



Why climate resilience is key to building the health care organization of the future

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Executive summary

AS THE COMPLEX relationship between climate change and human health has become increasingly pronounced, the medical profession, life sciences organizations, and health care systems have started to respond. The medical research community now fully recognizes climate change as the “greatest threat” to global public health,¹ according to an unprecedented joint statement in September 2021 by more than 200 medical journals.

This report outlines the core climate risks to the future of health and offers strategies that health care organizations can use to build more resilient operations. The following is a summary of the key insights to support industry leaders as they build new business plans, mitigate their environmental footprint, adapt their operations to changing conditions, and contribute to a more equitable, resilient health care system for all.

- **Climate change can exacerbate health inequity:** The changes to the Earth’s climate systems contribute to a host of health issues, commonly: lack of access to clean water, allergens, respiratory diseases, heat-induced illness, and infectious disease.² While climate change does not discriminate, the impacts disproportionately affect historically under-resourced populations³—those in urban and rural settings—multiplying the threats to the drivers of health (environmental, social, economic), while triggering migration, food insecurity, and mental health impacts. The resulting conditions can ultimately threaten the achievement of equitable *populationwide* health and wellness.
- **As climate change ramps up, costs are expected to rise:** The changes to the physical environment are expected to increase the total cost of health care services and delivery borne by the economy. Air pollution and climate change already generate more than US\$800 billion in health costs for the United States each year, according to the National Resources Defense Council. These changes likewise can make it more expensive for health care organizations to operate, due to damaged infrastructure, supply-chain disruptions, and the increased complexity of care. And as the industry increasingly moves toward value-based care revenue models, the financial cost of climate-related health conditions and illnesses will drive up the total cost of care, thereby dragging down the bottom lines of both health systems and health plans alike.
- **Health care organizations have an important role in solving the climate crisis:** Beyond being impacted by the effects of climate change, health care organizations are also significant contributors to global warming. If the global health care industry was a country, for example, it would be the fifth-largest greenhouse gas emitter on the planet, responsible for about 4.5% of worldwide emissions. In the United States, the health care industry’s contribution to emissions is even more pronounced, adding an estimated 8%–9.8% to the total national emissions.⁴ Mitigating existing impacts, investing in new technology, and introducing new business models are among the ways stakeholders can build resilience, while preventing further warming.
- **Sustainable organizations are taking a proactive stance:** Many of the innovative technologies and innovative care models that are driving the Future of Health landscape can help deliver cobenefits for sustainability. Health care leaders should be actively considering climate resiliency as an enterprisewide strategy. This analysis will likely require a comprehensive look at the risks throughout the value chain, but can equip organizations to prepare for, and respond to, risks as they emerge.

Understanding the greatest threat to global public health

CLIMATE CHANGE ENDANGERS life on every continent, universally exacerbating a host of health conditions and damaging the essential drivers of our overall health and wellness. And the environmental threats to health outcomes and related impacts on other drivers of health (e.g., socioeconomic impacts on communities) are accelerating as extreme climate events become increasingly prevalent.

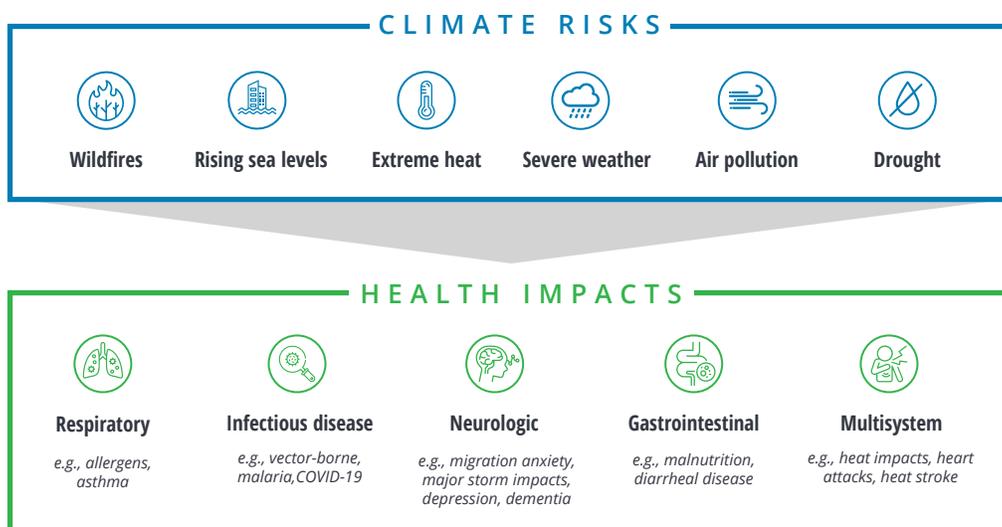
In 2021 alone, the United States saw a historic deep freeze in Texas,⁵ the hottest summer on record,⁶ the driest month in California since

the state began gathering data,⁷ and the third most-named hurricanes (21) in recorded history.⁸ Each of these events exacted a very real cost on human health. The winter storm and frigid temperatures in Texas, for example, overwhelmed hospitals and emergency departments (EDs), seriously disrupted health care operations, and forced the cancellation of elective surgeries.⁹ On the other extreme, the heat wave in King County, Washington, drove a spike in ED visits for heat-related illness in a single weekend in June 2021.

FIGURE 1

Climate change is a universal risk to human health and well-being

The concentration of carbon dioxide in the atmosphere is the highest in human history. The last nine years all rank among the ten warmest on record according to the National Oceanic and Atmospheric Administration.



Source: Deloitte analysis of scientific studies and IPCC reports.

Considering the impact on human health of these increasingly common extreme environmental events and conditions, many stakeholders across the health care ecosystem are finally beginning to feel a broad sense of urgency. The medical research community now fully recognizes the human health impacts of climate change, as more than 200 medical journals released an unprecedented joint statement last September citing it as the “greatest threat” to global public health.¹⁰ The issue has become a priority for the US government, and human health played a markedly more central role in the dialogues of the United Nations’ COP26 global climate conference. And, as part of the broader portfolio of environmental, social, and governance (ESG) priorities, companies across the sector are increasingly focused on reducing their operational footprint, even beginning to address health impacts of climate change.

