

Assessment and national report of Italy on the existing training provisions of professionals in the Healthcare Waste Management industry

REPORT: I



DEVELOPING AN EU STANDARDISED APPROACH TO VOCATIONAL QUALIFICATIONS IN HEALTHCARE WASTE

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CHAPTER 1 EXECUTIVE SUMMARY

The present report intends to describe the National scenario related to the healthcare sector, analysing in details the issue of healthcare waste produced taking in the light of current legislation.

In Italy the healthcare sector is represented by a multitude of structures, diverging in terms of size and services provided, that are divided almost equally between the public (54%) and private (46%) sector.

The composition of the staff working at these facilities is also divided between the various 'regulated' and 'non-regulated' professions and non-existent, and refers for 25% to doctors and for the remaining 75% to nurses, technicians, assistants, etc.

The heterogeneity in the composition of the staff, in the nature of the structures and in the subdivision of the same structures at different levels (national, regional, local) makes it very difficult to understand what are the processes to be improved in order to achieve efficiency in data collection and to enhance the ability of staff to intervene.

The scenario is made more complicated by a perplexing regulatory framework. Municipal waste that are usually less dangerous than special waste, are managed mostly by public authorities and cannot circulate beyond the regional boundaries while special waste is handled by the free market and may circulate throughout the national territory.

In 2010 the amount of exported waste was 3,8 million tons divided as follow: 2,5 million tons of non-hazardous waste (65%) and more than 1,3 million tons of hazardous waste (35%).

The amount of imported waste is even greater: over 4,9 million tons, consisting essentially of non-hazardous waste.

This scenario increases the potential for the healthcare waste to become a dangerous weapon as companies are tempted to dispose of them improperly, also through unconventional channels (mafia). Besides, the disposal of such waste in locations that are distant from the production sites prevents from a clear traceability.

The complexity of the issue itself and of the national context would certainly welcome any educational action leading to a more organized and efficient work within the healthcare structures.

Unfortunately, in terms of training there are no specific professional profiles entirely responsible for the management of healthcare waste and the training that is currently addressed to the existing healthcare professionals is delivered only to fulfill the legal obligations.

Introduction

The proper management of healthcare waste is particularly important for healthcare facilities for the possible implications and consequences that this entails in terms of penalties and reputational damage if the waste management does not comply with the existing legal requirements.

The recent seminar entitled “The management of healthcare waste - Legislation, procedures, transport” organised within the exhibition Exposanità 2014 in Bologna on 22 May 2014, highlighted the most pressing issues in Italian healthcare facilities that should be considered for improving the management of healthcare waste:

- procurement management;
- monitoring the activities related to waste management within external subsidiary structures that are affiliated to main hospitals/universities/centres;
- counterfeiting packaging;
- clear identification of key staff in charge of the waste management in healthcare facilities or identification of delegates.

The management of healthcare is therefore to be considered as a complex system, a sector where there are different actors whose skills and responsibilities often remain poorly defined.

If we consider the total waste generated by health care activities, about 80% is non-hazardous waste or urban waste. The remaining 20% is considered hazardous waste.

The waste produced by healthcare facilities also include a wide range of materials and products contaminated with antibiotic-resistant pathogens (e.g., needles, syringes and other materials and medical devices contaminated with blood and other body fluids), chemical products, pharmaceuticals (including antibiotics), radioactive materials.

The bad management of such waste may expose healthcare workers, waste handlers, patients, community to:

- infections;
- toxic and cytotoxic effects;
- environmental pollution (e.g., sewage, toxic elements or compounds such as mercury or dioxins that are released during incineration).

In accordance with the current legislation (DPR n. 254/2003, art. 2), we define "healthcare waste" those waste arising from public and private structures that carry out activities of medical and veterinary prevention, diagnosis, treatment, rehabilitation and research.

Healthcare waste is divided into the following types (see section 3.1 for more details):

- non-hazardous healthcare waste;
- healthcare waste that can be assimilated to municipal waste;
- non-infectious hazardous healthcare waste

- hazardous and infectious healthcare waste;
- healthcare waste requiring special disposal systems;
- waste from exhumation and disinterment, as well as waste from other cemetery activities except vegetable waste from burial areas;
- special waste produced outside of health facilities, whose risks are similar to hazardous and infectious waste, with the exception of sanitary napkins.

A correct separation of waste requires a separate collection within the healthcare facility to be practiced in the specific place of production (units) in order to allow a proper disposal or recovery.

The management of such waste should be based on the presence of appropriate facilities and tools and on the provision of courses for the employed people: those aspects should be addressed by the head of the facilities in a systematic way.

A push differentiation of waste at the source - especially infectious healthcare waste - helps to reduce the amount of final waste to be disposed and as a consequence to reduce the final cost of the management: often healthcare municipal waste is disposed of together with infectious healthcare waste causing significant economic consequences as well.

