

The Environmental Sustainability Gap in Clinical Trials: Workforce Attitudes, Barriers, and Emerging Practice from an International Survey

Joanna Bell and Samantha Holmes, Sustainable Healthcare Coalition

Findings from the BIG Clinical Trials Sustainability Survey — Shaping the Future Towards Low-Carbon Clinical Trials

ABSTRACT

Clinical trials carry a significant environmental footprint¹, and there is growing ambition across the sector to address it, from industry-led commitments to measure and reduce trial emissions² to grassroots efforts already underway at the site level³. Yet the attitudes and experiences of the global trials workforce in relation to environmental sustainability remain poorly understood. The BIG Clinical Trials Sustainability Survey gathered 181 responses from professionals across five continents to capture self-assessed readiness, perceived barriers, and training needs. Environmental sustainability was rated highly important (mean 4.5/5), but self-rated readiness to implement was lower (mean 3.2/5). The most cited barriers were conflicting organisational priorities, uncertainty about which practices to adopt, difficulty calculating trial carbon emissions, and sustainability not being embedded in trial design. Qualitative responses describe grassroots efforts undertaken largely by motivated individuals without an organisational mandate. The findings point to a persistent gap between recognising sustainability as important and being equipped to act on it, and highlight a need for clearer implementation guidance, shared standards, and role-relevant training that translates intent into actionable practice.

1. Introduction

Clinical trials are resource intensive. Global supply chains move investigational products and laboratory samples across borders, patient and staff travel to investigational sites, and supplies are manufactured, shipped, and frequently discarded unused³. As the healthcare sector faces growing pressure to reduce its environmental impact, the clinical trials community is increasingly being asked how it will contribute to that effort.

Momentum for change has been building across the sector. In February 2025, CEOs from members of the Sustainable Markets Initiative's Health Systems Task Force, including AstraZeneca, GSK, Merck, Novo Nordisk, Novartis, Sanofi, and Roche, published an open letter to the clinical trial community, encouraging contract research organisations (CROs) to measure emissions for all Phase 2 and 3 trials from 2025 onwards².

This shift is reflected in the World Health Organization's 2025 report on clinical trials and environmental sustainability⁴, which situates responsibility for reducing trial-related environmental harm across the full system in which trials are commissioned and delivered, from design and decision-making through to governance, procurement, execution, and oversight, rather than as a matter of individual practice alone.

Further momentum has come from initiatives such as the Sustainable Clinical Trials Community of Practice and the development of tools such as the Clinical Trial Carbon Calculator. However, translating awareness into consistent, everyday practice across the diverse clinical trials workforce, spanning sponsors, CROs, sites, clinical trials units, laboratories, and supply vendors, is a complex challenge.

To better understand where the workforce currently stands, the Sustainable Healthcare Coalition developed the “BIG Clinical Trials Sustainability Survey”. The survey set out to:

- capture current attitudes towards, and self-assessed readiness for, environmentally sustainable clinical trial practice;
- identify the barriers that clinical trial professionals perceive to reducing the environmental impact of trials;
- understand training needs and preferred learning formats across trial roles and settings; and
- collect real-world examples of current sustainable practices, together with wider reflections from the workforce.

This paper reports the survey findings and considers what they mean for organisations, initiatives, and individuals seeking to move clinical trials towards a lower-carbon future.

2. Methods

Study design

This study used a cross-sectional, self-administered, web-based survey with an embedded mixed-methods design: quantitative closed-item data formed the primary analysis, with qualitative open-text responses nested within to illustrate and contextualise the quantitative findings. The study is reported in line with the Checklist for Reporting Results of Internet E-Surveys (CHERRIES), the established reporting standard for web-based survey research.⁵

Sample and recruitment

An international, cross-sectional survey was distributed to clinical trial professionals by the Sustainable Healthcare Coalition in early 2026. Recruitment used a non-probability, convenience sampling approach, with the sample frame purposively targeting professionals across the breadth of actors involved in commissioning and delivering clinical trials, including sponsors, CROs, investigational sites, clinical trials units, laboratories, and supply vendors, working on commercial and/or publicly funded trials. The survey link was circulated via the SHC network, the LinkedIn “Sustainable Clinical Trials Community of Practice” group, and partner organisations. Recipients were able to forward the link to colleagues, so recruitment also included an element of snowball sampling.

