First Do No Harm: The Unintended Consequence of Contemporary Healthcare

Designing Health Systems Resilience: Surviving The Present, Ensuring The Future
New York Academy of Medicine
February 26, 2024

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### OVERVIEW: TJC’s HELP Agenda

<table>
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<th>Why</th>
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| **Health Equity** | - Social Responsibility & Patient Safety Issue  
                   - National Patient Safety Goal & Advanced Certification  
                   - Mass 1115 Waiver | 7/1/2023           |
| **Environmental Sustainability** | - Health, Equity, Patient Safety & Resilience Issue  
                                        - Clinicians demanding sustainability | 1/1/2024           |
| **Learning** | - Responsible Use of Health Data Certification  
                           - Guide safe, effective, equitable AI & algorithms | 1/1/2024           |
| **Performance Integration & Improvement** | - From Performative to Performance  
                                             - Reducing Burden by Retiring Obsolete Standards  
                                             - Measurement Alignment (National Quality Forum)  
                                             - Safe Environment: Preventing Workplace Violence | 2023 & ongoing |

**TJC Vision:** All people always experience the safest, highest quality, best-value health care across all settings
Environmental Sustainability

Greenhouse Gas Emissions in Healthcare:

• *If worldwide healthcare were a country, it would be the 5\textsuperscript{th} largest emitter among countries . . .

• *The U.S. is 27\% of the worldwide healthcare carbon footprint
  • ~9\% of U.S. emissions are from healthcare

• *Climate change is not only an environmental issue; it is a health, health equity, and patient safety issue . . .

• And an operational issue . . . for which we must build resilience!
  • 81\% of primary care clinics closed >1 day in last 3 years due to extreme weather events attributable to climate change
CO2 & Temperature – The Long View . . .
Arresting Warming at +1.5°C: Our Trajectory

**2100 WARMING PROJECTIONS**

Emissions and expected warming based on pledges and current policies

- Policies & action: +2.5 – 2.9°C
- 2030 targets only: +2.4°C
- Pledges & targets: +2.1°C
- Optimistic scenario: +1.8°C
- 1.5°C consistent: +1.3°C

**CAT warming projections**

Global temperature increase by 2100

November 2021 Update

Warming projected by 2100
Is even +2°C Too Conservative? (+4°C dark blue)
The Effects of Climate Change on Health

The Most Vulnerable are Least Able to Compensate

An Unvirtuous Cycle of CO₂ & Heat

- Injuries, fatalities, mental health impacts
- Heat-related illness and death, cardiovascular failure
- Forced migration, civil conflict, mental health impacts
- Malnutrition, diarrheal disease
- Asthma, cardiovascular disease
- Malaria, dengue, exephalitis, hantavirus, Rift Valley Fever, lyme disease, chikungunya, West Nile virus
- Respiratory allergies, asthma
- Cholera, cryptosporidiosisis, campylobacter, leptospirosis, harmful algal blooms

Figure 1: Impact of climate change on human health (Source: U.S. Centers for Disease Control and Prevention)
The Effects of Climate Change on Health

The Most Vulnerable are Least Able to Compensate
Deadly Heat . . .

• 2022: Worldwide Firearm Deaths – 250,000
• 2022: Worldwide Deaths from Extreme Heat – 489,000
• 2070: People living in extreme heat zones – 30 Million
• 2070: People living in extreme heat zones – 2 Billion
Heat Islands . . .

Causes of Heat Islands:
• Reduced Natural Landscapes in Urban Areas
• Urban Material Properties
• Urban Geometry
• Heat Generated from Human Activities

Contributes to Climate Change as a Health Equity Issue

https://www.epa.gov/heatislands/learn-about-heat-islands
Heat, Health Equity & Patient Safety . . .