Human health played a markedly more central role in the dialogues of the United Nations’ COP26 global climate conference.

At Intermountain Healthcare, for example, climate change has become an organizational priority, driving investments in renewable energy, decarbonization, and energy efficiency. And even for health plan organizations, with a smaller direct emissions footprint than their provider and life sciences counterparts, climate and sustainability initiatives have become leadership priorities. Centene, for example, has increasingly prioritized

environmental and climate issues over the past few years with a focus not just on emissions reduction but the impact of environmental factors on the health of their members. Health care ESG coalition groups have also emerged as important players in recent years as organizations have begun to tackle climate-related challenges head on.

Organizations such as Bon Secours Mercy Health have joined health care ESG coalition groups such as the nationwide Healthcare Anchor Network to collaborate across organizations on social determinants of health, including those which are affected by environmental issues.

At the same time, health care is rapidly shifting its focus from a reactive treatment of diseases and illnesses to a model that equitably and proactively promotes health and wellness across populations. This change will likely continue to accelerate as data and technology, deployed in a decentralized fashion directly with consumers outside of traditional care settings, allow us to have “always-on” measurements of health, better understand the underlying causal mechanisms of health and wellness, and predict disease and illness. This shift alone portends dramatic changes for players across the health care industry, demanding new business models from both incumbents and disrupters. However, climate change and its related impacts can present an enormous challenge to the realization of this healthier future.

Climate change not only contributes to a host of health issues, but it can also exacerbate the health inequities that the industry has recently begun working in earnest to rectify.

That's because the communities that are the most vulnerable to the effects of a changing climate tend to be those least equipped to manage and recover from the physical, economic, mental, and social devastation that accompanies it.

Indeed, addressing the “greatest threat” to global public health is no small undertaking. It likely requires health organizations to mitigate their own sizable carbon emissions, transform their operations to meet emerging needs, and engage across the sector to create more sustainable supply chains. Organizations should understand the vulnerabilities in the patient populations they care for, as well as the geography-based expected climate impacts for their regions they serve. As first responders to human health emergencies, and as organizations dedicated to health and well-being, life sciences and health care organizations hold a

responsibility to prove resiliency in times of need and to contribute to building healthier communities. Without organizational-level changes to become more climate resilient, a healthier and more equitable Future of Health may not be achieved.

No longer can we ignore the unbreakable connection between the health of our planet and the health of our people. As health care leaders, we have a responsibility to protect our patients and the communities we serve from the health impacts of climate change. This is a moral and business imperative, and at its core, climate change is a health equity issue. Caring for Earth is part of caring for the people who rely on us.

— Lloyd H. Dean, CEO, CommonSpirit Health

DELOITTE'S VISION FOR THE FUTURE OF HEALTH™

By 2040, Deloitte envisions a world where seamless collaboration among stakeholders focused on health and well-being is the standard. It's a consumer-centric future of well-being where data, technology, and new ways to prevent disease and promote wellness are readily accessible. The Future of Health is organized around the consumer, not health care institutions, and the consumer owning one's own data. It's an environment where digital transformation—enabled by always-on sensors; radically interoperable data; artificial intelligence; and open, secure platforms—sparks innovation and change. This progress will not only affect how, when, and where care occurs, but who is in charge and the types of services, products, and businesses in the industry. Further reading can be found in our [published report](#).

The impact of climate change on people, populations, and the Future of Health

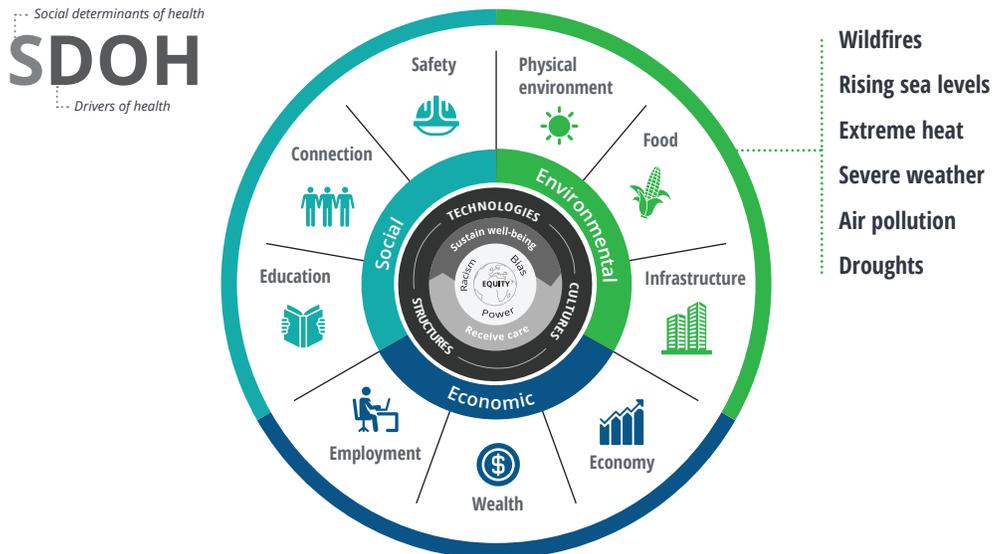
BYOND THE WALLS of clinical care settings, there are social, economic, and environmental factors that account for 80%–90% of “the modifiable contributors to healthy outcomes.”¹¹ Central to the Future of Health is the realization that addressing these drivers of health is imperative to delivering more holistic, equitable, and proactive care (figure 2).

Climate change stands out as the key **force multiplier** (a driver of health whose fluctuations amplify the effects, whether positive or negative, of another driver in an exponential, nonlinear way) among those drivers and a cross-cutting challenge to a vision of equitable wellness. In this sense, climate change is both an urgent environmental and social priority area as part of the broader ESG portfolio.

FIGURE 2

The physical environment is a threat multiplier for overall human health

Climate change disproportionately affects the health and well-being of historically under-resourced communities



Source: Deloitte analysis.