As recruitment relied on self-selection through sustainability-focused professional networks, no denominator of non-respondents exists, and a conventional response rate cannot be calculated. This is a recognised limitation of non-probability web-survey recruitment and is discussed further in relation to representativeness in Section 4.

Questionnaire

The questionnaire combined closed and open-text items covering: respondent demographics and role; the perceived importance of environmental sustainability in clinical trials; self-rated readiness to implement sustainable practice; barriers to action (maximum three selections); agreement with statements about the relevance and adequacy of

existing training materials; preferred channels and topics for future training; free-text examples of sustainability practices already implemented; and general feedback. Closed items used five-point rating scales or multiple-choice/multi-select formats.

The survey was anonymous unless the respondent chose to disclose their identity for the purposes of post-survey follow-up.

Prior to distribution, the draft questionnaire was reviewed for content, clarity, and relevance by two contract research organisations (CROs) and pre-tested by members of the industry Low-Carbon Clinical Trials (iLCCT) consortium. Feedback from this process informed refinements to question wording, response options, and overall survey length before the survey was finalised and distributed more widely.

Data analysis

Closed-item responses were analysed descriptively. Not all respondents answered every question; denominators are reported alongside individual results, and percentages are calculated on the number of responses to that question rather than on the total sample.

Open-text responses were reviewed and grouped thematically to illustrate and contextualise the quantitative findings, consistent with the embedded (qualitative-supporting-quantitative) design described above. The importance–readiness gap for each group was calculated as the difference between its mean importance and mean readiness scores.

Sample size:

A total of 181 responses were received from professionals across five continents.

Ethical considerations

Formal independent ethics committee review was not sought for this study. Independent ethical review was not considered necessary as the study involved voluntary participation of professional adults reporting on workplace attitudes and practices; it did not collect patient or sensitive personal data, involve clinical intervention, or include vulnerable populations (identifying details were collected only where respondents chose to provide them for follow-up).

Limitations of sampling

As a self-selected sample recruited substantially through sustainability-focused networks, respondents are likely to be more engaged with environmental sustainability than the clinical trials workforce as a whole. This should be considered when interpreting the generalisability of findings on perceived importance, readiness, and barriers.

3. Results

3.1 Who responded

Respondents were based predominantly in Europe (133 of 178 respondents with region recorded), with further representation from North America (25), Asia (14), Central America/the Caribbean/South America (3), Oceania (2), and Africa (1). By organisation type, the largest groups were sponsors (82), investigational sites (31), and CROs (29), with smaller numbers from supply vendors (10) and laboratories (6), alongside a range of other or mixed roles. The majority of respondents worked on commercial trials from pharma (115), biotech (34), and medtech (15), with a substantial minority working on publicly funded trials (34) or a mix of both publicly funded and commercial (35) (Figure 1).

