

The ESOT Agenda on

Sustainable Transplantation

Advancing sustainability
through robustness in global
transplant health





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About the European Society for Organ Transplantation

The European Society for Organ Transplantation (ESOT), founded in 1982, is a non-profit scientific organisation dedicated to advancing organ transplantation through research, education, and policy engagement. Bringing together transplant surgeons, physicians, scientists, and allied health professionals from across Europe and beyond, ESOT works to strengthen clinical practice, support scientific innovation, and promote ethical and equitable transplant systems worldwide.





Olivier Thaunat
ESOT President, 2025-2027

Presidential Foreword

Transplantation represents one of the greatest achievements of modern medicine. Each year, tens of thousands of patients across Europe and around the world receive life-saving organ transplants.¹ Behind every transplant lies an extraordinary act of generosity from donors and their families, and a remarkable collective effort from multidisciplinary healthcare teams.

Yet transplantation today operates within healthcare systems facing growing environmental, social and economic pressures. Climate change, demographic shifts, workforce challenges and widening inequalities in access to care are reshaping the context in which transplantation is delivered. Ensuring that transplant systems remain equitable, resilient and effective in this changing landscape is one of the defining challenges for the coming decade.

The European Society for Organ Transplantation (ESOT) has long recognised that the future of transplantation depends not only on scientific progress but also on the strength and sustainability of the systems that support it. In recent years, ESOT's Manifesto has articulated a clear vision for

advancing transplantation through research, education and advocacy, while strengthening transplant systems and addressing inequalities in access across Europe.²

This **ESOT Agenda on Sustainable Transplantation** builds on that vision by translating its principles into a structured roadmap for implementation, centred on the concept of **sustainability through robustness**. Robust transplant systems are those capable of adapting to environmental, societal and clinical challenges, while continuing to deliver high-quality care for patients.

Through this Agenda, ESOT sets out a clear framework for action over the coming years. It defines strategic priorities, measurable commitments and

opportunities for collaboration across healthcare institutions, professionals and policymakers. By aligning with broader global priorities, including the United Nations Sustainable Development Goals, this Agenda situates transplantation within the wider movement towards more resilient and equitable health systems.

ESOT is committed to working with partners across Europe and globally to ensure transplantation continues to save lives, advance medical science and honour the gift of organ donation. Together, we can build transplant systems that are robust, equitable, and sustainable for generations to come.

Executive Summary



Transplantation saves lives, but its future depends on resilient and equitable health systems capable of adapting to growing environmental, social and clinical pressures. **The ESOT Agenda on Sustainable Transplantation** outlines how sustainability through robustness can strengthen transplant systems across Europe and beyond.

In Europe and the UK, an estimated 11 patients die each day while waiting for a transplant,³ highlighting the urgent need to strengthen transplant systems, expand organ donation and ensure equitable access to life-saving care.

Healthcare contributes approximately 5% of global greenhouse gas emissions,⁴ with high-income regions carrying a disproportionately large share of this footprint. The environmental impact arises from multiple sources, including energy-intensive healthcare facilities, surgical and clinical activities, pharmaceuticals, and complex supply chains.⁴

Health systems are also facing a growing health and care workforce crisis, driven in part by demographic change and increasing demand for services.⁵ In transplantation specifically, limited organ availability⁶ and inefficient referral pathways continue to act as major barriers to access.⁷

Transplantation, while life-saving and cost-effective compared with long-term organ replacement therapies such as dialysis,⁸ operates within this complex ecosystem. Without coordinated action, environmental instability, geopolitical disruption and workforce shortages risk weakening transplant systems worldwide.

These pressures also present an opportunity. Strengthening sustainability in transplantation can improve system robustness, reduce inequalities in access and ensure that donated organs are used as effectively and responsibly as possible.

By reinforcing clinical quality, workforce resilience and responsible resource use, sustainable transplant systems can maintain high standards of care while adapting to environmental, economic and societal change.