The most apparent and associated effects of climate change originate from its impacts on our physical environment, namely, extreme temperatures, poor air quality, and precipitation extremes (from droughts to severe storms). These impacts extend well past personal health to threaten food security, stable housing, secure employment, and entire community relationships. Even the most powerful natural events such as hurricanes give way to subtle, yet far-reaching, impacts on the housing and labor market, regional wealth and local economies, and the physical and mental health of citizens. Both Kaiser Permanente and Ascension, for example, have closely connected their environmental impact work to the drivers of health, outlining how the environment affects the populations they serve, and the resulting impact on community.

Understanding environmental impacts on health is an important factor in shaping health and wellness programs to address the whole health of individuals.

— Jana Utter, vice president of enterprise risk management, Centene

And the most vulnerable populations are often at the greatest risk of the worst impacts. Children, the elderly, and those with existing health conditions are already at greater risk if they belong to indigenous populations and other historically under-resourced communities, who often live with inadequate infrastructure and a lack of resources resulting from long-term discrimination.¹² The way green space is distributed across a city is one example that demonstrates how decades of neglect and disinvestment result in fewer natural resources,

too. Due to the historic practice of “redlining,” or labeling neighborhoods as “high risk” based on their racial or ethnic composition, formerly redlined neighborhoods today still tend to have fewer trees and more asphalt.¹³ That means that neighborhoods made up of historically Black and Hispanic populations tend to be more exposed to more extreme heat than majority-white neighborhoods due to physical features such as being more “built up” and enjoying less vegetation:¹⁴ San Francisco’s Urban Forestry Plan notes that the higher-income areas in its community enjoys 30% canopy cover, compared to only 5%–8% in areas where immigrants and lower-income residents live.¹⁵



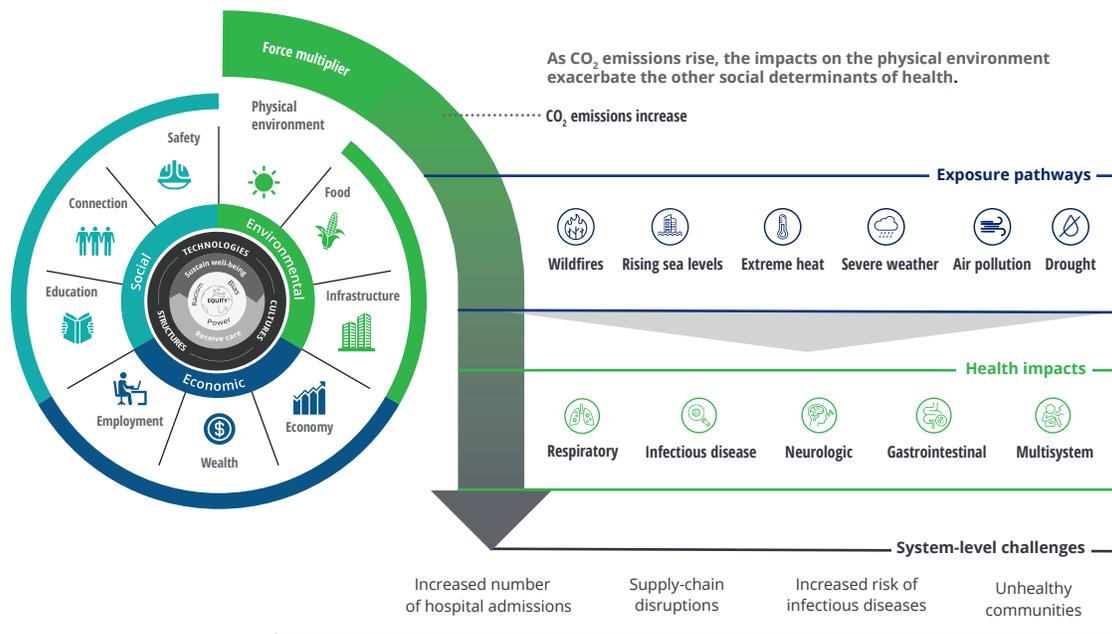
Nationally, higher-income (and often, white) communities tend to pollute and emit more per capita due to higher relative purchasing power and consumption—Black and Hispanic communities are exposed to 60% excess pollution than what is caused by their emissions.¹⁶

An uneven distribution of pollution and exposure to waste, paired with unequal access to green space and basic health care, often leads to avoidable and premature deaths. A longitudinal study modeling

the life expectancy for 136 nations found a strong correlation between shortened life spans and low-air quality areas, with income inequality identified as an amplifying factor between this negative association. In other words, the greater the income disparity in a nation, the greater the effect of air pollution on life expectancy.¹⁷ By disproportionately affecting historically under-resourced populations, therefore, climate change threatens the achievement of equitable *populationwide* health and wellness.

FIGURE 3

Rising temperatures multiply the risks to human health



Source: Deloitte analysis.

Accounting for the bottom-line costs of rising emissions

THE FINANCIAL IMPACTS of climate change are already being felt throughout the health care industry, from damaged equipment and facilities to interrupted services and lost revenue. In 2015, extreme winter storms cost Brigham and Women's Hospital US\$10 million due to the cancellation of elective surgeries, and reduced admissions and outpatient services. Superstorm Sandy similarly interrupted care delivery within the New York City health system, which shut down six hospitals and 26 residential care facilities. This reduced hospital capacity by 8% in the immediate aftermath; a month later, capacity was still down by 5%.¹⁸

Extreme weather events, from winter storms to heat waves, are threatening energy reliability and driving higher energy costs across businesses and households alike. In Texas, where energy grid investments in weatherization were not made to address freezing temperatures, power outages during the winter storm and deep freeze of February 2021 are estimated to have cost the equivalent of US\$4.3 billion, according to an estimate by the Federal Reserve Bank of Dallas.¹⁹ These energy disruptions not only drive up energy costs but threaten lives during times of increased acute care needs of the local population by disrupting providers of essential health services and products.

