EE697

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A BOTTOM-UP RESOURCE USE INVENTORY OF CONTRAST-ENHANCED MAMMOGRAPHY TO SUPPORT ENVIRONMENTAL SUSTAINABILITY IN HEALTH TECHNOLOGY ASSESSMENT

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OBJECTIVES

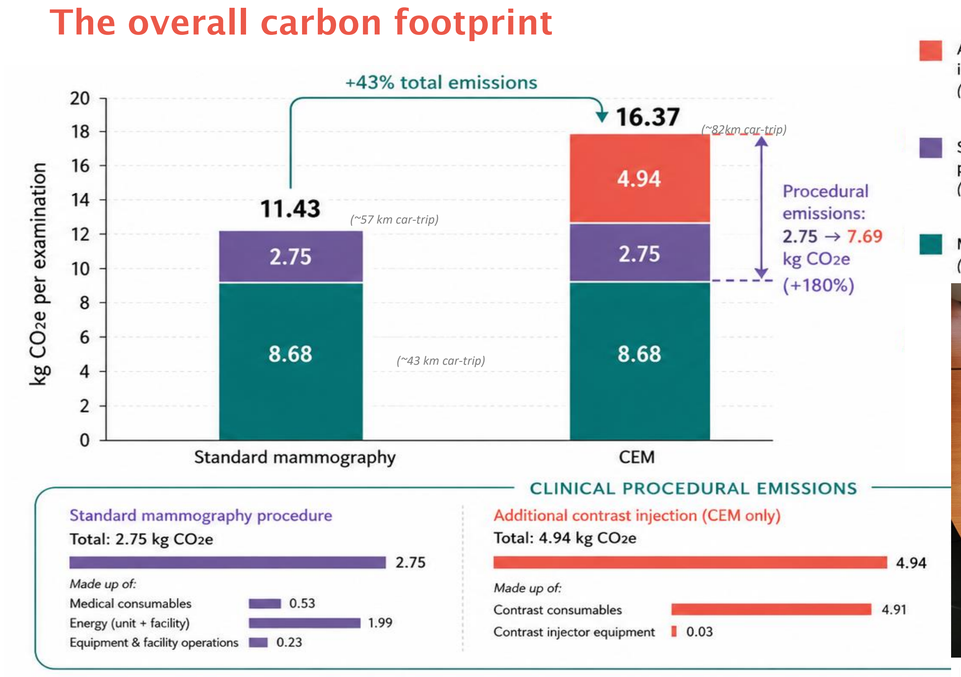
- Health technology assessment agencies are looking at how to include environmental sustainability in their evaluations.
- A major challenge is the lack of process-based resource use data. Contrast-enhanced mammography (CEM) is a new diagnostic option compared to standard mammography and MRI for women with dense breasts.
- To provide the essential data needed for extended economic evaluations, we created a detailed **resource use inventory** of the CEM clinical pathway.

METHODS

- A **process-based, cradle-to-grave LCA** was conducted at University Hospital Vienna (AKH Vienna) following ISO 14040/44 standards and using an attributional approach. The functional unit was one bilateral CEM examination. The **system boundary** encompassed the pre-clinical, clinical and post-clinical phases.
- Primary data were collected through on-site measurements, supplier data, self-reported patient questionnaires within the VABABS project. We supplemented this data from literature for power profiles and the **Ecoinvent 3.11** database for background processes.
- Environmental impacts were assessed using the **Environmental Footprint 3.1 (EF 3.1)** method to quantify emissions in kg CO2 equivalents (CO_2e). Parameter uncertainty was assessed through deterministic scenario analyses.

RESULTS

The overall carbon footprint



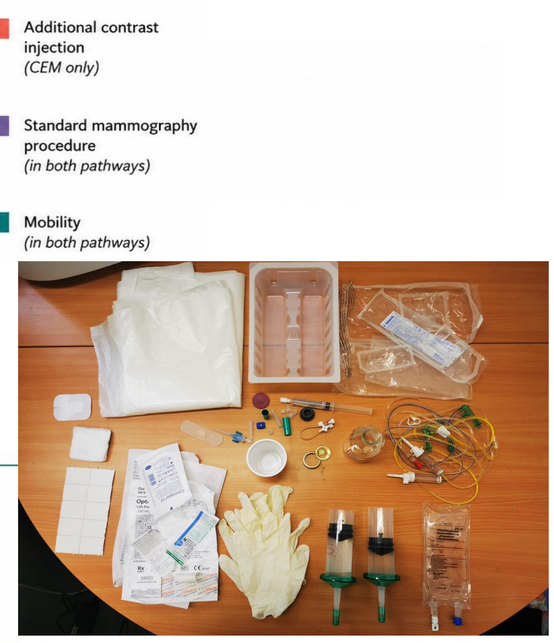


Figure 1. Waste composition of a CEM, © C Österle, used under CC BY 4.0 license.

