Opinion Paper

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Chemical strategies for sustainable medical laboratories

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Abstract: Chemicals are essential components of our daily lives, for the well-being, high living standards and comfort of modern society. They are used in many sectors, including health. However, some chemicals have hazardous properties which can harm the environment and human health. Chemical pollution is significantly contributing to the current global problem of climate change and loss of biodiversity There is an increase in health problems that can be partially explained by the use of chemicals. Some man-made chemicals are found in the most remote places in the environment, but also in our bodies. Chemicals are everywhere. Chemicals strategy for sustainability towards a toxic-free environment will ensure better protection of human health and the environment from hazardous chemicals, boost innovation for safe and sustainable chemicals and enable the transition to chemicals that are safe and sustainable by design. It is a first step towards the Zero pollution ambition for a toxic-free environment announced in the European Green Deal. The strategy proposes comprehensive chemical legislations for the transformation of industry with the aim of attracting investment into safe and sustainable products and production methods. Clinical laboratories must choose safer, more sustainable alternatives to hazardous chemicals, address sustainability issues, and implement official guidelines on how to reduce their carbon footprint.

Keywords: green chemistry; hazardous chemicals; sustainable chemistry.

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Introduction

Environment is the external conditions with which an organism interacts. This interaction has been going on since the existence. Environmental issues have become more widespread and intense due to increasing industrial and human impacts on the environment. Environmental unconsciousness and excess consumption caused deterioration and exhaustion of natural resources. Rapid population growth has triggered this situation, consequently 50% of the world's current environmental pollution has occurred in the last 4-5 decades. Global problems are growing. Our world is sounding alarm. Our natural resources are diminishing. Our world is warming. Climate is changing. Millions of species on the planet are at risk of being extinct due to warming of atmosphere and climate changes. Oceans and forests have been progressively destroyed and polluted. The COVID-19 pandemic, climate change and biodiversity problems are deeply connected. Biodiversity loss can cause changing hosts of the pathogens.

In recent years, there has been an increase in waste, including hazardous waste, due to industrialization, urbanization, economical development, and rising population. Waste generation has a profound social, economic and environmental impact. In Europe, approximately 3 billion tonnes of waste are produced each year, of which 100 million tonnes are hazardous [1]. It is estimated that 15% of healthcare waste is hazardous (infectious, toxic or radioactive) [2], and that chemical or pharmaceutical waste represents 3% of all waste associated with healthcare [3]. Thus, medical waste has become one of the most important pollutants worldwide and in Europe, affecting soil, water, and air quality. It is a priority for healthcare organizations to have multidisciplinary teams addressing sustainability issues.

Hazardous chemicals

Chemicals are ubiquitous in our society and have been sources of improvement of human health and life expectancy, specifically in healthcare and clinical laboratories. However, they represent possible causes of adverse effects to human health and the environment because of their potential hazardousness [4, 5]. Thus, the definition and classification of hazardous chemicals is key to identify and prevent exposure to these substances, which can be done through labels and safety data sheets.

Definitions of hazardous waste differ according to the country, although in general, hazardous waste is defined as a material that is deleterious to human health or the environment that is no longer usable for its original purpose and is intended for disposal, but it is still hazardous [6, 7]. The risk can increase as waste composition changes [6]. There are several properties that can render chemicals hazardous, such as being explosive, oxidizing, highly flammable, flammable, irritant, harmful, toxic, carcinogenic, corrosive, infectious, toxic for reproduction, mutagenic, sensitizer, ecotoxic, or capable of releasing toxic or very toxic gases in contact with water, air or an acid, as well as chemicals that yield another substance with the characteristics listed above after disposal [8]. In clinical laboratories, chemical waste includes solvents and reagents, sterilants, disinfectants, batteries, heavy metals from medical devices, radioactive diagnostic materials and chemical mixtures [2].