A correct choice of materials upstream and a careful separate collection also enables a further substantial reduction of the emissions from disposal plants and a significant reduction in operating costs (less in reagent use, improving the quality and quantity of waste to be sent to landfill).

For this purpose, it is important to implement:

- a waste cycle that starts from the choice of materials and devices (consistent with the therapeutic needs);
- information and training of personnel at various levels;
- development of a waste management system that enables a clear and precise differentiation in the various departments with a constant verification of compliance with procedures;
- packaging and collection systems that favour reusable containers but at the same time ensure the required security in terms of biological, chemical and physical risks;
- technologies that reduce waste (computer systems, digital imaging, etc..).

CHAPTER 2 OVERVIEW OF THE HEALTH CARE SECTOR

2.1 General description of the Health Care System

Statistics provided by the National Health Service for 2010 show the distribution of facilities by type of service delivered (hospital care, specialist outpatient care, residential and semi-residential community care, other community care and rehabilitation assistance ex. Art. 26) and by nature (public and private).

The surveyed facilities amounted to 1.165 for hospital care, 9.635 for specialist outpatient care, 6,153 for residential community care, 2.644 for semi-residential community care, 5.514 for other community care and 971 for rehabilitation assistance.

With regard to the nature of the facilities, public facilities deliver mainly hospital care (54.4%) and other community care (88.3%). The private facilities deliver mainly rehabilitation assistance (75.3%) and residential community care (75.4%).

Type of service	Nature				Total
	Public	%	Private	%	
Hospital care	634	54,4%	531	45,6%	1.165
Specialist outpatient care	3.855	40,0%	5.780	60,0%	9.635
Residential community care	1.513	24,6%	4.640	75,4%	6.153
Semi-residential community care	983	37,2%	1.661	62,8%	2.644
Other community care	4.870	88,3%	644	11,7%	5.514
Rehabilitation assistance	240	24,7%	731	75,3%	971
Total	12.095	46,4%	13.987	53,6%	26.082

In 2010, hospital care consisted of 1.165 healthcare facilities: 54% was public and the remaining 46% was private. It is confirmed the downward trend in the number of facilities, already highlighted in previous years, due to the restructuring and merging of many structures.

68% of the public facilities is made up of hospitals directly managed by the local health authorities, and the remaining 32% from other types of public hospitals.

The National Health Service has just over 215 thousand beds for inpatient, of which 21% in accredited private structures, 21.761 places for day hospital, almost entirely public (91%) and 8.230 places for day surgery in high prevalence public (80%).

At the national level 4,1 beds per 1.000 inhabitants are available on average. In particular the number of beds dedicated to acute activity are 3,5 per 1.000 inhabitants.

With reference to non-hospital healthcare, 9.635 facilities were surveyed in total, including clinics and laboratories. Other facilities were also recorded: 6.153 residential structures, 2,644 semi-residential structures, 5.514 different facilities such as mental health centers, counseling centers, hydrothermal structures. With regard to residential and semi-residential structures, 260.654 places were registered, equal to 432 per 100.000 inhabitants: 70.8% are dedicated to eldercare, 12,5% to mental health care, 16,2% to the mental and physical disabled, 0,6% to terminal patients.

Institutes and centres for the recovery and functional rehabilitation carry out their activities by providing diagnostic and therapeutic rehabilitation.

In 2010, 971 rehabilitation facilities were detected with 14.211 places for the residential activities and 13.691 places for semi-residential activities.

The number of total users assisted in the residential regime is higher than the number of users assisted in the semi-residential (respectively 56.316 and 23.181 users); this ratio varies depending on the type of rehabilitation activities, in particular the child neuropsychiatric rehabilitation is carried out preferably in semi-residential structures.

In 2010, rehabilitation facilities employed 45.890 units of which 10% was made up of doctors and 43% by therapists and speech therapists.

Regarding the type of staff employed by healthcare facilities, 25% is made up of doctors and dentists, 54% are nurses and 21% is formed by other health professionals.

These data suggest how varied is the composition of the health workforce and, therefore, how complex is to programme a proper training strategy in order to optimize the use of human capital in this sector.

A prominent role is played by the Faculty of Medicine and Surgery on behalf of the Ministry of Education, University and Research, in close correlation with the activities of the national health care system. In our country there are 41 Faculties of Medicine and Surgery (38 public and 3 private) and for the academic year 2011/2012, 10.271 have been registered.

2.2 Statistical data on the Health Care System

The collection of data at national level is guaranteed by the National Waste Observatory.

From the geographical point of view, the level of aggregation (under the National Waste Observatory) is the Region. The Region has in turn is subdivided on the basis of local health authorities (hereinafter ASL).

A part of the health facilities (clinics, polyclinics, hospitals, hospitals, etc..) refer to ASL, while the remaining structures, generally larger, are defined as 'Hospitals' (hereafter AO) and are then managed independently. Because of this significant differentiation between the various regions (and, sometimes, even among the various ASL belonging to a single region), the identification of health facilities from which to collect the data is left to the ASL (and possibly the AO).