**Example:** Examining Heat-Related Deaths During the 1995 Chicago Heat Wave*

**Figure 2.** Summer Deaths Due to Heat and Cardiovascular Disease in the United States, 1999–2018

https://www.epa.gov/climate-indicators/climate-change-indicators-heat-related-deaths
The Effects of Climate Change on Health

The Most Vulnerable are Least Able to Compensate

Figure 1: Impact of climate change on human health (Source: U.S. Centers for Disease Control and Prevention)
The Effects of Climate Change on Health
The Effects of Climate Change on Health

Gulf Coast, Mississippi Delta

Fish are seen washed ashore after dying in a red tide in Captiva, Florida, on Aug. 3, 2018. Cristóbal Herrera / EPA file
The Effects of Climate Change on Health

Two weeks after the *Special Report on Global Warming of 1.5°C* was released by the Intergovernmental Panel on Climate Change (IPCC) in South Korea, Central American Ministers of Environment gathered in *Panama* to discuss its findings. The report, alongside growing national concerns, lead them to call for increased awareness on the need to implement adaptation measures to address the challenges of human mobility in the context of the adverse effects of climate change, in a region highly exposed and vulnerable to this phenomena.

In the United States, that niche today blankets the heart of the country, from the Atlantic seaboard through northern Texas and Nebraska, and the California coast.
The Effects of Climate Change on Health

But as the climate warms, the niche could shift drastically northward. Under even a moderate carbon emissions scenario (known as RCP 4.5), by 2070 much of the Southeast becomes less suitable and the niche shifts toward the Midwest.
Migration Patterns of Climate Refugees

Projected Migration Routes:
1. The Caribbean, Central America, and northern South America north to the United States.
2. Amazonia south to Paraguay, Bolivia, Argentina, and Chile.
3. Northern Africa north to Europe.
4. Central Africa south to southern Africa
5. The Middle East northwest to Europe.
6. The Indian subcontinent northwest to Central Asia and Europe.
7. Southeast Asia north to China, Korea, Japan, and Russia.
8. Malaysia and Indonesia south to Australia.
9. Polynesia and Melanesia to Australia and around the world.
10. Australia southeast to New Zealand.

The Effects of Climate Change on Health

The Most Vulnerable are Least Able to Compensate

- Injuries, fatalities, mental health impacts
- Heat-related illness and death, cardiovascular failure
- Forced migration, civil conflict, mental health impacts
- Malnutrition, diarrheal disease
- Severe weather
- Air pollution
- More extreme weather
- Rising temperatures
- Sea levels
- Sea ice
- Water and food supply impacts
- Water quality impacts
- Cholera, cryptosporidiosis, campylobacter, leptospirosis, harmful algal blooms
- Malaria, dengue, encephalitis, hantavirus, Rift Valley Fever, lyme disease, chikungunya, West Nile virus
- Respiratory allergies, asthma
- Asthma, cardiovascular disease

Figure 1. Impact of climate change on human health (Source: U.S. Centers for Disease Control and Prevention)
“In total, Winegard estimates that mosquitoes have killed more people than any other single cause—fifty-two billion of us, nearly half of all humans who have ever lived. He calls them ‘our apex predator . . . the destroyer of worlds,’ and ‘the ultimate agent of historical change.’”
The Effects of Climate Change on Health

<table>
<thead>
<tr>
<th>Vector</th>
<th>Mosquito-borne diseases</th>
<th>Causative organism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aedes sp.</td>
<td>Chikungunya</td>
<td>Virus - CHIKV</td>
</tr>
<tr>
<td></td>
<td>Dengue</td>
<td>Virus - DENV</td>
</tr>
<tr>
<td></td>
<td>Rift Valley fever</td>
<td>Virus - phlebovirus (RVFV)</td>
</tr>
<tr>
<td></td>
<td>Yellow Fever</td>
<td>Virus - flavivirus (YFV)</td>
</tr>
<tr>
<td></td>
<td>Keystone virus-induced encephalitis</td>
<td>Virus - orthobunyavirus (KEYV)</td>
</tr>
<tr>
<td>Culex sp.</td>
<td>Japanese Encephalitis</td>
<td>Virus - flavivirus (JE virus)</td>
</tr>
<tr>
<td></td>
<td>West Nile fever</td>
<td>Virus - WNV</td>
</tr>
<tr>
<td>Anopheles sp</td>
<td>Malaria</td>
<td>Parasite - Plasmodium sp.</td>
</tr>
<tr>
<td>All three</td>
<td>Lymphatic filariasis</td>
<td>Parasites - Wuchereria sp., Brugia sp.</td>
</tr>
</tbody>
</table>
The Effects of Climate Change on Health

States and territories reporting dengue cases – United States, 2023 (as of August 2, 2023)

https://www.vaxbeforetravel.com/2023/08/03/540-dengue-cases-reported-us-cdc
Greenhouse Gases (GHG) in Healthcare

GHG Convention Defines “Scopes” of Emissions:

• **Scope 3 – The Stuff We Buy & Use**
  - Equipment, Supplies and Investments
    - If cost is lower or equal, why not buy lower CO₂ product?

