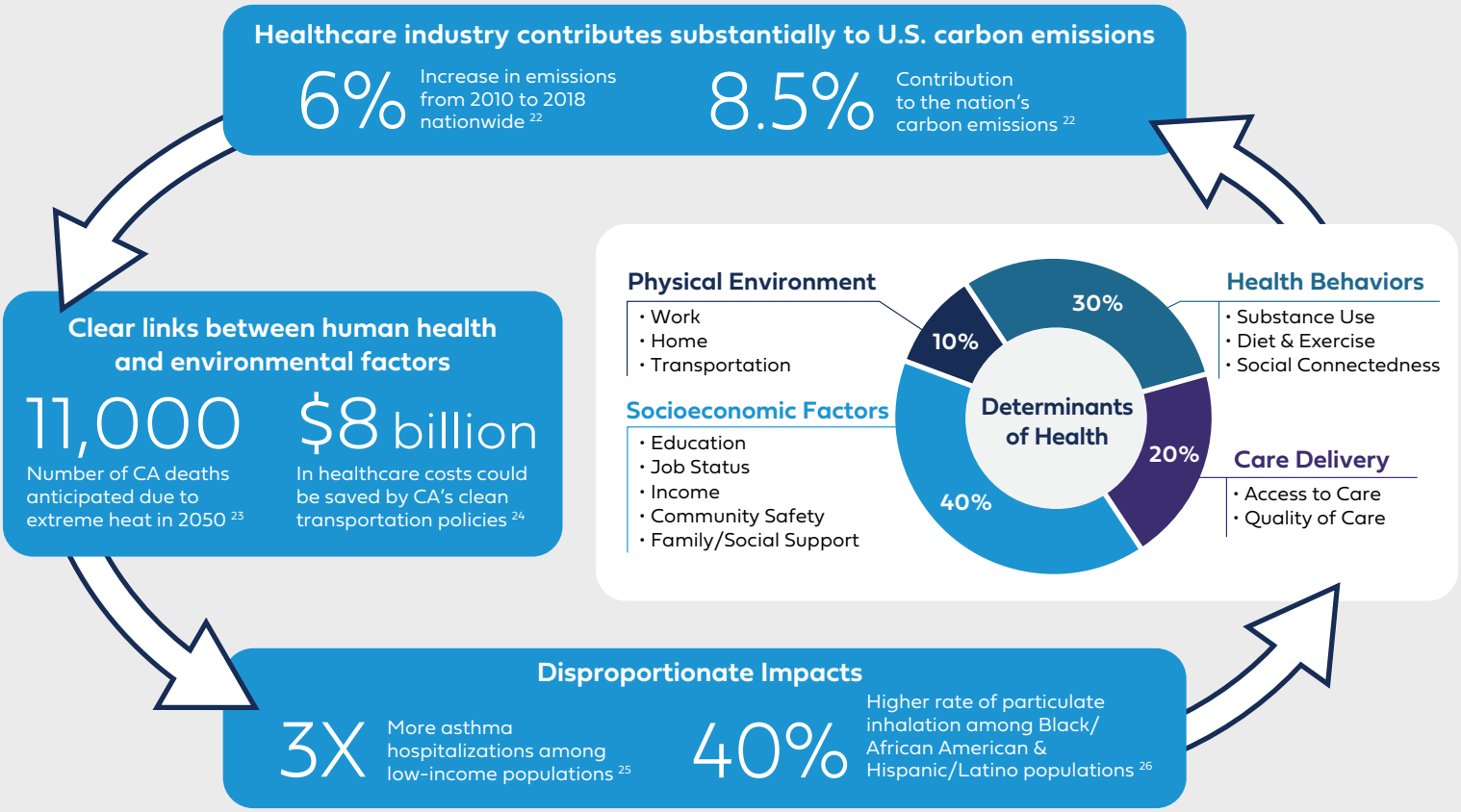
blue california

Advancing climate action with virtual health care

Climate change poses the largest threat to human health, and reducing the carbon footprint of the healthcare industry presents a compelling opportunity to alleviate climate-related health risks and promote resilient communities. Virtual care is considered a potential way to help the industry reduce its carbon footprint.

