On the Value of Environmental Stewardship and Sustainability in Health Administration Education

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Abstract

Global warming, the depletion of the world's natural resources, and excessive consumer consumption in developed countries are determinants reshaping the way we live our everyday lives. These factors are rapidly giving rise to new ecological paradigms of environmental stewardship and in healthcare environments that express sustainable theories and practices. This has given rise to a systematic system for promoting and assessing the energy performance and efficiency of healthcare facilities known as Leadership in Energy Efficient Environmental Design (LEED), and a parallel certification program, the Green Guide for Heath Care. These developments are examined in direct relation to the functions of managerial ethics. A series of ten sustainability-based ethical dilemmas are presented. Each is examined in relation to the need to inculcate in future healthcare administrators a critical understanding and appreciation of the need to reposition contemporary healthcare organizations at the center—as leading civic participants and role models in relation to the emerging movement towards carbon neutrality in the healthcare industry.

Introduction

Global change is occurring rapidly. This is evidenced in our everyday lives, in our shared conversations over concern for the environment, and the rising cost of our own excessive consumption. The 21st century confronts the

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healthcare administrator with a different landscape than that of his or her elders. The challenges of coping in a world of diminished natural resources will be daunting (Carson, 1962; Orr, 2004). We have left forever the world of economic growth based on cheap foreign fossil fuel. Carbon dioxide emissions are reaching crisis levels in many parts of the world and the thermal atmosphere has become degraded (Leggett, 2001). Global climate change and climatic destabilization is beginning to exert a profound effect on water quality and the rising levels of the world's oceans, the threatened extinction of living species, mean temperature increases, and dramatic shifts in weather patterns (Weart, 2004; Kolbert, 2006). Healthcare administrators in the immediate future will need to be equipped to confront and cope with an altogether different prospect, that of ever more expensive and scarce energy, rapidly growing populations consuming ever more of the world's resources, the unprecedented pollution of the planet, and the need to strive for carbon neutral healthcare facilities. These factors will exacerbate already strained political and social tensions, which will result inevitably in acts of terrorism and war over oil, water, food, and our very survival, with the built environment at center stage (Verderber, 2003; 2006). Carbon neutrality is centered on the global movement to eradicate carbon dioxide emissions, or what is referred to in the critical context of the following discussion as a healthcare organization's "carbon footprint".

Health and the built environment have been interwoven phenomena since the dawn of the earliest human settlements. It is a symbiotic relationship whereby the physical well being of humans and their communities is intimately linked with the support provided by the physical environment (Nightingale, 1859; Frumkin, 2001). It is a transactional relationship—humans impact the built realm, and vice versa, and this relationship is timeless and enduring (Verderber & Fine, 2000). In 2005, $23.7 billion was spent on the construction and renovation of healthcare facilities in the United States alone (Cauchon & Appleby, 2006). Expenditures in this sector of the U.S. construction industry are soaring in the early years of the 21st century. It is a sector where rapid change is a constant, and the growth of capital investment in healthcare shows no sign of diminishing in the immediate future. Existing organizations seek to replace and upgrade their campus physical infrastructures, and new organizations appear on the scene. The latter trend is most pronounced in areas of the country with sizeable populations over the age of 65, and in expanding Sunbelt communities.

While the level of annual healthcare construction activity in the U.S. remains substantial, it pales in comparison to global spending on healthcare facilities. The world's 6.1 billion population increases by nearly 9,000 persons

each hour. It is predicted that by 2030 the world's population will soar to 8.5 billion persons (Rose, 2006). With this said, knowledge of the functions of architecture and the built realm in relation to health facility planning, site selection, design, assessment, and management can be of tremendous benefit to the health administrator (Hemmes, 1992; Verderber, 2002).

On a global scale, deleterious consequences have registered with a growing segment of the general public: unsustainable development, and buildings which consume excessive amounts of energy—including hospitals and allied healthcare building types—are contributors to the aforementioned problems. In 1992 the Union of Concerned Scientists issued its "Warning to Humanity," outlining the case for stewardship as essential to survival (Union of Concerned Scientists, 1992). The United Nations has called for a halt to the continued degradation of the natural environment, asserting that healthy individuals and communities cannot exist on a sick planet (United Nations, 2004).

It is becoming increasingly difficult to dismiss the calls of environmental advocates—including carbon neutralists—for green healthcare facilities. The concern for facility stewardship has grown into a movement now referred to as "sustainable healthcare architecture" (Guenther & Vittori, 2008). More specifically, environmental stewardship goals and economic goals need not be incompatible with one another. Administrators, nonetheless, may be tempted to defer a decision to invest in energy efficient facilities on the grounds that the "front end" costs of a "green" facility are too high in relation to more traditional approaches. This may especially be the case when this cost is weighed directly against staff recruitment and retention expenses, or investment in new diagnostic and treatment equipment. These pressures of course are real and pervasive within the industry. However, many far less pervasive measures can be taken to significantly reduce energy costs, including retrofits of fluorescent ballasts in lighting fixtures, new training initiatives in facility maintenance, the use of landscaping to reduce excessive sunlight penetration into the facility, paperless medical records (thereby reducing physical storage space), bike racks, and the use of recycled building materials in renovation projects, to name but a few.