• **Scope 2 – The Stuff We Burn (Facilities & Vehicles)**
  - Fuel (Power) for Buildings and Vehicles . . . And Water
    - Federally-Legislated Incentives to Recap Infrastructure

• **Scope 1 – The Stuff We Do**
  - Anesthetic Gasses & Propellant Inhalers
    - Reducing flow rate of fluorinated anesthetics saves $
    - Fluorinated hydrocarbons ~1,500-3,600 X more warming than CO₂

Scope 1: Propellant Inhalers

Metered Dose Inhalers

- Use hydrofluorocarbon aerosol propellants.
- Can generally use Dry Powder Inhalers instead
Scope 1: Anesthetic Gasses

Fluorinated Anesthetics (ASA Guidance)

- Providers should avoid... anesthetics with disproportionately high climate impacts, such as desflurane, isoflurane, and nitrous oxide.
  - Lowest possible fresh gas flow
  - Regional and/or i.v. anesthesia should be prioritized
  - Nitrous oxide is lost, pre-use, and released into the air though leaks in central piping systems
  - Portable canisters should be substituted and closed between uses to avoid continuous leaks.

Volatile fluorocarbons are estimated to cause 10% of total global warming

- Dr. Jodi Sherman, Yale University

Success Stories: Seattle Children’s “Project SPRUCE”

**SEATTLE CHILDREN’S**

**10x Reduction in OR Emission**

- $177,000 reduced spend per year
- 500,000 kg CO2 less per year
- Cuts CO2 footprint of entire hospital by 7%

**Emissions Decreasing Over Time by Clinician**

Scope 2: Fuel, Power & Water

Healthcare Facilities: Opportunity Space

- U.S. healthcare facilities comprise approximately 4 billion square feet or 5% of total commercial floorspace, accounting for about 10% of total commercial building energy consumption (EIA 2012).
  - Hospitals comprise about half of the healthcare facilities floorspace and nearly three-fourths of all energy consumed (EIA 2012).
  - Hospitals tend to have a high energy use intensity (EUI) compared to other building types, nearly three times the average commercial building (Della Barba 2014) . . . with heating, cooling, and ventilation (HVAC) comprising 52% of their energy use (Taylor and Arch 2016)

https://www.energy.gov/femp/articles/integrating-health-and-energy-efficiency-healthcare-facilities#:~:text=Hospitals%20tend%20to%20have%20a,building%20(Della%20Barba%202014).
Advocate Aurora Health set a 100% renewable electricity goal by 2030 across their health system. This goal builds on their extraordinary energy efficiency work throughout the health system, including a weather-normalized 23% energy utilization index reduction in their Illinois hospitals from 2008-2016, and ENERGY STAR certification for nine of their hospitals to date.

Ascension’s environmental stewardship program met the Department of Energy’s Better Buildings Challenge goal of 20% energy reduction by 2020 across its acute care hospital portfolio. From 2008 through 2016, Ascension reduced energy usage by 29.8%, saved $64.9 million in cost avoidance, and reduced over 1.5 million tons of carbon dioxide emission across 141 health care facilities. Ascension also deployed a data dashboard to report facility operations (energy, water, temperature, humidity, and air change) on a real-time basis.

From 2005 to 2015, Gundersen Health System became 96% more energy-efficient and installed every form of renewable energy – solar, wind, geothermal, biomass, landfill gas, anaerobic digestion – supporting community health and growing the local economy. Gundersen first achieved energy independence in October 2014. The health system saves $3 million annually from energy efficiency improvements. In 2019, Gundersen expanded its energy portfolio by installing a battery and microgrid at a new clinic.