Devi Mey
ESOT Chief Executive Officer

11

11 patients die each day waiting for a transplant in Europe and the UK³

5%

Healthcare contributes approximately 5% of global greenhouse gas emissions

Building on the ESOT Manifesto

The **ESOT Agenda on Sustainable Transplantation** builds on the ESOT Manifesto launched in 2022, and translates its policy ambitions into clear, measurable commitments across four interrelated pillars:



From baseline mapping and congress integration to policy engagement and impact assessment, this Agenda provides guidance on establishing and maintaining sustainable transplant systems aligned with the United Nations Sustainable Development Goals.

The Case for Sustainable Transplantation

Transplantation is one of the most transformative interventions in modern medicine. For people with end-stage organ failure, it is the only treatment capable of restoring organ function, preventing premature death and improving survival and quality of life.⁹

However, transplantation operates within healthcare systems facing growing environmental, social and financial pressures. To remain effective and equitable, it must be sustainable.

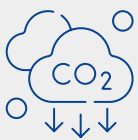
For ESOT, sustainability means strengthening systems so they protect patients, honour donors and remain resilient in a changing world.

Healthcare's Environmental and Social Footprint

Globally, the healthcare sector accounts for around 5% of greenhouse gas emissions.⁴ If considered a country, the global healthcare sector would rank among the world's five largest emitters.¹⁰ Operating theatres are particularly energy-intensive, using an estimated three to six times more energy than other hospital areas.¹¹

Healthcare systems also reflect social inequalities. Access to specialised treatments varies according to geography, infrastructure and socioeconomic conditions, affecting referral pathways, waiting times and patient outcomes.⁷

Key pressures on healthcare systems include:



Greenhouse gas emissions



High energy consumption



Resource-intensive supply chains



Unequal access to advanced care



45,439
transplants in 2024



Europe performed 45,439 solid organ transplants in 2024, representing 26% of global transplant activity.¹

11
deaths per day



Across Europe and the UK, 11 patients die each day while waiting for a transplant.³

3-6
higher energy use



Operating theatres can consume three to six times more energy than other hospital areas.¹¹



The Unique Sustainability Challenge of Transplantation

Transplantation is one of the most resource-intensive areas of modern medicine, combining high clinical value with substantial system demands. Most importantly, transplantation depends on altruistic organ donation, creating a unique responsibility to use every donated organ wisely and fairly.

Honouring the gift of organ donation means recognising that sustainability extends beyond environmental impact alone. It requires responsible stewardship of donated organs, equitable allocation systems, durable graft outcomes, financially resilient programmes and a supported workforce.

A transplant system is sustainable when:

- ✓ Donated organs are used optimally
- ✓ Recipients achieve long-term graft survival
- ✓ Follow-up care prevents avoidable complications
- ✓ Access is determined by clinical need, not geography or socioeconomic status.
- ✓ The transplantation system is robust and designed to withstand fluctuations.

In transplantation, sustainability and ethical responsibility are inseparable.

Sustainability through Robustness

Sustainability through robustness means strengthening systems so they can withstand environmental, economic and societal shocks, while continuing to deliver equitable, high-quality transplant care.

For ESOT, sustainability is not limited to environmental performance.

It requires robustness across four areas:

1

Clinical (patient care and procedures)

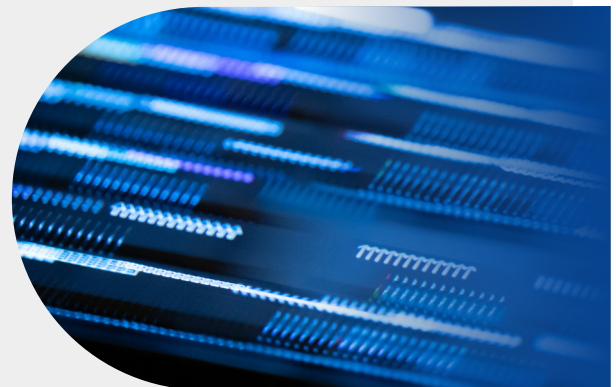
- Standardising protocols while allowing controlled flexibility for patient heterogeneity.
- Building redundancy in critical decision pathways (e.g. multidisciplinary review, second opinions).
- Using risk stratification models validated across diverse populations.
- Ensuring continuity of care across pre-, peri- and post-transplant pathways.
- Developing fail-safe mechanisms for complications (e.g. early warning systems, rapid response teams).
- Incorporating real-world data feedback loops to continuously refine practice.
- Strengthening infection and immunological monitoring systems adaptable to emerging threats.



