Opportunities for Sustainable Design in Skilled-Nursing Culture Change

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Abstract

The skilled-nursing industry is undergoing a great evolution, renovating and re-organizing in a national movement known as "culture change." Values of culture change include providing more choice, dignity, respect, self-determination, and purposeful living for residents. The building industry as a whole is undergoing a similar evolution in sustainability—focusing on energy efficiency, cleaner interior air quality, and healthier urban environments. Most hospital administrators indicated that they generally perceive evidence-based design as synergistic with eco-effective design (Shepley et al. 2009). This should make sense intuitively—that a natural building would in fact *feel* better than a "conventional" building. Do sustainable buildings generate better healthcare outcomes? What would an environment look like that seamlessly integrates both culture change goals and sustainable design goals into an elegant home for healing and wellness?

Culture change provides an opportunity for architects to discuss environmental sustainability concerns that dovetail with the therapeutic goals driving the culture change movement. Our clients need to know that there are opportunities to incorporate sustainable design into their new environments in a way that reinforces the underlying values of culture change. This paper draws on the available research to examine how sustainable design strategies and culture change strategies overlap in long-term healthcare facilities. Five design strategies are discussed in depth: daylighting, therapeutic gardens, family and community, households, and safe materials—in relation to both their therapeutic and sustainable potential.

Article

"We can create places that devour and destroy the environment and that in turn destroy us. Or we can do the opposite—create places that help us to live in harmony with the environment and sustain our health."
—Esther M. Sternberg, MD
(Sternberg 2009)

The skilled-nursing industry is undergoing a great evolution, renovating and re-organizing in a national movement known as "culture change." Ideally, elderly and those with chronic medical conditions who reside in skilled-nursing facilities should be able to live well, with dignity, outside of traditional institutional medical facilities. Just because a person needs regular medical care, on a monthly, daily, or weekly basis does not need to mean they are "sick." Culture change is a progression from institutional or traditional models of care to more individualized, consumer-directed practices that embrace choice and autonomy for care providers and recipients (Frampton 2010: xiii). Values of culture change include providing more choice, dignity, respect, self-determination, and purposeful living for residents. Most facilities implement programs that give residents more choices and more control over their daily schedule. Most buildings undergo some kind of physical renovation to transform existing sterile, institutional spaces into decentralized, home-like environments. Renovated facilities usually have smaller units, refreshed residential style interiors, and amenities like kitchens, laundry rooms, or game rooms that are available to residents 24 hours a day.

The building industry as a whole is undergoing a similar evolution in sustainability—focusing on energy efficiency, cleaner interior air quality, and healthier urban environments. Quantifying and measuring sustainability is challenging. The most prevalent measure in the building industry today is the Leadership in Energy

and Environmental Design (LEED) rating system created by the United States Green Building Council. LEED rating systems are checklists developed by a collaboration of industry professionals, and are peer reviewed and pilot tested prior to being implemented. Buildings achieve a sustainability rating by earning a number of points from the checklist. LEED is by no means a perfect measure of sustainability, but it may be the most standard tool currently available. Architects must still strive for true sustainability beyond LEED—creating conditions "in which human and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations" (EPA).

Culture change provides an opportunity for architects to discuss environmental sustainability concerns that dovetail with the therapeutic goals driving the culture change movement. Our clients need to know that there are opportunities to incorporate sustainable design into their new environments in a way that reinforces the underlying values of culture change.

Some of these opportunities are straightforward; here are two examples:

Acoustics: Quieter environments with fewer unwanted background noises result in improved sleep and decreased agitation among residents (Joseph 2006: 3). Most LEED-certified buildings have increased levels of wall, floor and ceiling insulation in order to meet energy efficiency standards. This decreases the sound transfer between walls, floors, and ceilings, producing quieter indoor environments for the benefit of residents and staff.