To understand the impacts of virtual care on the environment, Blue Shield of California conducted a life-cycle assessment comparing the environmental impacts of an in-person care model to that of a hybrid virtual care model. The result of this analysis shows that large-scale adoption of virtual care not only improves the climate resilience of communities, but also reduces negative environmental impacts of healthcare facilities and their operations by driving a reduction in carbon emissions and resource consumption. While beyond the scope of this paper, it is suspected that virtual care, when used appropriately, can also improve patient experience.

Figure 1: Healthcare sector carbon emissions and impacts on human health



Health care and climate change: An opportunity for large-scale impact

Climate change poses the largest global threat to human health. Global temperatures continue to rise, driving increasingly frequent extreme weather events such as heat waves, storms, and floods, as well as disrupting food systems and increasing the transmission of disease. The effects of climate change have significant impact on human health, leading to an increase in illness, mental health issues, and death.[1]

If the global healthcare industry were a country, it would be the fifth-largest greenhouse gas (GHG) emitter on the planet, responsible for about 4.5% of worldwide emissions.[2] Building health systems and infrastructure that are climate resilient and environmentally sustainable helps reduce the health impacts of climate change.[3] Decreasing healthcare facilities' emissions could significantly reduce U.S. emissions, decrease operating costs, and contribute to greater resilience in healthcare infrastructure.

As healthcare organizations recognize climate-related threats to health, they can play a large role in reducing these operational risks.[2] Additionally, health practitioners can redesign sustainable, longer-term service models that, along with reducing the carbon footprint of the healthcare industry, can also reduce public health burdens, build resilience to extreme weather events, and progressively eliminate environmental contaminants released through their operations.[4, 5]

The broad adoption of virtual care models by healthcare organizations offers a promising opportunity to drive this type of systemic change and achieve these positive outcomes.*

* *Virtual care opportunities exist for (but are not limited to) the following appointment types: psychotherapy, prescription management, post-surgery follow-ups, consultations, and physical/occupational therapy. It may not be an appropriate solution for surgical procedures, most drug administrations, blood draws, immunizations, some psychiatric emergencies, and for certain complex medical conditions, amongst other scenarios.*

By embracing virtual healthcare models, healthcare systems have an opportunity to play a large role in driving climate resilience.

Reducing our carbon footprint with virtual care: A learning opportunity in our own backyard

Hybrid virtual care models, where some appointments are conducted in-person and others are conducted virtually, can also serve as a more resilient healthcare solution. As climate change causes more extreme public health and environmental events, there is an increased health hazard exposure for communities, resulting in injuries and illness[1] and potential risk to critical infrastructure, such as healthcare facilities.[6] The flexibility of the virtual care model allows for continuity of care and improved access when critical infrastructure services are disrupted.

This was recently observed in California, where climate change is contributing to more extreme heat, drought, and wildfire events. The 2018 Camp Fire was the most destructive in California's history, causing $12.5 billion (USD) in total insured losses. The town of Paradise was one of the most affected communities, with 83% of its population displaced, 90% of the housing stock significantly damaged or destroyed, and the primary healthcare provider sites severely damaged and inoperable.[7, 8]

In the wake of the Camp Fire, Blue Shield of California (Blue Shield) began delivering a hybrid of in-person and virtual care solutions to affected communities. While this scenario demonstrated the benefits of virtual care for climate resilience, it also provided Blue Shield with a unique case to study and analyze the environmental benefits of virtual care. As discussed in the following section, the observed environmental benefits illustrate the value of virtual care extends beyond emergency situations.

Case study and life-cycle analysis: Delivering virtual care in wake of the Camp Fire

In collaboration with Anthesis and analytical support from WAP Sustainability Consulting (WAP), Blue Shield used one year of data from delivering hybrid primary care in Paradise and partial-year data from a second pilot site in Sacramento to estimate and compare environmental footprints of virtual and in-person health care by performing an environmental life-cycle assessment (LCA) across both delivery methods.

Use of a hybrid virtual care method of healthcare delivery generated an average 25% reduction in carbon emissions and 35% reduction in water consumption across both sites. Through this analysis, Blue Shield was able to show large-scale adoption of virtual care not only improves the climate resilience of communities, but can also reduce negative environmental impacts of healthcare facilities and their operations by driving a reduction in carbon emissions and resource consumption.