2

Health infrastructure

- Designing interoperable and resilient systems (e.g. IT, organ allocation platforms, logistics).
- Strengthening supply chain resilience (e.g. organs, medications, preservation technologies).
- Maintaining surge capacity (e.g. ICU beds, transport systems, cross-border collaboration).
- Ensuring robust data systems through high-quality, real-time registries.
- Developing contingency plans for system disruptions (e.g. pandemics, geopolitical events).
- Promoting interoperability across regions and countries to reduce fragmentation.
- Investing in cybersecurity and system reliability.



3

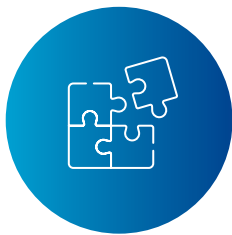
Workforce

- Building multidisciplinary teams with overlapping competencies.
- Ensuring continuous training and re-certification aligned with evolving practice.
- Developing succession planning and knowledge transfer mechanisms.
- Preventing burnout through sustainable workload distribution and support systems.
- Encouraging mobility and cross-training across centres and countries.
- Strengthening leadership and crisis management capabilities.
- Fostering a culture of adaptability and continuous learning.

4

Ethics

- Establishing clear, transparent and adaptable ethical frameworks.
- Ensuring consistency in allocation principles while allowing contextual flexibility.
- Building robust consent processes that account for cultural and informational variability.
- Implementing equity monitoring systems to identify and address disparities.
- Maintaining independence and integrity of oversight bodies.
- Enabling ethical decision-making under uncertainty (e.g. emerging technologies, scarcity).
- Fostering public trust through transparency and accountability.



When these four elements are strong, transplant systems are better able to withstand clinical, environmental and geopolitical pressures.

This forms the foundation of the **ESOT Agenda on Sustainable Transplantation**.



Strategic Alignment

Sustainability through robustness is embedded within ESOT’s mission and long-term strategy. This commitment is reflected in the ESOT Strategic Plan (2025–2030), which sets out a framework for advancing transplantation across Europe and globally.¹²

One of its strategic drivers, Global Transplant Health, aims to address disparities in transplant access, strengthen transplant systems and infrastructure and promote collaboration across countries and transplant centres.¹² Sustainability reinforces these priorities by helping transplant systems remain effective, adaptable and future-ready.

The theme of the ESOT Congress 2025 – “Nurturing a Sustainable Transplantation Journey” – reflects this direction. Transplantation is not a single intervention but a continuum spanning donation, allocation, surgery and lifelong follow-up. A life-course perspective strengthens each stage of the pathway and supports robust systems over time.

Embedding sustainability within Global Transplant Health recognises that robustness must extend beyond individual centres.

Robustness requires:



Workforce resilience



Harmonised data systems



Ethical stewardship



Cross-border cooperation



Shared standards



Continuous innovation



Climate adaptation readiness

Stronger systems can improve survival and quality of life, reduce disparities in access, and reinforce long-term health system resilience and sustainability across Europe and globally.

The United Nations 2030 Agenda

The United Nations 2030 Agenda for Sustainable Development provides a universal framework for advancing health, equity and environmental responsibility. Adopted by all UN Member States, it comprises 17 interconnected Sustainable Development Goals (SDGs) that are indivisible and mutually reinforcing.¹³ The Agenda emphasises improving wellbeing at all ages and ensuring that no one is left behind, principles that align directly with equitable access to transplantation and long-term patient outcomes.

ESOT's sustainability agenda aligns particularly closely with four SDGs:¹⁴

SDG 3: Good Health and Wellbeing

Ensure healthy lives and promote well-being for all at all ages, including improving access to healthcare, reducing mortality from communicable and noncommunicable diseases, and strengthening health systems.



SDG 10: Reduced Inequalities

Reduce inequalities within and among countries by promoting social, economic and political inclusion and ensuring equitable access to opportunities and services.