When addressing the hazardous potential of a chemical, several aspects as shown in Table 1 should be considered [9]:

Roughly 60% of more than 100,000 chemicals in the EU market are considered hazardous to the environment and/or human health, and 11.2% of EU's global chemical output is attributed to health and social work [10]. Regarding the risks related to chemicals, they can arise either from production, transport, use or disposal. Managing chemicals correctly and sustainably is a priority. Hazardous chemicals are a known contributor to health conditions in EU, being associated with cancer, neurodevelopment disorders, reproductive, metabolic, cardiovascular and respiratory diseases [11, 12]. In general, the most vulnerable population subgroups will more likely develop pollution-related diseases (e.g. children of low socioeconomic status) [6]. Furthermore, exposure to chemicals, even at low doses, can promote long-term health outcomes, such as, decreased fertility, lower birth weights and neuropsychiatric conditions in children. 10–15% of all births present neurobehavioral development disorders, attention deficit-hyperactivity disorder (ADHD) and autism spectrum disorder having a widespread distribution [10]. There is an increasing number of different hazardous chemicals in human tissues and blood [13], which can induce toxic combination effects that are greater than the effects of each individual chemical separately [10]. Combined exposure to hazardous chemicals has been associated with lower birth rates and reduced fetal growth [13]. Moreover, there is a major economic impact due to exposure to endocrine disrupting chemicals, with €157 billion spent each year, and approximately €1.5 billion attributed to female reproductive diseases alone [10].

Table 1: The list to determine hazardous potential of chemicals.

1	Its physicochemical properties
2	The quantity produced/imported and used in each product application
3	Duration and frequency of exposure. Combined exposure with other chemicals
4	Transformation and degradation products
5	Major impurities and additives
6	Likely pathways to the environment, environmental distribution and degradation or transformation
7	Duration and frequency of emissions to different environmental compartments and its respective dilution
8	Likely routes of exposure and absorption in humans
9	Geographical scale of exposure
10	Matrix dependent release of the chemical
11	Accurate exposure data availability
12	Implemented or recommended risk management

Concerning the environmental impact of hazardous chemicals, they can enter the natural ecosystems either at extraction, manufacture, downstream use (e.g. at clinical laboratories) or through disposal/recycling/reuse of the substances [11]. The assessment should include the potential effects on the aquatic, terrestrial and atmospheric compartments, as well as in the microbiological activity of sewage treatment systems and impacts via food-chain accumulation [9]. Additionally, their impact varies according to the type and volume/concentration of the chemical; the affected environmental compartment (air, water, land); the duration of exposure (acute vs. chronic); the timing of release into the ecosystem and the receptors (e.g. species) exposed and their sensitivity to the chemical [11]. These assessments help to categorize a hazardous chemical and to define the concentration below which adverse effects in the environmental sphere of concern are not expected to occur – Predicted No-Effect Concentration (PNEC) [9]. Furthermore, there are issues concerning reused chemicals in a circular economy, as this can increase the circulation of hazardous chemicals. An important class of chemicals are those determined as very persistent (resistant to degradation) since their indefinite stability promotes accumulation to harmful levels. Recently, combination effects of chemicals have gained relevance, which consist of exposure at low concentrations of different hazardous chemicals, even if all substances are below the PNEC [14].

Hazardous chemicals can cause stratospheric ozone depletion and affect ecosystems, flora and fauna [6, 12]. Specifically, they can decrease water and air quality, contaminate land and affect insect pollinators, especially if used and/or discarded with disregard for current legal, scientific and technical guidelines [11, 12]. Chemical pollution is significantly contributing to the current global problem of climate change and loss of biodiversity [15]. In the healthcare sector, disposal of untreated waste can promote the contamination of drinking water, groundwater, and surface water if landfills are not adequately built; inappropriate waste incineration can result in air pollution and ash residue, generation of carcinogenic dioxins and furans from chlorine-containing substances and spread of toxic metals from lead, mercury and cadmium-containing materials [2]. Recent data points to over 2.5 million possibly contaminated sites in Europe, with 14% known to be contaminated and in need of damage control measures [11]. Therefore, new production processes and technologies, as well as new chemicals, must be sustainable throughout the product life cycle [15].

