

Climate Action in Academic Medicine

An overview of how medical schools and teaching hospitals and health systems are responding to climate change





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November 2022

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Acknowledgments

The authors wish to thank the following AAMC (Association of American Medical Colleges) colleagues for their invaluable assistance with various aspects of this report:

- Survey review and assistance: Sierra Alewine, Daria Grayer, Christiane A. Mitchell, Mirtha Soto
- AAMC data on the medical education curriculum: Angela Blood, Chris Hanley, Andrew Nees
- Manuscript review: Diana Bourke, Daria Grayer, Merle Haberman, Christiane A. Mitchell, Jennifer Schlener, Christa Wagner

The authors are solely responsible for any errors or omissions.

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Suggested Citation

Mallon WT, Cox N. *Climate Action in Academic Medicine: An Overview of How Medical Schools and Teaching Hospitals and Health Systems Are Responding to Climate Change*. Washington, DC: AAMC; 2022.

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How medical schools and teaching hospitals and health systems are responding to climate change

The impacts of climate change on human health are well documented and are getting worse. Around the world, incidents of wildfires, vector-borne diseases, extreme temperatures, and droughts are all increasing.¹ Across the globe, the most vulnerable people and communities contribute the least to climate change, yet they suffer the most. These deep inequities in human health caused by climate change will continue to worsen.

Activists have been ringing alarm bells about climate change for decades, and the number of people worried about its destructive impacts is rising rapidly in the United States.² Communities, corporations, and institutions are planning for a future of profound environmental consequences, including impacts on human health.

Researchers estimate that the health care sector is responsible for 8%-10% of greenhouse gas (GHG) emissions in the United States and a quarter of all global health care GHG emissions.^{3,4,5} If the U.S. health care sector were a country, it would emit more greenhouse gases than the United Kingdom.⁵ Policymakers and thought leaders are increasingly pressuring the health care sector to reduce climate pollution.⁶

The projections about the impacts of climate change are indeed dire, yet there is reason for optimism. The Inflation Reduction Act, signed into law in August 2022, is one of the largest public investment in the U.S. energy sector in history; researchers have estimated that the total investment in renewable energy could reach \$1.2 trillion through 2035.⁷

In addition, in September 2022, the U.S. Senate voted to ratify an amendment to the Montreal Protocol that aims to phase down the use of hydrofluorocarbons, which make up a group of major greenhouse gases. This phasedown is projected to prevent warming by as much as a half-degree Celsius by the end of the century.⁸

Even with these recent actions, climate change will still affect every aspect of health care and academic medicine: the types and frequencies of disease and disabilities, patterns of practice and specialization, access to care, the focus and funding of research, calls for community action, curricula and student activism, and the sustainability of health care and educational facilities.

Amid this backdrop of worsening impacts of climate change and greater attention in the health care sector, we undertook a study to understand the extent to which MD-granting medical schools and teaching hospitals and their affiliated health systems in the United States are engaged in “climate action” — that is, the extent to which academic medicine is preparing for and addressing the impacts of climate change. In particular, we focused on two questions:



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- To what extent are medical schools and teaching hospitals and their affiliated health systems measuring their institutional GHG emissions, setting goals to reduce or eliminate those emissions, and tracking progress toward those goals?
- To what extent are medical schools and teaching hospitals and their affiliated health systems preparing for and taking action to address the impact of climate change on their clinical delivery, education, research, and community engagement missions and on environmental justice and health equity in their local communities?



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Methods

We undertook this study in four phases, which included a survey, an analysis of public data, interviews with the CEOs of teaching hospitals and medical school deans, and a curriculum analysis.

Survey

First, we sent surveys to the leaders of AAMC-member institutions: the CEOs of 256 nonfederal short-stay, acute-care teaching hospitals and 94 affiliated health systems and the deans of 156 MD-granting medical schools. The surveys asked whether the institution (health system, hospital, or medical school) was undertaking actions on climate change, such as measuring GHG emissions, setting goals to reduce GHG emissions, or engaging in conversations at the executive level about the impacts of climate change on their missions and people. We received 48 responses from teaching hospital CEOs (19% response rate), 19 from health system CEOs (20% response rate), and 100 from medical school deans (64% response rate).