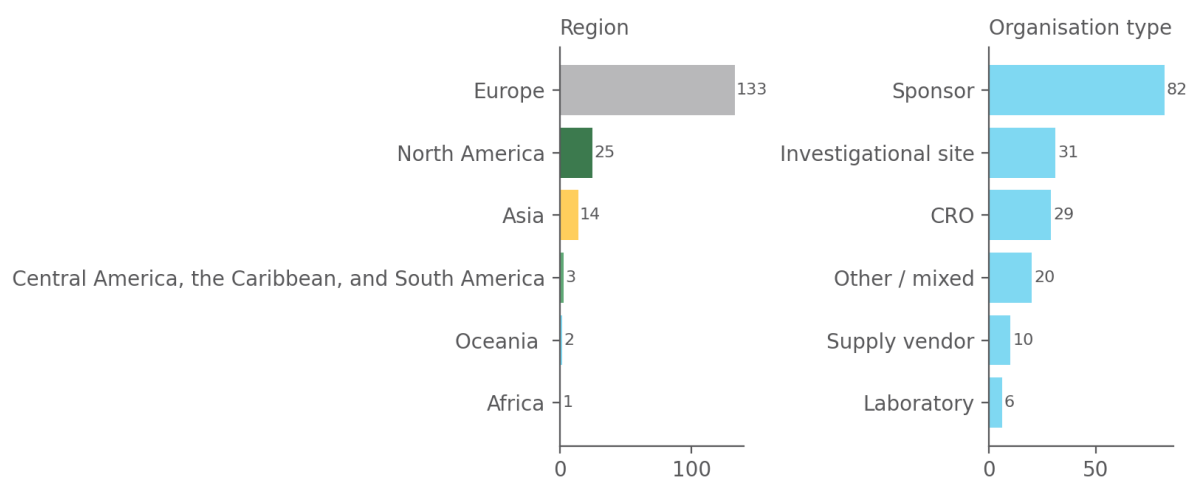


Figure 1. Respondent profile by region and organisation type (n = 178).

3.2 A gap between importance and readiness

Environmental sustainability was rated highly important: 93% of respondents (165 of 177) rated it 4 or 5 out of 5. Self-rated readiness to implement sustainable practices within respondents' own roles was markedly lower: only 41% of respondents (72 of 175) rated their readiness as 4 or 5, while a quarter (25%) rated it 1 or 2 (Figure 2). Mean scores were 4.5/5 for importance and 3.2/5 for readiness (1.3 points gap).

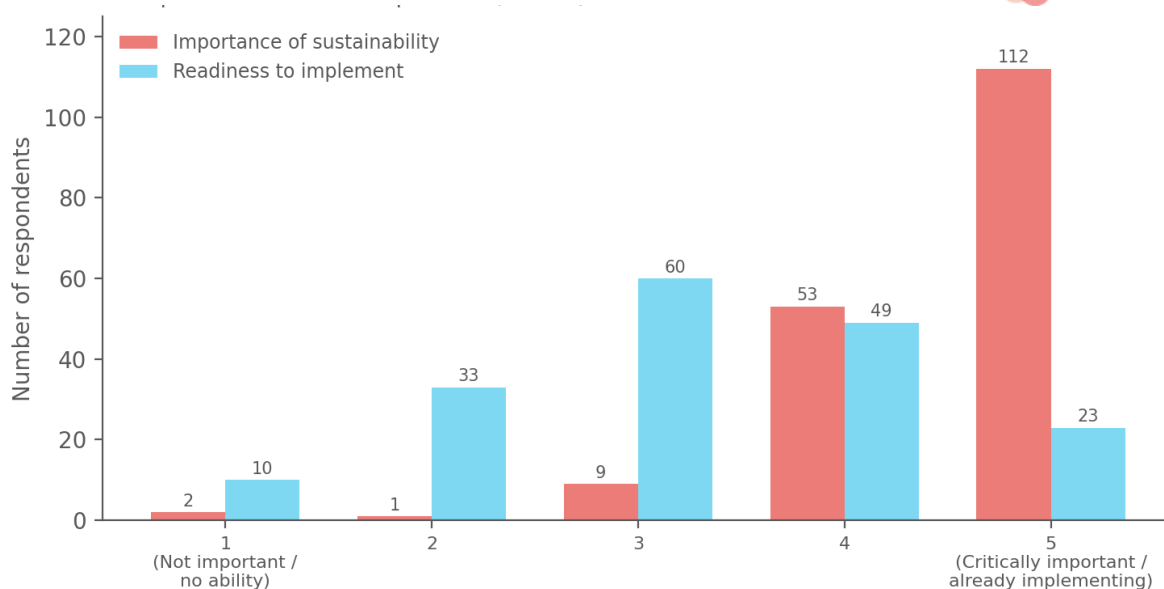


Figure 2. Importance of environmental sustainability vs. self-rated readiness to implement sustainable practice ($n = 177$ and $n = 175$, respectively).