The planning and design of a healthcare facility is a complex, time consuming, expensive, even at times contradictory proposition (Becker, 1983; Haggard & Hosking, 1999). Properly conceived initiatives with energy conservation at the heart will need to become common practice if the healthcare industry is to continue to assume its role as a stabilizing influence in contemporary society. By extension, healthcare architecture can positively influence the quality of life and strengthens our communities.

However, healthcare institutions have to date by no means been in the vanguard of the movement toward green architecture. Many hospitals and related healthcare institutions, as mentioned, have resisted change largely on the grounds that it is too expensive to invest in energy efficient facilities. In fact, a growing number of environmental advocacy groups, even within the realm of healthcare, have insisted that mainstream healthcare organizations continue to be recalcitrant "players" in the burgeoning green movement. One such organization, Health Care Without Harm, founded in 2001, has grown into a global coalition of 443 organizations in 52 countries working to protect health by reducing pollution in the healthcare industry (Health Care Without Harm, 2008). The typical scenario encountered by the healthcare executive is aptly stated in the following passage:

> "At many healthcare organizations, it is difficult for administrators to think about undertaking green building when the cafeteria still uses Styrofoam cups. Hospital leaders recognize that pursuing sustainable building requires operational initiatives to support it. At the same time, a major building program represents a chance to shift the organizational culture in support of sustainable design and operations objectives. Just as design is actualized during construction, both design and construction create operational realities…Within a single generation of healthcare operations, massive amounts of disposable products replaced reusable ones as the economy of cheap waster disposal was weighed against the labor associated with processing for reuse…hospitals are awash in throwaway supplies…as syringes washed up on beaches, regulations surrounding medical waste increased, and with them, (so did) the cost of compliant disposal (Guenther and Vittori, 2008, p. 155)."

Hospitals justified the rapidly escalating cost of waste disposal as a cost of doing business. However, most organizations did not adopt a proactive stance in stemming the massive flow of disposable consumption. In 1998 a voluntary memorandum of understanding between the American Hospital Association (AHA) and the federal Environmental Protection Agency (EPA) set in motion a series of pollution prevention initiatives (EPA & AHA, 1998). That same year Hospitals for a Healthy Environment (H2E), a nonprofit organization, was formed, in Guenther and Vittori's (2008) words, to "transform the environmental footprint of healthcare operations." Its effort to reduce solid waste and divert the incinerated waste stream has yielded significant results. The number of medical waste incinerators in North American dropped from more than 6,200 in 1996 to fewer than 100 by 2005. In 2001, with assistance from Healthcare Without Harm, a program

was established that, by 2005, reported that 97.3% of participating hospitals were actively engaged in eliminating mercury-containing medical devices (H2E, 2005).

Stewardship of the environment is widely viewed as a defining principle of sustainable healthcare architecture (Guy & Moore, 2007). Architects, facility planners, and their clients are being compelled to reconsider past practices in an effort to produce healthier healthcare environments that consume significantly less energy. A new ecology of mind is at the core of this emerging movement (McKibben, 1989), a movement that has provided a new perspective of the healthcare industry in the U.S. and other developed nations (Hawken, 1993; Hawkin, Lovins, & Lovins, 2000). The parallel ideologies of "clean" production and a cradle to cradle paradigm are having a significant impact, with new biodegradable and non-toxic materials appearing in the marketplace for application in healthcare settings, among other building types (McDonough & Braungart, 2002).

In the field becoming known as "biomimickry", in the future science will look to nature for inspiration, with nanotechnology but one area directly benefiting from this analogical perspective (Benyus, 1997). These developments hold much promise to exert a direct impact on human health, stewardship, and sustainability. Therefore, the range of potential energy saving measures is vast. Energy conservation measures with a direct impact on healthcare facilities can span from hazardous waste storage and disposal, to medical records, lighting systems, landscaping improvements, efforts to promote cycling to and from work, recycled materials and equipment in renovation projects, to the construction of an entirely new medical center campus.

A New Paradigm: Leadership in Energy Efficient Environmental Design (LEED)

During the 1990s a coordinated rating system was developed for the systematic appraisal of the energy performance of buildings. A variety of pubic and private sector programs coalesced in 1998 with the advent of the United States Green Building Council's (USGBC) Leadership though Energy Efficiency in Environmental Design (LEED) program. The USGBC, founded in Chicago in 1993, launched this effort. It began with identification of best practices in the realm of green building design, facility planning, assembly technologies, policies, and regulatory standards. The LEED rating system is now a well-established organization based in Washington, D.C. It administers its programs through a three tier rating, or certification, system—the three levels of recognition consist of silver, gold and platinum certification. Each tier reflects attainment of a minimum number of "points" conferred for

specific site planning, design, technology, commissioning, and operational factors, involving a combination of pre and post occupancy conditions. This point-based metric tool is essentially a third party verification system to ascertain that the building or campus in question promotes the virtues of environmental stewardship and energy conservation.

In 2001 the USGBC launched a program to test and accredit professionals specializing in this quickly expanding area of professional practice. By 2006 more than 30,000 professionals had attained LEED approved registration (Guenther & Vittori, 2008). The LEED program has proven to be highly successful. Many cities, suburbs, government organizations and private sector organizations in the U.S. have issued mandates that all their buildings must be LEED certified at least at the silver level. LEED certified and candidate projects are listed on its website by state and by building type. By mid 2008 more than 14,000 projects either had received or are in the process of qualifying for certification, representing all fifty states, totaling 1.062 billion square feet of construction activity (USGBC, 2008).