Analysis of Public Data

Next, we combined the survey responses with other information from public sources on AAMC-member teaching hospitals, health systems, and medical schools taking climate action. This other information included the following:

Teaching Hospitals and Affiliated Health Systems

- Public information on AAMC-member teaching hospital and affiliated health system websites, such as climate change or sustainability metrics.
- A public list of AAMC-member teaching hospitals and affiliated health systems that signed the [Health Sector Climate Pledge](#), issued by the U.S. Department of Health and Human Services.
- The AAMC-member teaching hospitals and affiliated health systems that have won national awards from [Practice Greenhealth](#) (an Environmental Excellence Award or a Climate Circle honoree).

Medical Schools

- Public information on the medical school website, such as climate change or sustainability metrics.
- Public information on the website of the parent university of the medical school (if the medical school has a parent university), such as climate change-related goals or sustainability metrics.

Interviews

Additionally, we interviewed 15 leaders from AAMC-member organizations about their views on climate change for their organizations and for academic medicine as a whole: the CEOs of six teaching hospitals and nine medical school deans. We also received written responses from the CEOs of two additional teaching hospitals. Interviews were video recorded with the participants' permission and were transcribed for analysis.

Curriculum Analysis

Finally, we obtained information from two AAMC databases on the curriculum in medical education programs: (1) the Liaison Committee on Medical Education (LCME) Part II survey and (2) the AAMC Curriculum Inventory, a benchmarking and reporting tool on the content, structure, delivery, and assessment of U.S. and Canadian medical school curricula.⁹

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Results

Based on the various methods and data described above, we constructed the following snapshot of findings on how AAMC-member teaching hospitals and their affiliated health systems and medical schools are preparing for and taking action against climate change.

Finding 1: Momentum for climate action is building among teaching hospitals and health systems.

Based on our examination of data from various sources — including the responses to the AAMC survey, information on institution websites, institutional commitments to the [Health Sector Climate Pledge of the U.S. Department of Health and Human Services](#), and the winners of national awards from Practice Greenhealth — we estimate that 50 of 94 AAMC-member health systems (53%) and 125 of 256 AAMC-member teaching hospitals (49%) were taking some type of climate action as of the summer of 2022. The proportion for AAMC teaching hospitals increased to 53% when we included all the federal members (i.e., the U.S. Department of Veterans Affairs and the National Institutes of Health) in the denominator because they are required to have climate goals and actions by Executive Orders [13693](#) and [14057](#).

We consider these percentages of teaching hospitals and affiliated health systems to be a floor and not a ceiling of climate activity. It is possible that an AAMC member had climate goals and climate actions that were not visible from the various data that we collected. Therefore, although we are confident that we have not overreported the level of activity, it is possible that we are underreporting it.

On the basis of the information from CEOs who responded to our survey, it appears that momentum is building for additional action against climate change in the future. Nearly two-thirds of the CEOs of teaching hospitals and their affiliated health systems that responded reported that their leadership teams had had discussions over the previous 12 months about reducing institutional GHG emissions; almost half had discussed how to prepare for the impact of climate change on their clinical delivery, education, research, and community engagement missions; and about 4 in 10 had discussed how to prepare for the impact of climate change on environmental justice, health justice, and equity in their communities (refer to Table 1).

Table 1
Percentage of CEOs at AAMC-member teaching hospitals and health systems reporting executive-level discussions about climate change in the previous 12 months
(n = 67)

In the past 12 months, has teaching hospital/health system leadership had discussions about any of the following:	
Discussions on reducing your institution's greenhouse gas emissions	65%
Discussions on preparing for the impact of climate change on your educational, research, clinical delivery, or community engagement missions	47%
Discussions on preparing for the impact of climate change on environmental justice, health justice, and equity in your community	43%

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As noted in Table 2, the majority of responding AAMC hospitals and health systems had goals in place to reduce GHG emissions at the hospital or system level (58%). Another one-quarter of teaching hospitals and health systems had such goals under consideration. Slightly fewer teaching hospitals and health systems were tracking those emissions (47%), suggesting a stepwise progression as institutions first set goals to reduce GHG emissions and then track progress toward those goals.

