

Tests, treatments and procedures at risk of inappropriateness in Italy
that Physicians and Patients should talk about.

**Five Recommendations on Green Laboratory from SIPMeL
Italian Society of Clinical Pathology and Laboratory Medicine
Evidence Based Laboratory Medicine Study Group**

1	Do not perform routine laboratory tests or screenings without a clear clinical question and within an inappropriate retesting interval. The issue of appropriateness in laboratory testing is central from the standpoint of environmental sustainability. Inappropriateness entails negative consequences, including interpretative errors and incidental findings leading to unnecessary interventions, increased workload, and both direct and indirect costs, with a consequent rise in greenhouse gas emissions, waste production, and water and air pollution. The “clear clinical question” constitutes the first step in the diagnostic process and the foundation for implementing robust Laboratory Medicine stewardship, both in diagnostic settings and in screening <i>stricto sensu</i>, as recommended by the WHO. There is no evidence that routine health checks or general screening programmes are effective in reducing morbidity and mortality from disease. Within a green laboratory framework, it is also essential to respect the minimum retesting interval for each examination, proper for the specific clinical context.
2	Do not acquire reagents, instrumentation, and/or laboratory supplies without considering their environmental impact, while maintaining diagnostic efficiency Laboratories have a significant impact on carbon emissions due to their infrastructure, and the consumption of electricity, water, gas, as well as the generation of waste. It is essential, during both the design phase and the procurement of instrumentation and reagents, to consider the ecological impact. Moreover, it is crucial that laboratories and professional and scientific societies establish collaborations with the in vitro diagnostics industry to promote solutions that enable laboratory testing to be performed in an environmentally sustainable manner, in accordance with the most recent guidelines, such as those of the EFLM (European Federation of Clinical Chemistry and Laboratory Medicine). In this context, POCT (Point-of-Care Tests) should be strategically used only when they significantly influence immediate treatment decisions with a clear advantage over traditional laboratory tests, as they may at times be less accurate and carry a higher environmental impact. Given the environmental impact of laboratory examinations, the test menu offered by a laboratory should be chosen on the basis of scientific evidence of effectiveness, in collaboration with the reference clinicians and within diagnostic–therapeutic pathways.
3	Do not use the paper report when a dematerialized report or electronic health record is available The dematerialization of medical reports represents a fundamental tool in achieving environmental objectives, through the reduction of natural resource consumption and waste production, thereby supporting the promotion of a circular economy. The digitalization of processes and laboratory examinations can lead to a significant decrease in energy consumption and help reduce pollution associated with the production, transportation, and disposal of materials, especially when accompanied by energy-efficiency strategies. In this context, the Electronic Health Record (EHR) provides a comprehensive overview of the patient’s clinical history, enabling healthcare professionals to make more informed decisions, tailor treatments, and deliver more appropriate care. Laboratory professionals, too, must encourage the use of the EHR for report access, which is currently used by just over one in three citizens.
4	Do not engage in automatic or unconscious behaviors that lead to the waste of reagents, the use of non-essential single-use plastics, improper waste management, or energy waste, in compliance with the laboratory’s Quality System. The adoption of Total Quality Management (TQM), integrated with Six Sigma (“zero defect”) and Lean Thinking (“no waste”) methodologies in laboratory management, is closely linked to sustainability. TQM practices enhance organizational capabilities in achieving ecological performance objectives. The Quality System of laboratories and professional organizations must include Continuing Education and foster the awareness that each individual can take concrete action toward sustainability. Within the Quality System, for the implementation of recommendations concerning chemical agents, energy, water, and waste, as well as the guidelines of the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) aimed at the green certification of laboratories, internal partnerships within the organization—with suppliers and with Clinical Engineering and Health Trust HTA—are essential. Clinical Engineering and Health Trust HTA can play a proactive role in equipment assessment with regard to sustainability, in the application of the European In Vitro Diagnostic Regulation (IVDR) EU/2017/746, in the dematerialization and interoperability of ICT systems, and in risk management and cybersecurity.
5	Do not overlook advocacy for “Green Laboratory” initiatives, a key element in raising awareness among institutions, companies, citizens, and patients toward a sustainable healthcare system. The laboratory must not limit itself to communicating internally its choices, awareness initiatives, results, and sustainability goals, but must also address patients, institutions, suppliers, and the broader community. The Laboratory must take on a proactive advocacy role for green pathways, engaging with institutions (decision-makers and stakeholders), healthcare organizations (Region, Health Authority, Universities, IRCCS), citizens (both through civic organizations such as Cittadinanzattiva and as individuals), and patients (individually or in associations). Sustainability is a process that must be addressed with a systemic vision, and the laboratory can assume a “social role”, driving action and problem-solving through the proper education and information of citizens and stakeholders regarding science and medicine, from its own specific perspective. Laboratory Medicine, by its very nature rooted in measurement and its direct connection with basic science, holds a greater awareness of the uncertainty inherent in measurements and of their largely statistical—and not absolute—value in the context of risk management and in the development of solutions or mitigation strategies for environmental risk.

