out and classified according to the danger of exposure to employees and patients.

Biological hazards (type A) are represented by potentially infectious agents, while chemical hazards (type B) are substances with corrosive, toxic, etc. Type C wastes are those that contain radioactive substances or emit ionizing radiation.

The D-type residue is classified as common, while the E-group residue is sharps. While the former does not require specific collection, the latter must comply with the practices determined by the National Health Surveillance Agency (Anvisa).

The collection of type A waste must be done after a previous treatment to reduce the microbial load and then packed in specific packages that are resistant to breakage.

Type B waste can be packed in drums to facilitate transport within the hospital, provided that the possibility of not causing dangerous chemical reactions is observed.

Type E waste must be collected in specific boxes for this purpose — and employees must transport them carefully to avoid falling during the process.

USE OF TECHNOLOGY FOR BIOSAFETY

Technological resources are very useful for health managers. Through technology, it is possible to quantify the main waste generated by sector and prepare the so-called risk map.

This mapping consists of a compilation of the risks existing in each sector, as well as the most relevant threats, according to the activities carried out by employees. Based on this diagnosis, preventive and corrective interventions are designed.

In addition, the technology is able to determine the main incidents that occurred in situations of exposure to occupational risks, facilitating safe and effective decision-making by managers.

CLEANING AND CORRECT DISINFECTION OF HOSPITAL SURFACES

The correct cleaning and disinfection of hospital surfaces provides a safe environment for clinical activities performed by employees. Therefore, it is necessary to identify which places need cleaning or disinfection, which are different methods.

Cleaning is the removal of apparent dirt — and is basically carried out with water and soap for hospital use only. The detergent property of soap fixes dirt and, with water, cleans the entire hospital surface.

The frequency of cleaning and the amount of dirt are factors that need to be documented and analyzed frequently — in case of inspection by the Health Surveillance bodies.

Disinfection is a step that occurs after cleaning and sanitizing — and consists of the application of chemical products capable of reducing the microbial load present on the hospital surface.

Disinfection can be done at three levels that relate to the possible amount of microorganisms and the main ways of reducing these possible pathogens.

It is important that both processes are documented through standard operating procedures (Pops) and made available to health inspectors during the inspection.

In addition, the Pops must justify the detailed application of hygiene and disinfection techniques according to the degree of criticality of each environment, demonstrating the efficiency of this activity.

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Exercises arranged in the four modules of the Health Waste Management Course

FIXING EXERCISES: MODULE II

1) According to CONAMA Resolution 358, waste from health services is:

- a) All those resulting from activities performed in services related to the care of human or animal health, including home care services and fieldwork; analytical laboratories of health products; morgues, funeral homes and services where embalming activities are carried out); forensic medicine services; drugstores and pharmacies, including handling ones; teaching and research establishments in the health area;
- b) All those resulting from activities performed in services related to the care of human or animal health, including home care services and fieldwork; analytical laboratories of health products; morgues, funeral homes and services where embalming activities are carried out, except drugstores and compounding pharmacies.
- c) All those resulting from activities performed in services related to the care of human or animal health, including home care services and fieldwork; analytical laboratories of health products; morgues, funeral homes and services where embalming activities are carried out, with the exception of teaching and research establishments in the health area;
- d) HSW are all those resulting from activities performed in services related to human or animal health care, including home care services and fieldwork; analytical laboratories of health products, being left out, acupuncture services; tattoo services, among others.

2) Answer with T (true) and F (false):

Among the laws that regulate the waste produced by health institutions, we have as a reference:

- a) () RDC nº 222/2018, which was an amendment of RDC 306/2004, which deals with good practices in the management of waste from health services.
- b) () RDC 306/2004, which indicates technical regulations for the management of waste from health services, among them, one of the objectives is to preserve public health and the quality of the environment, considering the principles of biosafety;
- c) () CONAMA resolution 358/2005, which indicates how the treatment and final disposal of waste from health services should be;
- d) () RDC 306/2004, which indicates technical regulations for the management of waste from health services, among them how the treatment and final disposal of waste from health services should be.

3) Answer F (false) and T (true):

- a) () ABNT (Brazilian Association of Technical Norms) establishes in NBR 13,853 how the RSS collectors for sharps and sharp materials should be.
- b) () NBR 7.5000 establishes a standardization of Risk and Handling Symbols for the transport and storage of materials.
- c) () NBR 9,190 determines that there is no need to classify plastic bags for packaging waste.
- d) () NBR 10.004 deals with solid waste and its classification.