This gap was not evenly distributed across the workforce. Readiness was lowest among CROs ($n = 29$; mean 2.9/5) and investigational sites ($n = 31$; mean 2.9/5), the roles closest to trial delivery rather than trial design, producing the widest importance–readiness gaps of the three largest respondent groups (1.6 and 1.5 points respectively). Sponsors ($n = 82$), who sit closer to design-stage decisions, reported a narrower gap (1.2 points).

3.3 Barriers to action

Respondents selected up to three barriers to reducing the environmental impact of clinical trials from a fixed list, with the option to add free text. The four most commonly cited barriers were conflicting priorities within the organisation (66 respondents), uncertainty about what sustainable practices to implement and how (54), difficulty calculating trial carbon emissions (49), and sustainability not being part of trial designers' goals and objectives (48). Lack of data to support decision-making (41), perceived costs (37), lack of awareness of the importance or impact (36), and regulatory requirements (34) were also frequently selected (Figure 3).

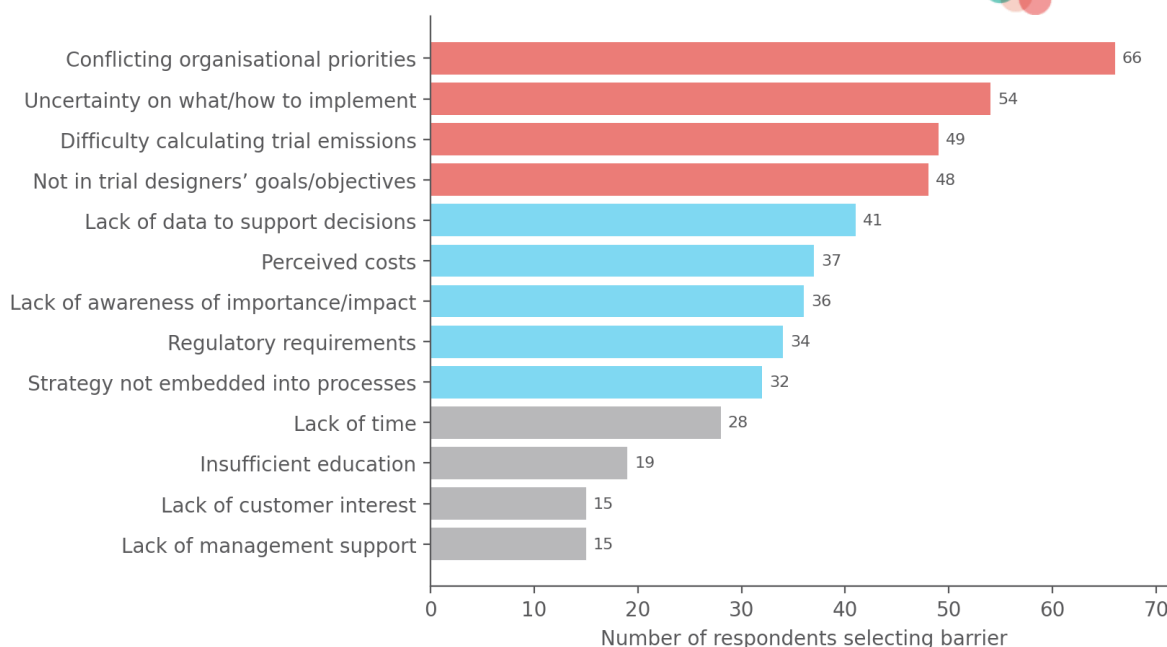


Figure 3. Most commonly cited barriers to environmental sustainability in clinical trials ($n = 176$; up to 3 selections per respondent).