The classification list of hazardous substances and chemicals can be found in the EU document entitled "Regulation on the Classification, Labelling and Packaging of hazardous substances (CLP)" [16] and the EU Regulation on the "Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) [17]. The European Waste Catalogue classifies waste from human or animal healthcare and/or related research and further divides it into sections applicable to chemicals in clinical laboratories.

– 18 01 Wastes from natal care, diagnosis, treatment, or prevention of disease in humans
– 18 01 06 Chemicals consisting of or containing hazardous substances
– 18 01 07 Chemicals other than those mentioned

According to the ECHA/CLP inventory, there are over 120,000 registered chemicals and 2,327 hazardous substances out of 4,231 that have a harmonized classification of "harmful to the aquatic environment" [11]. In Europe, the most common soil contaminants include heavy metals, mineral oils and polyaromatic hydrocarbons (PAH) [11]. Table 2 includes the most commonly registered chemicals in REACH [17]:

Moreover, according to the Directive 2011/65/EU regarding medical devices, there are restricted substances which have a maximum concentration tolerated by weight in homogeneous materials, namely, lead (0.1%), mercury (0.1%), cadmium (0.01%), hexavalent chromium (0.1%), polybrominated biphenyls (PBB) (0.1%), polybrominated diphenyl ethers (PBDE) (0.1%), bis(2-ethylhexyl) phthalate (DEHP) (0.1%), butyl benzyl phthalate (BBP) (0.1%), dibutyl phthalate (DBP) (0.1%) and diisobutyl phthalate (DIBP) (0.1%) [18]. Mercury has a high toxic potential to both humans and wildlife, especially in the form of methyl mercury; however, the use of this heavy metal is declining globally and in the EU due to the availability of mercury-free alternatives and increasing regulatory restrictions for its use [19]. In Europe, mercury is used in the chemicals sector, lighting, switches and electrical controls, measuring and control equipment, dental amalgam, batteries and in chlor-alkali plants [19].

Table 2: Most commonly registered substances in REACH.

Substance	Number of registrations
Ethanol	707
Calcium dihydroxide	577
Iron	535
Ethylene oxide	526
Ethylene	450
Charcoal	413
Aluminium oxide	412
Aluminium	385
Styrene	358
Methyloxirane	355
Silicon dioxide	339
Propene	335
Calcium sulphate	325
Titanium dioxide	316
Sodium hydroxide	310
Ethane-1,2-diol	306
Silicon	301
Methanol	284
Calcium oxide	278
Propane-1,2-diol	276

The economic toll concerning the contamination of the environment is significant, since there are very high costs of remediation related to the loss of drinking water, land and fish stocks [10]. The cost of healthcare waste disposal corresponds to 25% of the global healthcare sector spending in the United States (US) [20]. In addition, decontamination of natural resources as well as buildings and infrastructure is extremely expensive – polychlorinated biphenyls (PBCs) contamination represented an expenditure of €15 billion between 1971 and 2018 in the EU [10].

What is green and sustainable chemistry?

"Green" and "Sustainable" are terms that are used for environmental awareness and protection of natural resources. "Green" is definitely about environmental protection/health. "Sustainable" is about environmental protection, economic growth and social benefits. Despite these differences, the concepts of 'Green' and 'Sustainable' are often used interchangeably. We should know that the concept of "Green" is not always mean "Sustainable" (Figure 1) [13].