Wayfinding: Buildings with floor plans in the shape of letters, such as L, H, or E are easier for elderly residents to navigate than buildings that are linear or thick, square shapes (Joseph 2006). These simply shaped buildings lend themselves to an orientation along an East-West axis. Such orientation facilitates daylighting and thereby uses less energy than buildings with deep, boxy floor plans. Letter-shaped buildings are easier

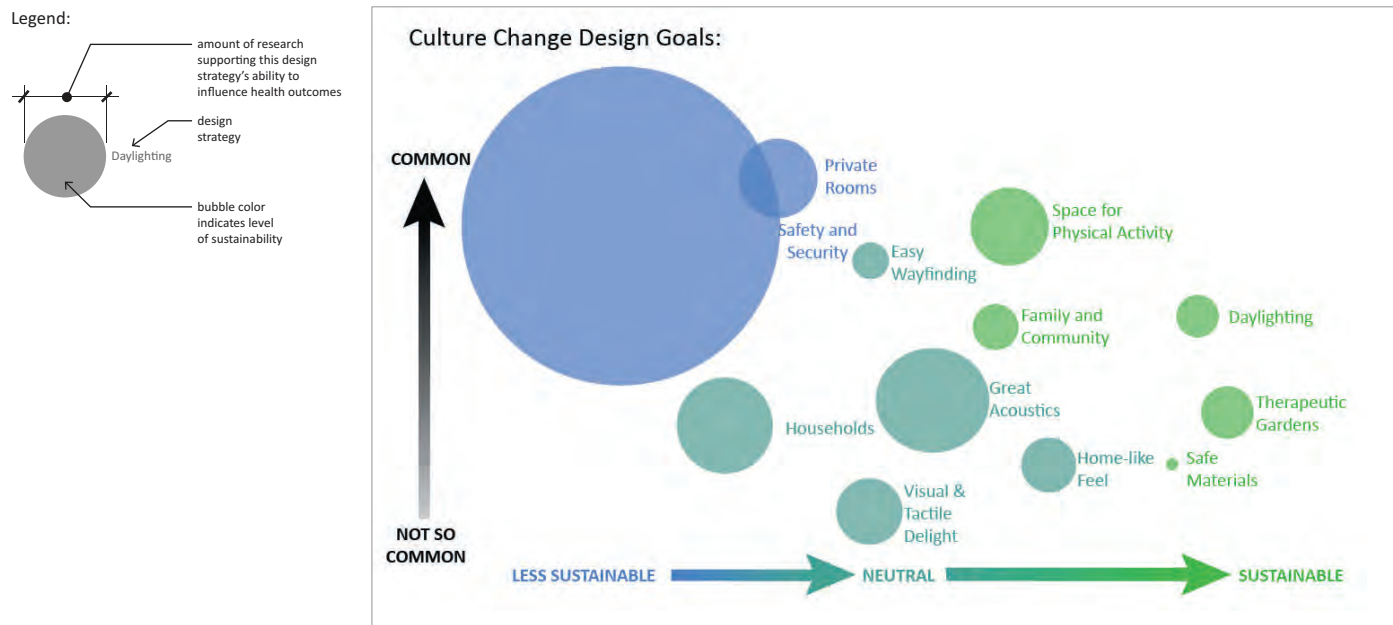to make sustainable and easier for residents to navigate—a real win-win.

This paper draws on the available research to examine how sustainable design strategies and culture change strategies overlap in long-term healthcare facilities. Healthcare designers are now turning to evidence-based design (EBD) to inform more and more of the design process. EBD is "the process of basing decisions about the built environment on credible research to achieve the best possible outcomes" (Harris et al. 2008). Many of the design strategies implemented in culture change are supported by credible research. How does evidence-based design and culture change relate to sustainability? Most hospital administrators indicated that they generally perceive EBD as synergistic with eco-effective design (Shepley et al. 2009). This should make sense intuitively—that a natural building—one designed such that humans and nature exist in productive harmony—would in fact *feel* better than a "conventional" building. When asked to picture a place of healing, the majority of people imagine a space dominated with natural elements (Cooper Marcus and Barnes 1999). What evidence is there to support this notion? Do sustainable buildings generate better healthcare outcomes? What would an environment look like that seamlessly integrates both culture change goals and sustainable design goals into an elegant home for healing and wellness?

