

Quantitative and qualitative assessment of healthcare waste and resource potential assessment

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Healthcare waste treatment methods should be also viewed in the context of the waste-management hierarchy

Analyses the possibility to apply the circular economy principles into healthcare waste management, evaluation of resource recovery alternatives

Methodology:

- literature review
- data analysis
- indicator analysis method
- multi-criteria decision-making analysis (MCDA)

Healthcare waste is from hospitals, clinics, healthcare centers, dental centers, laboratories, research centers, mortuary and autopsy centers, animal research and testing facilities, blood banks and collection services and nursing homes

From all healthcare waste hazardous waste is **15-25%**



Sharp waste

Infectious waste

Anatomical and pathological waste

Pharmaceutical and chemical waste

Genotoxic waste

Radioactive waste

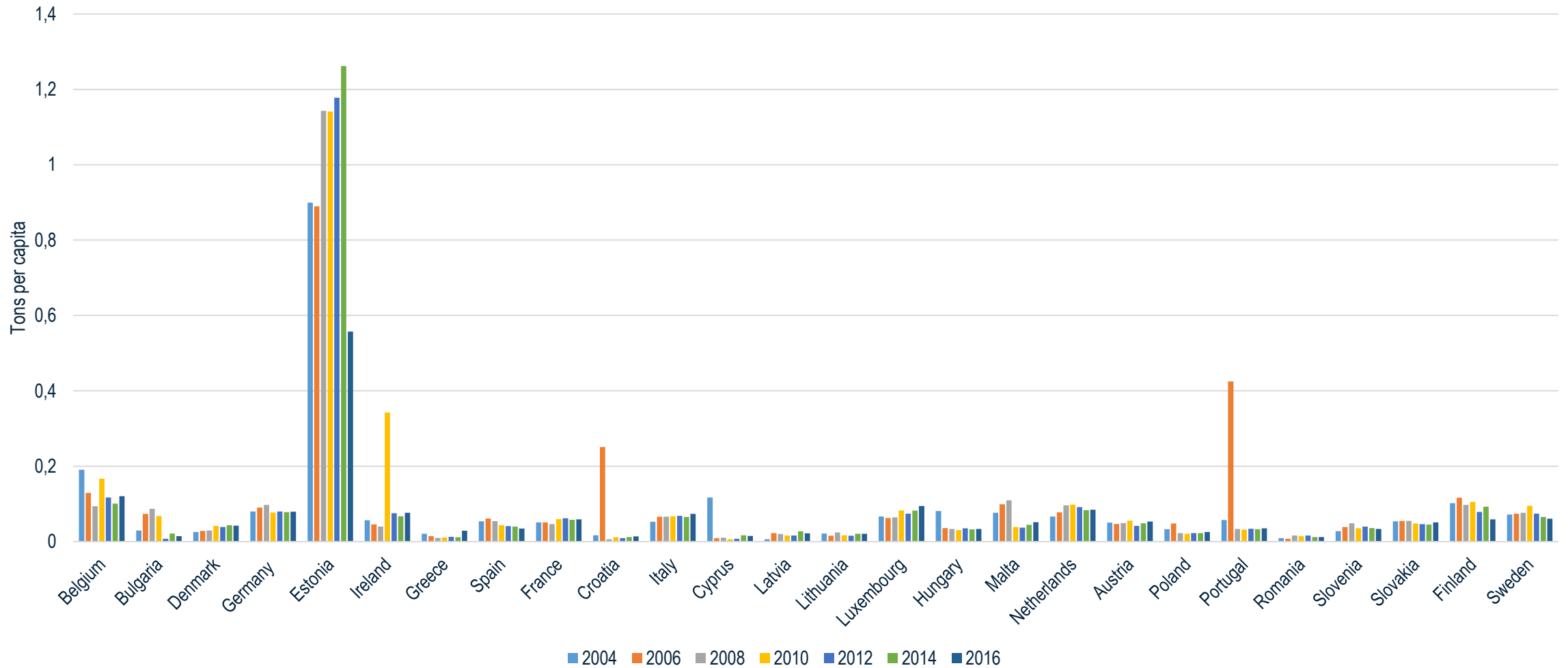
Cytotoxic waste

On average **healthcare waste** in Europe is 3,10 kg/bed-day, in America it is 4,41kg/bed-day, in Asia it is 2,47 kg/bed-day and in Africa it is 0,80 kg/bed-day

