



**CONCORDAT FOR THE ENVIRONMENTAL
SUSTAINABILITY OF RESEARCH &
INNOVATION PRACTICE**

**UNIVERSITY OF LIVERPOOL
CASE STUDY**

Sally Shaw
Associate Director of Sustainability

November 2024



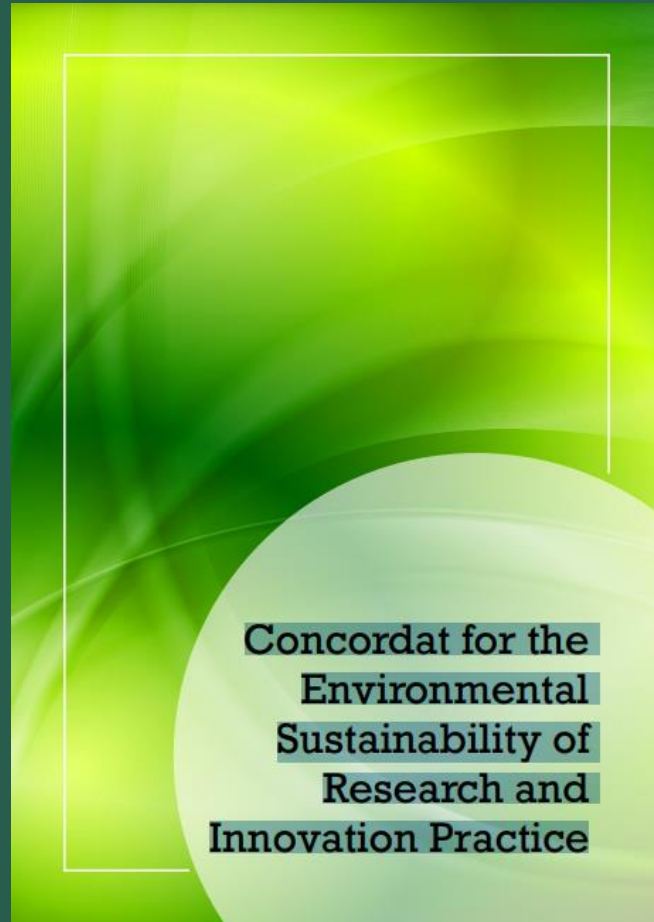
CONTEXT

- Founded in 1881 as the original 'red brick' university
- Member of the Russell Group
- Three campuses: Liverpool, Wirral and XJTLU in China
- 30,000 students and 6,000 FTE staff on the main campus
- Annual turnover of £675m





Oct 2023: We will conduct our research in a way that supports social and environmental equity



Apr 2024: Concordat for the Environmental Sustainability of Research and Innovation Practice is published

LEADERSHIP & SYSTEM CHANGE




Nov 2024: We will act at an institutional level, and collectively across the sector, to achieve the six priority areas of the UKRI Concordat for the Environmental Sustainability of Research and Innovation Practice

RESEARCHER CASE STUDY

- Professor Paula Williamson and colleagues from the Low Carbon Clinical Trials Group published the first publicly available method and guidance to carbon footprint a clinical trial that can be used to inform lower carbon trial design
- Using her knowledge and experience, Professor Williamson is driving environmental change in the Faculty of Health and Life Sciences, helping academics in other disciplines to address the carbon impacts of their research and associated activities.

BMJ Open Quantifying the carbon footprint of clinical trials: guidance development and case studies

Jessica Griffiths ¹, Lisa Fox,¹ Paula R Williamson,² on behalf of the Low Carbon Clinical Trials Group

To cite: Griffiths J, Fox L, Williamson PR, et al. Quantifying the carbon footprint of clinical trials: guidance development and case studies. *BMJ Open* 2024;**14**:e075755. doi:10.1136/bmjopen-2023-075755

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2023-075755>).

Received 18 May 2023
Accepted 06 December 2023

ABSTRACT

Background The urgency of the climate crisis requires attention from biomedical research, not least clinical trials which can involve significant greenhouse gas emissions. The Low Carbon Clinical Trials Working Group set out a strategy to reduce the emissions of clinical trials, starting with the development of a method to measure their carbon footprint (CO₂e).