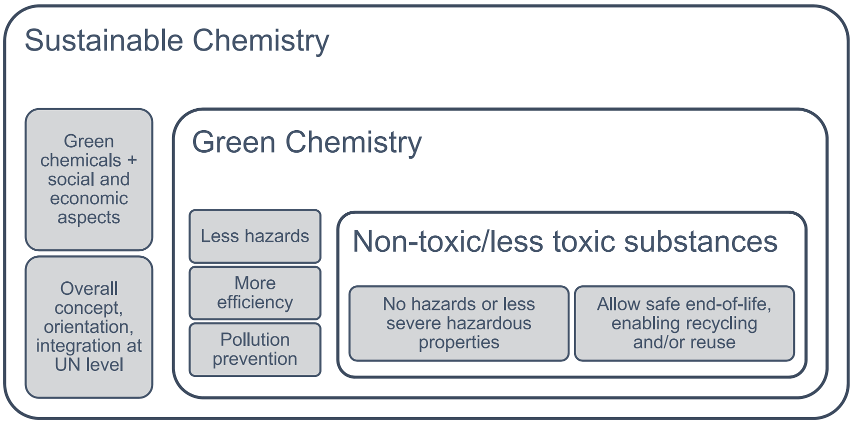

Figure 1: Relationship between the concepts of sustainable chemistry, green chemistry and non-toxic/less toxic substances.

The idea of Green Chemistry is defined as “the design of chemical products and processes that reduce and/or eliminate the use or generation of hazardous substances” [10]. Green chemistry and its principles can provide a strategy for reducing pollution, hazardous synthesis and accident prevention, while evaluating the overall life cycle impact of a given chemical [10]. Importantly, the effective environmental management of a clinical laboratory will lead to increased quality performance, as the two issues are intertwined.

The Green Chemistry concept applies innovative scientific solutions to solve environmental issues posed in the laboratory. The concept of Green Chemistry was introduced in the late 1990s by Paul Anastas and John Warner. They developed the Twelve Principles of Green Chemistry [21]. These principles can be grouped into “Reducing Risk” and “Minimizing the Environmental Footprint” which include the reduction of both the amount of hazardous chemicals in waste and the toxicity of those substances; improved efficiency of the production process; decreased resource use and greenhouse gas emissions; improved safety; and the economic and social aspects of chemicals [10].

The aim of Green Chemistry is to reduce chemical-related impact on human health and virtually eliminate contamination of the environment through dedicated, sustainable prevention programs. Green chemistry searches for alternative, environmentally friendly reaction media and at the same time strives to increase reaction rates and lower reaction temperatures.

The concept of Green Chemistry, along with the EU strategy for a non-toxic environment, can be viewed as part of the global sustainability goals. Additional, safe and sustainable-by-design chemicals is a pre-market approach that strives to deliver substances that minimize their health and environmental impacts [13].

Concerning the strategies to promote sustainable chemistry in clinical laboratories, there are general approaches to both the management of waste and the selection and management of chemicals, as seen below in Figure 2 [13] and Table 3.

Sustainabilty strategies of UN and EU related to hazardous chemicals

The first definition of sustainability was published by the United Nations in 1987, stating that “the needs of the present without compromising the ability of future generations to meet their personal needs” [22]. The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.

The definition of sustainability proposed by the European Union (EU) considers a wide range of sustainability strategies, including human, environmental and economic aspects [23]. The European Commission (EC) in line with the 2015 Paris Agreement for climate has taken some initiatives to decrease carbon footprints and established the European Green Deal (EGD) Investment Plan, also known as the Sustainable Europe Investment Plan. It aims at making Europe the world’s first climate-neutral continent by 2050 and to

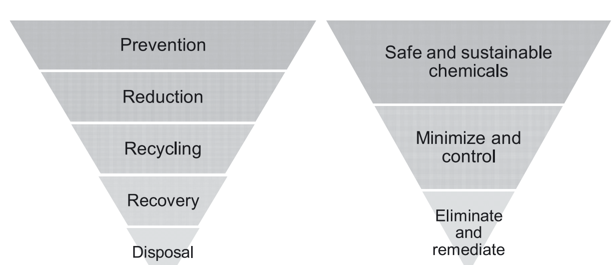

Figure 2: Hazardous chemical waste management hierarchy.