Multiplied across a global economy, climate change is expected to create untold shortages and supply-chain interruptions as well. The COVID-19 pandemic illuminated the delicate nature of medical and clinical supply chains, which are highly regulated (and therefore typically not readily flexible in emergencies) and involve

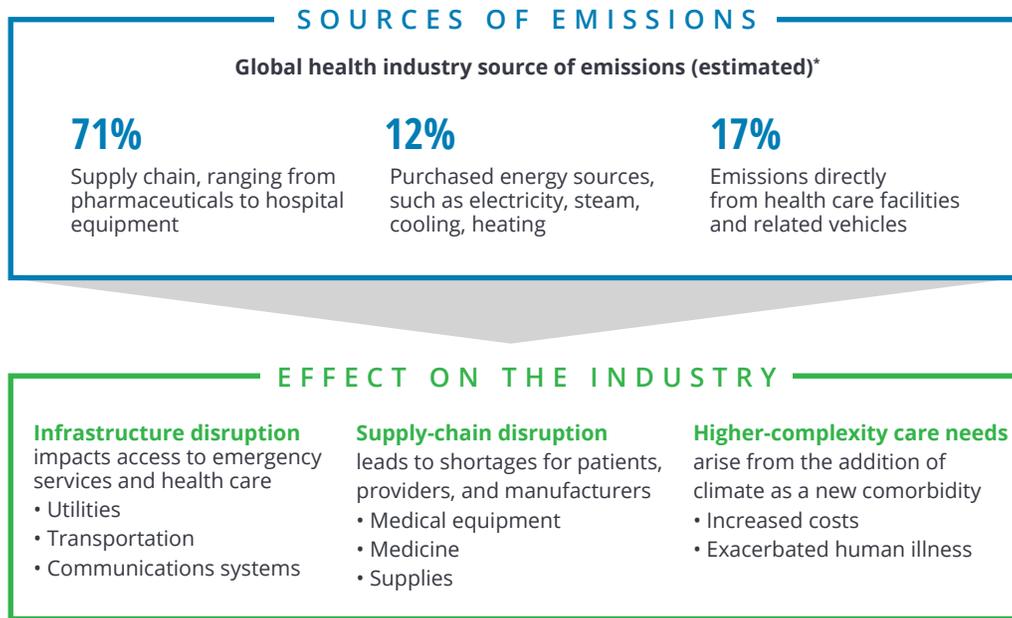
difficult-to-source components. Unlike products such as automobiles and smartphones, which share common components across brands, medical devices such as ventilators require specially manufactured equipment, which slows the supply chain's ability to scale up capacity. These barriers to entry limit the number of US suppliers approved to manufacture essential equipment such as personal protective equipment (PPE).

This challenge became a crisis in March 2020, when the nation's emergency stockpile had dwindled to 12 million N95 respirators, with a four-month turnaround for enough supply to serve the needs of the country.²⁰ States, hospital systems, and the federal government were forced to compete for the same limited resources and to pay a significant premium over list prices. This type of shortage can be replicated several times over when natural disasters strike a highly populated area, driving up costs, threatening timely care, and reducing the effectiveness of provider emergency operations.

But climate change is a two-way street for health care organizations. The global health care industry is not only affected by climate change, but is also a significant driver of global greenhouse gas (GHG) emissions, contributing about 4.5% of worldwide, with the US health care system responsible for about a quarter of those emissions.²¹ In the United States, the contribution of the health care industry to GHG emissions is even more pronounced than the global average, contributing an estimated 8%–9.8% of total national emissions.²² The world's top three emitters—the United States, China, and the European Union—account for 56% of the world's total health care climate footprint.²³

FIGURE 4

Where US health care firms contribute 8%–10% of total US-based GHG emissions, globally, the sector contributes to 5% of worldwide emissions*



Sources: * Health Care Without Harm, *Health care's climate footprint: How the health sector contributes to the global climate crisis and opportunities for action*, September 2019; Deloitte analysis.

The race to net zero is picking up speed across industries and stakeholders in health care ecosystem should ultimately seek to go beyond net zero in emissions reduction. While it can serve as an important framework with which to develop organizational goals and motivate action in the near term, maximizing decarbonization efforts beyond net zero will best serve the health and wellness of communities. For example, Genentech, a member of the Roche Group, is looking beyond net zero and has established a roadmap to reach “true zero emissions” for its scope 1 and scope 2 emissions by 2050.

Health care organizations can now lead a path of strong and corrective response to the benefit of both the populations they serve, including their employees and other stakeholders. The organizations with sustainable and resilient operations will most likely also be the ones most empowered to establish equitable wellness across diverse populations and address climate change’s disproportionate impact on these communities.

Strategies to mitigate risks, build resiliency, and contribute to climate action

AS HEALTH CARE organizations increasingly recognize climate-related threats to health, they can design a climate resilience program that addresses the immediate needs as well as the systemic challenges. There are three interrelated strategies—mitigation, adaptation, transformation—that can reduce operational risks while advancing an organization’s readiness for the Future of Health.

Mitigation efforts are designed to minimize an organization’s contribution to the root causes of climate change by reducing GHG emissions through activities such as using renewable energy. Adaptation strategies improve an organization’s operational resiliency in the midst of extreme climate events and prepare it to better meet evolving care needs amidst a changing climate (e.g., proactive wellness interventions with vulnerable patient/member populations in advance of acute climate events, investments in climate-resilient infrastructure). The third opportunity for health care organizations is to invest in transformation by pioneering new products, services, and models that meet future health care needs while also proactively promoting health and wellness.

Taken together, these strategies can help determine an organization’s biggest climate vulnerabilities and contributions, enable

prioritization of investment areas, and ensure that investment decisions are ultimately compatible with the organization’s strategic vision and the emerging Future of Health ecosystem.