In addition, some structures, generally small in size (for example, clinics and polyclinics), give their waste directly to the ASL on which they depend. In healthcare facilities data relating to the production/disposal/treatment of waste should be reported to the hospital unit or outpatient clinic (particularly in the case of decentralized structures).

Not always, however, the adopted management systems allow you to reach such a degree of detail.

In fact, the weighing of waste products is generally carried out in a single location within the hospital (in some cases it is not performed at all); similarly, the contracts with managers/disposers are not concluded and administered at the department or outpatient clinic level.

The following diagram shows the various levels of aggregation of the data reported:

Levels of aggregation		
N.	Description	
1	National Waste Observatory	
2	▼ Regions	
3	▼ ASL	▼ AO
4	▼ Healthcare facilities	▼ Healthcare facilities
5	▼ Departments	▼ Departments

The data for levels 1 and 2 will be obtained simply by aggregating those of lower level. Data for levels 3-5, will instead be obtained thanks to some 'data collection sheets' filled by ASL, AO and healthcare facilities.

All data related to the workload faced by health facilities with reference to the production/disposal/treatment of the waste must be collected and aggregated preferably every year.

The motivation for this choice can be traced back mainly to the following factors:

- First of all, it is believed that periods shorter than a year do not make possible to obtain significant statistical data, especially for small structures;
- Secondly, the method of data collection adopted by healthcare facilities may not allow to easily obtain detailed information relating to time periods that are less than one year;
- In addition, the minimum time unit of measurement generally considered in the drafting of contracts with service providers for the management/treatment/disposal of waste is one year.

The main problem found in the collection of data on production/processing/disposal of waste in healthcare facilities is the frequent inconsistency and incompleteness of the data themselves.

This problem is sometimes due to the inexperience or lack of attention from the staff responsible for the collection of information, and sometimes the lack of procedures and detection methods for collecting data according to the level of detail required within the health care facility .

Generally, the higher the level of detail required will be pushed, the greater the frequency with which such problems arise.

2.3 Legislation Applicable to HCWM

The relevant legislation at national level is formed by the following laws:

- D. Lgs. 152/2006 modified by D.Lgs. n. 4/2008 and by D.Lgs. n. 205/2010 – Part IV (environmental act)
- DM 145/1998 (form accompanying waste)
- DM 148/1998 (register for loading/unloading waste)
- D. Lgs. 95/1992 (disposal of waste oils)
- Decreto 161/2002 (recyclable hazardous waste)
- DM 27/09/2010 (criteria for landfill disposal)
- DM 05/02/1998 modified by DM 186/2006 (recyclable non-hazardous waste)
- D. Lgs. 151/2005 (WEEE)
- DPR 254/2003 (healthcare waste)
- D. Lgs. 230/95 e s.m.i. (radioactive waste)
- DPR 309/1990, DM 15/02/96, Legge 12/01 (narcotic drugs)
- D. Lgs. 121/2011 (Environmental crimes extended to legal persons)
- Reg. 1013/2006/CE (transboundary shipments of waste)
- DM 12/11/2011 (MUD declaration)
- DL 29/12/2011 n. 216 (SISTRI system)
- DL 201/2011 (changes to D. Lgs. 152/06 as regard to the remediation of contaminated sites and exceptions to the rules on the management of infectious waste for certain categories eg. beauticians).

Waste management in Italy is regulated by Law Decree 152/2006, which repealed and replaced the D. Lgs. 5 February 1997 n. 22 (the Ronchi Decree).

The decree incorporates the definition of waste as indicated by the EU legislation and identifies as waste any substance or object in the categories set out in Appendix A of Part IV of this decree and of which the holder discards or intends or is obliged to discard.

In Annex D, Part IV the decree embeds the European Waste Catalogue (EWC) that classifies waste into 20 categories identified by origins, or, in some cases or by chemical and physical characteristics.

In the latest version of the decree, the priority criteria in waste management have been modified. Currently, the criteria are:

- Prevention
- Preparation for reuse
- Recycling
- Other types of recovery
- Disposal

With particular reference to the healthcare waste, their management is still regulated with DPR n. 254 of 15 July 2003, "Regulations on the management of healthcare waste in accordance with art. 24 of the Law n. 179 of 31 July 2002".

The DPR 254/03 defines healthcare waste those arising from public and private structures that carry out activities of medical and veterinary prevention, diagnosis, treatment, rehabilitation and research and providing services according to the Law 833/1978.

Namely all waste generated from healthcare activities, regardless of their nature, classified as follows:

- special hazardous waste (infectious waste, waste including other risks such as toxicity, corrosion, etc.)
- assimilated to municipal waste (non hazardous waste that can be separated and managed at local level);
- special non hazardous waste (all the remaining waste not classified in the previous categories).