Despite this flurry of interest and activity, the realm of healthcare lagged far behind, overall. The first LEED accredited inpatient hospital in the U.S. was the Boulder Community Hospital Foothills Campus, in Colorado (2005). The first LEED ambulatory care clinic was the Discovery Health Center, in Harris, New York (2006). The Green Guide for Health Care, a parallel program to LEED, was launched in 2003. By mid 2008 more than 200 healthcare facility projects were candidates for certification. The Green Guide, recognizing that the healthcare industry in still in its infancy with regards to environmental sustainability developed a self-certification metric slightly different from the LEED point system. This parallel set of criteria at once embraced, reinforced, and validated a culture of internal assessment, monitoring, and continuous improvement. This guide, as mentioned, parallels the more formal LEED protocol and itself is rapidly fostering widespread awareness and respect within the healthcare industry (USGBC, 2008).

The LEED for Health Care Mission Statement:

> "LEED for Health Care supports sustainable planning, design, and construction of healthcare facilities by adapting the U.S. Green Building Council's LEED to respond to the unique set of opportunities and challenges presented by the healthcare sector. By affirming healthcare's fundamental mission of 'first, do no harm,' LEED for Health Care recognizes the profound impact of the built environment on the health of occupants, local communities, and global ecology and encourages design strategies that enhance the healing

environment for patients, healthy and productive work environments for staff, and responsible ecological stewardship (LEED for Health Care Core Committee, 2004)."

The Green Guide is a web based open source document, and has been continuously refined since its initial release. Two years following the release of Pilot Version 2.0, Green Guide registrants totaled more than 11,000, representing all fifty states, 600 from Canada and 900 from eighty-three other countries (Guenther & Vittori, 2008). The pilot projects represented over 30 million square feet of construction activity. The Guide has made it possible for a cross-section of leading healthcare institutions and their executives to collaborate in an active refinement process for a much-needed new metric tool. Meanwhile, in 2007 only 2% of all LEED registered facility projects represented healthcare organizations (a scant 13 out of more than seven hundred LEED certified buildings overall, and only four of the 13 were acute care hospitals).

The Green Guide was wise to align itself early with LEED. Nearly ten years after the start of LEED, interest across the healthcare industry, and among healthcare executives and allied administrators, is growing rapidly. LEED and the Green Guide programs encompass best practices, i.e., the topics of site selection, groundwater quality, energy and atmospheric factors, materials, construction methods, and overall environmental quality. Facility scenarios consist of additions to existing facilities, part renovation-part new construction projects, renovations to existing facilities, and new construction. It is hoped that the momentum established by LEED and the closely allied Green Guide to LEED certification will also build appreciation of its goals, within academia. Health administration education programs are in an ideal position to inculcate in their students awareness and respect for, and skill sets in, LEED and its associated theory and practice dimensions. These dimensions include the covariance of ethics, stewardship, and sustainability (Pierce & Jameton, 2003). At the core is the need to develop measuring standards for defining high performance healing environments from this new perspective. Similarly important is the need to develop new courses and curricula—perhaps at the accelerated executive MHA program level—in a new and rapidly expanding area of knowledge for the discipline of health administration education.

Managerial Ethics, Environmental Stewardship, and Health

Managerial ethics, the stewardship of the built environment, and their intersection with healthcare delivery systems are topics of increasing importance.

Ethical concerns in the discipline of architecture have centered on professional decision-making and conduct (Blau, 1984; Schon, 1983; Wasserman, et al, 2000). Similarly, in health administration education, parallel issues of decision-making and conduct are explored through a variety of methods. In Verderber (2002) it was noted that Verespej (1990) and Stewart (1996) addressed these concerns in relation to group dynamics in management curricula, and Gac, Boerstler, and Ruhnka (1998) examined these concerns in relation to the Socratic method used in legal education in the promotion of critical thinking and analysis. Such techniques provide the student with a critical "road map" to carry with him or her into the profession.

Table 1 presents a set of ten ethical dilemmas associated with the twin issues of environmental stewardship and the movement toward sustainable healthcare facilities. These ten dilemmas are: Energy Cost Policy Shift, Conflicted Decision Maker, Recycling Finite Resources, Former Hazardous Waste Site, Staffing Versus Sustainability, Unrealized Energy Cost Savings, Healthcare Provider as Alleged Polluter, Sustainability versus Institutional Survival, Unauthorized Resource Consumption, and Unintended Consequences of Green Policies.

These dilemmas are hypothetical scenarios. Each demonstrates the use of a structured dialogue grounded in a set of hypotheticals. In each, pre-existing assumptions are presented, tested, and confronted. Multiple perspectives and various ambiguities are embedded within each scenario and across the collective set of ten scenarios. Opposing viewpoints are illuminated, and this makes it possible in the classroom setting to coherently debate the merits of various response strategies. Multiple disciplinary perspectives are embedded as well. As mentioned in Verderber (2002) it is a method proven useful as a means to confront biases and underlying myths. It directly applies the methodology used by Gac, et al. (1998). The outcomes of error, misunderstanding, and lack of technical information can be pinpointed and clarified through group discussion. Above all, the future reflective practitioner is able to see immediate and broader, longer term consequences of his or her actions and decisions. It is a process whereby mutual respect and professionalism are at the heart of a process of ascertaining the most effective—prudent—course(s) of action. Alternatives can be examined with equal veracity. Taken collectively, these dilemmas express a subset of the myriad issues and challenges confronted daily by health administrators in an area of growing importance.