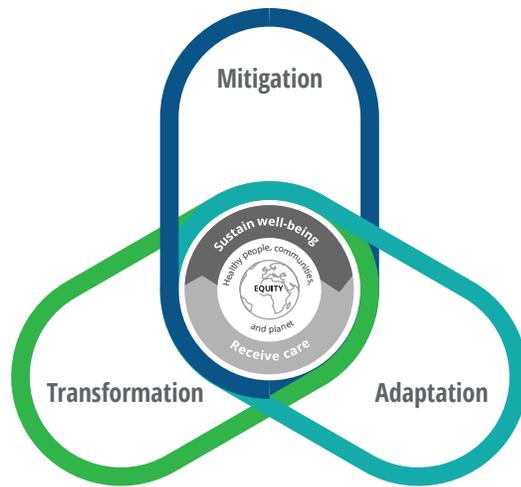
To better understand the leading practices shaping the industry, Deloitte interviewed sustainability leaders from companies across the industry: life sciences organizations, health care providers, health plans, and consumer health organizations. In the following sections, we explore each of these strategies in further detail, incorporating examples from the research to provide specific questions you can ask to help frame your climate resiliency strategy.

Johnson & Johnson’s current climate goals are our most ambitious yet, including our 100% renewable electricity goal. To date, we have built over 50 on-site renewable energy systems on properties in 14 countries and have executed 15 deals for off-site renewable electricity procurement. We are wasting no time making progress because we know there is no time to waste—the world needs bold climate action to advance both human and planetary health.

— Paulette Frank, chief sustainability officer, Johnson & Johnson.²⁴

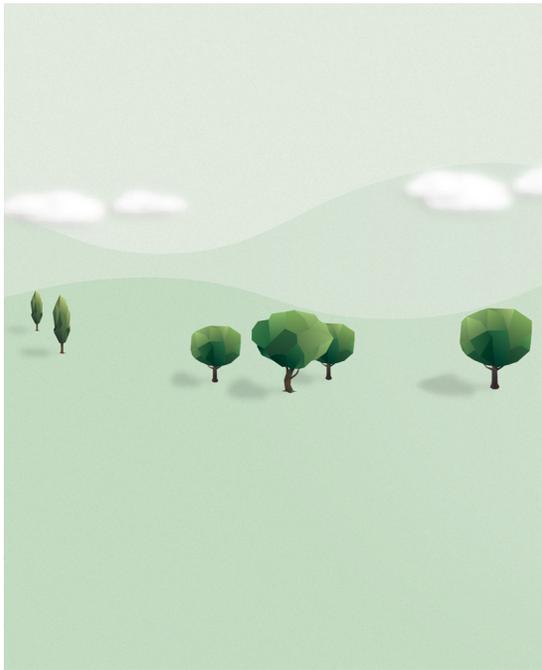
FIGURE 5

Addressing climate risks requires proactive change across the health care system



Climate change will increasingly lead to more volatile disruption of social and environmental factors. Organizations will need to be proactive about building climate resilience to adapt to these new conditions.

Source: Deloitte analysis.

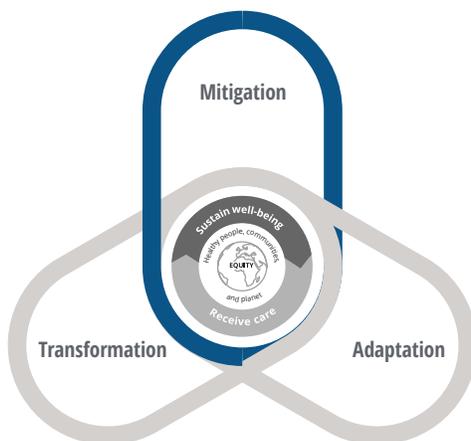


MITIGATION STRATEGIES

As in other industries, life sciences and health care organizations have primarily focused on the mitigation of direct emissions and energy consumption by setting ambitious goals and taking concrete actions to reduce their footprint. These programs may include things such as incorporating sources of renewable energy, introducing waste management programs, and exploring new hybrid models to reduce transportation-related emissions. While most industry participants we interviewed have focused their mitigation efforts on Scope 1 and 2 emissions, Scope 3 emissions remain more elusive. Reducing Scope 3 emissions (indirect emissions resulting from the value chain) is the most challenging; as a whole, the industry remains focused on gathering supplier data to accurately reflect the full scope of its carbon footprint.

FIGURE 6

Mitigation strategies to reduce operational risks and climate emissions



Providers	Pharma and MedTech	Plans
<p>Low-carbon local urban planning: Design community-based care centers to reduce or eliminate carbon-intensive transportation</p>	<p>Lower-emissions manufacturing: Introduce changes to manufacturing processes to improve efficiency and lower emissions. Explore and implement abatement technologies that can lower emissions footprint of operations</p>	<p>Virtual and digital care delivery/incentives: Incentivize members (e.g., through reduced cost-sharing) and providers (e.g., through value-based contract terms) to make use of virtual appointments and remote monitoring</p>
<p>Recycling and waste management: Implement a program to recycle medical waste safely and efficiently</p>	<p>Recycling and waste management: Implement a program to recycle medical waste safely and efficiently, reducing both waste and energy requirements for production</p>	<p>Elevate sustainability standards for providers: Establish contracts with provider networks that incentivize sustainability and emission-reduction standards in their facilities and operations</p>
<p>Virtual and digital care delivery: Increase access to virtual appointments and remote monitoring to reduce transit</p>	<p>Design sustainable, reusable packaging: Partner with pharmacies to reduce the use of plastic packaging associated with drug distribution and creation of packaging return/reuse programs</p>	<p>Hybrid operating models: Design hybrid operating models that balance in-person and virtual work and collaboration between employees to minimize transit and reduce physical footprint</p>

Source: Deloitte analysis.

If your organization is interested in establishing a baseline for your carbon mitigation efforts, you can begin by taking a thorough inventory of both direct

and partner emissions. Here are some of the foundational questions you can ask as part of that assessment.

QUESTIONS TO HELP INFORM YOUR CLIMATE MITIGATION STRATEGY

- What are your organization's biggest drivers of GHG emissions?
- What is the current state of your emissions reporting and what blind spots exist? Can you leverage any of your current capabilities, tools, and/or solutions to eliminate these blind spots and enhance reporting? Is government funding, tax credits (federal, state, local), or preferred investment vehicles (e.g., Green Bonds, ESG bonds) available to subsidize or provide preferred funding for investments in clean energy infrastructure?
- What level of visibility do you have into your supply chain's GHG emissions footprint? What about the emissions of contractual partners?
- Can you incorporate climate-related reporting requirements or emission-reduction incentives into your supplier and partner contracts?
- Can you use current partnerships, alliances, group purchasing organizations, or even coordination with competitors to foster demand for a more sustainable supply chain?