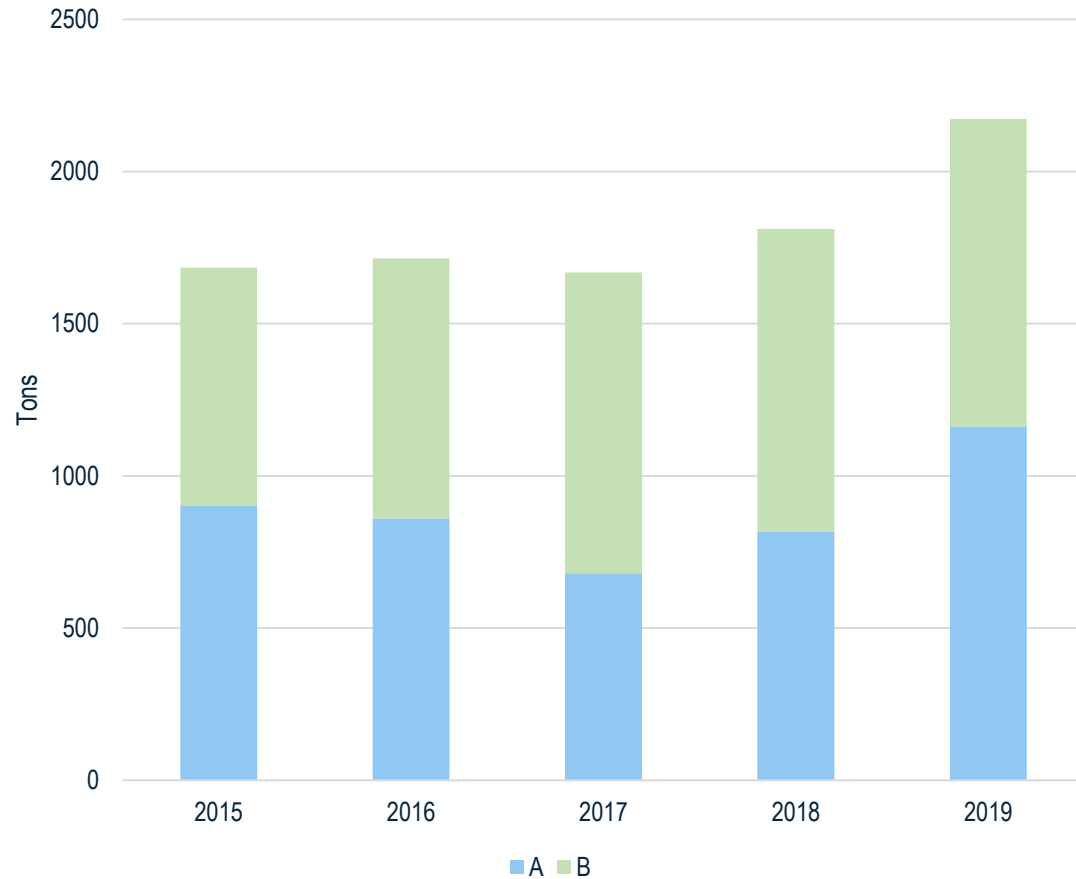
High-income countries generate **hazardous healthcare waste** on average up to 0,5 kg/bed-day and low-income countries generate on average 0,2 kg/bed-day

	Healthcare Waste	Hazardous healthcare waste
Hospital	2 kg/bed-day	0,5kg/bed-day
Clinic	0,02 kg/patient-day	0,007 kg/patient-day
Maternity Center	5 kg/patient-day	3 kg/patient-day
Clinical Laboratory	0,06 kg/test-day	0,02 kg/test-day
Basic Health Unit	0,04 kg/patient-day	0,01 kg/patient-day