Key managerial ethics principles embedded in Dilemmas 1-10 (D1-D10) include the following:

- Contract negotiations with architects, engineers, and allied profes-

sionals (D1, D2, D3, D6, D7, D10).
- Interactions and communications with an organization's Board of Directors (D1, D2, D3, D4, D6, D10).
- Adroit decision making in pressured situations with multiple, conflicting constituencies (D3, D4, D5, D10).
- Knowledge of national and international trends in sustainable healthcare architecture (D1, D6, D8, D9, D10).
- Familiarity with the field of historic preservation, local preservation organizations, and community activists (D2, D3, D4, D8).
- Knowledge of federal, state and local regulations with respect to land procurement (D3, D4, D5, D10).
- Familiarity with facility life cycle cost analysis, tendencies, trade offs, and associated intangible factors (D5, D8, D9, D10).
- Legal implications of unprofessional and/or unethical conduct in capital improvement projects (D1, D6, D7, D8, D9, D10).
- Intra-organizational conflicts in values, behavior, culture, and human relations (D6, D7, D9, D10).
- Awareness of the complex, often contradictory parameters of capital improvement projects and the consequences of inexperience in this arena (D4, D6, D8, D9).
- The consequences of poor civic leadership lack of long range visioning skill sets, and ineffective or unethical public relations (D2, D7, D9, D10).

PLAUS IBLE COURSES OF ACTION

Energy Cost Policy Shift

A first step might be to contact the project architect and bring in a LEED specialist to see where the project currently stands in meeting the new mandate. After the initial assessment, it would be possible to extrapolate what steps should be taken through to the end of construction to meet the mandate of reducing energy costs by 30% annually. Third, assess the recommendation and weigh whether or not the change order would financially make sense. If the annual savings would not cover the cost of changing the design, then steps would have to be taken to prove this point to the Board.

Conflicted Decision Maker

The CEO may wish to argue for the suburban site in this particular situation for a number of reasons. The new campus would reduce emissions caused by caregivers and staff who commute into city. The new facility, built to LEED specifications and presumably designed on principles of

Table 1.

Managerial Ethics, Environmental Stewardship, and Sustainability—Twelve Dilemmas

Legal/ Ethical Area	Architecture/ Facility Issue	Possible Questions and Hypotheticals
1) Energy Cost Policy Shift	**1)** A medical center's Board of Directors authorized its CEO to commission the design and construction of a new 120-bed addition. Then, during construction, the Board mandated to the CEO that the new addition reduce its projected energy costs by 30% annually, although the addition was planned and designed in a manner that did not take this new criterion into consideration.	1) Is the board authorized to impose this type of mandate at such a relatively late stage in the construction process? 2) Is it ethical for the Board to place this much performance pressure on the CEO? 3) Would a change order (a directive that incurs an additional cost to the client) alleviate this dilemma, i.e., authorization to modify the design of the building-in-progress to accommodate the Board's mandate? 4) Would it be prudent and cost effective to consult with a LEED certified specialist at this stage in the construction project? 5) What is the role of the Architectural/Engineering (A/E) firm currently in charge? Does the firm commissioned at the outset voluntarily relinquish its role, renegotiate the terms of its current contract, or can the client simply fire the architect at any stage, if even during construction?
2) Conflicted Decision Maker	**1)** A medical center in an older inner urban neighborhood seeks to relocate to the suburban fringe, where land costs are affordable and rapid population growth in occurring. The president of the local chapter of the Urban Land Institute, who so happens to be the President of the Medical Center Board of Directors, rejects this scenario due to the deleterious environmental and human consequences of suburban sprawl.	1) Where will the patient constituencies who will be left behind in the inner urban neighborhood receive their healthcare? 2) Is it ethical for the institution to abandon its neighborhood of origin and traditional base of operations? 3) What role could the city have in assembling a package of incentives to have the institution remain in its current location, such as a Tax Increment Financing (TIF) District? 4. What are the trades offs, from a community health status standpoint, pro and con, of a suburban versus urban location? Is the potential greater for more positive health outcomes for a larger population base in the suburban setting? 5. Would staff, patients, and visitors generate a higher level of carbon emissions by commuting to the urban location, or the proposed suburban site?

Table 1 (cont'd).