Barrier profiles also varied by role. Investigational sites were the only group for which "not part of trial designers' goals and objectives" tied for the most commonly cited barrier (35%, compared with 27% across the full sample), a quantitative echo of the free-text theme that sustainable choices are made upstream of site-level delivery. CROs showed a different profile again, with lack of awareness of the importance or impact of sustainability (34%, compared with 20% overall) and perceived costs (28%, compared with 20% overall) featuring more prominently than for other groups. Sponsors' barrier profile closely tracked the overall sample, consistent with sponsors making up the largest single group of respondents (82 of 181).

Free-text responses added further texture to these barriers. Several respondents described a structural tension between wanting to act and having the authority or remit to do so, and between measuring a trial's footprint and having viable options to reduce it:

"Sustainability should be included in trial design."

"the rigid operating procedures...[means] there isn't a lot of room for independent practice at site level."

"a lack of sustainable solutions to act on it" — respondent describing their ability to calculate, but not act on, their trial's carbon footprint

Excess and wasted supplies emerged as a specific and recurring concern. Several of these accounts came from investigational site-based professionals.

"we receive an obscene amount of excess supplies from sponsors which goes to waste."

3.4 Training: relevance, adequacy, and preferences

Respondents were asked how strongly they agreed with statements about existing training materials, both those provided by their own organisation and those publicly available. Around one in six respondents (roughly 15–17% across items) reported that no training materials were available to them at all, or that they were not aware of any. Where materials did exist, agreement was consistently higher for relevance than for adequacy: respondents were more likely to agree that organisational or public materials were relevant to their role than to agree that those materials prepared them sufficiently to act. Publicly available resources were also less likely to be rated as easy to locate than organisation-provided materials, suggesting accessibility, not only content, is a barrier to learning.

Asked which topics would best support their learning journey, the most popular were applying a sustainable mindset in clinical trials (95 respondents), integrating sustainability into business-as-usual (93), general awareness of sustainable clinical trials (92), and calculating the carbon footprint of trials (92). Solutions for known emissions hotspots (74), the link between climate change, healthcare, and clinical trials (74), building the business case for sustainability (65), and integrating the Clinical Trial Carbon Calculator into internal systems (60) were also widely selected (Figure 4).

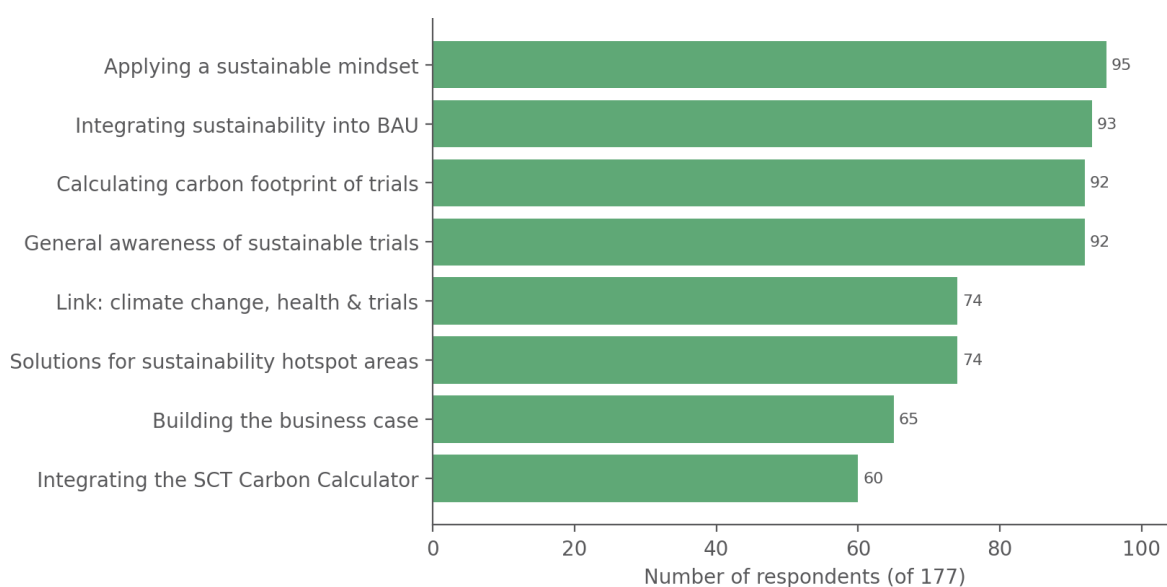


Figure 4. Training topics respondents want to support their sustainability learning journey (n = 177; multiple selections allowed).