Hazardous healthcare waste in EU



Healthcare waste in Latvia

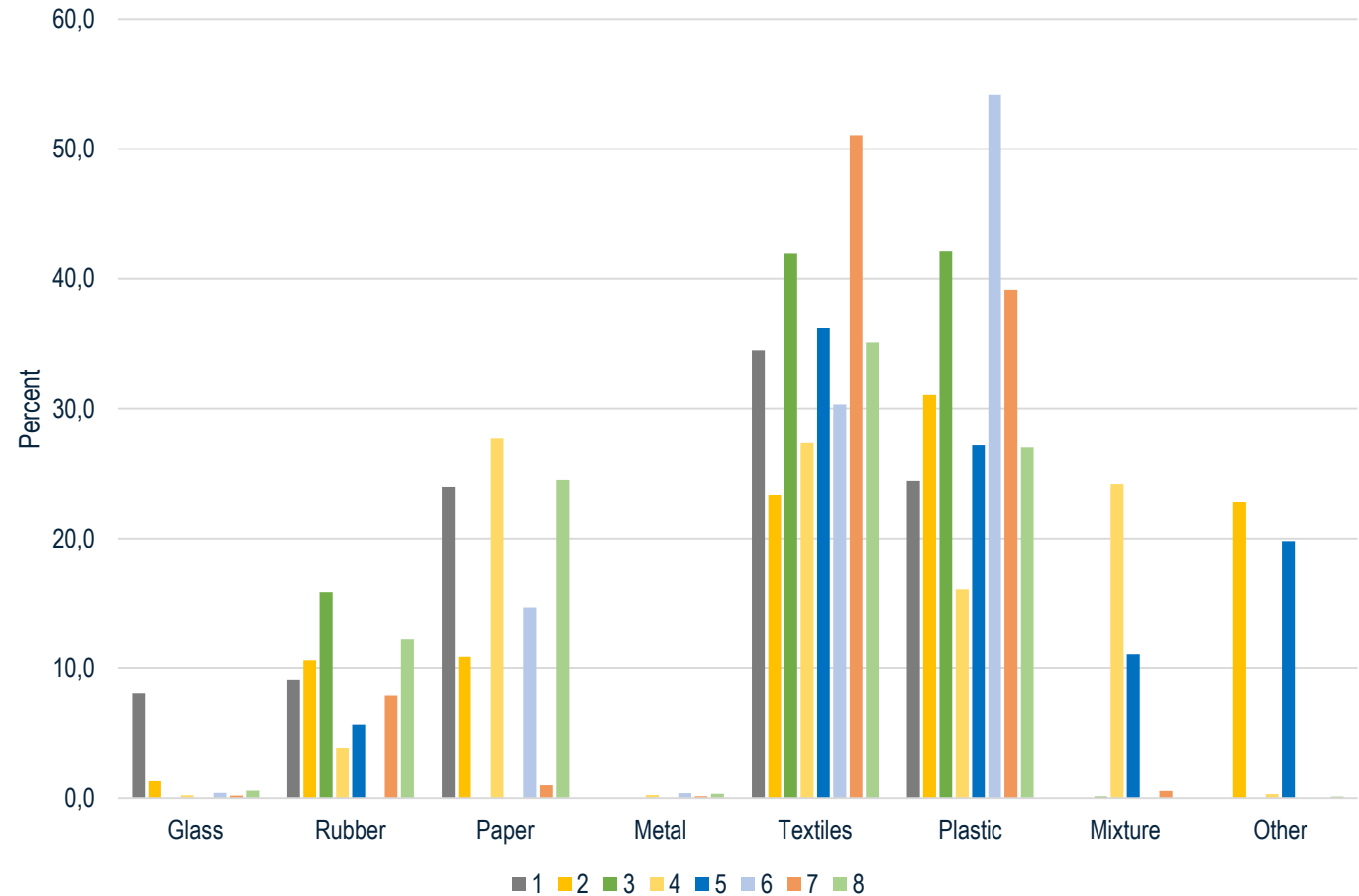


On average each year are collected:

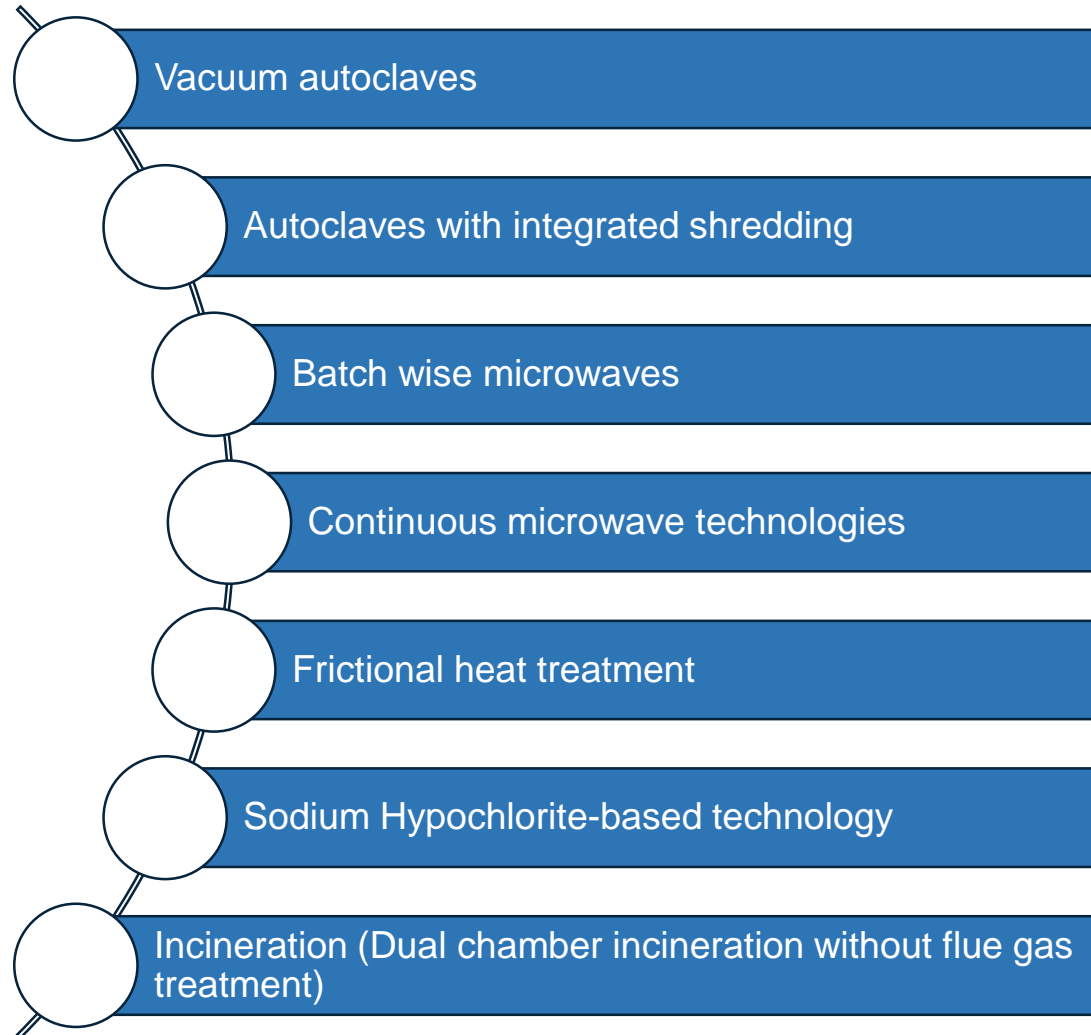
- **1668 tons** of hazardous waste from waste class 180103 - wastes whose collection and disposal is subject to special requirements in order to prevent infection
- **74,5 tons** of waste from class 180109 - medicines which is not cytotoxic
- **35,3 tons** of hazardous waste from waste class 180106 - chemicals consisting of or containing hazardous substances
- **29,7 tons** of hazardous waste from waste class 180202 - wastes whose collection and disposal is subject to special requirements in order to prevent infection

Morphological analysis of inactivated hazardous healthcare waste

On average from all healthcare facility biggest part was **textile waste (35%)** and different type of **plastic waste (33%)**



Indicators for hazardous healthcare waste management



Criteria	Weights
Energy consumption (kWh/kg)	0,1
Water consumption (l/kg)	0,1
Water connection (yes/no)	0,03
Quality of water for steam generation	0,03
Waste water connection (yes/no)	0,04
Environmental impacts (high/low)	0,05
Hazardous residues (yes/no)	0,05
Capacity interval (kg/hour)	0,04
Infectivity removal efficiency	0,2
Temperature (°C)	0,03
Residue (recognizable/unrecognizable)	0,03
Types of waste treated	0,1
Costs and maintenance (high/low)	0,2



Healthcare waste can be recycled:

- plastic materials
- personal protective equipment
- face masks and medical textile
- glass



Needles can be reused in use as a substitute in construction materials

Healthcare waste used as energy