Managerial Ethics, Environmental Stewardship, and Sustainability—Ten Dilemmas

Legal/ Ethical Area	Architecture/ Facility Issue	Possible Questions and Hypotheticals
3) Recycling Finite Resources	1) A Hospital is located in a coastal US city recently struck by a devastating hurricane. The hospital is listed on the National Register of Historic Places. The administration has elected to demolish the historic structure despite the protests of local preservationists, who argue that no alternate uses were seriously explored, and the shuttered hospital repair would consume 20% less energy and resource compared to building a replacement facility.	1) Which agency issues the legal authority to demolish—is it the preservation organization, city council, or another agency? 2) Does the building in question have asbestos or a similar condition, potentially rendering it cost-prohibitive to retain and adapt to a non-patient care use? 3) In a neighborhood recovering from a major disaster, has the surrounding area repopulated sufficiently to warrant the building's retention? 4. What is the interventional function of the city to require the institution to explore viable alternative uses for the building in question in light of "green" building polices recently enacted by the city and the healthcare organization itself.
4) Former Hazardous Waste Site	1) A 74-acre tract near the center of an historic American city has been approved as the site for a new 400-bed replacement hospital for on state supported academic health sciences center and medical school. However, an investigative article and the local daily newspaper reported this to be the site of a former chemical plant in the early 20th century. Regardless, the board reaffirms its commitment to proceed with the initiative as planned.	1) Is it appropriate for a government agency to have this degree of jurisdictional and land use authority? 2) Has the institution's Board and administration seriously weighed the advantages and disadvantages of alternate sites in the general vicinity of the proposed site? This would likely entail a due diligence protocol which embraces the health concerns raised. 3) If a due diligence protocol is adopted, do alternate sites afford the same degree of access for staff and patients as the site tentatively chosen? 4) If the project proceeds as initially planned, what remediation measures will be taken to mitigate potential unhealthful consequences of the project?

Table 1. (cont'd)

Managerial Ethics, Environmental Stewardship, and Sustainability—Ten Dilemmas

Legal/ Ethical Area	Architecture/ Facility Issue	Possible Questions and Hypotheticals
5) Staffing versus Sustainability	1) The administration of a suburban 400-bed acute care medical center is planning for the construction of a new, 250-bed pediatric hospital on its campus as a means to better serve its growing community. The immediate neighborhood is strongly advocating a carbon neutral strategy, with the new hospital as a LEED Platinum rated case study. However, the Board has not provided funds to attain this goal, asserting, alternatively, that any such funds be earmarked for staff recruitment.	1) Would the organization's attainment of LEED Certification enhance its public relations image within the community, regionally and/or nationally? 2) Would LEED certification result in increased patient referrals, a higher overall level of patient satisfaction, or improved health outcomes? 3) Would the provision of natural daylight, operable windows, full spectrum lighting, and an easily navigable building layout, aid in staff recruitment and retention? 4) Is the Board willing and able to raise the extra funds needed (approximately 2% in this example) to facilitate the attainment of LEED certification for the organization?
6) Unrealized Energy Cost Savings	1) An architectural firm recently won the commission to design a biomedical research laboratory on the campus of a prestigious Canadian university. The firm's proposal was chosen as the winner of an international design competition, on the basis of its high degree of energy efficiency. Upon construction, however, the client soon learned that the finished building's highly touted energy efficiency did not manifest. The architect claimed unforeseen difficulties had arisen during the design process.	1) Is this building adaptable, after its initial occupancy, i.e. ductwork, exhaust chases, large fixed items of equipment such as autoclaves, refrigeration units, sample testing areas, etc.? Is it feasible to attempt to retrofit this equipment? 2) Who should fund any additional or future retrofit measures needed to bring the facility into alignment with the clients' overall goals and intent? 3) Do any national or international minimum guidelines exist which define the concept of "energy efficiency" for this building type? 4) Would it be prudent to seek a second professional opinion from an expert on this subject? 5) If so, would this be a prudent expenditure given the implications for the energy costs expected to be incurred by this facility over the coming 10 to 20 years?

Table 1. (cont'd)

Managerial Ethics, Environmental Stewardship, and Sustainability—Ten Dilemmas

Legal/ Ethical Area	Architecture/ Facility Issue	Possible Questions and Hypotheticals
7) Healthcare Provider as Alleged Polluter	1) A community-based outpatient clinic claims to be a "green citizen" in the community, yet the local news media recently reported this to not be the case, as nearby residents have become increasingly ill in recent months. The residents, for their part, assert their declining health status is the direct result of toxic medical wastes that are being illegally/improperly incinerated on site. Regardless, the clinic's PR spokesperson denies the allegations.	1) Is it appropriate for neighborhood residents to call for the surgery center to relocate elsewhere, in a scenario not unlike a classic case of NIMBY (not in my backyard)? 2) Have deleterious health consequences been proven with any degree of certainty, based on empirical research, for instance? 3) What are the legal and regulatory roles of local, state and federal agencies in resolving this dispute? 4) Should this facility be held to a higher level of environmental accountability compared to other commercial activities in the neighborhood?
8) Sustainability versus Institutional Survival	1) An inner city hospital is located in a declining neighborhood where a high percentage of residents lack health insurance. This institution reported a loss of $18 million in revenue last year. The administration claims it absolutely cannot adopt "green" or environmentally sustainable facility management policies, for fear of closure due to the high percentage of uninsured patients it administers care to in its emergency department.	1) Would it be feasible to assume that a greater number of patients with health insurance would receive their care at the hospital if it were to adopt "green" facility management policies? 2) Do current local or state regulations require long-established, even historic, healthcare institutions to adopt "green" principles and practices as a means to reduce their carbon footprint within the urban setting? 3) Would it be feasible to build a freestanding outpatient clinic that is LEED certified somewhere else on the campus, if this allows the core existing facility to be "grandfathered," and therefore not have to comply with mandated energy saving measures? 4) What are the public relations implications if the hospital maintains its non-green policies?