The decree DPR 254/2003 also lays down the detailed rules for the management of medical waste, and provides the basis for the preparation of regional plans. The regional plans, in turn, form the basis for the preparation of guidelines that should be drawn up by all the bodies responsible for waste management and by the local healthcare facilities.

For each type of healthcare waste listed below, the DPR n. 254/2003 indicates how management should be carried out referring, unless otherwise specified, to the administrative requirements for waste management set out in the Decree 152/2006.

- Non hazardous healthcare waste: they are subject to legal rules and procedures laid down for the management of non-hazardous waste.
- Healthcare waste assimilated to municipal waste: if the waste has no hazardous characteristics and is not infectious, it is subject to the legal regime and the methods of solid waste management.
- Hazardous non infectious waste: waste is subject to the legal regime and the procedures required for non-hazardous waste.
- Hazardous and infectious waste: waste that must be managed by applying special precautions to avoid infection. The operations for preliminary storage, collection and transport are still under the general scheme of hazardous waste. This waste must be disposed of by incineration or sterilized directly in authorized facilities (authorization is not required if the healthcare facility handles the sterilization of waste products itself).
- Healthcare waste requiring special disposal methods: waste specified in Art. 2, paragraph 1, letter h, of Decree 254/2003, which must be disposed of by incineration. Bodies, not recognizable anatomical parts and small animals are managed with the same modalities of hazardous and infectious waste.
- Waste from exhumations and disinterment: such waste should be collected separately and, if necessary, can be stored in special disposable packaging in confined areas within the cemetery.
- Special waste produced outside of healthcare facilities, which are similar to hazardous and infectious waste, with the exception of sanitary napkins: they must be managed as hazardous and infectious waste.

Each of these types of waste, whose detailed enumeration and classification is shown in Annexes I and II of Decree 254/2003, requires specific treatments disposal.

The following materials do not fall into the category of healthcare waste:

- Genetically modified organisms referring to the Decree n. 206 of 12 April 2001;
- Materials regulated by EC Regulation no. 1774/2002 laying down the rules concerning animal by-products not intended for human consumption, such as the carcasses of experimental animals, the whole carcasses and body parts coming from the diagnostic activities of the Faculty of Medicine, Veterinary medicine and Agriculture and of research centres with the exception of small experimental animals and their associated tissues and anatomical parts produced by public and private structures, involved in medical and veterinary prevention, diagnosis, treatment, rehabilitation and research.

The decree establishes that, in order to reduce the amount of waste sent for disposal, recovery of material from the following types of medical waste must be encouraged:

- glass containers of drugs, foods, beverages and solutions (except those containing anticancer drugs or biological or radioactive material);
- packaging: glass, paper, cardboard, plastic, metal (except hazardous waste);
- non hazardous metal waste;
- garden waste;
- organic waste from kitchens;
- film fixer;
- mineral and vegetable oils;
- batteries;
- toner;
- mercury;
- photographic films and plates.

Roles and responsibilities

The following table summarizes the key roles and responsibilities in relation to waste management in healthcare facilities.

N.	Role	Main powers and duties
1	Head of the healthcare facility	The Head of the healthcare facility oversees the application of the provisions of Presidential Decree 254/2003, on the basis of art. 17.

2	Prevention unit for occupational health and safety	<p>The head of the healthcare facility may appoint a Technical Manager within the prevention unit.</p> <p>The Technical Manager is responsible to:</p> <ul style="list-style-type: none"> - appoint the heads of the individual operating units; - provide guidelines for the collection of waste; - in collaboration with other relevant departments, the Technical Manager prepares tenders for the services related to the collection and disposal of waste; - ensure the proper management of waste; - fill the form concerning the loading/unloading of hazardous waste; - prepare the MUD declarations
3	Director of single unit	<p>The Director is responsible for the organization of the unit.</p> <p>The Director's responsibilities on the waste management may be exercised by an appointed delegate Head for waste management within the unit.</p>
4	Head of unit for waste management	<p>The head of unit for waste management coordinates the organization of all phases of all the produced waste and in particular their transport to temporary storage or collection points. This figure enables also the separate collection requiring the cooperation of providers and patients.</p>
5	Responsible for the maintenance service and for other technical facilities	<p>The responsible person carries out operational checks, maintenance and recording throughout the healthcare facility: he/she is therefore the contact person for the management of waste produced by the activities he/she leads.</p>
6	Doctors	<p>Doctors may decide in turn if certain waste related to a specific patient can be regarded as infected in consideration of the mechanism of transmission of the disease in place and then establish, consequently, their classification and their means of disposal/recovery.</p>
7	All the operators	<p>All operators are required to comply with the rules for the proper collection and disposal of waste.</p>
8	Patients	<p>All patients are required to comply with the rules for the proper collection and disposal of waste.</p>

It should be noted that, in presence of radioactive waste, there must be a qualified expert.