Table 2
Percentage of CEOs at AAMC-member teaching hospitals and health systems
reporting climate goals or action at the hospital or system level
(n = 67)

Does your hospital/health system:	Yes, at a hospital level	Yes, at a system level	Under consideration	No
Track its greenhouse gas emissions?	25%	22%	31%	22%
Have goals to reduce greenhouse gas emissions?	26%	32%	24%	18%
Have goals to prepare for the impact of climate change on your missions, operations, and/or community?	16%	25%	27%	31%

Both the survey results and the public data indicate that a majority of AAMC-member teaching hospitals and affiliated health systems are active in or preparing to undertake efforts toward GHG reduction and sustainability. Furthermore, national recognition programs and awards indicate that many academic medical centers are in the vanguard of the health sector in making significant and meaningful changes to lower their GHG emissions.

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Finding 2: Teaching hospitals and health systems are acting against climate change first and foremost to improve the health of patients and their families; cost is the biggest barrier.

In the survey that we administered in the summer of 2022, we asked the CEOs of AAMC-member teaching hospitals and their affiliated health systems about the biggest motivator encouraging them to take action to reduce their institutions' carbon footprint as well as the biggest barrier to achieving lower GHG emissions. The most common theme that emerged from our analysis of motivators was that climate action is aligned with the institutions' missions to improve the health of patients and families.

The following responses are illustrative of the CEOs' sentiments on what motivates them and their institutions to address climate change.

- “[Our institution] is invested in efforts to reduce the environmental impact of our operations and achieve carbon neutrality to improve the health of our patients and community.”
- “[The] organization’s values: As a pediatric hospital, [climate action is] the right thing to do for the future of children and families.”
- “[Health care] has to lead by example in reducing its carbon footprint so that it is not contributing to the medical conditions of our communities.”
- “The positive impact we can make on the health of our community — supporting a better future for generations to come.”
- “Climate change impacts the wellness of the communities we serve.”
- “Our goal is to have zero events of preventable harm to patients, visitors, and team members. Being in service to our communities, we strive to protect and improve public health. This requires that we don’t contribute to environmental harm.”



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Other common motivators included environmental justice and the reduction of costs (through energy efficiency, for example). Refer to Appendix 1 for the complete list of responses.

When they were asked to describe the biggest barrier or obstacle to reducing the carbon footprint at their institutions, the CEOs most often cited cost and access to capital. In particular, the CEOs were worried about the upfront capital costs to invest in greener facilities and replace aging infrastructure, even if those costs could be recouped over time. Many of the CEOs, especially those at institutions with operating deficits after the COVID-19 pandemic, were concerned about upfront outlays, despite their interest in contributing to climate solutions.

Other common themes included a lack of energy alternatives that would meet operational requirements; regulatory barriers and requirements; and supply chain issues. Although the supply chain is a barrier not cited as often as other barriers, it is a formidable one; more than 80% of the health care sector's GHG emissions come from the supply chain.⁴ Although reducing and eliminating direct GHG emissions from more efficient energy use and from medical gases (Scope 1 emissions) and purchased electricity (Scope 2 emissions) are indeed necessary, the health care sector also must confront GHG emissions that come from upstream suppliers and manufacturers around the world (Scope 3 emissions).

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Finding 3: Medical schools and their parent universities have pervasive goals to address climate change and achieve sustainability and are taking actions to address the impact of climate change.

Based on the responses from medical school deans to the survey administered in the summer of 2022 and an examination of the websites of medical schools and their parent universities, we found that 131 of 156 medical schools (84%) have in place goals to reduce or eliminate GHG emissions or have taken actions to address the impact of climate change or are part of a university that does. At more than half of these medical schools (71 of 131), we found climate change-related goals and actions at the university level but not necessarily at the medical school level. Our analysis did not determine the extent to which these university-level goals require involvement by the medical school and whether the medical school is actively engaged in achieving them.

On an optimistic note, this high percentage is a significant step in addressing climate change in the university sector. For example, any new and rehabilitated buildings designed for energy efficiency and no- or low-carbon emissions—whether they be at a medical school or another division of the university—is a win for climate action.

In some cases, however, the medical school infrastructure may be embedded in a health care delivery system that may or may not have the same climate goals at the university. Even though a parent university has sustainability and climate goals, if the medical school is housed in a clinical affiliate without the same goals, the percentage of medical schools with climate change-related goals and actions may be inflated.

