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Healthcare's Role in Managing the Environmental Toll of AI

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Artificial intelligence is poised to revolutionize healthcare, but its use, from chatbot interactions to radiology image interpretations, carries a steep energy debt that the industry is only beginning to confront.

The technology, which imitates human learning, has gluttonous power needs. It draws on the electrical grid not only to keep servers and electronic equipment humming, but also to power air conditioners and closed-loop cold water-cooling systems, said Dr. Andrea Vicini, PhD, a Jesuit and bioethics professor at Boston College. A large data center can use as much energy as 80,000 homes. It might also consume up to 5 million gallons of water a day, enough to supply a town of 10,000 to 50,000 people, depending on usage rates. If projections hold true, AI could account for 12% of electricity use in the country by 2028.[1,2]

These vast demands raise questions about the hidden environmental and social costs of planned AI infrastructure projects and who will ultimately pay the astronomical energy bills. These questions will only intensify as the technology weaves its way into more ubiquitous use, driven by the rise of agentic AI, a self-sufficient iteration that can carry out tasks without continuous human prompting.

In these early days, many health systems are primarily focused on AI's promising possibilities to support patient care and streamline operations. But they should also factor in its downsides and take a more active role in mitigating its risks, Vicini said. "We are in a situation where the technology we are going to use is worsening our mission as healthcare institutions and ultimately worsening the health of the citizens," he said.

THE PROMISE OF AI-DRIVEN CARE

The appeal of AI in healthcare is clear. It's uniquely suited to analyze and digest an enormous amount of medical data, detect patterns and make predictions. It doesn't complain about taking on rote, labor-intensive tasks that bog down doctors and staff, such as note-taking during patient appointments. "We are currently using AI in ambient listening," said Alan Sanders, vice president of ethics integration and strategy at Trinity Health. Reducing tasks like this helps free up more time for patient care, he said.

Other facilities are using AI to interpret imaging results or to scan data for early signs that a patient may be at risk for sepsis.[3] It can also provide oversight, flagging errors, speeding diagnoses of rare diseases, and recommending treatments. Some organizations are already seeing signs that it can reduce burnout and medical errors in an era where many facilities are overburdened and understaffed.[4]

While AI is already being used in some form at most healthcare organizations, it's still too early to say where it will ultimately find its place. "Our

overall focus is on whatever is going to improve the patient experience and clinical efficiency," Sanders said.

As organizations decide where AI will fit, the conversation should also focus on its environmental impact and how to protect vulnerable communities, Vicini said.

CONSIDERING THE COSTS

In addition to hoovering up electrical energy and water, it has damaging outputs, including water and air pollution, toxic electronic waste and noise, Vicini said.

As AI demand grows, so does the need for new infrastructure. AI research and deployment company OpenAI embarked on a $500 billion AI infrastructure project to build server farms.[5] At the same time, companies like Meta and Microsoft are pushing for nuclear power plants to support the rising use of AI-driven technology. In the meantime, most existing data centers are powered by fossil fuels, which could set back environmental efforts, including the United Nations' 17 Sustainable Development Goals,[6] Vicini said.

To accommodate their large footprints, many data centers are constructed in rural locales — often lured by the promise of cheap land, cheap electricity and tax incentives, Vicini said. However, it's not such a bargain for those who live there, often already among the nation's most vulnerable. They may face rising electricity costs, increased risk of water shortages, and potential exposure to pollutants from contaminated water runoff and electronic waste, he said.

According to a 2019 MIT study, just one training run for the typical large language model generates more than 600,000 pounds of carbon dioxide, five times the emissions caused by building and running the average American car over its lifetime.[7] That number could be even higher today.

Even the manufacture of AI microchips and servers can result in environmental impacts, such as water pollution. "We know how difficult it is to treat water that is polluted with chemicals," Vicini said. Data centers also exacerbate water scarcity, forcing them into competition with other critical uses, including agriculture. Many facilities are constructed in desert or semidesert areas, where water is already in short supply, Vicini said.

There's often little upside for the communities that host these sites. While these facilities are large and complex, they don't need a large staff, so they aren't a major source of new jobs. One facility in Washington state is 450,000 square feet, has tens of thousands of computers, and consumes 30% more energy than all the people in the entire county. But it employs only 75 people, Vicini said. The electricity demands will not only put a strain on the power grid, but will drive up electricity bills, a cost that may be borne by the public while AI profits remain in corporate hands, he said.