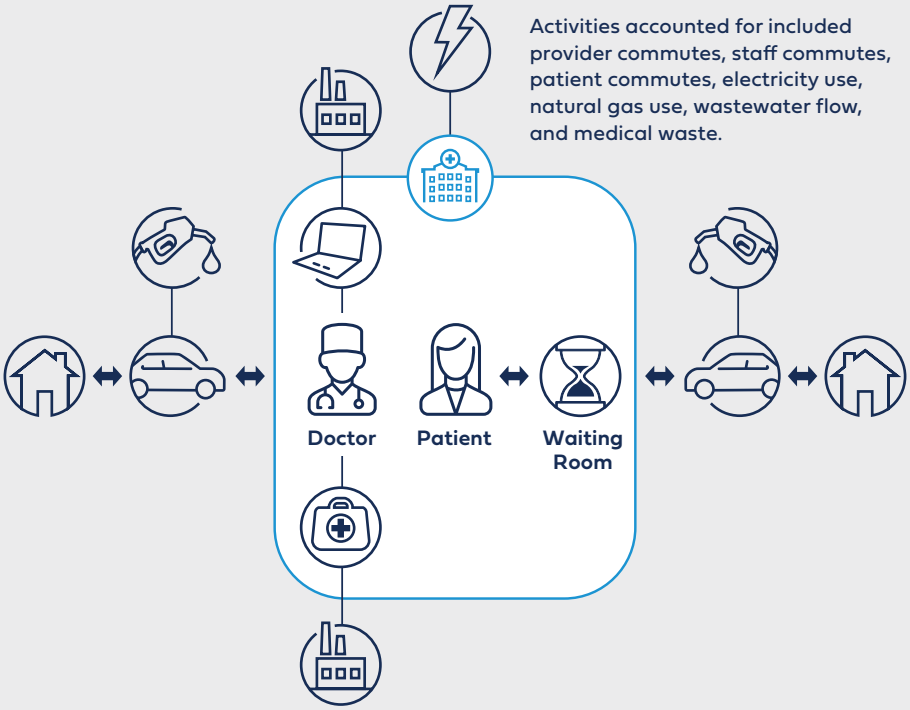
Approach and methodology

An LCA is a technique to "assess the environmental aspects and potential impacts associated with a product, process, or service."[9] It requires an inventory of relevant energy and material inputs and environmental releases to be compiled and assessed for each of the virtual and in-person care scenarios so that the relative impacts can be compared.

Blue Shield analyzed the environmental impacts across two scenarios: a pilot case scenario that represents a hybrid approach to health care in which some patients are seen in-person and others are seen virtually, and a base case scenario that assumes all patients are seen in-person who would have otherwise been seen virtually under the pilot case (hybrid virtual care) scenario.

Both scenarios were analyzed across two sites: Paradise Medical Group (PMG) during a trial period of January 2020 through December 2020, and Sacramento/Hill Physicians Medical Group (HPMG) during a trial period of March 2020 through December 2020. The PMG clinic provided primary pediatric and adult care, while the HPMG clinic provided specialist care. It is important to note that the COVID-19 pandemic began and changed virtual care utilization rates during the period of measurement.

Figure 2: Activities accounted for in LCA scenario analysis



Activities accounted for in the LCA included provider commutes, staff commutes, patient commutes, electricity use, natural gas use, wastewater flow, and medical waste. These metrics were measured across both sites for both scenarios.

With a focus on short-term environmental impacts, the measurements were used to calculate the impacts for each identified category (e.g., carbon footprint, smog formation, particulate matter, water use) across both scenarios for each site. Hypothesized impacts like the potential diversion of care from highly resource-consumptive sites, like urgent care or emergency rooms, to lower cost sites, and the potential reduction of future care due to better controlling conditions, were not considered in this analysis.

Results and key conclusions

Analysis of the impact category metrics showed the pilot case (hybrid virtual care) scenario avoided a significant amount of negative environmental impacts. **Use of a hybrid, virtual care method of health care delivery generated an average 25% reduction in carbon emissions and 35% reduction in water consumption across both sites.**

Blue Shield did not initially set up these pilot programs with the intention to do an LCA. As a result, we had to utilize estimations for some data. In future LCAs, for more precise results, we could set up the measurement strategy to include environmental impact from the outset, as this would enable more precise estimations or measurements for commuting distances. We would also include facility energy use data and utilize more precise estimates of the facility use during hybrid or virtual visits.

