



CLINICIAN AND HEALTH SERVICE INTERVENTIONS TO REDUCE THE CARBON FOOTPRINT OF HEALTHCARE: A systematic review

Kristen Pickles (1), Romi Haas (2), Michelle Guppy (3), Denise O'Connor (2), Thanya Pathirana (4), Alexandra Barratt (1), Rachele Buchbinder (2)

1 School of Public Health, Faculty of Medicine and Health, The University of Sydney;
 2 School of Public Health and Preventive Medicine, Monash University; 3 School of Rural Medicine, University of New England, Armidale;
 4 School of Medicine, Griffith University, Sunshine Coast



We are uncertain if interventions to reduce the carbon footprint of healthcare are effective as the certainty of the evidence is very low. Rigorous studies are needed to determine their true effects.

Characteristics of 12 included studies

POPULATION: staff in **hospital settings** (40% anaesthetic department)

INTERVENTIONS: 38 interventions implemented across **12 studies**, mainly **staff education** targeting behavioural change: delivery of anaesthesia (5/12), unnecessary test requests (3/12), waste/recycling (3/12), and energy use (1/12)



COMPARISON: **Before/after study design** comparing a period of intervention with a preceding period of no intervention (n=12)

OUTCOMES: common outcomes of interest = **carbon emissions** (n=10) & **financial costs** (n=8)



Most studies (n=11) rated unclear or high risk for at least one **Risk of Bias** domain. Most common domains of high risk => generalisability, reporting of outcome measures

➤ Unable to pool data for any outcome due to **methodological and clinical diversity** in participants, interventions, and outcomes of the included studies.

➤ 11/12 studies reported a **reduction in carbon emissions**, but we are unable to determine if the effect sizes are likely to be environmentally important.

Background:

- Global healthcare is responsible for **~5% of global greenhouse gas emissions**
- **Delivery of care** (medical devices, consumables, pharmaceuticals) accounts for the majority of the sector's total emissions
- Addressing this footprint requires **changing patterns of clinical pathways** and **use of healthcare**.

Objective:

- **To identify and synthesise the available evidence on the effects of interventions designed to reduce carbon emissions of health care.**

Methods:

- Electronic databases searched for trials or before-after studies that assessed interventions primarily designed to reduce the carbon emissions of healthcare delivery, initiated by clinicians or healthcare services and within any setting.
- **Primary outcome:** reduction in carbon or greenhouse gas emissions measured directly or indirectly (e.g. estimated from costs, waste and/or energy consumption)
- **Secondary outcomes:** patient relevant outcomes, effectiveness, harms, financial costs, engagement, and acceptability
- Paired screening for study eligibility and extraction; independent risk of bias assessment
- Certainty of the evidence assessed using GRADE approach.

Recommendations:



- High quality randomised controlled trials needed
- Broaden research field beyond hospital setting and anaesthesia; measure impacts on patient outcomes and potential harms
- Underpin behavioural change interventions with appropriate theory