

# Ensuring the Benefits of Our Therapies are not Offset by Our Operations: Reducing the Climate Impact of Clinical Research

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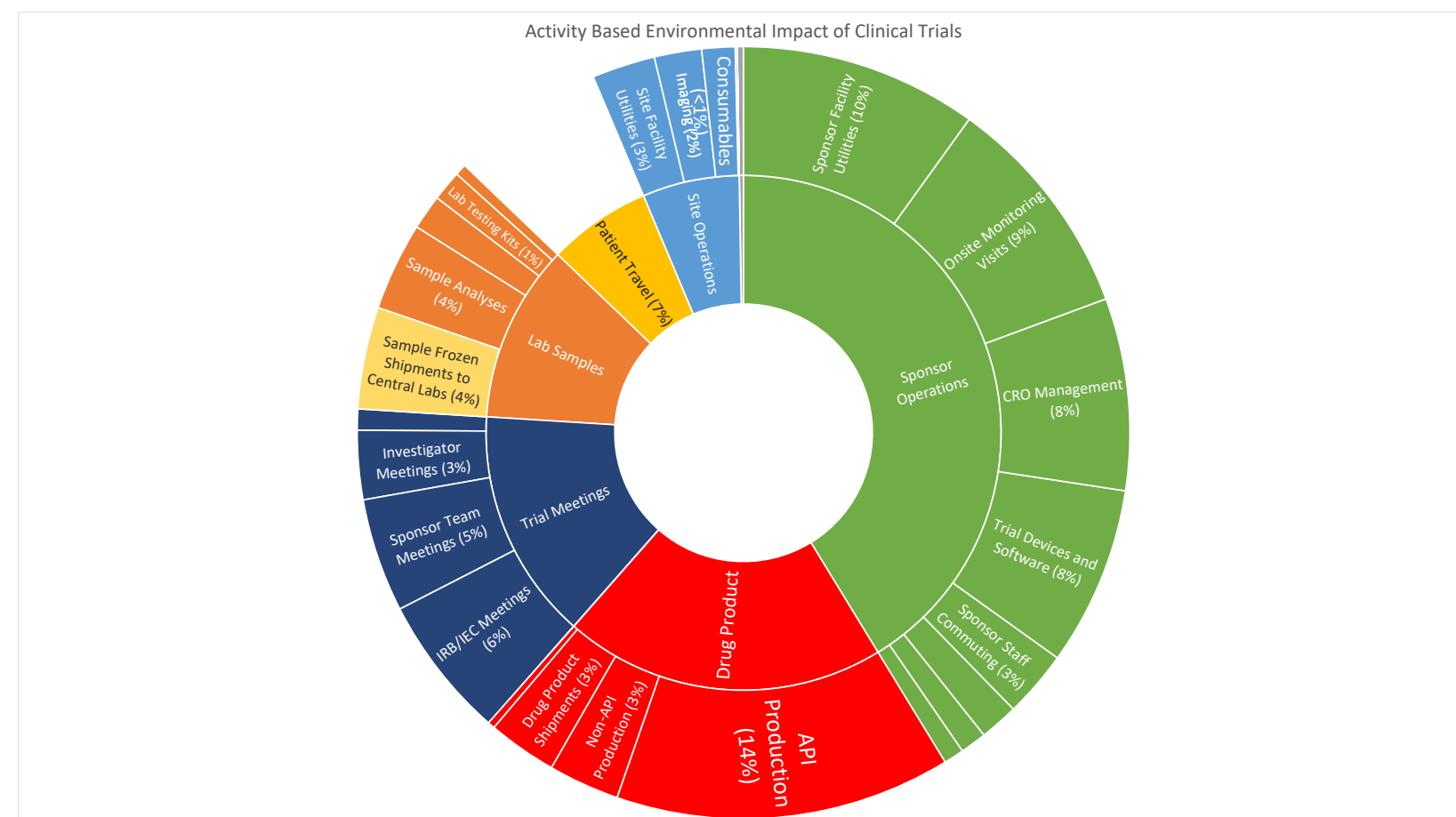
## Why Should We be Concerned?

Workers in healthcare share a common goal: to improve people's health. For pharma companies, clinical trials are a big part of achieving that goal. And yet, there has been a collective rise in awareness that while we work to develop medicines to help improve patients' health and their quality of life, we also cause environmental harm on our planet. Over time, this will negatively impact the health of individuals and populations, running contrary to our aim.

The more than 350,000 clinical trials conducted worldwide are estimated to have generated 27.5 million tons of GHG emissions, or the equivalent of 5.3 million gasoline-powered passenger vehicles driven in the US for one year.<sup>1,2</sup> These clinical trial emissions are due to everything from manufacturing and research to drug distribution and electricity usage at clinical trial sites.

