

The Resilient Health Systems Model (RHSM): Practical Actions for Health Plans to Reduce Carbon Footprints

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Background

The U.S. health sector contributes approximately 8.5% of national greenhouse gas (GHG) emissions¹. This study identifies effective strategies for payors to reduce emissions and integrates findings into a systems-based quality framework. The work also builds on national efforts like the HHS Health Sector Climate Pledge, the Agency for Healthcare Research and Quality (AHRQ) decarbonization priorities, and the National Academies' Collaborative on Decarbonizing the U.S. Health Sector, proposing that climate sustainability be incorporated into quality improvement frameworks, including the IHI Quintuple Aim^{2,3,4}. This work was funded by a grant from The Commonwealth Fund.

Methods

A review of literature and consultation with subject matter experts identified 27 decarbonization strategies relevant to health care organizations. A Delphi panel with two survey rounds and one facilitated discussion was conducted to identify top decarbonization strategies for health plans. For this study, nine health plans were recruited via convenience sampling. Panelists represented not-for-profit and for-profit plans across all lines of business and a broad range of U.S. geographic areas. Survey 1 included 27 strategies across six domains. Survey 2 (n=29) included two additional strategies identified as important by the Delphi panel during the facilitated discussion.

Surveys were administered via Qualtrics XM v.2024. Panelists rated each strategy on three criteria (importance, usability, feasibility) using a 9-point scale and provided qualitative comments. Descriptive analyses were conducted using the RAND Appropriateness Method (RAM), a two-step method that identifies the level of agreement based on the distribution of panel ratings and then categorizes the median panel rating as low, uncertain, or high. A prioritization category was then applied (Table 1).

Table 1. Prioritization Categories for Decarbonization Strategies per Criterion Ratings

Category	Importance	Usability	Feasibility	Implication
Α	High	High	High	Recommend as a potential strategy/metric to support decarbonization in the health care industry.
В	High	High	Uncertain/Low	
С	High	Uncertain/Low	High/Uncertain/Low	strategy/metric to support decarbonization in
D	Uncertain/Low	Uncertain/Low	High/Uncertain/Low	

Results

For Survey 1, there was a 100 percent response rate (n=9). Eight of nine participants (89%) attended the Delphi Panel meeting and completed Survey 2. Survey 2 ratings determined the Delphi Panel's final level of agreement for each strategy. Percent agreement increased between survey rounds for all three criteria (importance, usability, feasibility). There was no panel disagreement for any of the 29 strategies following Survey 2. Across all strategies, Figure 1 highlights the "Top 7" strategies identified by health plans.

Use of Renewable Energy at Health Plan Owned or

Controlled Facilities (B)

Figure 1. Top 7 Decarbonization Strategies and Associated (Prioritization Category)

Governance & Capacity Building Management Measure Scope 2 Emissions (Energy) at Health Plan Implement Sustainability Officer/ Controlled or Owned Facilities (A) Implement Energy-Efficient Lighting, Heating, Cooling, Implement Strategic Planning via Forecasting & Modeling Use Cases & Other Equipment in Health Plan Controlled or Owned Buildings (A) Electrification of Health Plan Controlled or Owned Building Systems & Equipment (B)

Resource & Conservation **Government Policies**

Fines/Penalties for Not Disclosing Carbon Emissions (B)

Results (continued)

During the modified Delphi panel discussion, health plans focused on strategies that were within the health plan or system control. As a result, six out of the seven individual strategies fell under the Governance and Capacity Building or the Resource and Conservation Management domains. Two strategies had high median ratings on all three criteria. Of these, the panel reached agreement on all criteria for one (Measure Scope 2 Emissions), while they reached agreement on importance only for the other (Implement Energy-Efficient Lighting, Heating, Cooling). Five strategies achieved high importance and usability ratings but an uncertain feasibility rating. Participants did acknowledge that even though the strategy related to fines and penalties was not within the organizations control, government policies play an integral role in advancing climate sustainability efforts.

Participants ranked individual decarbonization strategies by importance, feasibility and usability; strategies with higher rankings contributed to elevating the perceived relevance of specific domains. Figure 2 presents the overall rank order from highest to lowest for the six domains. To determine the overall rank, the mean of the domain averages for importance, usability, and feasibility was calculated using equal weighting. The Governance and Building Capacity domain ranked highest overall, and on each criterion individually.

Figure 2. Overall Rank Order by Decarbonization Domain



Qualitative Results

Panel feedback received via open-ended survey responses and during the facilitated discussion was categorized into three central themes for each domains (Figure 3). Domains are listed in order of overall ranking post Survey 2. The first theme focused on organizational structure and efficiency, the second on measuring progress, and the third on climate policy.