Table 1. (cont'd)

Managerial Ethics, Environmental Stewardship, and Sustainability—Ten Dilemmas

Legal/ Ethical Area	Architecture/ Facility Issue	Possible Questions and Hypotheticals
9) Unauthorized Resource Consumption	1) A suburban wellness center and therapeutic spa promotes itself, through its PR efforts, printed materials, and Internet site, as a "green" member of the local civic community. However, it is discovered that the facility's energy cost savings have come at the expense of the immediate neighborhood. The facility was illegally drawing power off the local residential power grid for the past 4 years, resulting in higher energy bills for the surrounding neighborhoods.	1) From the standpoint of ethical responsibility, is it appropriate to expect the offending institution to provide energy rebates to the local community as a means to atone for its past transgressions? 2) Would it be prudent, from a public relations standpoint, for the facility to offer free one year memberships to those persons and businesses who unknowingly bore the brunt of the additional energy surcharges caused by the wellness center's egregious behavior? 3) Does the community have the legal right to file a class action lawsuit against the institution? 4) Is it warranted for the wellness center, from a carbon emissions as well as public relation perspective, to attain higher than expected energy conservation goals in the aftermath of this scandal?
10) Unintended Consequences of Green Policies	1) A hospital has demolished its main parking structure—a 1960s structure deemed to be an eyesore, and visually obstructive of the new main entrance to be constructed. However, this will result in much further walking distances from the remaining surface parking lots on the campus. The administration promotes this fact as a health promoting policy to encourage walking, and as an alternative to the significant carbon "footprint" of the automobile. The local chapter of the American Association of Retired Persons (AARP) strongly opposes this new policy.	1) Will the proposed actions inadvertently impede patient access to high quality care? 2) Will this action reduce the institution's regional drawing power from the viewpoint of patient referrals? 3) Is it ethical to require that patients and visitors walk further distances simply as a means to attain an aesthetic impression with the new main entrance? 4) What effect will the removal of the structure have on staff satisfaction if one has to walk further to one's workplace? Will this have a deleterious effect of staff recruitment and retention? 5) What is the probability of a class action lawsuit against the institution of behalf of the AARP, claiming discrimination? Can opponents dismiss the hospital administration's claim that its actions are intended to foster a greater degree of health-promoting physical activity within the community? Beyond this, is this new policy in violation of the federal Americans with Disabilities Act of 1990?

patient focused care, could be used to attract new staff while retaining existing employees. In this particular instance, the head of the Medical Center Board of Directors is also the President of the local Urban Land Institute (ULI) chapter. The hospital could work closely with the ULI to promote smart growth and integrate the hospital and future developments into a cohesive urban fabric.

Recycling Finite Resources

It is typically the responsibility of a CEO to attempt to take into consideration the views of the community and local preservationists. However, considerations focused upon staff, patient safety, and facility quality are primary concerns. This includes checking for sick building syndrome and future disaster strike zone probabilities. One would have to weigh the possibility that if the surrounding context is destroyed, what will patient utilization levels be upon re-opening the facility. It may be beneficial to not demolish (and adapt to a new health-related use), yet opt to relocate. Moving to another site could be profitable for both the community and the healthcare organization's viability if adaptive uses can be found for historic buildings that conserve finite building construction resources.

Former Hazardous Waste Site

Although this is a well-established practice to utilize imminent domain to acquire buildings or land, the CEO has to take into consideration the broad ramifications of the new hospital project. A successful hospital depends on community support and engagement and it would therefore be prudent to initiate negotiations with current residents and landowners within the proposed 74 acres to strike a compromise beneficial to all parties. Imminent domain for a number of reasons should be used only as a last resort.

Staffing Versus Sustainability

As LEED becomes more widely known, it will likely be used more and more by employers as a recruitment strategy, and to help in staff retention. More specifically, the institution's progressive program to strive towards a carbon neutral campus, combined with LEED, can have the two-fold effect of establishing the intuition's environmental stewardship and as being a great place to work.

Unrealized Energy Cost Savings

The architect should be held accountable. It is the responsibility of the architect to act as the representative of the client to all parties involved in the

construction process. He or she must guide key day to day decision-making, and to systematically inform the client of all aspects of construction. The architect fell short and should have revealed the issue during the routine phases of the design process. One could take the next plausible step to acquire the professional opinion of an outside expert. An unbiased outside opinion would perhaps shed additional light on the situation. After a thorough analysis of the facility, and the architect's claims, a decision could be made to ignore the previous claim or file a lawsuit against the architect.

Healthcare Provider as Alleged Polluter

The first step to combat the animosity of the community would be to hire a third party to conduct testing of the surrounding area. This testing could be monitored by the hospital, with full public disclosure, to avoid any appearance of impropriety. By keeping the media and the public informed throughout this process, the outcome may clear the hospital of any wrongdoing. However, if the results do not favor the hospital, the administration would have to take full responsibility and initiate measures to alleviate the problem. In this way, the community and facility can move forward together, hopefully, with mutual trust.