As defined in Art. 4 of Decree n. 230 of 17/03/1995 the qualified expert is a "*person having the required knowledge and training to make measurements, examinations, audits or to perform physical, technical or radiotoxicological evaluations, to ensure the correct operation of protective devices, and to provide all other information and formulate measures to ensure the monitoring of the physical protection of workers and the general population*".

Stages of waste management

Waste management in healthcare facilities typically follows the following process:

1. Collection of individual fractions in the place of production
2. Classification and allocation of EWC code
3. Packaging and labeling
4. Internal handling
5. Temporary/preliminary deposit
6. Transport
7. Disposal or recovery
8. Recordings: forms, registers, MUD declaration

It is important to specify that some particular types of waste takes the form of dangerous goods for transport. This waste is subject to the provisions of the ADR (Accord Europeen relatif au stands for International des transport for merchandise Dangereuses par Route - European Agreement concerning the International Carriage of Dangerous Goods by Road) signed in Geneva in 1957 and ratified for the first time in Italy in 1962.

Even if:

- there is no direct correlation between ADR and regulations governing waste;
- there are no clear environmental provisions indicating that the hazardous waste must comply with the coding of dangerous goods;
- hazardous waste according to Legislative Decree n. 152/06 do not fall automatically within the scope of the ADR;
- in the same way non hazardous waste according to Legislative Decree no. 152/06 could instead be subject to the provisions of ADR.

For the purposes of transport, waste must be further classified by the consignor, according to the ADR regulations if they contain hazardous materials in quantities that determine one or more characteristics of danger attributable to the ADR classes.

All personnel involved in transport operations (consignor, carrier, etc..) must be trained in accordance with their duties and responsibilities.

The employer must keep a description of the training undertaken by employees. The training shall also be verified before a new employment takes place and periodically updated through continuous training.

2.4 Hospital Waste Management – best practice

In Italy, the waste from healthcare activities is divided into urban and special waste.

The definition identifies as urban, waste that is produced by domestic activities and street sweeping, and as special, waste produced by commercial and industrial activities.

It should be recognized that the majority of healthcare waste may be considered comparable to municipal waste, usually about 75-90%, and should be managed as such (separate collection, recovery, disposal, etc..).

The remaining share is classified as special waste and sometimes should be treated as hazardous waste. This classification takes into account the material/substance (i.e. chemical risk) or considers the usage by specific hospital units (i.e. infectious units) or if it contains biological materials potentially at risk of infection (i.e. materials derived from infectious isolation wards that have come in contact with any biological fluid secreted or excreted by patients, contaminated with blood or other body fluids).

It should be immediately highlighted that the management of special waste is a problem far more complex than that of municipal waste because of the quantity produced, the diverse treatment methodologies and the potential hazard to human health and to the environment.

In addition, special waste have a negative economic value as they are materials for which the holder has to pay to dispose of and can therefore be tempted to eliminate it improperly.

Special waste are formed for 91,8% by non-hazardous waste and for the remaining 8.2% by hazardous waste. In addition, the special waste often takes paths that lead them away from the place of actual production: other provinces, other regions or even abroad, in this case, giving other countries a real economic wealth, with costs borne by the Italian taxpayers.

Moreover, the minor traceability of waste, unfortunately, tends to facilitate the shift towards forms of illegal disposal, which for years has enriched the so-called eco-mafias.

The scenario is made more complicated by a perplexing regulatory framework. Municipal waste that are less dangerous, are managed mostly by public authorities and cannot circulate beyond the regional boundaries while special waste is handled by the free market and may circulate throughout the national territory.

This happens in a country where environmental crimes are still poorly recognized as criminal offenses.

There are several reasons for making the management of special waste more difficult than the management of municipal waste. First of all, the greatest amount of waste to be treated. Then the plurality of types of special waste and the consequent need for specific treatments.

While only few fractions are identified for municipal waste, there are dozens of types of special waste and many treatment technologies through which each of them can or should be managed: the BRef document of the European Union identifies at least 50 different technologies only for the treatment of hazardous waste.

Finally, the levels of intrinsic hazard must be taken into account. In some cases, such as for healthcare waste, the danger is significantly high and carries serious risks to health and the environment if appropriate technologies are not adopted and properly implemented.

The activities related to healthcare facilities, due to their characteristics, involve an increasing use of disposable materials and, consequently, an increase in the production of medical waste, especially those considered hazardous and infectious.

In general, the facilities with a greater number of beds and with a high level of specialization are those that have a proportionally greater production of healthcare waste.

The production of waste from healthcare facilities may present values generally up to 10 kg/inpatient/day consisting for the most part of municipal waste.

The following data provides an overview of the national situation.

The evaluations carried out on healthcare facilities show that the production of special healthcare waste is represented by four types of waste:

- Hazardous and infectious;
- Non-hazardous chemical substances;
- Hazardous chemical substances;
- Liquids for fixing and development.