Figure 3. Qualitative Themes by Domain



Integrating Findings within a Quality Framework

Three key findings related to health plan progress in implementing decarbonization and sustainability goals within their organizations were identified from the quantitative and qualitative analyses.

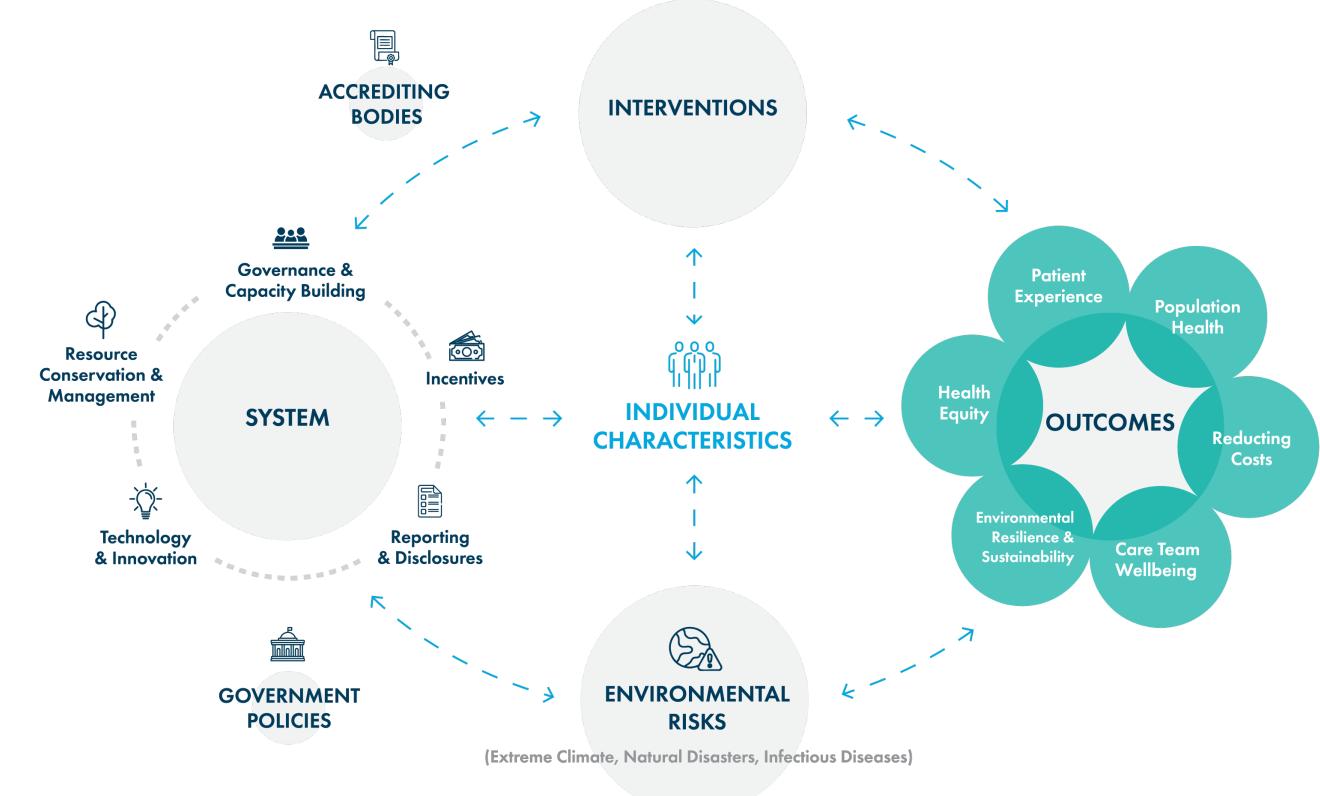
Aligning climate sustainability with health care quality goals ensures that environmental efforts support patient outcomes and operational efficiency.

Focusing on strategies within a health plan's control or ownership helps organizations make measurable progress in reducing GHG emissions.

The national climate narrative and federal leadership play a major role in shaping policies and accelerating progress.

These findings supported the development of a new quality framework, the Resilient Health Systems Model, to guide climate health initiatives at the health plan or health systems level and to address environmental-related structural enablers, technical measures, and improvement initiatives (Figure 4). This model has been adapted from the Modified Quality Health Outcomes Model⁵.

Figure 4. The Resilient Health Systems Model (RHSM)



Conclusion

The health care sector must address its significant contribution to GHG emissions to align with global and national sustainability goals and protect the health of the public. By integrating climate considerations into a quality improvement framework, health plans have a roadmap to drive meaningful change. Health plans can catalyze progress by focusing first on strategies within their control and continuing to refine accountability practices. More research is needed to identify effective mechanisms for measuring progress in reducing GHG emissions and improving health outcomes.

References

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