4) Among the changes that occurred with resolution from RDC 306/2004 to 222/2018, mark the correct one:

- a) Specification of the sanitary landfill for waste with the risk classification for the environment and society.
- b) All non-hazardous chemical packaging can be sent for recycling.
- c) Group A waste must not exceed 2/3 of its capacity or change the bag every 5 days.
- d) For home care, the waste can be transported by the professional who generates the waste, placing it in an appropriate plastic bag that does not allow it to tip over during transport to the place intended for proper disposal.

MODULE II FIXING EXERCISES:

1) Enumerate the HSW groups according to their classification and their nature:

- a) Group A
- b) Group B
- c) Group C
- d) Group D
- e) Group E

() Sharps or scarifying residues;

() common waste, which does not present risks to human beings or associated environmental impact;

() Waste of a chemical nature with risk of contamination to the environment or impact on public health;

() Radioactive waste;

() Biological residues or the presence of these may present a risk of infection.

2) Answer T or F:

Group A residues, known to contain agents that can cause damage to health, are subdivided into 5 groups, namely:

- a) () A1: transfusion bags containing blood or blood components rejected due to contamination or poor conservation, or with an expired expiration date, and those resulting from the incomplete collection
- b) () A2: anatomical parts (limbs) of the human being; fertilization product without vital signs, weighing less than 500 grams or height less than 25 cm or gestational age less than 20 weeks, which have no scientific or legal value and have not been requested by the patient or family.
- c) () A4: organs, tissues, organic fluids, sharps or scarifying materials, and other materials resulting from the health care of individuals or animals, with suspicion or certainty of contamination with prions.
- d) () A5: air filters and gases aspirated from the contaminated area; filtering membrane for hospital and research medical equipment, among others;
- e) () A3: containers and materials resulting from the health care process, which do not contain blood or body fluids in free form.

3) Tick the column according to the group dealing with HSW:

- a) GROUP B
- b) GROUP C
- c) GROUP D
- d) GROUP E

residues of sanitizers, disinfectants; waste containing heavy metals; laboratory reagents, including containers contaminated by them;

This group includes any materials resulting from research and teaching laboratories in the health area, clinical analysis laboratories and nuclear medicine and radiotherapy services that contain radionuclides in amounts exceeding the elimination limits.

sanitary paper and diapers, sanitary pads, disposable items of clothing, patient food waste, material used in antisepsis and hemostasis of venipunctures, IV set and other similar items not classified as A1;

Sharps or scarifying materials, such as: razor blades, needles, scalpels, glass ampoules, drills, endodontic files, diamond tips, scalpel blades, lancets

4) The management of RSS goes through different stages from its segregation to its final disposal, so answer with T (true) and F (false).

- a) Segregation: consists of separating waste at the time and place of its generation, according to a previously adopted classification for these wastes, taking into account their physical, chemical and biological characteristics.
- b) The identification must be displayed in the packaging bags, in the internal and external collection containers, in the external and internal transport containers and in the storage places, using symbols, colors and phrases, in compliance with the parameters of NBR 7.500 of ABNT .
- c) Internal storage: consists of storing the waste in their respective appropriate collection containers, in an exclusive environment until the external collection stage is carried out with easy access to collection vehicles.
- d) The collection and external transport of RSS: consists of removing the RSS from the waste shelter (external storage) to the treatment unit or final disposal in accordance with NBR 12,810.
- e) Final disposal: it is the last stage of the management of the RSS from which the residue will no longer undergo any type of handling.

5) Within the final disposal of HSW, this can be carried out using the following processes: sanitary landfill, class I hazardous waste landfill (for industrial waste), controlled landfill, dump or dump, and ditches. In this way, Septic ditches are defined as a procedure used in small municipalities, but many professionals are not properly qualified, which can lead to risks to the health of the worker and contamination of the soil and groundwater, also putting the environment at risk. environment. Is this statement right or wrong?