SDG 12: Responsible Consumption and Production

Promote sustainable resource use and reduce waste by encouraging responsible production systems and consumption patterns.



SDG 13: Climate Action

Take urgent action to combat climate change and its impacts, including strengthening resilience and reducing greenhouse gas emissions



By embedding sustainability across governance, education, research and policy, ESOT advances transplantation not only as a field of clinical excellence but also as a contributor to resilient, equitable and climate-conscious health systems. This emphasis on robustness reflects ESOT's broader mission to expand organ donation and improve transplantation through research, education and advocacy, while the **ESOT Agenda on Sustainable Transplantation** further strengthens the Society's role in enabling more sustainable and resilient transplant systems.

Human Capacity as the Foundation

Sustainable transplantation depends on people. Environmental reform, digital transformation and policy development cannot succeed without a resilient, well-trained and supported workforce. Transplantation relies on multidisciplinary teams operating in high-pressure environments, making complex clinical decisions and maintaining long-term relationships with patients.

Burnout and workforce strain among transplant professionals are associated with workforce attrition and compromised patient safety, threatening the long-term stability and capacity of transplant systems.¹⁵ Workforce shortages further compound these pressures. For example, global data from kidney care systems report shortages of kidney transplant surgeons and other specialist professionals in more than half of countries, with the most severe gaps occurring in low and lower middle-income countries.¹⁶ Such workforce constraints can limit the ability of health systems to deliver equitable access to transplantation and related care.

Strengthening human capacity across the transplant community is fundamental to sustainable transplantation. A resilient and well supported workforce underpins progress in areas such as environmental accountability, equitable access and system improvement. Delivering this requires coordinated investment in workforce development, structured education pathways and measurable commitments to professional support.

ESOT's Commitments

To operationalise sustainability through robustness, the **ESOT Agenda on Sustainable Transplantation** is structured around four interconnected pillars.¹² Each pillar translates strategic intent into focused, measurable commitments aligned with ESOT's Strategic Plan and Manifesto.

1

Sustainable Clinical Practice

Sustainable transplantation begins in clinical practice and in the responsible stewardship of donated organs. ESOT will support clinical excellence while reducing unnecessary environmental impact and strengthening system efficiency.

Commitments

- ✔ Promote green transplant pathways, encouraging energy-efficient operating practices and sustainable anaesthesia approaches where clinically appropriate.
- ✔ Encourage lifecycle assessment of transplant procedures, technologies and procurement decisions.
- ✔ Reduce waste in transplant settings by promoting responsible material use and safe alternatives to single-use products where feasible.
- ✔ Advance research and knowledge sharing on low-carbon, climate-resilient logistics and optimised organ transport systems that protect organ viability while improving efficiency.

Real-world example Sustainable clinical practice

A sustainable anaesthesia programme in Spain reduced anaesthetic gas emissions by 54% in one year, following reductions of 64% in nitrous oxide use and 63% in desflurane consumption.¹⁷



2

Equity and Access

Sustainability must be equitable. Building on the ESOT Manifesto and the Global Transplant Health strategic driver, ESOT will work to reduce disparities and strengthen collaboration across Europe to advance global transplant health equity.

Commitments

- ✔ Promote harmonised referral and listing standards to reduce disparities in access to transplantation.
- ✔ Encourage greater transparency through strengthened reporting of transplant activity and outcomes.
- ✔ Support development of a pan-European transplant data observatory to enhance benchmarking and shared learning.
- ✔ Strengthen cross-border cooperation and ethically grounded organ exchange through collaborative networks and shared standards.

Real-world example Expanding equitable access

Despite spending less on healthcare than the European average, Portugal became one of the world's leading countries for deceased organ donation. This success was driven by sustained organisational reforms, including the introduction of hospital donor coordinators and a strong national transplant coordination network.¹⁸



3

Education and Workforce Sustainability

Robust transplant systems depend on resilient professionals. ESOT will strengthen education, workforce development and professional engagement to support a skilled, collaborative and sustainable transplant community.