Finding 4: The majority of medical schools have significant climate actions under consideration.

Data from the survey of medical school deans add important nuance to the type and extent of climate action among medical schools. As of the summer of 2022, climate change had become an important strategic concern for the majority of medical school deans and their executive leadership teams. Among the medical school deans responding to the summer 2022 survey, 6 in 10 indicated that medical school leadership (the dean and the dean's executive team) had discussions in the previous 12 months on preparing for the impact of climate change on the educational, research, clinical delivery, or community engagement missions of the school.

Just over half of the medical school deans and their medical school leadership had similar discussions on reducing institutional GHG emissions, and 49% discussed how to prepare for the impact of climate change on environmental justice, health justice, and equity in their communities (refer to Table 3).

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Table 3
Percentage of medical school deans reporting executive-level discussions about climate change in the previous 12 months
(n = 100)

In the past 12 months, has medical school leadership (you and your executive team) had discussions about any of the following:	
Discussions on reducing your institution's greenhouse gas emissions	53%
Discussions on preparing for the impact of climate change on your educational, research, clinical delivery, or community engagement missions	59%
Discussions on preparing for the impact of climate change on environmental justice, health justice, and equity in your community	49%

The survey of the deans also provided insight into the level or placement of climate change-related goals within the university-medical school structure. Although most medical schools did not have their own goals to reduce GHG emissions or systems to track GHG emissions, a majority of schools (54%) did have such goals when the goals of their parent university were included. This finding is unsurprising, given that management of the institution's infrastructure, energy use, and vehicle fleet are often governed at the university level.

Even more progress is on the horizon, as additional medical schools had climate change-related goals or actions under consideration as of the summer of 2022. Two-thirds of responding medical schools had goals to reduce GHG emissions in place or under consideration and to prepare for the impact of climate change on their missions, operations, or communities (refer to Table 4).

Table 4
Percentage of medical school deans reporting climate change-related goals or actions at the medical school or university level
(n = 100)

Does your medical school:	Yes	No, but the university does	Under consideration	No
Track its greenhouse gas emissions?	10%	35%	9%	46%
Have goals to reduce greenhouse gas emissions?	24%	30%	13%	33%
Have goals to prepare for the impact of climate change on your missions, operations, and/or community?	22%	22%	22%	34%

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Finding 5: Leaders in academic medicine are paying attention to the values of their students, residents, and the younger members of their workforce.

During the course of this study, we interviewed the deans of nine medical schools and the CEOs of six teaching hospitals or health systems, plus received written responses to follow-up question from CEOs of two additional teaching hospitals. We asked these institutional leaders how they thought about climate change vis-à-vis other institutional priorities, as well as the priorities for academic medicine as a sector. Many of the themes that emerged from those conversations were consistent with the information that we have discussed earlier.

Both the medical school deans and the CEOs of teaching hospitals and health systems observed that students, residents, and younger health professionals working within and being recruited to their institutions care deeply about climate change and seek to be associated with institutions that share those values. Leaders saw the connection to recruitment and retention, as exemplified by the following comments:

- “We feel like this is becoming table stakes with our younger employees as we recruit people. They expect us to be active in this space. So we’re feeling a need to do something.” (hospital CEO)
- “From a retention and engagement standpoint of our younger workforce, they expect their employer to represent their values. They expect employers to be engaged and care about things that they care about, and they care a lot about the environment.” (hospital CEO)
- “[Climate change] was brought up by our medical students; they asked for a specific content to be embedded into our curriculum.” (medical school dean)
- “Students have an expectation that [the medical school] is going to have a certain level of citizenship around how we deal with climate change.” (medical school dean)



Regional attitudes toward climate change also create challenges for academic leaders. The CEO of one teaching hospital acknowledged that recruiting a younger workforce with predispositions for climate action is difficult for the institution: “It’s hard for a lot of academic health centers that are in more conservative states.... We create a counternarrative and say, ‘This is what we as an employer stand for.’ There is a very different set of politics based on age.”

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Finding 6: Over the past 3 years, the percentage of medical schools with required curriculum on the health effects of climate change has doubled; five in 10 schools have required climate change-related curriculum.

