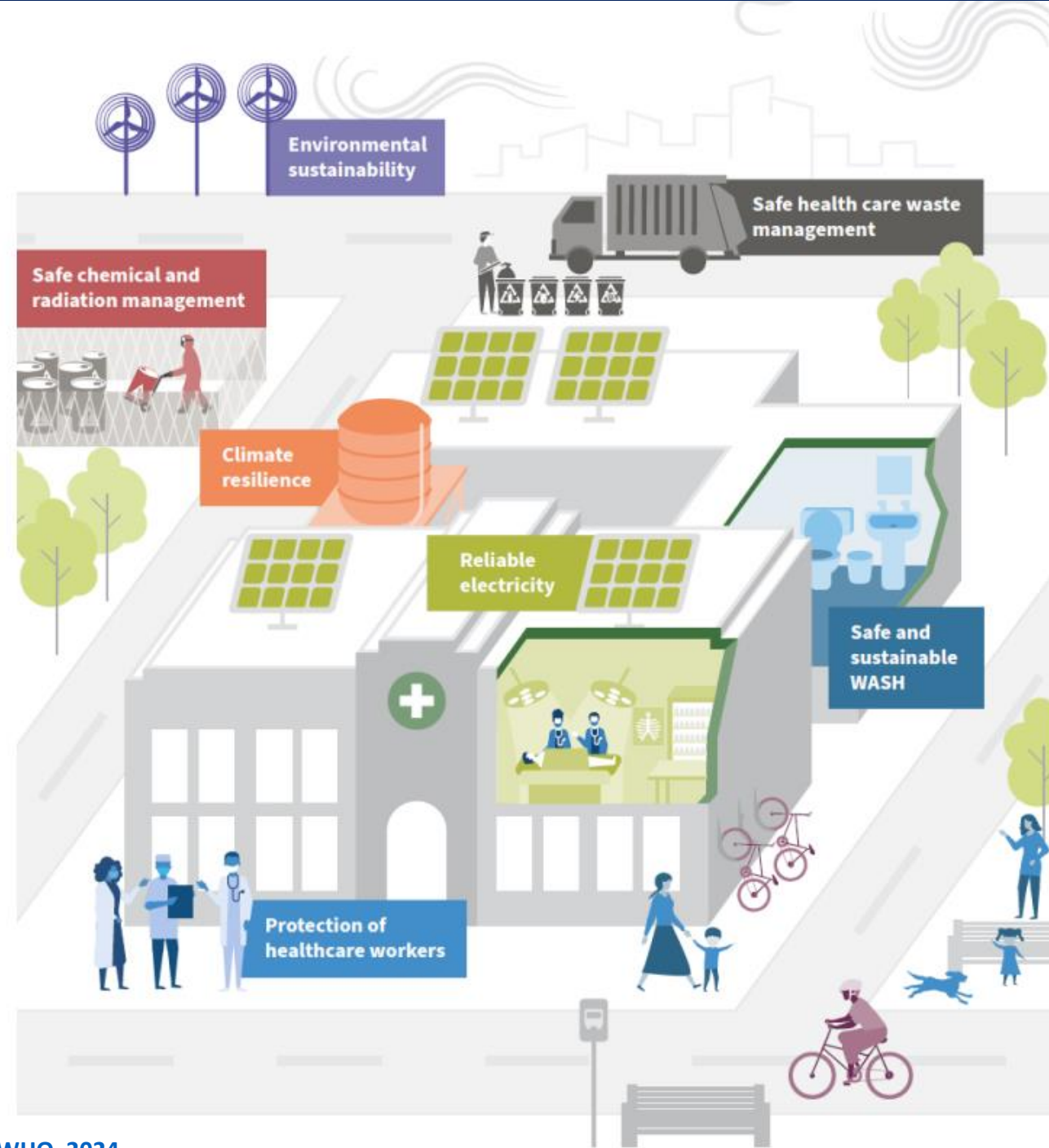


WHO-led initiatives to minimize the environmental impact of medication waste

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WHO European Centre for Environment and Health