Sustainability versus Institutional Survival

In a case where such large amounts of money are being lost, the CEO must thoroughly assess the situation before making any decisions. Small steps may be taken towards becoming green or more sustainable. These implementations may have to take place gradually over time. Once a sizable improvement has been made, the facility could look to obtain outside grants for improvements to the existing facility or funding for a freestanding clinic that could lessen the burden of the emergency department.

Unauthorized Resource Consumption

It is the responsibility of the CEO to find out whether or not the accusations are true. Negative public relations can be damaging to any business enterprise. As previously noted, hiring a third party consultant to conduct an unbiased analysis that cannot be overshadowed by any form of alleged 'cover up' is prerequisite, from the outset. If the results are independently validated, then it is the responsibility of the institution to fairly and reasonably compensate those affected in order to re-establish a positive and productive relationship with the surrounding community.

Unintended Consequences of Green Policies

While tearing down the parking structure was perhaps at first deemed a positive idea, the current issue raised by the AARP was perhaps valid in terms of the institution's disinterest to serve one of its core constituencies. Second, the institution may have not have this constituency's best interests foremost in its decision from the outset. As a result, it would be viable to explore building a new parking structure away from the main entrance to allow visual lines of sight to and from the facility while accommodating the parking and transportation needs of all patients and visitors. The hospital in turn could focus its attention on wellness programs to promote healthy living and lifestyles.

Summary and Future Directions

This discussion extends a pedagogical model previously put forth for an interdisciplinary curriculum in healthcare architecture and facility management (Verderber, 2002). It is a reaction to the reality that a number of university level health administration programs in North America offer courses in ethics and in organizational behavior that touch on this general subject, although these courses rarely address the "nuts and bolts" of healthcare facility planning, assessment, and management. Meanwhile, the knowledge required to guide a health-related renovation or new construction project from inception to completion is becoming ever more complex (Verderber, 2002). It is a multi-tiered process involving an organization's decision makers and all stakeholders to be genuinely engaged with many types of specialists over the course of many months, even years, from a project's start to finish. Many a seasoned healthcare executive will privately confide that much knowledge in this facet of one's daily responsibilities was hard earned through trial and error in the trenches, so to speak. It does not have to be this way. Health administration curricula can and should embrace these concerns in a more systematic manner.

To date, no single required course is taught in any AUPHA health administration program that devotes the majority of its curricular content to the subject of global warming and its implications for healthcare facility management. With this said, the Graduate Program in Architecture + Health at Clemson University currently offers an annual elective interdisciplinary seminar co-sponsored by that university's Department of Public Health Sciences. This course, "History and Theory of Architecture + Health" explores the functions of sustainability and resource management from the period of ancient Greece up to the present and projects outward to 2050 scenarios on this topic. It is recommended that if a freestanding course on facility

planning and management is not offered at a particular institution, then at the very least this material can be incorporated into existing courses on managerial ethics, negotiations, and/or organizational behavior. The ten preceding scenarios, at once place-specific and universal, are recurrent, resonant, and generalizable to diverse curricular contexts. They are applicable across diverse building types, across diverse patient and staff constituencies, and diverse geographic locales.

In a broader sense, it may be prudent to engage the teaching support of an adjunct faculty member with a background in this area, i.e. an architect, interior designer, landscape architect, or an urban planner, to break down the formidable departmental barriers within colleges and universities that too often inhibit and discourage truly cross-disciplinary coursework, and hence, cross disciplinary learning. Disciplinary exclusivity is unwarranted in this period of rapid global change. The blurring of the lines between disciplines can be exciting for the student and inspiring—by confronting the barriers and myths that would otherwise doggedly appear later in one's daily professional life. Dismantling such obstacles in the name of pedagogical fluidity can foster new interdisciplinary knowledge, curricular hybridization, and most importantly, result in better-prepared health administrators.

Conclusion

The intent here has been to insert the topics of environmental stewardship and sustainable healthcare architecture squarely into the pedagogical equation in the education of future leaders in healthcare. Receptivity on the part of the student, however is a prerequisite for any degree of success in this. It is important that the student realize that these issues will be routinely encountered in one's career trajectory, and more so in the coming decades. This will occur due to changes wrought by global warming and associated climate change, instability caused by disease, food shortages, scarce natural resources, including water supplies, and geopolitically-based hostilities across the globe. The shopworn adage, think globally-act locally will remain apropos.

This is not to say that other dimensions of the built environment for healthcare will be any less critical within this evolving pedagogical discourse. The functions of nature as a therapeutic modality in healthcare facilities, the rise and growing reach of evidence-based research and design, and the increasing sophistication of the patient-as-healthcare consumer, and similarly among one's loved ones, will exert a critical influence. These and other determinants will be key in the delivery of high quality care, and the

quality of care environments. Healthcare industry leaders can effect positive community, institutional, and environmental change. Change itself will be a constant in regard to the role and function of the built environment for healthcare.

References

Becker, F.D. (1983). Evaluation. In R. Beck and M. Meyer, eds., *Health Care Environment: The Users' Viewpoint*. Boca Raton, FL: CRC Publications.

Benyus, J. (1997). *Biomimickry: Innovations Inspired by Nature.* New York: William Morrow.

Blau, J. (1984). *Architects and Firms: A Sociological Perspective on Architectural Practice*. Cambridge: MIT Press.