Right now, there are about 4,000 data centers operating in the U.S., and 3,000 more are either planned or under construction, according to the *Harvard Gazette*.[8] While many of these facilities are moving forward, opposition is mounting in many communities across the country and in other nations. The U.K. arm of the Stargate initiative was recently put on hold due to energy costs, according to Bloomberg.[9]

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The Southern Environmental Law Center is embroiled in a dispute over xAI data centers in Tennessee and Mississippi, which use methane gas turbines.[10]

"This was extremely concerning because Memphis is already violating minimum federal smog standards, and the turbines did not have a permit or any pollution controls installed," said Amanda Garcia, senior attorney with the Southern Environmental Law Center, during a recent Catholic Climate Covenant webinar.[11]

An analysis estimated up to $44 million in health damages from related pollution, including lost work and school days, emergency room visits and potential deaths, she said. The controversy represents what she called "an early and stark example of the unreasonable demands that AI data centers are putting on local communities, especially on communities that are already overburdened and with industrial pollution."

Healthcare organizations should play a role in buffering the negative effects from AI, including environmental impacts and the potential toll on vulnerable populations, Vicini said. They can do this by being strategic about their own use while also pushing for regulatory and policy guardrails.

PRUDENT MANAGEMENT

While there are some anti-AI voices who want to halt the development of the technology, Vicini sees it as an inevitability, one that should be managed to reduce harm. The Vatican, in an official doctrinal reflection on AI, *Antiqua et Nova* ("Ancient and New"), takes a similar view. "By exercising prudence, individuals and communities can discern ways to use AI to benefit humanity while avoiding applications that could degrade human dignity or harm the environment," it states. "In this context, the concept of responsibility should be understood not only in its most limited sense but as a 'responsibility for the care for others, which is more than simply accounting for results achieved.'"[12]

Used correctly, AI could help improve environmental stewardship, according to the United Nations. This may include broad uses, such as monitoring satellite imagery of global emissions or energy conservation support in individual homes.[13] UNICEF is using AI to predict where water shortages and natural disasters like flooding may occur to enable quick responses.[14]

Healthcare organizations should play a role in buffering the negative effects from AI, including environmental impacts and the potential toll on vulnerable populations, Vicini said. They can do this by being strategic about their own use while also pushing for regulatory and policy guardrails. Providers should favor applications that have proven clinical benefits and lower energy needs, he said.

"I think it begins and maybe even ends with regard to what I call responsible and prudent use of AI," Sanders said. This means asking questions about each use, he said. Do we really need it? How will it improve patient care? And what are the benefits and consequences?

Advocacy at the local, state and federal levels will be crucial as powerful, wealthy companies exert their interests, Vicini said. History is rife with examples of corporate interests winning out over humanitarian protections, he said.

Healthcare facilities are well positioned to play an important role in helping to guide how AI use will unfold, Sanders said. As an example, Providence has taken steps in that direction by initiating conversations with service providers.

"Providence uses AI models and hosted services from trusted third-party vendors instead of hosting in its own data centers," the organization said in a written statement. "While data providers are not currently reporting AI-related carbon emissions and water usage to us at this time, Providence continues to regularly engage partners on these issues as part of its broader environmental stewardship efforts. Our Environmental Stewardship team works diligently with all vendors to seek greater transparency and access to emissions reporting across our enterprise."

Individual health systems and organizations can also advocate for change by reaching out to their representatives in Congress to encourage federal laws governing the use of AI, Vicini said. Currently, few federal regulations govern AI use. States have increasingly introduced their own legislation to fill the void.

In a December 2025 executive order, the White House not only confirmed its preference for a hands-off regulatory approach to AI, but also said state laws present a barrier to technological progress and to the U.S. establishing itself as a leader in this technological revolution.[15] "To win, United States AI companies must be free to innovate without cumbersome regulation," it stated. "But excessive state regulation thwarts this imperative." Individual states may have some legal footing to push back on federal efforts to roll back laws, according to an insight from the law firm of Ropes & Gray.[16]

(Separately, a June executive order established a framework where some advanced AI systems could voluntarily be submitted to the federal

government for 30-day review to guard against national security risks before their release to the public.)

In addition to pushing for more AI oversight, organizations should advocate for clear policies that specify who will pay for AI-related energy costs and negative health-related effects, Vicini said. They should also back efforts to develop less harmful ways to power AI in the future, he said.

While individual organizations should establish their own guiding policies to ensure ethical use of technology, they can also consolidate their power by banding together to amplify their concerns. "Together, we can have a stronger voice in advocating for changes or regulations or raising awareness," Vicini said.

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NOTES

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