Minimizing the Ecological and Economic Burden of Medication Waste in Europe

June 26, 2025

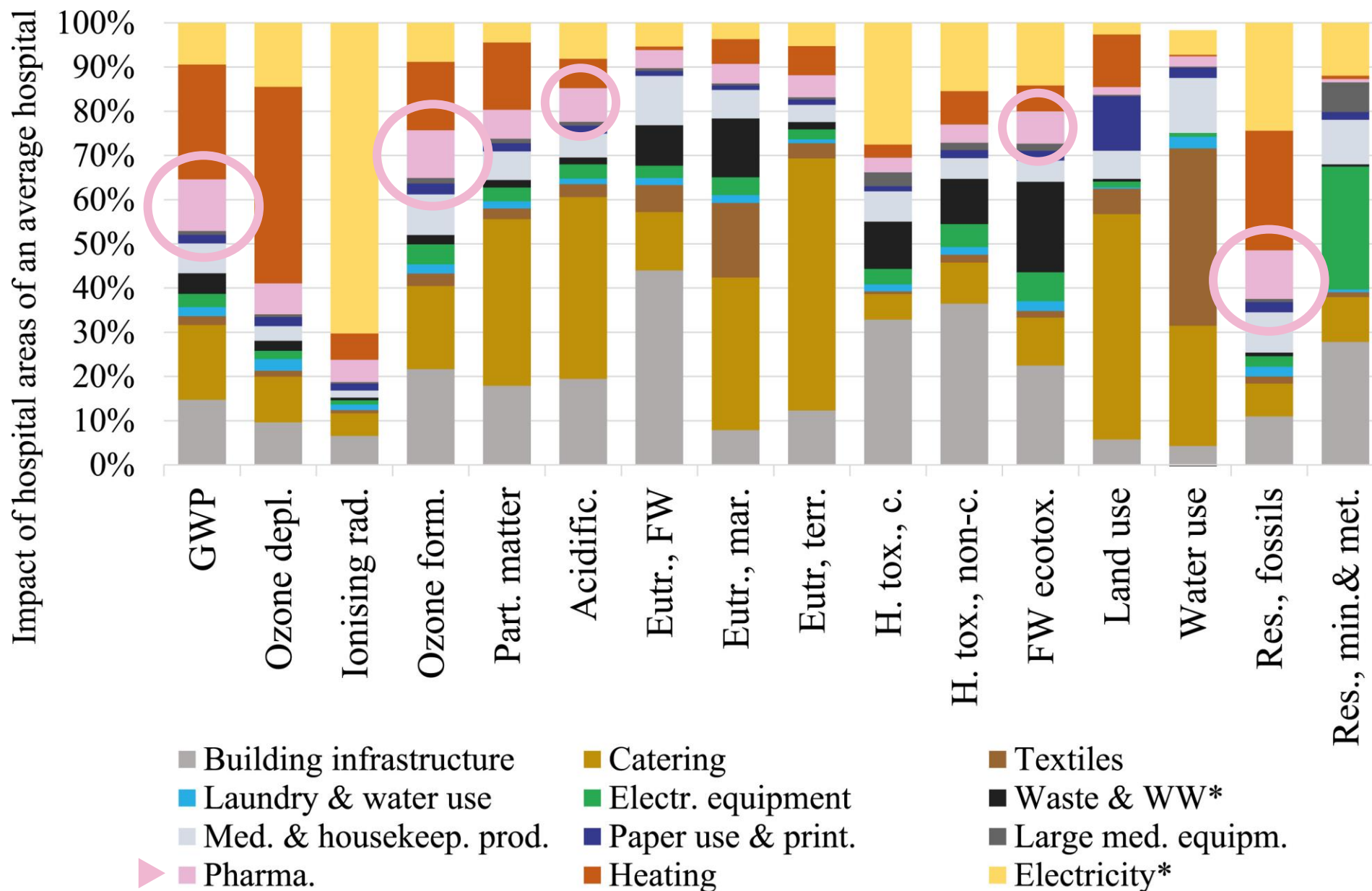


The ecological footprint of pharmaceuticals

Proportion of the global warming potential (GWP) of an average Swiss hospital



Environmental footprint of 33 hospitals in Switzerland



Carbon footprint of selected pharmaceuticals

(3.5 Mt per year)