Table 3: Objectives to implement green and sustainable chemicals.

1	Standardization of green chemistry and hazardous chemicals sustainability processes in clinical laboratories.
2	Encouragement of laboratory medicine professionals to implement green chemistry and hazardous chemicals-related sustainability measures.
3	Promote the increase in hazardous chemicals data from clinical laboratories, including new insights and outcomes.
4	Support changes in community attitudes and behaviours concerning chemicals, specifically among healthcare professionals.
5	Promote educational programs in green chemistry.
6	Strive to reach a significant number of european countries and clinical laboratories regarding chemical-related sustainability actions.
7	Prevent air, water and soil contamination with hazardous chemicals and respective environmental, health and economic impacts.
8	Improve occupational health.
9	Increase resource efficiency.
10	Reduce hazardous chemical waste collection, treatment and disposal expenditures.
11	Promote sustainable procurement systems. Indirectly increase demand and innovation for safe and sustainable chemicals.

transform the EU into "a fair and prosperous society, with a modern, resource-efficient and competitive economy that aims to protect, conserve and enhance the EU's natural capital, and protect the health and well-being of citizens from environment-related risks and impacts" [24].

The European Commission adopted the EU Chemicals Strategy for Sustainability on 14 October 2020. The Strategy is the first step towards a zero-pollution ambition for a toxic-free environment announced in the European Green Deal. The Strategy will boost innovation for safe and sustainable chemicals and increase protection of human health and the environment against hazardous chemicals. The strategy proposes a clear roadmap and timeline for the transformation of industry with the aim of attracting investment into safe and sustainable products and production methods [13].

In line with the European Green Deal, the EU Chemicals Strategy strives for a toxic-free environment, where chemicals are produced and used in a way that maximises their contribution to society including achieving the green and digital transition, while avoiding harm to the planet and to current and future generations. It envisages the EU industry as a globally competitive player in the production and use of safe and sustainable chemicals. The strategy proposes a clear roadmap and timeline for the transformation of industry with the aim of attracting investment into safe and sustainable products and production methods.

Chemicals Strategy for Sustainability towards a toxic-free environment will.

– Ensure better protection of human health and the environment from hazardous chemicals
– Boost innovation for safe and sustainable chemicals
– Enable the transition to chemicals that are safe and sustainable by design

It is a first step towards the Zero pollution ambition for a toxic-free environment announced in the European Green Deal.

There is evidence to support the beneficial effects of regulation in waste management. A recent study reported possible waste cost savings over $700 million over five years if all hospitals in the US instituted waste management strategies and of $2.7 billion over five years if single-use medical device reprocessing was implemented [25]. Furthermore, the EU chemicals acquis has been effective in reducing human and environmental exposures to hazardous substances targeted by EU legislation in the previous 3-4 decades, with some preliminary data pointing to substitution of these chemicals [2]. The EU Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) regulation has estimated cost savings of €100 billion over 25–30 years in benefits to the environment and human health [26]. Thus, regulation to implement safe and sustainable management of healthcare waste can prevent expenditure in adverse health outcomes and environmental impacts due to the release of chemical hazards [2].

Lack of training and knowledge in chemical products and their hazardousness may result in occupational and environmental safety issues. Concerning healthcare, a lack of knowledge and/or awareness in sustainability practices by clinical laboratory employees is the most common reported hurdle for sustainability in the healthcare sector [27]. Thus, laboratory-related scientific societies have a key role in providing continuing education and guidance. Although sustainable structures and methods for sustainable healthcare are now well-defined regarding their goals in the social, economic and ecological fields, there is a lack of consensus on the strategies to be implemented in clinical laboratories [27]. In fact, a survey performed by the International Federation of Clinical Chemistry and Laboratory Medicine reported that most respondent laboratories had not addressed sustainability issues, and that there was a need for official guidelines on how to reduce their carbon footprint [28].