## What are the key drivers of emissions in clinical trials?

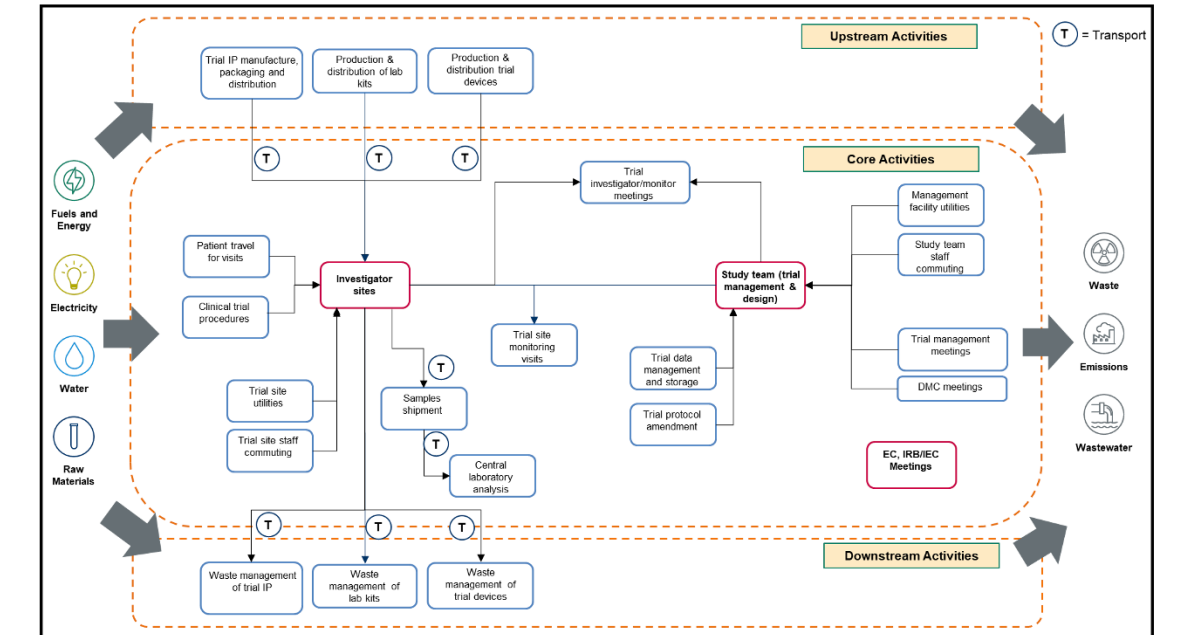
Based upon a lifecycle analysis of 11 different clinical trials conducted by Astra Zeneca<sup>3</sup> and Johnson & Johnson Innovative Medicines spanning multiple trial phases and disease areas, the following common greenhouse gas emissions hotspots appear:



- References:
1. Adshead F, Al-Shahi Salman R, Aumonier S, Collins M, Hood K, McNamara C, Moore K, Smith R, Sydes M R, Paula R Williamson P R, "A strategy to reduce the carbon footprint of clinical trials." The Lancet. Vol 398; July 24, 2021.
  2. United States Environmental Protection Agency, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results>
  3. MacKillop N, Shah J, Collins M, Costelloe T, Öhman D, "Carbon footprint of industry-sponsored late-stage clinical trials", BMJ Open 2023 2023;13:e072491. doi:10.1136/bmjopen-2023-072491
  4. Sustainable Healthcare Coalition, <https://shcoalition.org/clinical-trials-framework/>

## How to Measure Greenhouse Gas Emissions in Clinical Trials?

[Sustainable Healthcare Coalition](#) and [Pistoia Alliance](#) as part of the Industry Low Carbon Clinical Trials Group (iLCCT) is bringing together industry and academic partners to co-develop [common methodologies for measuring greenhouse gas emissions from clinical research](#)<sup>4</sup>. An assessment framework was made publicly available in 2023.



## Activity Based Measures: A Tool For Scenario Modeling And Co-Informing Trial Design

Consider a chest x-ray. It's an activity performed regularly in our trials.

First, we measure the carbon footprint for this activity.

Because this activity is standardized, the emissions are fixed. We can treat this activity as a module generating a defined quantity of emissions every time it is performed.

We can repeat this for all the different activities performed in our trials, ultimately creating an inventory of modules or "bricks."

Utilizing a study's T&E schedule, we can pull the associated bricks for each study activity from our inventory and assemble them. Summing the carbon footprint of all the bricks will allow us to estimate the overall emissions for a study design.

Study Day	Notes	Study Visits									
		Screening Phase		Treatment Phase (1 Cycle = 28 days)		Treatment Phase (2 Cycles = 56 days)		Follow-up Phase		Survival	
		Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2
Baseline consent											
Baseline vitals											
Baseline lab											
Baseline ECG											
Baseline x-ray											
Physical examination											

In 1Q24, iLCCT members will be delivering:

- Open access database for the collection and sharing of activity-based measures across the healthcare sector
- Eco-design tool for estimating the greenhouse gas emissions of new trial designs for open use by academic and industry sponsors