	High	Medium	Low		
Products	Product Emission Factor by weight, kgCO ₂ e/kg	Consumption per patient-year, kg/patient	Total GHG emission per patient-year, kgCO ₂ e/patient	Patient demand ¹ in 2030, M	Total GHG emission, ktCO ₂ e
Heat-stable Carbetocin	7.4	0.03	0.2	17	4
Long-acting Cabotegravir	9.7	0.2	2	21	11
Dolutegravir-based regimen ²	64.4	1.3	83	32	2,657
B-PaL regimen ³	57.4	0.7	41	0.1	2
Artemisinin-based combination therapy	6.9	0.04	0.3	480	103
HIV Self-Testing	9.4	0.1	0.9	30	27
Point-of-Care PCR testing platform	4.3	0.1	0.3	30	10
High-throughput real time platform for HIV-1 PCR test	3.1	0.1	0.4	31	14
Long-Lasting Insecticide-treated Nets	7.5	0.1	0.7	115	506
Pressure swing adsorption oxygen generating plant	0.2 kg CO ₂ e/m ³	101m ³	17	854 M m ³	147
					~ 3,480

WHO Initiatives

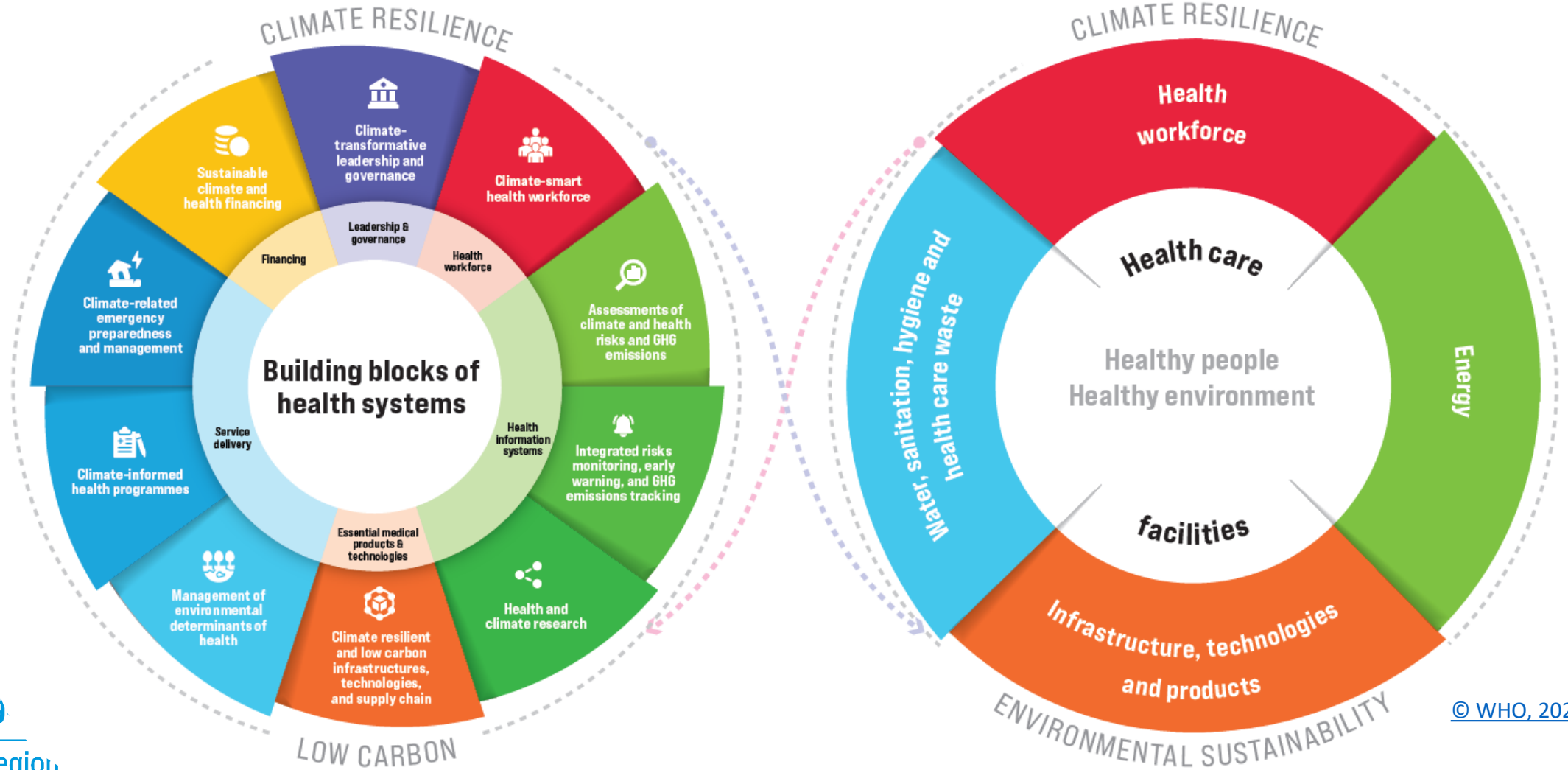
Technical Global Guidance (2025)