We examined data from two AAMC sources on the curriculum in medical education programs. The first source was an annual survey that the AAMC administers on behalf of the Liaison Committee on Medical Education (LCME) and that all U.S. MD-granting medical schools must complete. In this LCME Part II survey, medical schools self-report if the topic of the health effects of climate change is covered in a required course in the preclerkship or clerkship phase of the curriculum. For the 2021-2022 academic year, 86 of 155 U.S. medical schools (55%) reported in the LCME Part II survey that they included the health effects of climate change as a topic in required preclerkship or clerkship courses. Moreover, this percentage more than doubled over that in the 2019-2020 academic year, as displayed in Table 5.

Table 5
Number and percentage of U.S. MD-granting medical schools including the health effects of climate change as a topic in required preclerkship and clerkship courses, 2019-2020 to 2021-2022 academic years

Academic year	Number of schools with required courses	Number of schools participating in survey	Percentage of schools with required courses
2019-2020	41	153	27%
2020-2021	60	155	38%
2021-2022	86	155	55%

The second source was the AAMC Curriculum Inventory, which is a benchmarking and reporting tool on the content, structure, delivery, and assessment of the curricula of U.S. and Canadian MD- and DO-granting medical schools. Schools share their curriculum inventories with the AAMC so that the AAMC can generate national reports on various topics. A total of 128 U.S. MD-granting medical schools voluntarily participated in the AAMC Curriculum Inventory in the 2020-2021 academic year.¹⁰ The curricular content information from these medical schools can be summarized in case studies to illuminate the climate change-related curriculum at various medical schools. Appendix 2 presents the five case studies, which are based on a random selection of relevant events by medical schools with curricular content on climate change.

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Discussion: Moving to Greater Action

Across academic medicine, some academic medical centers are significantly advanced in the strategies and in the actions that they use to reduce GHG emissions and mitigate the impacts of climate change on their operations, missions, and communities. Other institutions are just beginning that journey or have not yet taken action.

Academic medicine as a whole is well represented among the hospital and health sector by taking concrete action to reduce institutional GHG emissions, preparing for the health impacts of climate change, and working with their communities to understand and address climate change-related health inequities. Although AAMC-member teaching hospitals and their affiliated health systems comprise only 5% of all nonfederal, short-stay, acute-care hospitals, they are overrepresented among the winners of the Top 25 Environmental Excellence Award, which is the highest honor presented by Practice Greenhealth for all-around sustainability performance for hospitals.

Nevertheless, much more work remains for the academic medicine sector to reduce its carbon footprint and prepare for the increasing impacts of climate change on the institutions and the people and communities that they serve. We anticipate that many AAMC-member hospitals and health systems and medical schools will undertake and accelerate sustainability efforts in the coming years for many interrelated reasons: because their missions to improve the health of people and communities necessitate climate action; because new generations of learners and health care professionals will continue to seek out organizations that share their values for sustainability and environmental justice; and because facilities with low- and no-carbon emissions and climate change-related solutions in the energy, food, and transportation sectors will increasingly save money, in addition to protecting the environment.

During our conversations with the medical school deans and the CEOs of teaching hospital, we heard that some organizations seek guidance and resources to get started on or accelerate their climate action journeys. We are fortunate that many publicly available resources and tools are available to help health care organizations and academic institutions learn more about the need to address climate change, guide them in their implementation of climate action, engage their communities, and track and measure their progress in reducing carbon emissions.

We present below a few such tools and resources that academic medicine leaders may consult.

- [Reducing Healthcare Carbon Emissions: A Primer on Measures and Actions for Healthcare Organizations to Mitigate Climate Change](#)

This publication of the Agency for Healthcare Research and Quality was released in 2022 and is a resource guide to help health care organizations reduce their carbon footprint and protect communities from climate threats.

- [The Path to Carbon Neutral: A Guide to Building a Climate-Smart Health Care System](#)

This resource presents a case study of Kaiser Permanente, which was the first health system in the United States to achieve carbon-neutral status. Kaiser Permanente has eliminated or offset its 800,000-ton annual carbon footprint, the equivalent of taking 175,000 cars off the road.

