

Health Care Ventilation: A Problem / Solutions Statement, and the Need for New Data

V 2.0, 12/5/16

English, Lipke, Mian, Salabasheva¹



Q1: PROBLEM STATEMENT

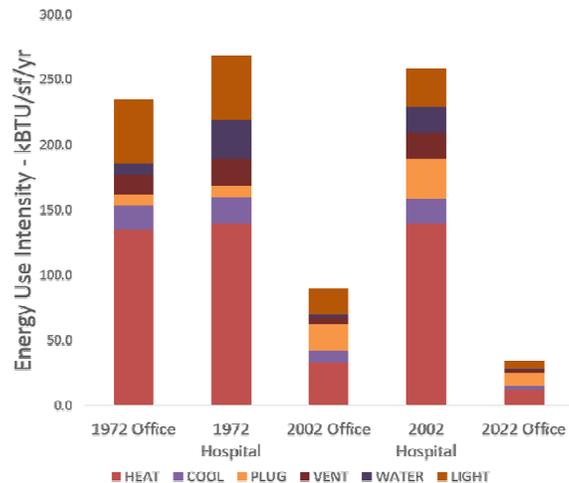
Ventilation standards change could potentially save \$2 – \$3.5 billion/year in annual energy costs, reduce health care sector carbon emissions by 8.5 to 14 million MTCO₂e, maintain infection prevention, patient and staff comfort, and improve facility and community air quality. Standards reform can be controversial. Kaiser Permanente, some members of Health Care Without Harm's Climate Council, architecture and engineering firms, and others are interested in alternative compliance paths (ACP). Alternative methods could be based on indoor air quality (IAQ), rather than the current air changes per hour (ACH).

BACKGROUND/MEASURE: What strategic area of focus does this impact, & how? What does the data tell us?

The relevant strategic areas of focus to maintain and enhance patient health/staff well-being, include:

1. Energy and facility budgets
2. Environmental health, climate change, community health improvement
3. Capital planning and budgets
4. Resilience of healthcare facilities due to increasing/unnecessary demand for natural resources

Health care energy has been largely unaffected by developments in other US energy codes and practices in the last 40 years. While commercial buildings have seen a 60%+ reduction in energy intensity, hospital buildings have not. Under the ACH paradigm, many health care spaces are over-ventilated much of the time, causing excess heating and cooling energy use.



The benefits of reform would accrue to health systems building new facilities, or undergoing major renovations of HVAC systems. Many existing facilities with VAV/reheat systems could benefit more immediately, by undertaking rebalance and controls re-programming projects. The opportunities vary by regulatory environment, geographic/climate regions, and by types of facilities.

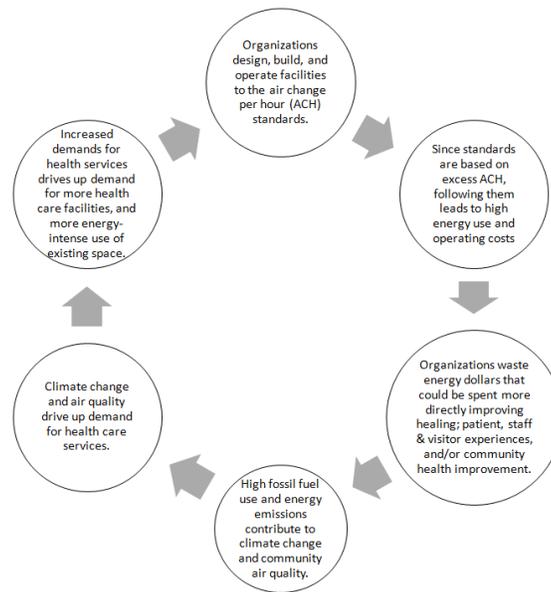
Regulatory Overview

ASHRAE and the Facility Guidelines Institute (FGI) issue and maintain relevant standards, which have lengthy review processes. States, regulatory bodies and governmental agencies adopt the standards, in whole or part, and sometimes with variations.

¹ Travis English, Chief Design Engineer/Director of Engineering, KP; Paul Lipke, Senior Advisor for Energy & Buildings, Health Care Without Harm; Iqbal Mian, Member Engagement Manager, Practice Greenhealth; Maya Salabasheva, Principal Mechanical Engineer, KP

Q2 CURRENT CONDITION - Visually display the current flow. How does this impact our patients?

The current condition is a self-reinforcing feedback loop, depicted below.



Q3 TARGET CONDITION/COUNTERMEASURES - How will this impact patients? The bigger picture?