- Summary of existing, relevant recommendations and good practice examples for the safe management of pharmaceutical waste
- Scope: Covers pharmaceutical waste generated in healthcare settings produced during routine operations as well as in outbreaks and emergencies
 - Waste prevention and minimization
 - Pharmaceutical waste management
- Target audience: Health authorities, health care facilities, and waste management professionals

Safe management of pharmaceutical waste from health care facilities global best practices



WHO guidance on climate-resilient and environmentally sustainable health systems and health care facilities






Examples of interventions: Pharmaceuticals



Procurement

- Choose less environmentally harmful products (e.g., packaging, APIs)
- Choose products with adequate package size
- Forecasting and inventory management to avoid expiration 




(Climate) Resilience

- Sufficient stocks of essential supplies in case of supply chain disruptions (production/transport)
- Protection of heat-sensitive medicines during transportation and storage




Consumption

- Education!
- Early intervention / diagnostic accuracy
- Reduce overprescription and enhance medication adherence
- Reduce overconsumption
- Collect and redistribute unused medications 



Disposal

- Extended producer responsibility
- Waste segregation, safe storage and disposal 

Initiatives in the WHO European Region

Creating political commitment



The Budapest Declaration (2023)

- Prioritize action on the health challenges related to the triple crisis of climate change, environmental pollution, and biodiversity loss:
 - Strengthen the engagement of the health sector in this agenda
 - Strengthen interlinkages between environment and health within and outside the health sector
 - Enhancing efforts to reduce emissions and releases of chemicals to the environment, in particular, persistent and so called 'forever' chemicals, pharmaceuticals, etc.