Legislations

Chemicals-related legislations have more than 100 directives and regulations. The existing EU legal framework on chemicals, in particular the EU Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and

Classification, Labelling and Packaging (CLP) Regulations, are the strictest legislations in the world, regulating chemical substances, and affecting industries throughout the world. The Chemicals Strategy suggests that they should be reinforced with targeted revisions of both Regulations to ensure that there is sufficient information on chemicals manufactured or imported into the EU.

Implementation and enforcement of European chemicals legislation are needed to ensure compliance for the whole life cycle of chemicals: production, placing on the market, release, and disposal. Currently almost 30% of the alerts on dangerous products on the market involve risks due to chemicals. Only one third of the registration dossiers of the chemical substances registered by industry under REACH are fully compliant with the requirements.

The Commission will carry out audits on the enforcement systems in the Member States and make proposals to further strengthen the principles of 'no data, no market' and the 'polluter-pays'.

Substances were identified as of very high concern under REACH as well as those listed in Classification, Labelling and Packaging (CLP) Regulations as having chronic effect on health and the environment.

In order to prevent negative long-term effects, the exposure of humans and the environment to these substances of concern should be minimized and substituted by safe alternatives if possible. The most harmful ones should be especially banned from consumer products and allowed only for proven essential societal use and where no acceptable alternative exist.

How can laboratories reduce hazardous chemicals use

Chemical production is one of the most polluting, energy and resource-intensive sectors and is closely integrated with other energy-intensive sectors and processes. While the European chemical industry has already invested in improved manufacturing plants, the green and digital transition still requires significant investments for the sector [19]. Novel and cleaner industrial processes and technologies would help not only to lower the environmental footprint of chemicals production, but also to reduce costs, improve market readiness and create new markets for the European sustainable chemicals industry.

Energy efficiency must be prioritized in accordance with the ambition of the European Green Deal, and fuels such as renewable hydrogen and sustainably produced biomethane could play a decisive role for the sustainability of energy sources [29]. Digital technologies – such as the internet of things, big data, artificial intelligence, smart sensors, and robotics – can also play an important role in greening manufacturing processes. In addition, chemical innovations can bring sustainable solutions across sectors to reduce the overall environmental footprint of production processes.

The following actions can be implemented to eliminate/reduce or substitute hazardous chemicals [30].

- Eliminate hazardous chemicals whenever possible:
  - Exchange mercury thermometers and discontinue ethidium bromide use for gels.
  - Consider the development of solventless chemical reactions.
  - Use computer simulations as a substitute for experiments.
- Reduce quantities of harmful chemicals, reagents, and precursors if they cannot be excluded:
- Use more efficient chemical reactions.
- Use green chemistry to substitute chemicals with less toxic alternatives.

Procurement

Healthcare represents approximately half of the EU government expenditure, with more than 15,000 hospitals [29]. Therefore, clinical laboratories can play a role in shifting supply and demand of chemicals towards green alternatives by adopting a green purchasing policy, which includes the selection and acquisition of products that minimize environmental impacts over their entire life-cycle: use recyclable, recycled, less toxic and locally produced chemicals whenever possible. Quality assurance requirements need to be applied in the medical laboratories. Kit usage, reagent stability are important issues for quality assurance requirements, and they need to be considered carefully.

Chemical inventory management and storage

- Do not store chemicals in the fume cupboard, specially without a proper seal.
- Maintain and review the chemical inventory to avoid over-purchasing and guarantee that expired chemicals are disposed of adequately.
- Date and use kits, reagents, chemicals and reagents as first in, first out.
- Purchase the minimum amount of kits, reagents and chemicals required.

- Share kits, reagents and chemicals if they are not to be used till their expire dates:
  - Increase collaboration between clinical laboratories.
  - Host chemical share/swap events.