ADAPTATION STRATEGIES

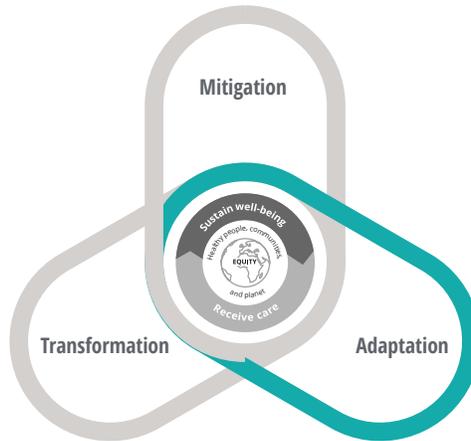
Many health care organizations are also investing in programs to better adapt to extreme weather events and regional climate changes, such as drought and sea level rise. For the time-being, these tend to be focused on the operations, but adaptations to how organizations deliver their products and services, or adaptations that address the climate impacts on health of their patients and members, are on the radar for sustainability leaders within many leading companies. Genentech, for example, views access and affordability as critical levers to reaching under-resourced communities who are at greater health risk for the diseases they are working to treat. Advancing diversity, equity and inclusion, from scientific research to its sustainability initiatives, is a core commitment for the company that includes collaboration across the Sustainability team, Chief Diversity Office, and Access & External Affairs department. Investing in capabilities such as data mapping (e.g., integrating data on drought impacts into patient geographies)

and predictive analytics (e.g., leveraging risk stratification to predict which patients/members are most vulnerable to evolving climate factors in a given geography) are among the ideas that can improve an organization's understanding of how climate is impacting the populations it serves. These types of tools also point to new opportunities for health care organizations to adapt their products, services, and interventions to meet the emerging needs. While leading firms are exploring new solutions to address the impacts of climate on health, robust adaptation strategies and direct interventions with patients and members remain on the horizon.

Although product and business model adaptations are still in their nascent phases, the work to develop these outcomes will likely require coordination at all levels. Those who wish to invest in adaptation should account for not just direct climate risks to an organization's operations, but also to its suppliers and, most importantly, the health of its patients, members, and/or customers.

FIGURE 7

Adaptation actions to build resilient organizations



Providers	Pharma and MedTech	Plans
<p>Interconnected health communities: Interconnected health communities share data and collaborate in real time to address the drivers of health</p> <p>Analytics for personalized (N-of-1) care: Cognitive technologies analyze large datasets—including environmental health data—to create personalized insights into a consumer’s health, allowing for tailored action plans</p> <p>Protocols for climate-sensitive care: Detailed plans to treat climate-sensitive diseases that integrate the drivers of health into care delivery</p>	<p>Analytics for personalized care: Cognitive technologies analyze large datasets—including environmental health data—to create personalized insights, allowing for development of personalized drugs</p> <p>Strategic investment in drug development: Take a proactive approach to developing the drugs of the future. Align research with changing disease burden and invest in rapid-response capabilities</p> <p>Innovate for climate-resilient care: Innovate in anticipation of growing risks—such as physical disruptions and biodiversity loss that shrinks sources of existing and potential drugs</p>	<p>Interconnected health communities: Build interconnected communities of providers to share data and enable collaboration in real time on the drivers of health, including environment and climate</p> <p>Interoperable data enablement: Share data across platforms and care enablement teams to proactively manage health impacts linked to climate change-driven weather events (e.g., heat waves, poor air quality)</p> <p>Risk assessment of climate/health impacts: Leverage analytics to model increasing probabilities of extreme weather events and develop risk profiles for member population vulnerabilities</p>

Source: Deloitte analysis.

The following questions can be used to help frame what climate adaptation might mean to your organization.

QUESTIONS TO INFORM A CLIMATE ADAPTATION STRATEGY

- To what extreme weather events are your operations most vulnerable? How will these events evolve over the next 10–20 years?
- How have your operations been impacted by severe weather events over the past 3–5 years?

- How many days annually do you project the electrical grids that power your operations will be negatively impacted by extreme weather? How do you project this will change over the next 10–20 years?
- What preparations and investments have been made to improve resiliency to current extreme weather events? Emerging weather events?
- Is government funding, tax credits (federal, state, local), or preferred investment vehicles (e.g., ESG bonds) available to subsidize investments in or provide preferred funding for onsite, sustainable energy, and electricity infrastructure?
- What are your highest priority supply-chain relationships? What are the biggest climate-related threats to continuity for these suppliers? What steps have these suppliers taken to build resiliency into their operations? What type of alternatives have you built into your supplier relationships to withstand supply-chain disruptions?
- What are the biggest climate-related health risks among your patients, members, or customer populations? How will these risks evolve over the next 10–20 years?
- What interventions, products, or services are you providing and/or investing in to address these climate-related health risks? What investments are being made to proactively address emerging health risks?
- Beyond operational risk, are your organization's investment portfolios exposed to any ESG-related risk (e.g., investments in fossil fuel assets)? What are some of the risks that could stem from greater ESG reporting requirements demanded by regulators or institutional investors?

TRANSFORMING TO SOLVE THE SYSTEM-LEVEL CHALLENGES

Beyond the strategies available to them, health care organizations should also be ready to deploy the innovative technologies and care models that have become central health care investments in recent years, accelerated by the COVID-19 pandemic, to deliver on these strategies. These technologies (e.g., remote sensing, virtual platforms) and care models (e.g., hospital-at-home, on-demand virtual PCPs) are simultaneously paving the way for the Future of Health while providing health systems, health plans, and life sciences companies with capabilities to address their contributions to climate change. These identified technologies and capabilities can enable the emergence of new business models that deliver health and well-being

services in a more flexible, site-agnostic, and personalized manner.

