SWAT 257: Calculating and considering the carbon footprint of publicly funded clinical trials

Objective of this SWAT
To estimate, quantify and assess the carbon footprint of a publicly funded clinical trial.

Additional SWAT Details
Primary Study Area: Trial Design, Greener Trials
Secondary Study Area: Carbon footprinting, Lower Carbon Trial Design, Environmentally Sustainable Research
Who does the SWAT intervention target: Trial Team; Researchers
Estimated resources needed to conduct the SWAT: Low
Estimated cost of the SWAT (£): To perform carbon footprinting only: 1 month salary for a member of the trial team/CTU (eg. Data Manager, (Senior) Trial Manager, MSc or PhD student project. (Estimated maximum £10,000 @100% FEC) To perform continued research into identification and implementation of possible mitigation strategies: small increase in fte of Senior Trial Management staff to consider this during the trial set-up period (protocol development, supplies procurement, monitoring plan etc) (Estimated maximum £30,000 @100% FEC)

Findings from Implementation of this SWAT
Reference(s) to publications of these findings: n/a
Primary Outcome Findings: n/a
Cost: n/a

Background
Climate change is the biggest health threat facing humanity [1], current action is neither sufficient nor rapid enough to protect us from the worst effects of climate change, and healthcare emissions are contributing to the problem, with an estimated 4-5% of global greenhouse gas emission coming from health care [2]. Clinical trials are crucial to the development of new treatments and the advancement of medical knowledge, but they also contribute significantly to healthcare emissions [3]. As a first step to reducing greenhouse gas emissions, we must be able to reliably quantify them and identify the carbon hotspots. If hotspots can be identified by the team designing, managing and reporting a trial, steps can be taken to reduce emissions, facilitating lower carbon trial design and delivery [4,5]. This Study Within a Trial (SWAT) [6] provides a framework for doing this using the NIHR-funded guidance for the carbon footprinting of clinical trials.

In order to calculate a clinical trial's carbon footprint using the guidance, all activities undertaken to answer the research question which are in addition to routine care must first be identified (activity data). Activities are structured into modules within the guidance, which facilitates both identification and subsequent reporting. The activity data are then multiplied by standard emission factors to calculate the footprint of the activity, module or clinical trial in its entirety. The guidance document, all data collection tools, emission factors, and automated Excel spreadsheet to perform calculations (and online Greener Trial Toolkit from 2026) are available to support teams with carbon calculations. The Institute of Cancer Research in London, UK also run monthly drop-in clinics, which are open access and free to attend, providing training in clinical trial carbon footprinting and application of the guidance. For more information, email Cict-icrctsu@icr.ac.uk or visit https://www.methodologyhubs.mrc.ac.uk/about/working-groups/trial-conductwg/tcwg-subgroup-greener-trials/enabling-lower-carbon-clinical-trials-cict-project

Host Trial Population: Adults and Children
Host Trial Condition Area: Any and All

Interventions and Comparators
Intervention 1: Apply the NIHR-funded detailed guidance to carbon footprint clinical trials to a trial in development, to calculate its likely carbon footprint, identify carbon hotspots and consider possible mitigation strategies [4,5].

Intervention 2: Apply the NIHR-funded detailed guidance to carbon footprint clinical trials to the completed trial, to report its carbon footprint, identify changes to anticipated hotspots and assess implemented mitigation strategies [4,5].

Method for Allocating to Intervention or Comparator: n/a

Outcome Measures
Primary Outcomes: Clinical Trial Carbon Footprint (kgCo2e).
Secondary Outcomes: Identification of the carbon footprint of various trial activities, and reduction of the footprint where possible

Analysis Plans
The primary analysis is the quantification and assessment of the clinical trial carbon footprint, and relative quantification of any reduction in carbon footprint made as a result of the footprinting exercise.

Possible Problems in Implementing This SWAT
Performing carbon footprinting after funding has been secured poses a problem if potential mitigation strategies require funding beyond that included in the funding application.

References Cited in This Outline
1. Secretary-General Calls on States to Tackle Climate Change “Time Bomb” through New Solidarity Pact, Acceleration Agenda, at Launch of Intergovernmental Panel Report. UN Press. press.un.org. Available from https://press.un.org/en/2023/sgsm21730.doc.htm (accessed 16 December 2025).
2. Karliner J, Slotterback S, Boyd R, et al. Health care's climate footprint: how the health sector contributes to the global climate crisis and opportunities for action 2019. Available from https://global.noharm.org/sites/default/files/documents-files/5961/HealthCaresClimateFootprint_092319.pdf (accessed 16 December 2025).
3. Adshead F, Al-Shahi Salman R, Aumonier S, et al. A strategy to reduce the carbon footprint of clinical trials. Lancet 2021;398:281–2.
4. Griffiths J, Fox L, Williamson PR. Quantifying the carbon footprint of clinical trials: guidance development and case studies. BMJ Open 2024;14:e075755. doi: 10.1136/bmjopen-2023-075755.
5. Griffiths J, Adshead F, Al-Shahi Salman R, et al. What is the carbon footprint of academic clinical trials? A study of hotspots in 10 trials. BMJ Open 2024;14:e088600. doi: 10.1136/bmjopen-2024-088600
6. Treweek S, Bevan S, Bower P, et al. Trial Forge Guidance 1: what is a Study Within A Trial (SWAT)? Trials 2018;19:139.

References to This SWAT
1. Griffiths J, Fox L, Williamson PR. Quantifying the carbon footprint of clinical trials: guidance development and case studies. BMJ Open 2024;14:e075755. doi: 10.1136/bmjopen-2023-075755.
2. Griffiths J, Adshead F, Al-Shahi Salman R, et al. What is the carbon footprint of academic clinical trials? A study of hotspots in 10 trials. BMJ Open 2024;14:e088600. doi: 10.1136/bmjopen-2024-088600

Source of This SWAT
People to show as the source of this idea: The Institute of Cancer Research - Clinical Trials and Statistics Unit (ICR-CTSU); University of Liverpool (UoL); MRC-NIHR Trials Methodology Research Partnership Greener Trials Group
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