Reduce and recycle solvents

Reduce the use of organic solvents by recycling them, which reduces exposure and chemical waste – many solvents (acetone, acetonitrile, xylene, alcohol, formalin) can be efficiently distilled back to +99% purity through on-site recyclers and vendors [28].
- Xylene, alcohol and formalin may be recycled by the use of a CBG Biotech Supreme Solvent Recycler (Thermo-Fisher Scientific).

Small volumes need to be purchased intermittently to replace the dead volume lost during the recycling process, which is also economically favorable.

Chemical waste management

- In cases where exclusion of hazardous chemicals cannot be done, it is key to have dedicated management and safe and efficient separation of chemical waste [6].
- Chemical waste disposal must be as safe as possible, ensuring that it is treated as close as to its source as possible [1].
- Label, store and dispose of hazardous chemicals according to procedures and considering specialized clinical laboratory waste; preferably, write Standard Operating Procedures (SOPs) for handling chemical waste/hazardous chemicals.

Rational number of tests

Laboratory testing costs constitute approximately 3% of all clinical costs, with a common strategy to reduce healthcare expenditure being a random reduction of laboratory budgets and unnecessary tests [31]. Thus, auditing requests of laboratory tests to identify test redundancy can decrease the number of reagents and hazardous chemicals used. The World Health Organization (WHO) published an Essential *in Vitro* Diagnostics (IVD) List, which identified 35 test categories of general IVDs that can be used for the diagnosis of several common diseases and 27 test categories of IVDs for the management of HIV infection, tuberculosis, malaria, hepatitis B and C, syphilis and HPV infection [32].

Policy

- Institute an environmental policy, provide documentation and a staff training program on environmental issues and best practices.
- Promote audits to evaluate progress before and after sustainable measures.
- Appoint an environmental manager and obtain support from senior management by advocating for corporate responsibility, financial benefits and increased laboratory reputation among customers and the community.
- Set the example through senior members and provide employee feedback.
- Implement control measures to avoid or minimize the release of hazardous substances into the work environment and the number of exposed employees. Train workers in the use of hazardous chemicals, safe work practices and appropriate use of Personal Protective Equipment (PPE).

Advocacy

The community in general supports environmental initiatives. Engage groups associated with the clinical laboratory, such as patients, contractors, colleagues, societies, institutes, media, and governmental bodies.

Conclusions

Laboratory medicine should contribute to a sustainable healthcare system ensuring that resources are used efficiently from ecological, social, and economical perspectives, while providing high-quality services for patients and physicians. Medical Laboratory Scientists are the end-stage users of the test kits, reagents/Chemicals manufactured by the IVD Industry. EFLM should advocate and collaborate with the IVD Industry and MedTechEurope to design a common strategy with EC EGD to prepare Guidelines/Regulations. The aim is to transform medical research and clinical laboratories in EFLM member societies in Pan-Europe into a safe and sustainable spaces by decreasing their deleterious environmental impact and implementing efficient everyday actions in laboratories, and taking steps to minimize energy, water, and hazardous chemical use, as well as waste generation without compromising the quality of healthcare. Sustainability measures should be a key feature in the rapidly changing healthcare environment. It is a challenge for clinical laboratories to achieve sustainable operations. Chemicals are ubiquitous in our society and have been sources of improvement of human health and life expectancy, specifically in healthcare and clinical laboratories. However, they might have adverse effects to human health and the environment because of their potential hazardousness. Hazardous chemicals are a known contributor to health conditions, being associated with several diseases. Combined exposure to hazardous chemicals has been associated with lower birth rates and reduced fetal growth. Moreover, there is a major economic impact due to exposure to endocrine disrupting chemicals, Chemical pollution is significantly contributing to the current global problem of climate change and loss of biodiversity. In close collaboration with IVD Industry, EFLM and its Member Societies will lead the laboratory medicine community to achieve environment-friendly laboratories and for the shift to carbon neutrality in line with the European Green Deal (EGD) Investment Plan, also known as the Sustainable Europe Investment Plan, which is aimed at making Europe the world's first climate-neutral continent.

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