Initiatives in the WHO European Region

Technical support and capacity building for Member States

Example: Workshop for hospital managers in Romania, 2024




Technical inputs on climate resilient and environmentally sustainable health systems

Some practical examples of what we are doing

Waste Management

- Substitution of single use materials by reusable
- Reduction of use (cataract surgery, for example)
- Circular economy: reusing materials for new functions
- Capture of anesthetic gases



Practical examples: Switching from IV to oral anesthesia during cataract surgery (hospital in Portugal)

Green deal 3.0

Theme 5: Reducing the environmental impact of medication (use)

Reducing the environmental impact of medication (use)

As a result, we are committed to:

- 1. Appropriate prescribing and appropriate delivery** of needed medications
- 2. Promote patient compliance** and proper use

Commit to **reducing discharge of X-ray contrast media**

Inform drug recipients of importance of returning residuals

Planning

Prefer less environmentally damaging option in situation where equal effect

Develop approach with measures to reduce wastage of medication due to unnecessary prescribing

Investigate whether purification at source makes sense

Let's Sustainable Together for Romania

Practical example: Redispensing medication (hospital in the Netherlands)

Initiatives in the WHO European Region

Facilitating dialogue and knowledge exchange among Member States

European Environment and Health Process (EHP) Partnerships

- Health Sector Climate Action (led by Ireland)
- HBM in the WHO European Region (led by Germany and co-led by Georgia)
- EHP Partnership on Poison Centres
- The PEP/EHP Partnership on Healthy and Active Mobility (led by Austria, France and the Netherlands)
- Youth in the WHO European Region (led by Slovenia)
- EHP Partnership on Risk Reduction in the School Environment



Relevant tools and guidance

Source: Annex A5, WHO (2025): [Safe management of pharmaceutical waste from health care facilities](#)

Area	Name and weblink of document
Specific guidance	
Donations	Inter-agency Guidelines for medicine donations: https://www.who.int/publications/i/item/9789241501989
Procurement	United Nations Development Programme Sustainable Procurement Index for Health (SPIH): user guidance: https://api.savinglivesustainably.org/documents/file/764e233134ffe62af43550927d10c2eb/full/hash
Tools	
Implementation	United Nations Children's Fund/WHO WASH FIT implementation tool: https://www.who.int/publications/i/item/9789240043237
Controlled substances	United Nations Toolkit on Synthetic Drugs – safe handling and disposal: https://syntheticdrugs.unodc.org/syntheticdrugs/en/safe-handling-and-disposal/index.html

Area	Name and weblink of document
Databases	
Pharmaceuticals	United States Pharmacopeia classification system: https://www.fda.gov/regulatory-information/fdaaa-implementation-chart/usp-therapeutic-categories-model-guidelines
Pharmaceuticals	World Health Organization (WHO) Model list of essential medicines: https://list.essentialmeds.org/
Controlled drugs	Drug Enforcement Administration of the United States list of controlled substances: https://www.deadiversion.usdoj.gov/schedules/orangebook/c_cs_alpha.pdf
Controlled drugs	United Nations Single Convention on Narcotic Drugs of 1961: https://www.unodc.org/pdf/convention_1961_en.pdf Its updates: https://www.incb.org/incb/en/narcotic-drugs/index.html
Antineoplastics and others	National Institute for Occupational Safety and Health of the United States (NIOSH) NIOSH list of antineoplastic and other hazardous drugs in healthcare settings: https://www.cdc.gov/niosh/healthcare/hazardous-drugs/index.html
Environmental impacts	Stockholm County Council database of the environmental impact of pharmaceuticals: http://janusinfo.se
General guidance on health care waste management	
Health care waste management	WHO Safe management of wastes from health-care activities: https://www.who.int/publications/i/item/9789241548564
Health care waste management	Basel Convention – Technical guidelines on the environmentally sound management of biomedical and healthcare wastes (Y1; Y3): https://www.basel.int/TechnicalGuidelines/tabid/8025/Default.aspx
Health care waste management	United Nations Environment Programme Compendium of technologies for treatment / destruction of healthcare waste: https://www.unep.org/ietc/resources/report/compendium-technologies-treatment-destruction-healthcare-waste
Technologies	WHO Overview of technologies for the treatment of infectious and sharp waste from health care facilities: https://apps.who.int/iris/handle/10665/328146

Thank you!

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European Region