Please note that these items are provided only for information and are not intended as a substitute for consultation with a clinician. Patients with any specific questions about the items on this list or their individual situation should consult their clinician.

How this list was created

The recommendations concerning the Green Laboratory (GL) were prepared by a narrow working group (NWG) of GL experts from the EBLM Working Group, which had organized events and manuscripts on the topic during the 2023 National Congress. On May 21, 2024, during a Zoom meeting of the EBLM Working Group, the NWG presented an initial list of recommendations, which were subsequently reduced to seven on July 2, 2024, during another Zoom meeting of the group. In August 2024, through extensive email exchanges, the NWG identified the five most relevant, current, and "sustainable" recommendations for clinical laboratories. These were approved by all members of the Working Group and by the President of SIPMeL. The final list of five recommendations for the Green Lab was presented at the 2024 National Congress and was later endorsed by the steering committee of Choosing Wisely Italy and by the SIPMeL National Council.

Sources

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Slow Medicine ETS, an Italian Third Sector organization of health professionals, patients and citizens promoting a Measured, Respectful and Equitable Medicine, launched the campaign **"Doing more does not mean doing better- Choosing Wisely Italy"** in Italy at the end of 2012, similar to Choosing Wisely in the USA. The campaign aims to help physicians, other health professionals, patients and citizens engage in conversations about tests, treatments and procedures at risk of inappropriateness in Italy, for informed and shared choices. The campaign is part of the Choosing Wisely International movement. Partners of the campaign are the National Federation of Medical Doctors' and Dentists' Orders (FNOMCeO), that of Registered Nurses' Orders (FNOPI), the Academy of Nursing Sciences (ASI), National Union of Radiologists (SNR), Tuscany regional health agency, PartecipaSalute, Altroconsumo, the Federation for Social Services and Healthcare of Aut. Prov. of Bolzano, Zadig. www.choosingwiselyitaly.org; www.slowmedicine.it

The Italian Society of Clinical Pathology and Laboratory Medicine (SIPMeL) is a national medical/scientific association of professionals working in clinical laboratories. SIPMeL was established in 2014, as a reunification of SIMeL (Italian Society of Laboratory Medicine), founded in 1986, and AIPaCMeM (Italian Association of Clinical Pathology and Molecular Medicine), historical continuity of the Italian Association of Analysts and Pathologists (founded in 1947) and the Italian Society of Clinical Pathology operating since 1970. The structure of the society, which has about 2000 members, is federal and includes three professional components: doctors, graduates specialized in scientific disciplines (DSLb) and biomedical laboratory technicians (STLB). It is the task of the Society to develop and disseminate the professional standards on which "good practice" in the laboratory depends. The training activities recognize training credits to participants, in accordance with the Continuing Medical Education Program of the Ministry of Health. Scientific research and training production activities are promoted and maintained by 22 study groups.