In 2017, Rochester Regional Health became the first health system to publicly announce a 100% renewable electricity goal by 2025. They have built a 500-kW solar array at their system headquarters, completed building a 5.5 MW solar farm, and have invested heavily in being an anchor for community solar systems, allowing the community members they serve to receive local renewable power and save money on their electric costs.

https://climatecouncil.noharm.org

Shane Dunne
Assoc Dir, Sustainability

Success Stories: Climate Action Council Partners & Memorial Sloan Kettering

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Memorial Sloan Kettering

Memorial Sloan Kettering’s sustainability strategy is to reduce operational energy consumption and capital allocation that increase associated costs, GHG emissions, and cost. To improve building resiliency through reduced energy dependence. MSK has committed to a 50% carbon reduction goal from energy-use intensity by 2025, in alignment with the NYC Carbon Challenge.

After almost two decades of investing in energy-efficiency projects, MSK has seen a substantial avoidance of energy usage and costs, thanks to the leadership of the Plant Operations department. Examples of energy conservation measures at MSK locations include but are not limited to LED lighting retrofits, setback and control modifications, upgraded pumps, energy-efficient 80°F freezers, and computer shutdown and energy management programs. MSK has recently converted Memorial Hospital, the Mortimer B. Zuckerman Research Center, and the Rockefeller Research Laboratories from steam to hot water and built a combined heat and power (CHP) generation plant, yielding the largest reduction in energy from any single project to date.

MSK’s renewable portfolio includes the procurement of low-impact hydroelectric power and a 2.4 MW solar canopy system.

https://www.mskcc.org/sustainabilitymsk#:~:text=Examples%20of%20energy%20conservation%20measures,Memorial%20Hospital%20the%20Mortimer%20B.

Success Stories: Climate Action Council Partners & Memorial Sloan Kettering
Scope 3: What We Buy and Use

U.S. Hospital Average: ~ 18-24 lbs / bed / day

Standard waste composition in health facilities.

Maria Koijck: Humanizing the Magnitude of Waste

- Nurse
- Performance Artist
- Climate Activist
- Breast CA Patient
- ← One Surgery

https://whatartcando.org/?project=health-waste
Success Stories: Cleveland Clinic, UCLA, Inova...

Ronald Reagan UCLA Medical Center diverted 297 tons of waste from landfills over the last few years via one simple change: reusable isolation gowns instead of disposable. Cost savings to date is $1.1 million, and the reusable versions are more comfortable and safe.

Inova Fairfax Hospital saved nearly $200,000 in annual waste disposal fees through better segregation of waste and a concerted effort to educate and engage staff.

Cleveland Clinic saved more than $4 million in 2017 through Practice Greenhealth’s Greening the OR strategies. Small hospitals can benefit too, saving hundreds of thousands of dollars through similar programs.

https://practicegreenhealth.org/topics/waste/waste
Scope 3 (Buy & Use): Improving our Carbon Diet

Nutrition Facts
8 servings per container
Serving size 2/3 cup (55g)

<table>
<thead>
<tr>
<th>Amount per serving</th>
<th>Calories 230</th>
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<tbody>
<tr>
<td>% Daily Value*</td>
<td></td>
</tr>
<tr>
<td>Total Fat</td>
<td>8g 10%</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>1g 5%</td>
</tr>
<tr>
<td>Trans Fat</td>
<td>0g</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>0mg 0%</td>
</tr>
<tr>
<td>Sodium</td>
<td>160mg 7%</td>
</tr>
<tr>
<td>Total Carbohydrate</td>
<td>37g 13%</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>4g 14%</td>
</tr>
<tr>
<td>Total Sugars</td>
<td>12g 20%</td>
</tr>
<tr>
<td>Includes 10g Added Sugars</td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td>3g</td>
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Vitamin D 2mcg 10%
Calcium 260mg 20%
Iron 8mg 45%
Potassium 240mg 6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.
Sustainable Health Care: Environmental Necessity

• The Joint Commission is the only accrediting organization leading environmental sustainability.
  • We signed White House / HHS Health Sector Pledge committing to:
    • 50% Reduction in CO₂ by 2030, net zero by 2050

• We convened two Technical Advisory Panels in 2022:
  1. Reviewed & Revised Joint Commission standards to make sure they do not inadvertently contribute to excess consumption.
  2. Generated proactive requirements to accelerate efforts in decarbonization.
Climate Change Feels More Real . . .
- Canadian Wildfires
- California 14’ Snow / Flooding
  - “Atmospheric River”
- 101° Florida Waters
  - Fish Kills & Coral Bleaching
- Maui Wildfires
- Vermont Floods
It’s a Workforce Issue (& Opportunity) . . .