The management of such waste should therefore be addressed in an integrated manner at the national level, focusing primarily on reducing the amount and harmfulness, ensuring then reliable and traceable carriage of waste as well as treatment and disposal procedures that are implemented through sustainable and safe technologies.

Regarding the different types of management, in 2010 the recovery of material resulted as the predominant form of management affecting more than 57,5% of the hazardous and non-hazardous waste.

In 2010 among the most prevalent forms of waste management we found also storages where the waste is kept before being sent for subsequent recovery or disposal: a total of over 21,4 million tons are affected by these intermediate forms of management, accounting for 14,8% of the total amount of managed waste. Intermediate forms of management however makes it difficult to monitor the special waste and, above all, does not allow to correlate the waste generated to those managed in the same reference year. In fact the waste remain stored at the treatment plant to be actually recovered/disposed of in the next year or shipped to subsequent recovery/disposal treatments.

To complete the picture on the management of special waste we must also take into account the relative amounts of import/export.

In 2010 the amount of exported waste was 3,8 million tons divided as follow: 2,5 million tons of non-hazardous waste (65%) and more than 1,3 million tons of hazardous waste (35%).

The largest quantities of exported waste are shipped to plants located in Germany (1,5 million tons) and China (399.000 tons).

Germany receives more than a million hazardous waste that is sent for disposal in salt mines while the waste exported to China is non-hazardous.

The amount of imported waste is greater: over 4,9 million tons, consisting essentially of non-hazardous waste. Hazardous waste is only 32.000 tons. Italy imports mainly from Germany, more than 1.2 million tons.

The annual report published in 2013 by ISPRA with reference to data collected in 2012 shows that the amount of incinerated waste amounts to about 5.5 million tons, including: approximately 2,6 million tons of unsorted municipal waste, approximately 1,9 million tons of dry fraction, about 553.000 tons of refuse-derived fuel (RDF) and approximately 431.000 tons of special waste.

With regard to the latter: special hazardous waste amounted to approximately 54.000 tons, of which nearly half are made up of healthcare waste.

In this field, the large disparities across the geographical areas are evident: most of the waste is incinerated in the northern regions (approximately 68%), with the largest share (40%) in the 13 plants of Lombardia and 17% in the 8 plants in Emilia Romagna.

By analyzing the current regulations, with regard to disposal, the Decree 254/2003, Art. 10, states that infectious healthcare waste should be disposed of as such by incineration or after sterilization (Articles 7 and 9). The term sterilization includes the operations necessary to achieve the elimination of microbial life-forms.

Such operations may be effected by means of physical treatments (heat, ionizing radiation, microwave) or chemical treatments (chemical agents) although the physical means are more popular.

The sterilization of infectious healthcare waste finds application in some healthcare facilities as it allows a simplification of the subsequent transport and disposal.

The majority of hospitals perform the sterilization of infectious healthcare waste in areas located within the perimeter of the healthcare facility.

In this way, the waste may be initiated in plants producing waste-derived fuels or can be directly used as a mean to generate energy, or disposed of in incineration plants.

The possibility, after sterilization, for the production of waste-derived fuels from infectious waste raises many concerns: their heterogeneity that does not allow to define with certainty the specific composition of waste (i.e. presence of biological fluids, volatile substances, etc.).

With regard to incineration, it should be considered that the composition of healthcare waste affects the calorific value and the possible emissions. Just think about the presence of particular products such as mercury, anticancer drugs, laboratory reagents, biological fluids, contaminated clothing, etc.

As previously reported, the legislation requires that the infectious healthcare waste should be disposed of by incineration in authorized facilities and if waste may cause further dangers it must be incinerated only in facilities treating hazardous waste.

It should be noted that the incineration of healthcare waste is considered as a guarantee of safety since the elimination of the bacterial load is comparable to the highest levels achievable by sterilization. Moreover, the substantial reduction in weight and volume of the waste makes incineration as the best practice in the current state.

In special cases, lack of adequate facilities or special authorizations from public authorities, waste may be subject to the legal regime of municipal waste and to the technical standards governing the disposal of non-hazardous waste in landfills.

In the case of co-incineration with municipal waste (solution that is widely used), infectious waste should not be mixed with other categories of waste but must be placed directly in the oven, this procedure is not needed in case of dedicated incineration facilities.

Loading operations must not involve direct manipulation of waste and operators should not be exposed to infectious risk.

The traceability of waste in Italy

In Italy, the national waste information system is represented by ISPRA which manages all the data related to the environment and verifies the status of implementation and effectiveness of environmental legislation.

The attention of public opinion is mainly given to the cycle of urban waste management, although they account only for about a fifth of the total waste produced annually at the national level and, in addition, are also effectively monitored by local authorities.

The accounting system of special waste is much more complex and require more attention and identification of the most appropriate tools to ensure the effective monitoring of flows from production to final destination.

