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Taking action to improve health for all

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A Scoping Review Exploring the Facilitators, Barriers, and Impacts of Transitioning from Disposable to Reusable Personal Protective Equipment (PPE) in Hospitals

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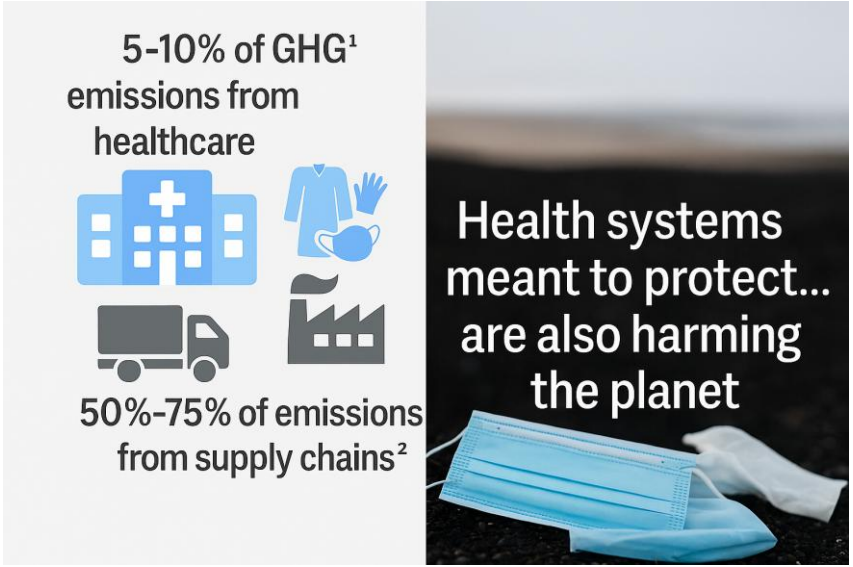
Study rationale



- **Single-use PPE** (e.g., gowns, masks, gloves), generates significant waste and emissions, and COVID-19 intensified this issue[3].
- Reusable PPE seems to offer **environmental and economic benefits** while also **enhancing supply chain resilience**[4,5] — prompting some hospitals to transition, especially during the pandemic.
- However, hospitals face challenges: **upfront investment**, **logistical constraints**, and **infection control concerns**.
- **Gap:** No comprehensive synthesis exists on **implementation barriers and facilitators** and the **multi-dimensional impacts** (environmental, safety, economic) of reusable PPE in hospital settings.

1. Andrieu B, et al. 2023
2. Seppänen & Or. 2023
3. Patricio Silva et al., 2022
4. Bromley-Dulfano et al., 2022
5. Baykasoğlu et al., 2009

Objectives

Map existing evidence on the **adoption** of reusable PPE in hospitals, including its **impacts on environment, safety and cost.**

Specifically :

- 🩺 Identify barriers and facilitators to the adoption and implementation of reusable PPE in hospital settings.
- 🩺 Explore variations in implementation factors across different clinical units (e.g., low-risk vs. high-risk).
- 🌍 Compare the environmental impacts of reusable versus disposable PPE.
- 🛡️ Assess differences in patient and staff safety between the two options.
- 💰 Analyze the economic costs associated with reusable vs. disposable PPE.

Methods

York's five-stage framework[6]

Stage 1 (completed)
- Identify research questions and hypotheses

Stage 2 (completed)
- Define eligibility criteria and search strategy (databases and grey literature)

Stage 3 (completed)
- Select studies (titles/abstracts, full-text screening with RYYAN)

Stage 4 (in progress)
- Extract (COVIDENCE) and appraise data (MMAT quality appraisal tool)

Stage 5 (not started)
- Narrative synthesis based on CFIR framework of Damschroder et al., 2022[7] (data on implementation dimensions)
- Statistics reported (data on impact outcomes)

Eligibility criteria

	Included	Excluded
Study focus	**Reusable PPE** **Implementation** facilitators/barriers and/or **impacts**	No-PPE focused (e.g., other medical equipment)
Study Context	**Hospital** clinical units	Non-hospital (e.g., primary care)
Intervention	**Adoption/utilization of reusable PPE** (gowns, masks, gloves, etc.)	Non-PPE reusable equipment
Outcomes	**Env. Impact** (e.g. GHG, waste, energy/water use) **Staff and patient safety** (protective performance, HAIs) **Cost reduction**	Not covering outcomes of interest
Study types	Original research, reviews, reports, theses	Expert opinions, theory papers

6. Damschroder et al., 2022
7. Arkey & O'Malley, 2005

Preliminary results

Characteristics of included studies

- Number of studies (n=35)
- Year range: 2009–2025
- Top countries: USA, UK, Europe (France, Germany, Italy, Netherlands)
- Reusable PPE types: gowns, respirators, face shields, headwear
- Clinical settings: ORs, EDs, hospital wards, outpatient clinics

Preliminary results

Impacts of reusable PPE

🌎 Environment (n=15 studies)

- ✅ Less energy use, waste, and GHGs vs. disposables
- ⚠️ May increase water use (cotton-based gowns)

🛡️ Safety (n=11 studies)

- ✅ No significant difference in infection rates
- ✅ Reusables offer equal microbial protection

💰 Cost (n=5 studies)

- ✅ Up to 75% savings per use with reusable PPE

Preliminary results

🩺 Implementation of reusable PPE (n=8 studies)

- Acceptability and perception of end-users:
  - ✅ Seen as protective in high-risk care
  - ⚖️ Initial discomfort, resolved over time
- Feasibility :
  - ⚠️ Requires appropriate laundering infrastructure and staff training
  - ⚠️ Hospital procurement practices often misaligned with sustainability goals
  - ⚠️ Absence of national safety guidelines for reusable PPE
  - ⚠️ Limited local production capacity for reusable options

THANK YOU

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Protocol (Clavel et al., 2025): https://bmjopen.bmj.com/content/15/5/e096504.full

Clavel N, Castonguay FM, Laprise C, Williams S, Ethier I, Bernier MC, Beauharnais C. Barriers and facilitators to implementing reusable personal protective equipment in hospitals, and their impacts on environment, care safety, costs, and supply chain resilience: a scoping review protocol. BMJ Open. 2025 May 23;15(5):e096504. doi: 10.1136/bmjopen-2024-096504.

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