On format, respondents most often said they would prefer to access training through their own organisation (127), followed by external websites such as the Sustainable Healthcare Coalition (74), webinars (73), short bite-size videos (61), published articles or white papers (50), and conferences (31) (Figure 5). This points to a two-tier need: content delivered internally by organisations, reinforced by short, easily accessible external resources.

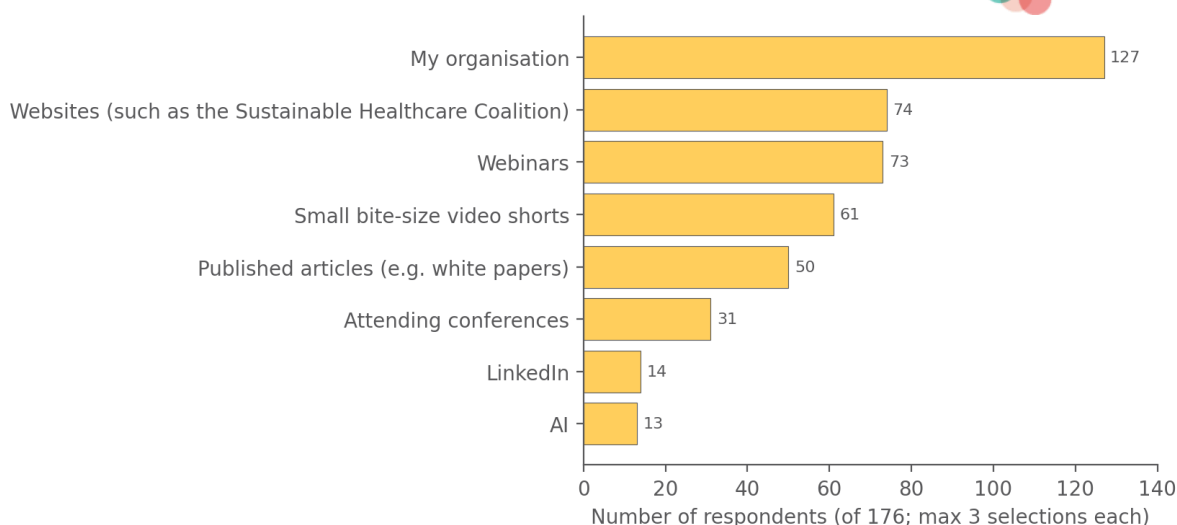


Figure 5. Preferred channels for accessing sustainability training materials (n = 176; up to 3 selections per respondent).

3.5 Practice already underway

Sixty-seven respondents shared examples of sustainability practices they had implemented or were involved in. Common themes included reducing shipment volumes and frequency (for example, using local rather than central laboratories, or consolidating and optimising sample shipments), moving from paper to electronic systems (electronic investigator site files, digital training materials, paperless trial documentation), and reducing consumable waste (redistributing unused laboratory kits, reviewing kit contents and shelf-life windows, and recycling programmes for site materials).

“Data-driven optimization of sample shipments... the concept of data > insights > hotspots > actions > reductions can be applied in other contexts.”

“I am the unit's green champion... I have implemented a system in our unit where excess supplies are donated to charities which send them on to countries in need. Since September 2025 I have sent over 10,000 items.”

A recurring pattern in these accounts was that progress was frequently driven by an individual acting on their own initiative, rather than as part of a formally mandated organisational programme:

“I am a one-man-show pushing this effort for clinical trials, not just supplies.”

“We have sustainable efforts in the organisation I work for, we even have it as one of our objectives, but no one else except me is involved.”

Other respondents pointed towards structural or design-stage changes as the more durable solution, rather than relying on individual effort alone:

“Sustainability needs to be included in trial design so clinical sites have flexibility to allow sustainable practices.”