In this regard, Article 17 of Directive 2008/98/EC provides that Member States shall take the necessary measures to ensure that the production, collection, transportation, storage and treatment of hazardous waste are carried out in conditions which ensure the protection of the environment and human health, including measures to ensure traceability from production to final destination.

To give effect to what is covered by the directive, the national legislature established a system of traceability of waste (SISTRI – Sistema di Controllo della Tracciabilità dei Rifiuti, Waste Tracking System) in order to allow to monitor and capture in real time, through the use of electronic devices, the data on the production and handling of special waste, as well as information on the management of municipal waste.

The SISTRI system has undergone numerous delays until the decree of 20 March 2013 established that it was supposed to operate starting from 1 October 2013.

The system was immediately adopted only by producers of hazardous waste with more than ten employees and by institutions managing hazardous waste, while the adoption by all the other companies was scheduled for March 2014.

The system is composed of the following electronic devices:

- USB
- Black box to be installed on vehicles carrying waste
- Cameras to be installed at some waste management facilities

Through the information system data regarding the characteristics and quantities of waste will be transmitted.

USB devices will allow to send data that will be held at the local unit/facility for which they have been issued and must be available during inspections from competent authorities.

The Black box installed on each vehicle will monitor the path from the producer to the disposal plant.



While waiting for the system to be fully functional, completely changing the mode of acquisition of data on the production and management of special waste, ISPRA will continue to provide the annual monitoring of the waste stream, collecting the information from the MUD declaration (Modello Unico Dichiarazione Ambientale, Environmental Declaration Single Form) filled by all the actors identified in Article 189 of Decree no. 152/2006.

The system for collecting information through MUD presents some problematic aspects that should be solved in order to be able to collect updated data in shorter time.

Nowadays MUD declarations are sent every year by 30 April to the local Chambers of Commerce informing about the waste produced and managed in the previous year.

The Chambers of Commerce then provide for the initial collection and for the subsequent transmission of data to ISPRA that publish validated information with nearly two years of delay.

Some improvements will be obtained from the MUD declarations sent in 2013: the declarations have been in fact sent electronically by all the waste managers and manufacturers that have produced more that 7 types of hazardous waste.

It should however be noted that not all producers of non-hazardous waste are required to make a declaration. This exemption covers a significant number of companies being our country characterized mainly by small and medium-sized enterprises.

To overcome these shortcomings, ISPRA has to integrate data from MUD declarations using specific estimation methods, based on field studies.

CHAPTER 3 SKILLS, COMPETENCES AND TRAINING OF INVOLVED PERSONNEL IN HEALTH CARE WASTE MANAGEMENT

3.1 National Qualification Framework – Nationally Accepted Qualifications for Waste Managers

In healthcare facilities the responsibility of healthcare waste management is usually entrusted with the medical director or with the person holding the legal representation.

The operational management of the healthcare waste is instead usually delegated to an external consultant or to an internal employee who is not required to hold any specific degree or qualifications. Normally, the acquisition of knowledge and skills by the person in charge of managing healthcare waste occurs through short training courses that are mainly provided by private organizations (VET centres) with the aim to inform about requirements, procedures, and systems established by law.

In Italy there are no existing nationally accepted qualifications but only training courses that serve mainly as professional upgrading.

Also with regard to the personnel working within healthcare structures, the training in healthcare waste management is carried out only in case of entry into force of new rules and only to comply with legal obligations.

In fact, some regulations establish minimum requirements that must be included within the training courses. For the occupational health and safety, which is closely related to the healthcare waste management, the main reference is the legislative decree n. 81/2008.

In particular Articles 36 and 37 lay down the duties of the employer to ensure that each worker receives adequate information and training on: specific risks, safety instructions, company provisions, job-related risks, prevention and protection measures.

The DPR 254/03 focuses also on the importance of the training, providing that healthcare companies organize specific training for staff on proper healthcare waste management.

In particular, the provisions of Legislative Decree no. 81/2008 can be applied to the management of waste in general as follow:

- information and training to be addressed to all workers must include statements relating to the proper handling and management of waste generated during the work;
- information and training must be easily understandable;
- training must be conducted at the beginning of the employment relationship, or in case the worker changes function, or when new procedures or instructions are introduced;
- training must take place in the workplace by a qualified and experienced person;
- training must be periodically repeated;
- person in charge of occupational health and safety aspects must be trained in order to be able to assess the risks related to waste management and to identify measures to eliminate, reduce or minimize the risks.

Specifically, training in the field of healthcare waste management has to provide for:

- the proper distinction and handling of hazardous waste, even if characterized by risk of infection or by chemical risks;
- arrangements for waste collection;
- the proper management and handling of radioactive waste;
- the measures adopted by the healthcare facility to better manage and reduce the production of healthcare waste.

In particular, to achieve an optimal level of training and information for staff of healthcare facilities it is necessary to:

- inform the workers about initiatives undertaken by the facility for the proper management of the healthcare waste produced;
- raise awareness and empower workers to ensure the implementation of the legislation;
- develop abilities and behaviors that workers can put into effect on the technical, managerial and organizational level.