These results and their associated environmental benefits have reinforced Blue Shield's commitment to providing virtual and hybrid care to the communities we serve. Blue Shield better understands how we can leverage lower-emission solutions to minimize climate change effects that contribute to severe events like the Camp Fire of Paradise, and is better positioned to be a part of the solution to reduce the overall carbon footprint of the healthcare system.

Table 1: LCA results for PMG pilot site
Trial period: January 2020 - December 2020

	Global Warming (kg $CO_{2Eq.}$)	Particulate Matter (kg $PM2.5_{Eq.}$)	Water Use (m^3 depriv.)	Smog (kg $O_{3Eq.}$)
Base Case Scenario	340,000	549	22,300	14,600
Pilot Case Scenario	234,000	424	13,400	9,100
Avoided Impacts	**106,000**	**125**	**8,900**	**5,500**
Avoided Impacts (%)	**31%**	**23%**	**40%**	**37%**

Table 2: LCA results for HPMG pilot site
Trial period: March 2020 - December 2020

	Global Warming (kg $CO_{2Eq.}$)	Particulate Matter (kg $PM2.5_{Eq.}$)	Water Use (m^3 depriv.)	Smog (kg $O_{3Eq.}$)
Base Case Scenario	87,000	178	4,300	3,100
Pilot Case Scenario	69,000	152	3,100	2,300
Avoided Impacts	**18,000**	**26**	**1,200**	**800**
Avoided Impacts (%)	**20%**	**15%**	**29%**	**26%**

Figure 3: Impact categories

Climate Change (a.k.a., global warming or carbon foorprint): A measure of GHG emissions, such as CO_2 and methane.

Particulate Matter (a.k.a., dust and aerosol emissions): A measure of particulate matter emissions and precursors to secondary particulates, such as SO_2 and NO_X.

Water Use: Indicator of the relative amount of water used, based on regionalized water scarcity factors.

Smog Formation (a.k.a., photochemical ozone creation): A measure of emissions of precursors that contribute to ground level smog formation (mainly ozone O_3).

Conclusions: An environmental call-to-action for the healthcare industry

There is a clear and urgent need for a more aggressive and strategic plan to reduce the carbon footprint of the healthcare industry and create climate resilient healthcare systems. A systemic, industry-wide sustainability call-to-action is needed to create large-scale impact. This will require innovative solutions that can contribute to significant carbon emission reductions across the industry. The result of Blue Shield's LCA shows virtual care can enable these efforts.

As noted in the "Beyond Sustainability" section below, utilizing hybrid and fully virtual care models as alternatives to in-person care when appropriate has proven to be a successful approach for the healthcare sector, providing benefits to patients and providers alike. Although the COVID-19 pandemic accelerated the adoption of virtual care models in the United States, barriers to the systemic adoption of virtual care remain, such as effective data sharing systems and a changing regulatory landscape. While virtual care can improve accessibility to care, there is also the risk of deepening healthcare inequities - specifically around lack of access to communication technology and information, which are intensified by poverty, under-resourcing, homelessness, and other factors that decrease digital health literacy skills.[5, 10] Virtual care will become increasingly valued and widely adopted if it becomes equally accessible and digitally secure while maintaining a high quality of care.[11]

By improving accessibility, virtual care contributes to a more equitable, low-carbon society. Annual health-related costs are projected to be approximately 50% lower under a lower-emissions scenario.[4, 12] Virtual care models will also yield ongoing benefits for patients, providers, and the climate. As we continue to face the direct impacts of climate change, climate-informed health policies, programs, and systems will become increasingly important.

To this end, Blue Shield launched our Virtual Blue benefit plan in 2023, which enables members to access care through a virtual network of providers, as well as a physical, in-person network. Primary care, specialty care, and behavioral health care will be coordinated across virtual and in-person care settings in an integrated member experience. In 2022, 84% of employers said integrating virtual health and in-person care delivery is critical for success.[13] By creating a seamless member and provider experience across in-person and virtual care, Blue Shield is working to promote a broader adoption of sustainable delivery models and drive greater emission reductions from patient and employee commutes and facility usage. It should be noted that Virtual Blue members receive a "vitals kit" in the mail which includes a thermometer, scale, and blood pressure cuff. These items are intended to help patients monitor their health at home. An LCA has not yet been conducted to understand the carbon emissions associated with the vitals kit, though care was taken to minimize packaging associated with the kits.