Some leading organizations are already beginning to connect climate and sustainability with business transformation, with a common linkage between footprint reduction, a transformed talent deployment model, and the use of virtual platforms. Some firms have found that investing in digital and virtual capabilities has allowed them to simultaneously deploy more innovative operating and talent models while also reducing their emissions footprints. Nevertheless, there remains a significant opportunity within the health ecosystem to think more holistically about how climate and sustainability strategies fit into and complement overall business transformation over the next 5–10 years.

FIGURE 8

How today's investments could transform tomorrow's health care and drive the future of health

M Mitigation **A** Adaptation

Climate-related risk/driver	Transformational investment	Example outcomes
Increased need and preference for home care	Virtual care platforms, virtual staffing models, and remote-monitoring capabilities	<p>M Reduce GHG emissions caused by transportation and physical footprints</p> <p>A Prevent climate-induced illnesses thanks to early detection via monitoring</p>
Need for environmental health data to predict vulnerabilities	Artificial intelligence- and machine learning-based sensing technology	<p>M Smart sensors built into refrigerators advise diabetic patients on how to optimize nutrition and eliminate food waste given current supply</p> <p>A Smart sensors on wearable technology advise asthmatic patients to stay indoors on days with poor air quality</p>
Need to manage multistakeholder health ecosystems and guide members/patients	Intelligent search and analytics capabilities, including environmental variables	<p>M Better understand environmental data and related climate footprint of ecosystem stakeholders</p> <p>A Rapidly identify health trends caused by rising temperatures</p>
Need to generate insights for value-based insurance	Analytics that illuminate population health and drivers of health	<p>M Inform prevention efforts against environmental health risks and enable rapid intervention</p> <p>A Enable integration of environmental metrics related to provider sustainability and patient intervention into value-based contracts</p>
Rapidly changing patient demands	Design modular and resilient facilities that provide adaptability to meet rapid changes in patient demands	<p>M By minimizing underutilized clinical space, modular facilities minimize physical footprint and help reduce the physical footprint</p> <p>A Modular facilities help to rapidly meet the needs of health issues that spike during climate disasters</p>

Source: Deloitte analysis.

Importantly, the assets, capabilities, and business models that can drive climate resiliency within organizations can also be deployed to proactively contribute to a more equitable health system in the long term. Do your current investments in physical or technical infrastructure align with the capabilities needed to succeed in the Future of Health? Some of these outcomes could include innovations in care delivery models, such as virtual care platforms or improving proactive interventions against climate-induced illnesses for health plan members. Understanding these opportunities for change does not mean an organization needs to fully align to a single 20-year business model. Rather, the investments made to

address priorities in the short-to-medium term should align with long-term organizational considerations to thrive in the Future of Health.

There is fertile ground for collaboration across the sector, given the carbon emissions that come from the broader value chain. Sustainability and ESG leaders have already shown an appetite for taking a cross-firm, ecosystemwide approach, by partnering to identify solutions to population-level health issues. As more and more firms prioritize sustainability and climate action, and make public commitments around their efforts, this type of collaboration will encourage even more information-sharing and learning across the sector.

DATA CAN BE A CRITICAL ENABLER FOR ASSESSING AND MANAGING CLIMATE RISKS

Robust data collection, management, and analytics tools may be the lynchpin to the strategies outlined above, whether it is mitigating emissions or better understanding and addressing the population health impacts of climate change. To adequately design and implement climate resiliency, health care players should incorporate more robust environmental data into their operations as delivery of their services and products continues to evolve. Data will likely play a critical enabling role in climate resiliency across the health care ecosystem, with example use cases including:

- **Health system:** Real-time weather and climate data (available through public sources) can help health systems predict and plan for near-term climate events, such as severe storms. Health systems can consider these climate variables during their short-term capacity and resource planning to help ensure emergency departments are equipped for a higher-than-usual influx of patients affected by severe weather. Another strategy is to consider nontraditional social drivers of health data points (i.e., community access to A/C, community flood risks, etc.) in EHRs, and community health planning efforts may also help health systems increase resiliency and understand which climate variables will impact the populations served the most.
- **Health plans:** Health plans that are already using technology tools to become digitally connected to their members can connect the dots between collected data on their members' health conditions and near-term data on air quality to determine which members to proactively warn via text message. These text messages can advise patients with respiratory conditions of impending poor-air quality days, during which they should avoid outdoor activities.
- **Life sciences:** Pharmaceutical and MedTech companies can integrate climate-trend data into their supply-chain operations to plan for costly disruptions caused by severe weather. Data can provide insights into even longer-term climate change risks to help these companies assess their relationships with suppliers and the locations of their facilities. A more agile life sciences supply chain can use data to inform and communicate between facilities, so resources are stored, shifted, and stockpiled in a flexible manner across large geographies.

Fortunately, as life sciences and health care companies and other market entrants move toward the Future of Health, many are already investing in several of the foundational data and IT capabilities needed to build climate resiliency. Data interoperability and data-sharing from patients and members, for example, are critical components of the data use cases outlined above and organizations that are leaders in these areas can be set up for success in building climate resiliency. Ascension has even gone beyond general data and IT capabilities to support its climate and sustainability work. As part of its environmental impact office, it has staff dedicated to measuring, collecting, and analyzing key environmental impact metrics. Given the critical nature of data analytics to achieving climate resiliency, building dedicated analytics teams and resources supporting this work is a key enabler to success.

THE SUPPLY CHAIN'S FOOTPRINT MAKES AN ECOSYSTEM APPROACH CRITICAL

In the health care ecosystem, a large majority of emissions originates from supply-chain processes. Supply-chain emissions are particularly complicated to address because they involve engagement and alignment with third-party suppliers, many of whom do not have established systems in place for data collection and reporting. Even those who do might use different methods for measuring their footprint, which complicates matters for organizations seeking a single standard of comparison. Widespread collaboration among industry groups can be critical to achieving industrywide net-zero emissions.

In the health care ecosystem, a large majority of emissions—over 70% for US health systems—originates from supply-chain processes.