Hospitals need legal and legitimate options to pursue alternative ventilation methodologies (AVM) in their facilities. Pilot programs should be developed for implementation. Standards and codes could be modified to allow, encourage, or include AVMs. AVMs and ventilation reform could improve reduce energy use, save energy costs, improve community health, mitigate climate change, and increase funds for patient care.

Reforming ventilation would mean adopting new indoor air quality and thermal comfort practices. Adopting those practices would also improve hospitals' ability to benchmark, measure, and validate comfort, safety, and hygiene. Standards organizations insist new and more conclusive data is needed to justify any changes.

PROBLEM ANALYSIS : 6 Whys -- What is/are the root cause(s)? What in the current condition is not ideal?

See above history and data. There is resistance towards reform due to the following:

1. State and federal regulators and inspection officials recognize the legitimacy of the FGI and ASHRAE standards, and the groups who author them. The regulatory environment is often complex, and interwoven, with turf/boundaries, and long adoption periods.
2. FGI and ASHRAE legitimately share our concerns for patient, staff, and visitor safety. These are compounded by and sometimes founded in a persistent perception higher ventilation rates are better for infection prevention.
3. There is concern for the amount of work creation of such AVMs and AVPs could entail. The issues are seen as so complex that even 'simple' changes can, as one participant put it, "take significant time and resources to research and get adopted."
4. There is not good data on the impacts of potential reform. The FGI and ASHRAE groups have not traditionally prioritized energy performance. Until US demonstration projects have been undertaken, the benefits may not be well understood.
5. Facility staff, HVAC engineers, and A&E firms perceive deviation from current standards as a potential liability/risk exposure if there turn out to be IAQ, thermal comfort, infection prevention and/or control problems.

POTENTIAL COUNTERMEASURES: What needs to be started, stopped, or maintained to reach target condition?

As a result of new information, we find ourselves in a data collection "feasibility assessment" stage.

- 1. Stakeholder research for AVM pilots / proposals:** Can we catalyze local/jurisdictional AVM proposals, similar to KP's Oregon and California pilot sites, that begin to develop a significant basis of proven, safe exceptions?
 - a. What states, jurisdictions, or regulatory bodies are most likely to be amenable to AVM pilot proposals? Which owners (HCWH's Health Care Climate Council members, other hospitals, utilities, etc.) would be in a position to both advocate AVM proposals, and benefit from them?
 - b. Identify pilot sites willing to assemble indoor air quality metrics and data, following industrial hygiene and industry protocols, to assure safety while reducing energy. Pilots would look at eligible (non-critical) spaces in at least one hospital each, located in the six key climate regions of the US: i.e. Chicago (Climate Zone 5A), New York (4A), Seattle (4C), Los Angeles (3C), Houston (2A), and Phoenix (2B) or their equivalents.
 - c. What new data might be collected by volunteering health systems that might address concerns of standards organizations, infection prevention, clinicians, etc. about the health risks and benefits of updating the standards or creating formal AVPs?
 - d. What precedents or processes exist, such as the FDA's "Investigational Design Process" that could be adapted to this situation?
 - e. What are the "areas of truth" within the stakeholder community that could allow us to reduce ACH safely and efficiently? A logic example can be drawn from airline checklists; you don't start reform by simply removing items from the checklist until planes start crashing.
- 2. Near term measures**
 - a. Enlist potential pilot sites. Create a template outlining the hospital IAQ monitoring, energy data collection, and AVM pilot opportunities in eligible (non-critical) spaces..
 - b. Create a network of like minded health system facility managers, senior leaders, clinicians, infection prevention, architecture and engineering firms, utility energy efficiency programs, etc.
- 3. Schematic Project Timeline:**
 - a. By end of Q3 2017, establish protocols and recruit initial pilots. By early Q4 2018: data collected for pilots' relevant seasons/climates. Begin analysis and sharing results by Q4, 2018.
 - b. Establish ongoing communication forum for partnering on advocacy.

Interested stakeholders can also:

1. Educate internal stakeholders to raise awareness and address concerns, define the potential benefits to your particular facilities, health system or even region(s)
2. Attend and/or contribute to educational and strategy webinars and bi-monthly conference calls
3. Support and Advocacy: Sign petitions of support and/or engage in coordinated letter writing to standards organizations.
4. Participate in data collection via survey(s).

For more documents, background, updates and coming events:

- KP's document archive: <https://sites.google.com/site/travisenglish/>
- HCWH's web page on Ventilation Standards: www.noharm.org/improvingventilation

For questions or to get on the circulation list, contact [Paul Lipke](#), Senior Advisor Energy and Building, Health Care Without Harm, 413-367-2878