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- [Climate Action: A Playbook for Hospitals](#)
This is a resource to help hospitals and health systems reduce their carbon footprint and implement health care delivery systems with low carbon emissions, to prepare facilities for climate change and build resilience against climate change, and to use their purchasing power to transition to a low-carbon economy. This resource includes many case studies of academic medical centers.
- [Better Buildings Healthcare Sector](#)
This U.S. Department of Energy initiative provides toolkits, case studies, financing options, and implementation models that health care organizations may use to reduce their energy costs, reduce their carbon emissions, and improve the environment of health care.
- [Energy Star® Portfolio Manager®](#)
This product of the U.S. Environmental Protection Agency is the industry-leading tool to benchmark energy use, water use, and GHG emissions for any type of building, allowing academic medical centers to identify underperforming buildings that require energy efficiency improvements, identify best practices, set investment priorities, and report performance.

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Appendix 1

Sentiments on Climate Change From a Survey of CEOs of Teaching Hospitals and Their Affiliated Health Systems (June 2022) Asking Them the Biggest Motivator to Take Action to Reduce Their Institutions' Carbon Footprint

The following are the verbatim responses of the CEOs, organized by theme.

Responsibility/stewardship as an institution serving communities and society in general

- Our sense of corporate responsibility as the largest private employer in our state
- Environmental stewardship
- Growing sentiment that being a leader in sustainability is consistent with our mission and vision
- Societal imperative to reduce [our] carbon footprint
- Social responsibility, air quality in our city
- Local and global impact of the effect of climate change on our workforce and patients

Aligned with the mission to improve the health of patients and communities

- [Our institution] is invested in efforts to reduce the environmental impact of our operations and achieve carbon neutrality to improve the health of our patients and community.
- Organization's values: as a pediatric hospital, the right thing to do for [the] future of children and families
- The impact on the health and well-being of our community, nation, and world.
- General mission to improve the overall health of the communities we serve, including the downstream effects on health due to climate change (both extreme weather events and ongoing climate change impacts)
- Healthcare has to lead by example in reducing its carbon footprint so that it is not contributing to the medical conditions of our communities.
- Increased national recognition as well as our commitment to the health of our community with the impact
- Level of carbon footprint related to healthcare institutions and the positive impact we can make on the health of our community — supporting a better future for generations to come.
- Direct impact of climate change is visible in our state, and we see the health impacts daily.
- Climate change and the effect it has on both the health of the human population and the environment in general
- Climate change impacts the wellness of the communities we serve.
- Direct impact on community health.
- Our goal is to have zero events of preventable harm to patients, visitors, and team members. Being in service to our communities, we strive to protect and improve public health. This requires that we don't contribute to environmental harm.

Environmental justice

- Moral imperative relating to its impact on human health and disproportionate impact on those already disadvantaged and underserved.

Reduce costs

- Sustainability for our environment and reduce costs to implement the environmental programs.
- There are opportunities to both improve our green footprint and seek less costly alternatives than current items that contribute to the carbon footprint.
- Right thing to do and reduce costs.

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Appendix 1, continued

Costs and access to capital

- Financial cost of retrofitting acute care facilities, access to capital for building more efficient new health system structures, access to competitively priced renewable energy, and sustainably sourced medical equipment and supplies
- As a safety-net provider, we face financial constraints due to our high public payer mix and low operating margins. Investing in efforts to advance our climate initiatives, if not a cost-saver, has to be balanced against resources needed for direct patient care. Government tax credit programs should be created to provide incentives for nonprofit hospitals to invest in reducing emissions or increasing climate resiliency as a way to mitigate this financial constraint that disproportionately impacts safety-net hospitals.
- Cost of implementing alternatives in the current financial crisis.
- Concrete efforts which could reduce that footprint that can be implemented without significant upfront capital costs
- Capital
- Financial resources necessary to meet goals
- Costs/expenses of initiatives
- Cost
- Cost
- Capital investment
- Cost to make changes, aging infrastructure. Large system made up of multiple entities with disparate histories and operations.
- Funding
- Budget
- Financial
- We are running a large deficit post COVID and lack resources to support this initiative at this time.
- Capital to replace outdated equipment with more efficient equipment is also an issue.