Even for a large company such as CVS Health, partnering with other environmental leaders has been critical to driving sustainable practices amongst suppliers. Furthermore, CVS Health leadership has found that working closely with suppliers early on to outline expectations for energy

use, fleet management, and general sustainability goals can help establish a stronger and more productive working relationship. This learning and collaboration model is of particular importance given the emissions that are generated outside the four walls of any one industry participant. Among some of the most important opportunities for collaboration is expanding and improving the data available from across supply chains to target emissions-reduction strategies more accurately. Although many companies are still in the early stages of assessing their value-chain footprint, it is imperative to create an environment of cooperation across the health care ecosystem, as climate resiliency cannot be effectively achieved without broader system change.

Efforts have already been launched to improve supply-chain transparency and move toward all-scope emissions reductions. Two examples include the Pharmaceutical Supply Chain Initiative (PSCI)—a coalition of over 45 pharmaceutical and health care companies that have pledged to maintain transparency and integrity in their supply-chain practices through a shared audit program²⁵, and *Energize*—a collaboration between 10 global pharmaceutical companies to increase renewable energy access for hundreds of pharmaceutical suppliers.²⁶ This precompetitive effort on behalf of an entire industry can help enable suppliers to access the resources needed to participate in the market for power purchase

agreements (PPAs). By overcoming the barrier of complexity in the PPA contracting process, participating suppliers can be more equipped to purchase and transition to renewable energy, significantly reducing their Scope 2 emissions (and thus, the pharmaceutical companies' Scope 3 emissions).

Health care stakeholders can also look beyond the sector for leading practices. Bon Secours Mercy Health leverages the forum provided by Cintrifuse, a Cincinnati-based innovation hub, to discuss approaches to supply-chain footprint reduction with large organizations in the consumer goods and retail sectors. Given that other sectors are often more mature, on average, in their sustainability efforts, health care organizations can look to these multi-industry hubs and any relationships they may have with nonhealth care organizations to learn approaches and leading practices around supply-chain footprint reduction. Efforts such as these can be used as foundational infrastructure to build more broader efforts across the health ecosystem and generate lessons learned and leading practices to accelerate mitigation.

These early efforts by leading and innovative firms are important to laying the blueprint for the fast followers, beginning to establish best practices, and generating a “bandwagon” effect around sustainability. As more firms make public commitments to sustainability, firms will be more inclined to provide transparency into their methods and approaches to the benefit as the sector as whole.

As a sustainability leader, it's critical to understand that you're speaking to multiple audiences across an organization and to determine the best approach to engaging with each of those audiences. Beyond the overarching objective that we all share of being a responsible environmental steward for our communities and patients, the “why” for sustainability that leaders and stakeholders prioritize varies across functions. For a CFO, it might be cost savings; for an HR leader, it might be talent retention—it's up to sustainability leaders to understand those different perspectives to generate enthusiasm and momentum around sustainability efforts.

— Seema Wadhwa, executive director of environmental stewardship, Kaiser Permanente

Building the vision of resiliency and innovation

WHILE OPTIMIZING THE climate resiliency of an organization is a significant undertaking, organizations can focus on an initial set of strategic activities and questions to jump-start their move toward climate resiliency.

Since the questions and considerations range from financial and operational to clinical, it is important to have a dedicated leader to answer questions, to incorporate input from across the organization, and to develop a road map accordingly. This point person should be able to foster close collaboration across functions, across levels of an organization, and with members of the industry. Kaiser Permanente, for example, achieved its carbon-neutral commitment through cross-functional engagement between executives across all of its operational areas. And at Ascension, sustainability of climate efforts are driven by both top-down and bottom-up channels. Employees proactively advocate for sustainability initiatives up to the leadership levels of the organization. Indeed, offering such an engaged culture of sustainability can be a critical component of talent attraction and retention for today's value-driven workforce.

For those organizations that are ready to start creating the benefits, here are some of the near-term activities that can start the journey to greater sustainability:

- 1. Set climate resiliency as an enterprisewide strategy:** Align across key stakeholders on strategic priorities for addressing climate change and how they fit into the organization's overarching vision.
- 2. Create a role focused on climate resiliency:** Dedicate a C-suite leader to a role committed to driving the organization's sustainability agenda and addressing the causes and impacts of climate change. Beyond a specific focus on climate and environment, this role can provide leadership over your organization's broader ESG portfolio.
- 3. Take a comprehensive snapshot of your business:** Expand your data aperture and competencies to develop a strong understanding of your own carbon footprint, climate-related health challenges of your geographies, and associated vulnerabilities.
- 4. Assess your risks:** Conduct a deep dive into not only the organization's own operations, but also those of its suppliers and partners, and the health risks of the population it serves.
- 5. Look toward the future:** Understand not only your organization's current climate risks, but how those risks will evolve over the coming decade.

Even if your organization has prioritized environmental and climate issues for some years, these strategic questions and considerations can still be leveraged to do a health check on your current path. They can help ensure that you are thinking holistically about climate change, health,

In an era of purpose-driven employees and the recent “Great Reprioritization,” environmental sustainability can be a powerful driver of employee engagement. Biogen has more than 700 employees involved in an employee resource network that helps employees go fossil fuel free at work, at home, and in their communities. We ran and are implementing projects from an employee Innovation Challenge for ideas to take Biogen beyond net zero climate commitments, and also introduced new benefits, covering the cost difference for employees to use 100% renewable electricity at home, and switch from gas to electric appliances, for example. And we give employees time off to volunteer for a range of issues, including turn-key opportunities to advance environmental causes, which fosters a sense of connection and excitement.

— Jennifer Wright, director of global EHS and sustainability, Biogen

and your organization in your current efforts and, if necessary, can help recalibrate your priority areas and investments appropriately with your organization’s overarching, long-term vision, and the Future of Health ecosystem.

At Genentech, and Roche more broadly, we have integrated sustainability into our corporate vision, values, operating standards, and guidelines. We also encourage all employees to integrate sustainable practices into their work and have “green teams” of employees driving sustainability efforts locally. Given this widespread engagement amongst employees, our centralized Corporate Sustainability Committee has been critical to guiding our sustainability strategy and reporting to ensure coordination and collaboration across the enterprise.

— Harun Asad, senior director of sustainability, Genentech

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