Through illustrating the carbon savings associated with virtual versus in-person care, this LCA is a key step in confirming the environmental benefits of virtual care as a more sustainable option for healthcare delivery. But this study is only a first step - as a whole, the healthcare industry has a long way to go toward understanding the environmental impacts of healthcare delivery at a system-level. It is of utmost priority that the healthcare industry begins collecting data and measuring environmental impacts for both in-person and virtual methods of care. **It is well understood that what matters is what gets measured, and what gets measured gets managed.**

To make transformational, systemic change, virtual care must only be one component of an ambitious, cohesive decarbonization strategy coordinated across all levels of the healthcare industry. While this will be an immense effort, it is one Blue Shield is ready to lead. Our members and our planet are worth it.

Beyond sustainability: Virtual care can be better care

> More sustainable care does not mean lower quality care. Along with the positive environmental impacts, virtual care can also improve the overall healthcare experience, accessibility, and medical outcomes for patients and providers in the following ways:

Accessibility and digitization:

- Improves opportunities for patients to identify and access the appropriate specialists for their condition and improves access to better, more frequent care for patients living in rural areas, provided that high-speed internet access is available.[14, 15]
- Increases health equity by improving access for isolated communities if promoted in tandem with digitization efforts in low-income communities.[17]
- Virtual care can improve access to diverse physicians on criteria that matter most to the patient or member.

Travel reduction:

- Data from the Blue Shield virtual care pilot suggested that the travel reduction was particularly beneficial for stressed caregivers of young and elderly patients, reducing the patient and caregiver burden.
- In a new study from UC Davis Health, researchers found patients saved an average of 17.6 travel miles, 35 minutes and $11 in travel costs by choosing virtual care over in-person visits.[19]

Long-term relationship building:

- Providers in Blue Shield virtual care pilots reported increased engagement with patients and caregivers through being able to see into patients' homes and engage patients' family and caregivers during virtual care visits.
- Provides connection and opportunities for increased trust and longer-term relationships between providers and patients, resulting in better health outcomes.[15]

Efficiency for patients and providers:

- Improves efficiency of patient transfers, referrals and scheduling, and diagnoses; improves data tracking outside of healthcare facilities, which can prevent readmissions and allow elderly and individuals with disabilities to live at home longer.[15]
- Reduces the patient load in communities with fewer providers, enabling other providers to fill in where there is the greatest demand.[15]
- Expands time window of when patients can receive care, get diagnosed, and receive treatment, closing care gaps for patients who fall ill outside of normal clinic hours, or for those with chronic and/or mental health issues.[20]

Improved diagnosis and treatment plans:

- Increases frequency of appointments and treatment in certain cases, improving management of chronic diseases such as obesity and diabetes.
- The combination of telemedicine and wearable devices improves patient monitoring and allows for more frequent medication adjustments, resulting in faster and better disease control and fewer complications at a lower total cost. [15, 20]

Reduced transmission rates in healthcare settings:

- In Blue Shield virtual care pilots, providers noted that the ability to triage patients virtually enabled them to continue care and prevent transmission during the pandemic.
- Allows providers to triage patients virtually, prioritizing those who need an in-person assessment, and protecting providers and patients from unnecessary exposure.[21]

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About Blue Shield of California

Blue Shield of California strives to create a healthcare system worthy of its family and friends that is sustainably affordable. Blue Shield of California is a tax paying, nonprofit, independent member of the Blue Shield Association with more than 4.8 million members, over 7,500 employees and more than $24 billion in annual revenue. Founded in 1939 in San Francisco and now headquartered in Oakland, Blue Shield of California and its affiliates provide health, dental, vision, Medicaid and Medicare healthcare service plans in California. The company has contributed more than $97 million to Blue Shield of California Foundation in the last three years to have an impact on California communities. For more news about Blue Shield of California, please visit news.blueshieldca.com. Or follow us on LinkedIn, Twitter, or Facebook.

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