Commitments

- ✓ Integrate sustainability principles into transplant curricula, including environmental literacy, ethical stewardship and systems thinking.
- ✓ Support leadership development and structured mentorship pathways for young professionals and the next generation.
- ✓ Promote multidisciplinary training across the transplant pathway to strengthen collaboration and continuity of care.
- ✓ Advocate for workforce wellbeing and protected time for education, research and innovation to safeguard system stability.



4

Sustainable Governance and Events

ESOT will model the standards it promotes by embedding sustainability within its governance, operations and scientific activities.



Commitments

- ✓ Introduce a sustainable congress model incorporating carbon-conscious planning and hybrid participation formats.
- ✓ Embed responsible procurement principles across ESOT operations and partnerships.
- ✓ Accelerate digital transformation to reduce unnecessary travel and material consumption while expanding access and collaboration.
- ✓ Monitor, benchmark and report sustainability progress transparently to demonstrate accountability and measurable impact.

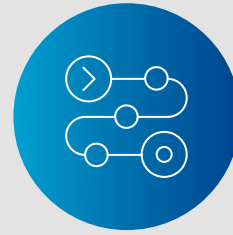
Real-world example Governance-driven accountability

In 2022, NHS England became the first health system to embed net zero into legislation, placing statutory emissions duties on all trusts. By 2025, NHS Carbon Footprint emissions had fallen by an estimated 68% from 1990 levels.²⁰



Delivering sustainable transplantation

To ensure measurable and sustained progress, ESOT will implement the Agenda through a phased roadmap aligned with its Strategic Plan and the United Nations SDGs.



1

Launch and baseline mapping

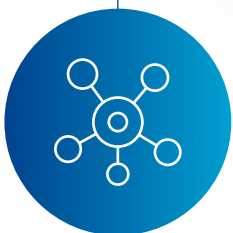
Key Actions

- Formal launch of the **ESOT Agenda on Sustainable Transplantation**.
- Establish baseline indicators aligned with SDG metrics and Global Transplant Health priorities.
- Map current practices, disparities and sustainability initiatives across member centres.
- Establish a sustainability governance and reporting framework within ESOT to oversee implementation and annual monitoring.



Phase 2

Phase 1



2

Congress integration

Key Actions

- Integrate sustainability metrics and carbon-conscious congress planning into ESOT Congress programming.
- Showcase clinical and organisational best practices.
- Strengthen education and workforce initiatives linked to the Agenda.
- Set the standard for hybrid participation and sustainable procurement within Congress operations.

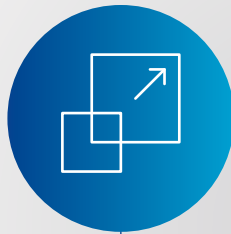
3

Policy engagement, scaling and partnerships

Key Actions

- Deepen engagement with European and global policy stakeholders.
- Support development of the pan-European transplant data observatory.
- Scale successful sustainability initiatives across networks and collaborative platforms.
- Engage policymakers on climate-resilient transplant systems and supply-chain preparedness.

Phase 3



5

Impact evaluation aligned with SDGs

Key Actions

- Conduct comprehensive impact assessment against baseline indicators
- Evaluate contribution to SDG 3, 10, 12 and 13.
- Publish a comprehensive progress report and define further strategic priorities in alignment with evolving global health and climate frameworks.

Phase 5



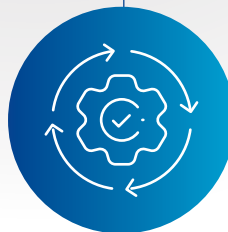
4

Further congress integration

Key Actions

- Embed sustainability benchmarks and reporting transparency within ESOT Congress programming and affiliated activities.
- Showcase cross-border collaboration and benchmarking initiatives through congress platforms.
- Evaluate workforce and education impact measures and disseminate findings at Congress.

Phase 4



Annual monitoring and transparent reporting will enable accountability, adaptive refinement and continuous improvement.

Calls to Action

Achieving sustainable transplantation requires coordinated leadership across institutions, professionals and policymakers. ESOT calls on policymakers, health authorities and medical professionals to join forces in advancing equitable and resilient transplant systems. Achieving sustainable transplantation therefore requires action at multiple levels of the health system, including policy, professional education, data systems and patient engagement.