Beyond CO_2e – EF 3.1 categories

CEM's impacts extend beyond GHG emissions, reflecting high material and energy intensity

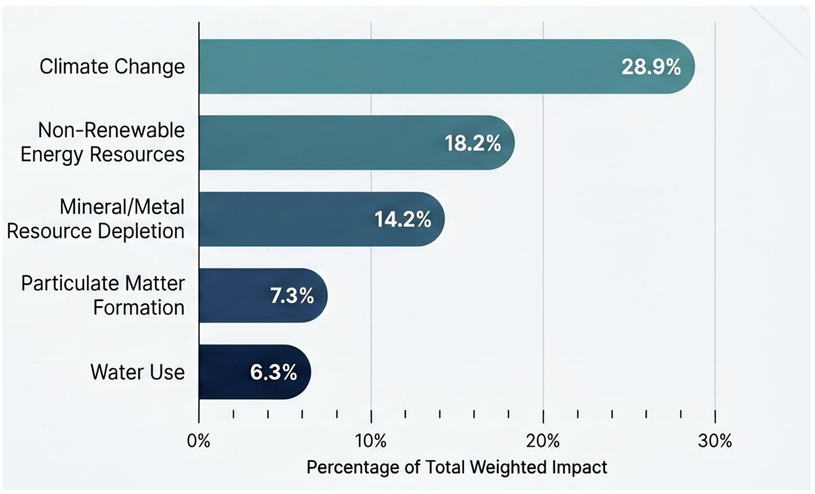


Figure 2. Top 5 environmental impact categories for CEM.

Scenario modeling

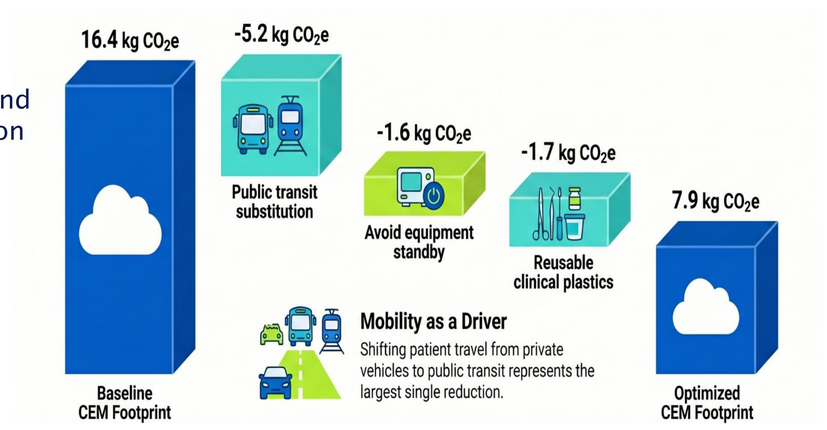


Figure 3. Footprint hotspots and optimization potential

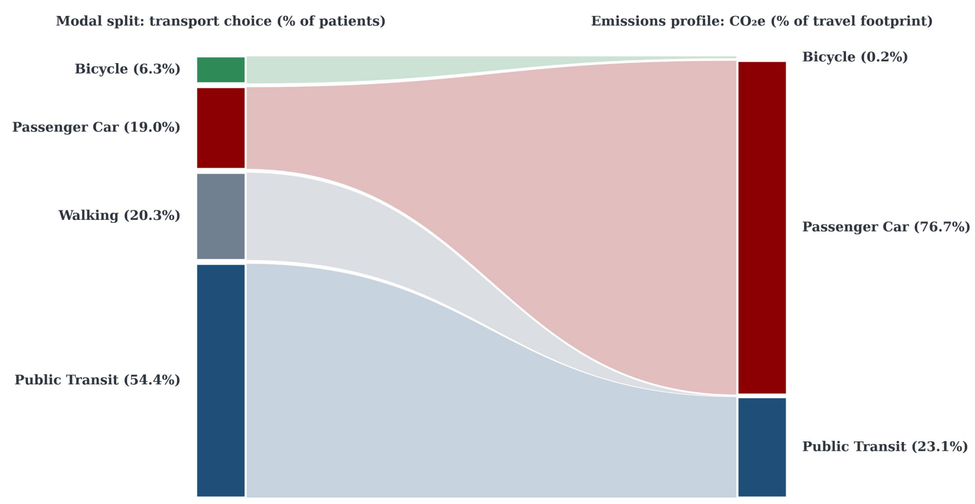


Figure 4. Patient mobility disparity between modal split and greenhouse gas emissions

CONCLUSION

- This bottom-up inventory provides the necessary parameters to incorporate the climate impact of CEM into standard cost-effectiveness models.
- Because the social cost of carbon (SCC) varies across regions, providing raw physical data allows health economists to apply the SCC specific to their context.
- Finally, even though CEM emits more GHG than standard mammography, it provides a carbon-efficient alternative to MRI without compromising diagnostic performance.

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