3.2 Training Programmes and National Occupational Standards for Waste Management Qualifications (Healthcare Waste)

Although the lack of nationally accepted qualifications, in Italy there are specific occupational standards related to the healthcare sector. These standards concern the so-called 'regulated' and 'non-regulated' professions for which there are specific degree, qualification or diploma. Among the mapped professions however none is related to the management of healthcare waste since the healthcare waste management. As regards the management of the waste in general there is instead a specific occupational profile which is described later.

From the legal point of view, in Italy there are two different types of intellectual professions: 'regulated' and 'non-regulated' professions. The Italian state thus determines the minimum criteria for pursuing a profession. Those who exercise in the absence of the requirements, commits the offense of unlawful practice of professional activity pursuant to art. 348 of the Italian Penal Code. In other cases, different institutional actors (ministries, regions, municipalities, etc..) may define specific requirements for the practice of the profession within the territorial jurisdiction.

Regulated professions in the healthcare sector

The healthcare professions are mostly at university level and are placed under the supervision of the Ministry of Health. People must therefore hold a degree and have passed a state examination to practice the profession concerned. But there are also figures at lower level, with servants and auxiliary functions, whose training is not delivered at university level.

Regional authorities may in fact identify and train operators that are of interest for the healthcare sector whose professional training is at secondary level (the tertiary level of education is only managed at national level). The national 'regulated' professions, placed under the supervision of the Ministry of Health, that are engaged in the prevention, diagnosis, care, treatment and rehabilitation are:

- | | |
|---|--|
| 1. Surgeon | 15. Occupational Therapist |
| 2. Odontologist | 16. Professional Educator |
| 3. Pharmacist | 17. Audiometric Technician |
| 4. Veterinary | 18. Biomedical laboratory technician |
| 5. Psychologist - Psychotherapist | 19. Radiology Technician |
| 6. Nurse | 20. Neurophysiopathology Technician |
| 7. Pediatric nurse | 21. Orthopedic Technician |
| 8. Obstetric | 22. Audiologist Technician |
| 9. Podiatrist | 23. Cardiocirculatory Physiopathology and
Cardiovascular Perfusion Technician |
| 10. Physiotherapist | 24. Dental Hygienist |
| 11. Speech Therapist | 25. Nutritionist |
| 12. Orthoptist - assistants in ophthalmology | 26. Technician for environmental prevention in
the workplace |
| 13. Therapist of neuro and psychomotor
developmental | 27. Health care assistant |
| 14. Technician for psychiatric rehabilitation | |

Along with the abovementioned professions, there are also other non-tertiary professionals which are:

28. Masseur, lifeguard head of hydrotherapy establishments
29. Optician
30. Dental technician
31. Paediatric nurse
32. Masseur-Physiotherapist
33. Healthcare social worker

Regulated professions in the waste sector

D.Lgs. 152/06 part IV establishes the profile of the Technical manager responsible of waste management in companies dealing with waste.

The Technical manager is a professional who deals with all matters relating to the technical aspects and proper management of waste. His/her duties consist in the planning, management and monitoring of the activities related to the waste management, providing advice and monitoring the implementation of technical measures to protect the environment and the health of workers.

Every company dealing with waste must enroll a Technical manager and this role may be covered by a person inside or outside the company.

The system for Continuing Medical Education (CME)

The Continuing Medical Education (CME) is a national programme of training activities which is active in Italy since 2002. The system provides for the maintenance of a high level of knowledge related to theory, practice and communication in the medical field.

In Italy, the program is mandatory for all health professionals with the aim of keeping their knowledge and skills up to date.

According to the law every health professional provides autonomously for his training and tries to meet the goals fostered at regional and national level.

The objectives are envisaged by a specific National Commission that identifies the priority to be considered as educational objectives of national interest.

Participation to the CME programme is a duty laid down by the Code of Conduct, and an obligation confirmed by the judgment of the Administrative Court no. 14062/2004 of 18 November 2004.

The CME program provides for the allocation of a fixed number of credits for each specialist area for all medical and health professions.

VET providers willing to deliver CME credits have to register and receive a national authorization otherwise they are not allowed to provide CME-based courses.

CHAPTER 4 REMARKS – CONCLUSIONS

At national level, the following urgent needs have to be answered:

- Improve the procedures for awarding procurement contracts and for controlling the work of contractors, especially in relation to the disposal of healthcare waste.
- Enhance the separate collection inside healthcare facilities raising awareness among staff, patients and visitors; and provide for recycling the materials when possible;
- Outline a specific hierarchy of responsibilities and skills that people should have with reference to the management of healthcare waste;
- Strengthen the preventive and punitive measures related to the environmental crimes;
- Speed up the implementation of systems that ensure traceability of healthcare waste during their entire lifecycle.

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