Methods As a first step, we developed a process map defining clinical trial core activities. Corresponding emission factors were sourced to convert activity data into greenhouse gas emissions. The subsequent method was applied to two Cancer Research UK (CRUK)-funded trials (the international randomised sarcoma trial CASPS (ISRCTN63733470) and the UK cohort-based breast cancer trial PRIMETIME (ISRCTN41579286)). A guidance document defining the scope, method and assumptions was written to allow application to any publicly funded/investigator initiated clinical trial.

Results Trial specific activities over and above routine care were grouped into 10 modules covering trial set up, conduct and closure. We identified emission factors for all trial activities within both trials and used them to estimate their total carbon footprint. The carbon footprint of CASPS, an international phase 2 trial of an investigational medicinal product with 47 participants, was 72 tonnes CO₂e, largely attributable to clinical trials unit emissions and staff travel. PRIMETIME, a UK-based phase 3 non-investigational medicinal product trial with 1962 patients, produced 89 tonnes CO₂e, largely attributable to trial-specific in-person participant assessments.

Conclusion We have developed a method and guidance that trialists can use to determine the carbon footprint of clinical trials. The guidance can be used to identify carbon hotspots where alternative approaches to trial design and conduct could reduce a trial footprint, and where methodology research is required to investigate the potential impact of interventions taken to reduce carbon emissions. We will continue to refine the guidance to increase the potential application and improve usability.

INTRODUCTION

The WHO has called climate change 'the single biggest health threat facing humanity today'.¹ While clinical trials are critical to identifying effective and safe treatments, in line with all healthcare activities, they also have a

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This is the first published and publicly available method and guidance to carbon footprint a clinical trial that can be used to inform lower carbon trial design.
- The guidance has been developed by an extensive and broad reaching collaboration and is intended for use by trialists with no prior experience of carbon footprinting.
- The method and guidance accounts for the carbon footprint of a clinical trial but no other metrics that may be important to consider in a full life cycle analysis.
- The emission factors used are the most appropriate publicly available factors that we could identify. More suitable or up to date emission factors may be available in the future or via paid subscription.
- The validity of results generated by the guidance is dependent on the quality and completeness of the activity data collated and the emission factors used.

significant environmental impact. This contribution was first recognised around 16 years ago, when Ian Roberts and other members of the Sustainable Trials Study Group concluded that 'clinical trials contribute substantially to greenhouse gas emissions.... Notably through energy use in research premises and air travel'.² Another study conducted by Lyle *et al* of 12 UK pragmatic randomised trials, involving an average of 402 participants, showed that the average carbon emissions generated by the trials was 78.4 tonnes.³ Multiplying this total by the 350 000 national and international trials registered on ClinicalTrials.gov would estimate the emissions of all global trials to be about 27.5 million tonnes of carbon dioxide equivalent.⁴ This total, which is likely a highly conservative estimate, is comparable to the 25 million tonne CO₂e total footprint of the UK National Health Service (NHS) which accounts for 6% of the UKs total footprint.^{5,6} More recently, Mackillop *et al* published a study quantifying



© Author(s) (or their employer(s)) 2024. Re-use permitted under CC BY. Published by BMJ.

¹The Institute of Cancer Research, London, UK

²The University of Liverpool, Liverpool, UK

Correspondence to
Jessica Griffiths;
jessica.griffiths@liver.ac.uk

SUSTAINABLE INFRASTRUCTURE

- University of Liverpool Sustainable Construction Framework / Projects Guidance
- LEAF
- Digital Infrastructure (Green Disc)
- Shared Research Facilities
- Leased assets e.g. Liverpool Science Park

SUSTAINABLE PROCUREMENT

- Centralising budgets for furniture, equipment and books
- Sustainable Procurement Policy aligned to funder policies
- Net Positive Futures / Supplier Engagement Tool
- Equipment sharing – asset management project
- Circular Economy Role

EMISSIONS FROM TRAVEL

- Travel Policy aligned with funder policies e.g. Wellcome, CRUK
- Sustainable travel guidance
- Scope 3 reduction targets

COLLABORATIONS & PARTNERSHIPS

- Interdisciplinary Centre for Sustainability Research

ENVIRONMENTAL IMPACT & DATA REPORTING

- Standardised Carbon Emissions Reporting framework
- HESA EMR
- LEAF
- ISO 14001:2015
- Annual Financial Statements





CONTACT

Sally Shaw
Associate Director of Sustainability
sally.shaw@liverpool.ac.uk