• Younger workers (18-34) do not want to work for organizations without a credible sustainability plan
  • ~ 50% Workers 18-34 said they would not take a job with an organization without commitment to sustainability
  • Robert Half, Inc. 2022

• Rare that TJC is asked to ADD Standards . . .
  • Younger workers & clinicians are requesting !!!
Commonwealth Fund (January 2024): Majority of clinicians feel it’s important that the health system they work for plays a role in addressing climate change

Percentage of surveyed clinicians who “agreed” or “strongly agreed” with the following statement:

- It is important to me that my organization plays a role in addressing climate change / minimizing its impact on the environment. 79%
- It is important to me that I play a role in addressing climate change/minimizing impact on the environment at work. 75%
- It is important to me that I play a role in addressing climate change/minimizing impact on the environment at home or outside of work. 82%

Note: N = 1,001 U.S. clinicians employed at a hospital or health system. Data: Commonwealth Fund 2023 Climate and Health Care Workforce Survey.
Introducing Sustainable Health Care Certification

• Announced voluntary program on Sept. 18, 2023 to start Jan 1, 2024
• Four Components:
  1. Strategic Plan Approved Annually by Board
  2. Designated Leader(s) Responsible for Operational Plan
  3. Measure ≥3 (in MTCO$_2$e):
     ✓ Combustible fuel use ✓ Fleet vehicle fuel use
     ✓ Purchased energy ✓ Waste disposal
     ✓ Anesthetic gas use ✓ Metered dose inhaler use
  4. Reduce Footprint in 3 Measured Areas
     • Annual Analysis of Sustainability Measures Against Goals
     • Revise Approach if Goals Not Met
Unprecedented, Once-in-a-Lifetime Incentives

Cash Incentives & Tax Credits Under Inflation Reduction Act (IRA):

A. Tax Incentives and Direct Pay Provisions
   • Investment tax credit for energy property for projects beginning construction before Jan. 1, 2025
   • Energy efficient commercial building deductions
   • Credit for qualified commercial vehicles

B. Grants and Incentives for Greener Energy
   • Rural Energy for America Program (REAP)

C. Grants and Incentives for Climate Resilience
   • FEMA’s Hazard Mitigation Grant Program
Energy & Sustainability Program

OHA's Energy & Sustainability Program is a source of expertise to:
- Support hospitals with energy and sustainability decision-making;
- Connect Ohio hospital leaders in the energy and sustainability field;
- Offer educational events and resources;
- Advocate on behalf of hospitals; and
- Facilitate energy procurement.

NATIONAL RECOGNITION

The OHA Energy & Sustainability Program is proud to announce that we received the 2023 ENERGY STAR Partner of the Year for Sustained Excellence Award from the U.S. Environmental Protection Agency and the U.S. Department of Energy. OHA was recognized with the same honor in 2022 and 2021. Previously, the program was selected for the ENERGY STAR Partner of the Year award for Energy Efficiency Program Delivery in 2016, 2019 and 2020.

MEMBERS SEE BENEFIT!

In 2022, participating member hospitals achieved $11.9 million in utility cost savings from OHA Energy & Sustainability Program Benchmarking, energy efficiency support and technical assistance.

OHA MEMBER RESOURCES
- Sustainability in Scrubs Monthly Newsletter
- Environmental Leadership Council
- ENERGY STAR Benchmarking and Certification
- Awards Program
- Education Events
- Case Studies and Toolkits
- Legislative Advocacy

ENERGY STAR CERTIFIED HOSPITALS

Ohio continues to lead the nation with 19 ENERGY STAR certified hospitals seen on this map.

INTERESTED IN LEARNING MORE?

To sign up for our monthly Sustainability in Scrubs Newsletter, and learn about what resources are out there and the great things OHA members are doing in the energy and sustainability realm, click here.

For more information on participating in OHA’s Environmental Leadership Council, please contact Kevin Zacharysz.
### Support: TJC Sustainable Healthcare Resource Center

|-------------------------------------|---------------------------------------------|------------------------------------------------------------------|
Summary: So, What’s Your Why for Sustainable Healthcare?
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For Today and Tomorrow !!!
First Do No Harm: The Unintended Consequence of Contemporary Healthcare

Thank You – Discussion / Q & A

Health Systems Resilience
New York Academy of Medicine
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