Right

Wrong

FIXING EXERCISES - MODULE III:

ANSWER RIGHT OR WRONG:

- 1) **The HSWMP is the document that points out and describes the actions related to solid waste management and consists of a set of planned and implemented procedures, based on scientific and technical, normative, and legal bases.**

Right

Wrong

- 2) **According to RDC ANVISA No. 306/04 and CONAMA Resolution No. 358/05, the following establishments are defined as generators of RSS: Analytical laboratories for health products; Mortuaries, funeral homes, and services where activities with health waste generators are carried out. Legal medicine services; drugstores and pharmacies, including handling ones; Teaching and research establishments in the health area; Zoonosis Control Centers; Pharmaceutical distributors.**

Right

Wrong

- 3) **A responsabilidade direta pelos RSS seja dos estabelecimentos de serviços de saúde, por serem os geradores, pelo princípio da responsabilidade compartilhada, ela não se estende a outros atores: ao poder público e às empresas de coleta, tratamento e disposição final**

Right

Wrong

- 4) **The HSWMP is the document that points out and describes the actions related to the management of solid waste and every institution that generates this waste needs to have this plan in operation, so that this implementation happens, it is necessary to observe some steps. In this way, highlight in the column according to the correct step:**

- a) Problem identification
- b) Work team definition
- c) Organization mobilization
- d) Definition of goals and objectives
- e) Program development

- Preliminary knowledge of the problem and preliminary work plan
- Knowledge, by all employees, of the importance of managing RSS and what is the – HSWMP.
- Team composed and trained.
- Defined form of evaluation Document containing a report validated by the manager.
- Report containing all proposed actions, with indication of resources and time for implementation

5) Answer if it is right or wrong:

For a good implementation of the HSWMP, it is essential to observe: the availability of financial resources and whether the technical team is qualified and the commitment of all employees, starting with the top management to the least representative services.

- Right Wrong

FIXING EXERCISES - MODULE IV::

1) The biosafety issue with regard to RSS is defined as, tick the correct answer:

- a) The set of knowledge directed towards actions to prevent, minimize or eliminate risks inherent to research, production, teaching, technological development and service provision activities, which may compromise the health of man, animals, plants and the environment or the quality of the work carried out.
- b) The set of knowledge directed towards actions to cure or eliminate risks inherent to research, production, teaching, technological development and service provision activities, which may compromise the health of man, animals, plants and the environment or the quality of the work carried out.

- c) The set of knowledge directed towards actions to cure or eliminate risks, which may compromise the health of man, animals, plants and the environment or the quality of the work carried out
- d) The set of knowledge directed towards prevention, minimization or elimination of risks inherent to research, production, teaching, technological development and service provision activities, exclusively focused on human health.

2) There are regulatory Norms that work with biosafety and the risks to which workers are exposed, they have the function of guidance, guidance and accountability for our practices. Within this statement, classify the norms and their nature:

- a) NR 06
- b) NR 07
- c) NR 09
- d) NR 15
- e) NR 17
- f) NR 32

- Programas de Controle Médico de Saúde Ocupacional (HSWMP);
- Programas de Prevenção de Riscos Ambientais (PPRA);
- Ergonomia;
- Equipamentos de Proteção Individual
- Atividades e Operações Insalubres;
- Segurança e Saúde no Trabalho em Estabelecimentos de Saúde.

3) Os riscos biológicos são considerados graves, são exemplos de medidas para diminuir a exposição a esses riscos, exceto:

- a) not recapping, bending, breaking or manually removing needles from syringes;
- b) do not place the collection containers for the disposal of sharps near the place where the procedure is performed;
- c) provide personal protective equipment to cleaning and waste collection personnel, in accordance with the establishment's Environmental Risk Prevention Program - PPRA, and demand its correct use (pay attention to the possibility of needles scattered on the floor);
- d) follow the establishment's PGRSS guidelines.

4) These are measures to minimize the risks to accidents, some recommendations must be observed, except:

- a) acquire quality personal protective equipment, with designs respecting ergonomics and in sufficient numbers for the use of cleaning personnel;
- b) carry out preventive and corrective maintenance of the physical structure of the room and the waste shelter, including hydraulic and electrical installations, the packaging containers, the internal collection car, and also the storage containers;
- c) segregate and properly package waste, especially those that can result in damage to the worker who cleans and collects it;
- d) install fire extinguishers as recommended by NR-23, with no need for staff training to use them.

5) Answer Right or Wrong:

When to opt for preventive and precautionary attitudes?

Precaution: when it is certain that all risks are known in the current state of knowledge and the existence of measures to reduce, eliminate and intervene in the possible damage is recognized. Therefore, safety attitudes are adopted based on the identified risks.

Right

Wrong