A Systematic Review to Identify the Effectiveness of Greenhouse Gas Mitigation Interventions for Healthcare Systems in Low- and Middle-Income Countries

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Annex 2 Conceptual Framework Detailed Sections

Situation and Context Analysis

Problem Statement

Climate change is expected to cause a major impact on human health due to many direct and indirect health effects (1). However, healthcare systems themselves contribute to 4.4.% of all GHG emissions (2). Healthcare systems need to implement mitigation interventions to ensure an adequate, effective and systematic response to these health effects whilst aiming for synergies or co-benefits with adaptation. Mitigation interventions should span all three scopes of emissions, including healthcare operations, energy and supply chains. There is a paucity of evidence guiding these interventions, particularly in LMICs.

At the UNFCCC COP26, countries committed to environmentally sustainable healthcare systems – of which the majority were LMICs (3). This provides an opportunity for these LMICs to transform their healthcare systems through GHG mitigation, with potential co-benefits for adaptation and health, while inspiring individuals, other sectors and efforts in HICs.

Context

To assess and influence the probability of success or failure of interventions towards GHG mitigation in healthcare systems, the implementation process needs to be taken into account. This includes the financial constraints, including costs and cost-savings. It also consists of the availability and accessibility of low-emission alternatives for healthcare providers and patients and other potential barriers.

Impact

The impact is the sustained and long-term change envisioned (4). Three levels of impact are identified. Firstly, the direct impact of GHG mitigation of healthcare systems in LMICs. By considering adaptation through identifying synergies and co-benefits, a knock-on impact would be a reduction of climate risk for health. Finally, and indirectly, these interventions could impact the awareness of and inspire climate action by individuals (patients), the community, other sectors and HICs.

Outcomes & Mechanisms

The outcomes are shorter-term changes that contribute to the eventual impact (4). These outcomes include different mitigation interventions across the three scopes of emissions. An overview of these scopes and their subdomains where interventions can be implemented are as follows and adapted from Rasheed et al.'s infographic (5):

1. A reduction of GHG emissions of healthcare operations (Scope 1):
	1. Stimulate low carbon prescriptions
	2. Increase efficiency and inimize patient travel, e.g. through strategic planning and multidisciplinary consults
	3. Transition to a healthcare system of community-based health promotion and disease prevention with a prominent role of primary healthcare
	4. Shift towards higher usage of eHealth, including teleconsults
	5. Stimulate the use of low-carbon transport alternatives for operations, including low emission ambulances
2. A reduction of GHG emissions of healthcare energy (Scope 2):
	1. Transition to clean energy through renewable energy sources and low carbon grids
	2. Use of battery power to expand the renewable energy supply
	3. Utilise energy efficiently, e.g. LED lighting
3. A reduction of GHG emissions of healthcare supply chains (Scope 3):
	1. Reuse of medical devices and supplies
	2. Reduce the acquisition of non-reusables and high-emission alternatives and increase the use of low-emission alternatives
	3. Transition to a predominantly plant-based hospital menu with locally-produced foods (particularly for staff and visitors)
	4. Stimulate healthcare workers and patients to minimise transport and, when necessary, use active transport or electric, shared vehicles
	5. Use low-emission alternatives for transportation and distribution
	6. Encourage low-emission travel options for business travels
	7. Procure from net-zero suppliers or suppliers with a strategy to move to net-zero

There is a lack of an overview of evidence about which specific mechanisms will lead to the abovementioned outcomes. Their outputs are specific to the intervention and measured by reducing GHG emissions.

It is vital to consider the interlinkages of all mitigation interventions leading to the above-listed outcomes with adaptation and categorise them under co-benefit, synergy, conflict, or trade-off. Whilst deciding which interventions to implement, preference should be given to those that synergise with adaptation or provide adaptation co-benefits.

Assumptions

Assumptions are an underlying process of the Theory of Change and refer to thinking processes leading to the abovementioned information (4). The following assumptions have been identified:

Delivery assumptions

* Relevant interventions towards GHG mitigation in healthcare systems in LMICs can be identified in the literature;
* There is sufficient interest and dedication of policymakers to implement these interventions;
* Icluding through supporting organisations, the right skills, abilities and resources are present to implement and measure these interventions.

Impact assumptions

* GHG mitigation in healthcare systems while considering actions relevant for adaptation in the context of climate change is relevant for improved health outcomes;
* Knock-on effects could include a reduction of climate risk for health through adaptation, yet it is vital to evaluate the evidence of these potential effects;
* Indirect effects could include inspiration and motivation to act across different groups, including individuals, communities, other sectors and HICs, yet future research has to confirm whether this is, in fact, a hypothesis that can be verified.

Possible unintended consequences

* An identified risk is that this project can potentially distract people from investing and implementing adaptation actions in contexts where urgency requires adaptation to be a priority due to an urgent need to adapt because of impacts or intervention measures can have a conflict or trade-off with adaptation. Therefore, every step must consider whether recommendations are transferable across contexts and the relation of proposed mitigation interventions with adaptation. Where urgency requires, adaptation should indeed be prioritised.

Theory of change process assumptions

* Robust data on the impact of GHG mitigation interventions and experts have been consulted while designing this Theory of Change;
* The Theory of Change is intended to be a 'living document' and continuously adapt to newly found evidence and insights.

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