“One of our biggest challenges is finding someone within the operations side of the business who can own and drive sustainability... getting someone who can commit... is proving really challenging with conflicting priorities.”

4. Discussion

These findings describe a workforce that is, on the whole, convinced of the case for change but not yet equipped to deliver it. The gap between importance (mean 4.5/5) and readiness (mean 3.2/5) was the most consistent signal across the dataset, and it recurs in different forms throughout the qualitative data: professionals who can calculate a trial's footprint but lack solutions to act on it; sustainability champions operating without a formal mandate; and a shared sense that sustainability is added on during trial delivery rather than built into design.

The subgroup findings sharpen this picture. Readiness was lowest among CROs and investigational sites, whose day-to-day work is largely shaped by protocols, supply strategies, and contracts set elsewhere, and higher among sponsors, who hold more of the design-stage decisions. Barrier profiles differed in ways consistent with this: site-based respondents more often reported that sustainability was not part of trial designers' goals and objectives, whereas CRO respondents more often cited limited awareness and perceived costs. Although these comparisons are exploratory, they suggest that different parts of the workforce have different levers to pull. Sponsors are best placed to build lower-impact options into protocols, supply strategies, and kit design; CROs may benefit most from awareness-raising and a clearer business case; and sites need enough flexibility within protocols to adopt sustainable practices they are often already motivated to deliver.

The barriers reported are largely structural rather than attitudinal. Conflicting priorities, the absence of sustainability in trial designers' objectives, and unclear guidance on what to implement, all point to gaps in organisational systems and incentives, not a lack of individual will. This is reinforced by the prominence of “trial design” as a recurring theme in free-text responses: several respondents independently identified the design stage, rather than delivery, as the point where sustainable choices can have the greatest positive impact. Once a protocol, supply strategy, or laboratory model is fixed, site- and vendor-level teams described having comparatively little room to act independently.

Excess and wasted supplies were a specific and recurring theme, particularly for site-based staff managing the practical consequences of centrally determined shipment volumes. This suggests that supply chain and kit-design decisions, often made upstream by sponsors, have a disproportionate effect on the volume of waste generated at sites, and on the frontline staff's ability to prevent it, making this a high-leverage area for coordinated action.

The training findings suggest the issue is not a lack of appetite for learning. Respondents want practical, applied content: how to embed sustainability into everyday trial design and conduct, how to calculate and act on carbon footprint, and where the emissions hotspots are in their trials. However, existing materials (where they exist at all) were rated as more relevant than they were adequate, and public resources were seen as harder to locate than organisation-provided ones. This points towards a need for training that is not only produced, but actively curated and signposted, and delivered through the channels respondents already trust: their own organisation, supplemented by short, easily discoverable external resources.

Several limitations should be considered when interpreting these results. The survey used a self-selected, convenience sample recruited substantially through sustainability-focused networks including the Sustainable Healthcare Coalition and its LinkedIn Community of Practice; respondents are therefore likely to be more engaged

with, and possibly more concerned about, sustainability than the clinical trials workforce overall, which may inflate importance ratings relative to the wider population. The sample was also geographically skewed towards Europe, and unevenly distributed across trial roles, with sponsors (46% of respondents) over-represented relative to laboratories, supply vendors, and clinical trials units. Self-reported readiness and barrier selection are subjective and may not align precisely with objective practice. Finally, free-text examples of implemented practice, while illustrative, cannot be independently verified or quantified in terms of environmental impact.

Despite these limitations, the consistency between the quantitative readiness gap and the qualitative themes of individual-driven effort, design-stage exclusion, and training accessibility gives a coherent and actionable picture of where support is currently most needed.