Aging facilities and power plant

- Aging facilities
- Reliance on old facilities that will be expensive to renovate/get into compliance
- Aging facilities and dated infrastructure
- Power plant emissions
- Old buildings in need of replacement and the huge financial impact to make the changes needed
- We are a safety-net hospital with a very old facility that is extremely energy inefficient. Without an upgrade to our facilities, it will be impossible to decarbonize.
- Power plant, utility utilization

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Appendix 1, continued

Energy alternatives

- Alternative fuel sources that can meet operational requirements.
- (1) Lack of general technological advancements re: energy grid; (2) patient safety concerns re: relying on a single energy source

Regulatory requirements

- Various regulatory requirements for facility and clinical operations that require certain performance levels with high energy intensity and limited technological capability to quickly reduce dependence on existing energy sources
- Ability to meet some of the targets that are being proposed at the state level...esp[ecially] on the research side of the mission
- Aligning government and institutional efforts and focus

Supply chain

- Supply chain issues
- Managing our supply chain of hundreds of thousands of products from tens of thousands of suppliers and manufacturers around the world
- Controlling the carbon footprint of the procurement process, perhaps the biggest carbon footprint generator, requires building effective partnerships.
- Supply chain constructs that are harder to influence

Medical waste reduction

- From a medical waste perspective and the carbon footprint for [the] supply chain, the sheer amount of disposables versus reusables is a significant barrier. Infection risk, of course, is the key concern with reuse of many items.

Competing priorities/getting started

- Understanding our baseline carbon footprint given the size and scale of our system
- Resources and education around the topic
- Getting alignment around importance and goals
- What is recommended by experts or healthcare institutions who have already started this journey? Checklist or toolkit with recommended actions. Example: Alternatives to utilizing batteries in telemetry monitors — waste a lot of disposable batteries in hospitals.
- Competition for institutional resources and attention
- Last two years of focus on COVID
- Competing priorities with other pressures occurring across the health system
- All the other emergencies
- It takes a lot of energy to save lives; it's just the nature of what we do.
- Having a baseline and understanding what to do about this
- The 24-hour-a-day occupancy nature of healthcare makes establishing effective setback programs challenging and costly.
- Competing issues that are consuming management time

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Appendix 2

Case Studies of Medical School Curricula on Climate Change

Case Study 1: In a fourth year required course on the practice of medicine, climate change was taught in the context of lung disease, where students were asked to describe how climate change affects adult asthma and to recognize the effects of climate change-related triggers on adult asthma and lung disease.

Case Study 2: In a second year required course on the social determinants of health and environmental health, a workshop was used as the instructional method to teach about climate change and the environment. Students were asked to describe the risks that climate change poses to human health so that they may counsel patients on how to protect themselves; discuss how providers' actions to understand and address the environmental and social determinants of health can improve the care that they provide their patients and their patients' health outcomes; explore health disparities and their social and structural contexts; explore through case studies various policies, programming, risk and resilience factors, and patient education related to environmental and social determinants of health; review the major social and economic determinants of health; and understand the influence of environmental determinants of health on individual health in the local and global contexts.

Case Study 3: In a first year required course on epidemiology and biostatistics, climate change, global health, economic development, urbanization, and population growth were covered in a lecture format. Students were asked to describe the impediments and future challenges confronting efforts to improve health in low- and middle-income countries; describe the influences of economic globalization, climate change, population growth, migration, and urbanization on current and future health indicators; and describe the leading causes of morbidity and mortality in the world among both children and adults and trends in causes of death.

Case Study 4: In a first year required course on the determinants of health, patient case presentations from both learners and patients themselves were used. In this course, students learned about climate change and health, catastrophes and health, health disparities, chronic conditions, communicable and noncommunicable health problems, and state resources for the clinical diagnosis and management of global health problems.

Case Study 5: In a fourth year required course on physicians and society, the course was scheduled concurrently with the six-week residency essentials course to cover selected topics for all future physicians, regardless of residency or career path. Among the many topics included, such as multiculturalism, health economics and systems, and social determinants of health, students were introduced to climate change and its impact on health care. The course used lectures, clinical cases, educational technology, electronic medical records, medical images, and patient care to teach its content.

Climate Action in Academic Medicine

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Endnotes

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⁹ We thank our AAMC colleagues Andrew Nees and Angela Blood for providing these data and Chris Hanley for facilitating the requests