Carson, R. (1962). *Silent Spring*. Boston: Houghton Mifflin.

Cauchon, D. and Appleby, J. (2006). Hospitals Go Where the Money Is. USA Today, 3 January, A2.

Environmental Protection Agency and American Hospital Association (2005). Memorandum of Understanding between the American Hospital Association and the U.S. Environmental Protection Agency. Washington, D.C.: American Hospital Association. http://www.noharm.org/library/docs/going_green accessed 12 April 2008.

Frumkin, H. (2001). Beyond Toxicity: Human Health and the Natural Environment. *American Journal of Preventative Medicine*, 20:3, pp. 234-240.

Gac, J.D., Boerstler, H., and Ruhnka, J.C. (1998). The Socratic Method: Analyzing Ethical Issues in Health Administration. *The Journal of Health Administration Education*, 16:2, pp. 403-424.

U.S. Green Building Council (2008). The Green Guide for Health Care 2008. Washington, D.C.: United States Green Building Council. http://www.gghc.org accessed 12 February 2008.

Guenther, R. and Vittori, G. (2008). *Sustainable Healthcare Architecture*. New York: John Wiley & Sons, Inc.

Guy, S. and Moore, S. (2007). Sustainable Architecture and the Pluralist Imagination. *Journal of Architectural Education*, 60:4, pp. 15-23.

Haggard, L. and Hosking, S. (1999). *Healing the Hospital Environment: Design, Maintenance, and Management of Healthcare Premises*. London: Routledge.

Hawken, P. (1993). *The Ecology of Commerce: A Declaration of Sustainability*. New York: Harper Business.

Hawken, P., Lovins, A., and Lovins, L.H. (2000). *Natural Capitalism: Creating the Next Industrial Revolution.* Boston: Back Bay Books.

Health Care Without Harm (2008). Statement of Principles. Washington, D.C.: Heath Care Without Harm. http://www:noharm.org accessed 1 April 2008.

Hemmes, M. (1993). *Managing Healthcare Construction Projects*. Chicago: American Hospital Publishing.

Hospitals for a Healthy Environment (H2E). (2005). A 2005 Report on the Status of Virtual Mercury Elimination in the Health Care Sector. Washington, D.C.: Hospitals for a Healthy Environment. http://www.h2e-online.org accessed 14 March 2008.

Kolbert, E. (2006). *Field Notes From a Catastrophe: Man, Nature and Climate Change*. New York: Bloomsbury.

LEED for Health Care Core Committee (2008). LEED for Health Care. Washington, D.C.: U.S. Green Building Council. http://www.usgbc.org accessed 12 April 2008.

Leggett, J.K. (2001). *The Carbon War: Global Warming and the End of the Oil Era.* London: Routledge.

McDonough, W., and Braungart, M. (2002). *Cradle to Cradle: Remaking the Way We Make Things.* New York: North Point Press/Farrar Strauss and Giroux.

McKibben , B. (1989). *The End of Nature*. New York: Anchor Books.

Nightingale, F. (1859). *Notes on Hospitals.* London: John W. Parker.

Orr, D.W. (2004). *The Nature of Design: Ecology, Culture, and Human Intention*. Oxford: Oxford University Press.

Pierce, J. and Jameton, A. (2003). *The Ethics of Environmentally Responsible Health Care*. New York: Oxford University Press.

Rose, E. (2006). *The World Population Explosion*. New Haven: Yale-New Haven Teachers Institute.

Schon, D. (1983). *The Reflective Practitioner*. New York: Basic Books.

Stewart, T.A. (1996). *The Great Conundrum: You Versus the Team*. Fortune, 134:6, 165-168.

Union of Concerned Scientists (1992). World Scientists' Warning to Humanity. http://www.ucsusa.org/ucs/about/1992 accessed 18 April, 2008.

United Nations Department of Economic and Social Affairs (2004). Confronting Global Change. New York: United Nations Division for Sustainable Development. http://www.un.org/esa/sustdev/documents/agabda21/index.htm accessed 17 April 2008.

United States Green Building Council (2008). Leadership in Energy Efficient Environmental Design. Washington, D.C.: United States Green Building Council. http://www.usgbc.org accessed 12 February 2008.

Verderber, S. and Fine, D.J. (2000). Healthcare Architecture in an Era of Radical Transformation. London and New Haven: Yale University Press.

Verderber, S. (2002). *On the Value of Architecture and Facility Management in Health Administration Education*. The Journal of Health Administration Education, 20:1, pp. 39-60.

Verderber, S. (2003). Architecture for Health—2050: An International Perspective. *The Journal of Architecture*, 8:3, pp. 41-57.

Verderber, S. (2006). Hospital Futures—Humanism Versus the Machine. In Wagenaar, C., ed., *The Architecture of Hospitals*. Rotterdam: NAi Publishers, pp. 76-88.

Verespej, M.A. (1990). When You Put the Team in Charge. *Industry Week*, 239:23, pp. 30-32.

Wasserman, B., Sullivan, P. and Palermo, G. (2000). *Ethics and the Practice of Architecture.*New York: John Wiley and Sons.

Weart, S.R. (2004). *The Discovery of Global Warming*. Cambridge, MA: Harvard University Press.