5. Conclusion and recommendations

The clinical trials workforce recognises environmental sustainability as important, but a substantial readiness gap remains between that recognition and the ability to act on it in day-to-day practice. Progress to date has often relied on the initiative of individual “sustainability champions” working without a formal organisational mandate, which can lead to fragmented implementation. Creating environmental sustainability champions is valuable and the work they undertake to educate and promote sustainable practices should be applauded, but organisations cannot rely on voluntary effort alone. Environmental sustainability objectives should be set from the top down, so that every role is clear on its responsibilities, and incorporated into existing roles, governance structures, and decision-making processes to enable scalable implementation.

Based on these findings, four areas of focus are suggested for implementation by the clinical trial sector:

- **Set sustainability objectives from the top down.** Define clear environmental objectives and accountabilities within existing roles, so that every role is clear on its responsibilities and progress no longer depends on the voluntary effort of individual champions. Formalise the “sustainability champion” role by aligning it with the organisation’s strategy, recognising it within performance objectives and giving champions the mandate and support to act.
- **Build sustainability into trial design and decision-making from the start.** Include environmental considerations at the points where design, governance and operational decisions are already made, so that lower-impact options are weighed alongside quality, patient burden, feasibility, time and cost. This allows investigational site, laboratory and supply chain teams to inherit trials with sustainable options built in, rather than retrofitting change into fixed protocols and supply strategies.
- **Make sustainability a routine part of every trial, not a one-off effort.** Develop and implement shared measurement standards, processes and practical guidance that allow teams to identify trial emission drivers, compare realistic alternatives and track outcomes without relying on extensive manual carbon-footprinting exercises. This provides a methodical, repeatable approach to identifying and implementing low-carbon options.
- **Support people with role-relevant, easy-to-access training.** Link guidance and training to the decisions each role actually makes, delivered through channels professionals already use. Combine organisation-led delivery

with short, well-signposted external resources, such as those provided through the Sustainable Clinical Trials Community of Practice.

The Sustainable Healthcare Coalition will use these findings to inform its ongoing programme of guidance, tools, and community-building for the clinical trials sector. We encourage organisations across the clinical trial ecosystem to treat the readiness gap identified in this study as a shared opportunity to reduce negative environmental impact and contribute to climate change mitigation, while simultaneously conducting more resilient, future-ready trials that are ‘Sustainable by Design’.

References

1. Adshead F, Al-Shahi Salman R, Aumonier S, et al. A strategy to reduce the carbon footprint of clinical trials. *Lancet*. 2021;398(10297):281–2. doi:10.1016/S0140-6736(21)01384-2
2. Sustainable Markets Initiative. Open letter to the clinical trial community from members of the Sustainable Markets Initiative Health Systems Task Force [Internet]. 2025 Feb [cited 2026 Jul 22]. Available from: Open Letter to Clinical Trial Community published by members of the Sustainable Markets Initiative Health Systems Task Force | Sustainable Markets Initiative
3. Cancer Research UK. Treading lightly – reducing the environmental impact of clinical trials [Internet]. Cancer News. 2025 Jan 13 [cited 2026 Jul 22]. Available from: <https://news.cancerresearchuk.org/2025/01/13/treading-lightly-reducing-the-environmental-impact-of-clinical-trials/>
4. World Health Organization. Clinical trials and environmental sustainability: review of key considerations to develop climate change mitigation and adaptation strategies. Geneva: World Health Organization; 2025. Available from: <https://www.who.int/publications/i/item/9789240120105>
5. Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *J Med Internet Res*. 2004;6(3):e34. doi:10.2196/jmir.6.3.e34. Available from: <https://www.jmir.org/2004/3/e34/>

Acknowledgements

The authors thank the 181 clinical trial professionals who took the time to complete the BIG Clinical Trials Sustainability Survey, the members of the industry Low Carbon Clinical Trial (iLCCT) consortium and the members of the Sustainable Clinical Trials Community of Practice and partner organisations who supported its distribution.

About the Sustainable Healthcare Coalition: Sustainable Healthcare Coalition is a membership-based organisation working to accelerate the transition to environmentally sustainable, low-carbon healthcare, including clinical research. For more information, or to join the Sustainable Clinical Trials Community of Practice, visit the [Sustainable Healthcare Coalition](#) website or [LinkedIn](#).