Call to Healthcare Professionals

Every transplant professional, whether surgeon, physician, nurse, coordinator or researcher, has a role in shaping sustainable practice through daily decisions.



ESOT calls on the transplant community to focus on three priorities:

1

Champion sustainable practice

- Identify opportunities to reduce waste and improve efficiency.
- Engage in institutional sustainability discussions.
- Advocate for evidence-based green practices.
- Mentor the next generation in responsible stewardship of organs and resources.

2

Integrate sustainability into clinical decision-making

- Consider long-term system implications alongside clinical outcomes.
- Support shared decision-making with patients.
- Contribute to sustainability education and curriculum development.

3

Advance equity

- Support initiatives aimed at reducing disparities in referral, access and follow-up.
- Promote transparent and fair allocation practices.



Call to Healthcare Institutions

Healthcare institutions play a central role in embedding sustainability across clinical practice, infrastructure and organisational culture.



ESOT calls on healthcare institutions to focus on four priorities:

1

Measure and understand impact

- Conduct sustainability audits within transplant programmes.
- Establish baseline data on carbon footprint and resource use and supply-chain dependencies.
- Map access disparities within local and regional catchment areas.
- Participate in national and European benchmarking initiatives to promote transparency and shared learning.

2

Embed sustainable clinical pathways

- Introduce energy-efficient operating protocols without compromising safety or outcomes.
- Review single-use versus reusable equipment in line with infection prevention standards.
- Strengthen coordination across the transplant pathway to reduce inefficiencies and reinforce responsible stewardship of donated organs.

3

Strengthen equity and access

- Review referral and listing criteria to reduce unintended disparities.
- Improve outreach to underserved populations.
- Enhance cross-border collaboration where appropriate.
- Monitor and publicly report disparities in access and outcomes to drive continuous improvement.

4

Invest in workforce robustness

- Support multidisciplinary training and leadership development.
- Integrate sustainability into quality improvement processes.
- Safeguard professional wellbeing to maintain system stability.
- Provide protected time for education, research and innovation to prevent burnout and sustain excellence.

Call to Policymakers and EU Institutions

Sustainable transplantation requires enabling policy frameworks, targeted investment and regulatory alignment.



ESOT calls on policymakers to focus on four priorities:

1

Integrate transplantation into climate and health policy

- Recognise transplantation within broader EU climate-health strategies.
- Include transplant services in national sustainability and adaptation plans.

2

Fund research and innovation

- Invest in low-carbon transplant pathways.
- Support innovation in organ preservation, logistics and digital infrastructure.
- Promote harmonised responsible procurement standards.

3

Reduce inequalities in access

- Strengthen cross-border cooperation mechanisms.
- Support data harmonisation and benchmarking initiatives.

4

Build climate-resilient health systems

- Ensure transplant services are included in national adaptation planning.
- Support contingency planning for supply chain disruption and extreme weather events.



A Shared Responsibility

Delivering sustainable transplantation requires sustained commitment across institutions, healthcare professionals and policymakers. By working together to implement these priorities, stakeholders can strengthen system resilience, reduce inequalities and ensure that transplantation continues to deliver life-saving care for future generations.

“

Because of organ donation I was able to have the gift of a normal life. I think of my donor often, especially on the anniversary of my transplant. I think about their family and what their family must have felt at the time.

”

Heart and lung transplant recipient²¹



Closing Statement

Sustainable transplantation is not optional. It is essential to protect patients, honour donors and ensure transplant systems remain resilient for future generations.

Transplantation depends on trust:

- ✔ Trust in clinical excellence
- ✔ Trust in fair allocation
- ✔ Trust in systems capable of withstanding environmental, economic and societal pressures.

Maintaining that trust requires deliberate action.

No single institution or profession can achieve this alone. ESOT stands ready to work with healthcare institutions, professionals and policymakers to ensure that transplantation remains equitable, resilient and responsible for generations to come.

Olivier Thaunat

ESOT President, 2025-2027



Contributions

ESOT gratefully acknowledges the contributions of the following individuals in shaping the **ESOT Agenda on Sustainable Transplantation** and advancing the Society's commitment to sustainability through robustness:

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