Based on a review of the literature, the design strategies presented in Figure 1 are the most widely recommended for improving health outcomes of residents in skilled-nursing facilities (Brawley 1997, Joseph 2006, Sloane 2002). Each bubble represents a relative estimate of the following: level of potential sustainability (x-axis), how often this feature occurs in current existing facilities (y-axis), and amount of research supporting each strategy (bubble size).

What does the level of potential sustainability mean? For instance, having "great acoustics" is fairly neutral as far as sustainability—a facility could be designed with great acoustics

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Figure 1: Mapping therapeutic design strategies in terms of sustainability and rate of occurrence

Legend:

amount of research
supporting this design
strategy's ability to
influence health outcomes

design
strategy

Daylighting

bubble color
indicates level
of sustainability

Culture Change Design Goals:

COMMON

Private Rooms

Safety and Security

Easy Wayfinding

Space for Physical Activity

Family and Community

Daylighting

Great Acoustics

Households

Therapeutic Gardens

Home-like Feel

Safe Materials

Visual & Tactile Delight

NOT SO COMMON

LESS SUSTAINABLE   NEUTRAL   SUSTAINABLE

by installing a ton of additional synthetic ceiling panels shipped in from overseas (not very sustainable), or by carefully configuring space in a shapes that reduce noise transfer, carefully overseeing the installation to ensure quality, and strategically installing a few ceiling panels made of recycled cotton to achieve the same result (very sustainable). The difference is having a knowledgeable design team that prioritizes sustainability. "Healing Gardens" is further on the right side of the scale because no matter how you detail it, any type of garden will be more sustainable than no garden. Private rooms is on the left side of the scale— because building new private rooms most likely means using more materials for construction and heating/cooling more air year after year— it's inherently less sustainable (although we may choose to build them anyway to achieve other goals).

Perfect data to quantify the measures in the above chart is not yet available, but the framework is a way to holistically visualize the factors that contribute to the improvement of these spaces and thus the figure is a heuristic for critical consideration.

To improve the health and sustainability of skilled-nursing facilities, we must find ways to inflate all these bubbles and move them to the upper right-hand corner. Increased research will inflate the bubbles; this in turn will help convince owners to incorporate these strategies into new or renovated facilities, which will float them to the top of the chart. Architects need to be educated in principles of sustainability so they can design solutions that move the items from the left to the right, while taking into account safety and economic realities.

This paper discusses five of the above design strategies in depth: daylighting, therapeutic gardens, family and community, household, and safe materials—in relation to both their therapeutic and sustainable potential—and shows how the bubbles can be inflated and moved.

Daylighting

"Good lighting should be thought of as the silent partner in caregiving."
—Elizabeth Brawley and Eunice Noell-Waggoner
(Brawley 2008)

Daylighting is the practice of designing a building such that sunlight and ambient daylight illuminate the spaces instead of electric fixtures. Daylighting significantly reduces energy use and promotes healing (Shepley et

al. 2009). Sunlight is essential for good health; it provides us with vitamin D, reinforces circadian rhythms, prevents depression, and helps to regulate sleep and wake cycles. It's been proven that light exposure during the day improves sleep at night for long-term care residents (Joseph 2006). Most elderly do not receive enough exposure to light for optimum circadian rhythm (Brawley 1997:75).

A successfully day-lit building will tend to have both high and low windows and skylights and shading devices designed to optimize the quality and quantity of light in the interior spaces throughout the day and year. Elderly residents are more affected by glare; so much of the sunlight in a long-term care facility would need to be diffused by the use of sheer curtains, light shelves, deepened window openings, or other window treatments. Victor Regnier, FAIA, recommends French balconies, picture windows with low sills and bay windows in assisted living facilities so residents can fully enjoy views as well as daylight (Regnier 1994: 64). The latest survey by the U.S. Energy Information Administration reports that only 9 percent of healthcare buildings have skylights (USEIA 2003: table B11). LEED for healthcare awards points for buildings that have daylight and views provided to 90 percent of the spaces in the interior and for providing outdoor places of respite, both of which support therapeutic needs of long-term care residences.

Therapeutic Gardens

"In the twenty-first century, the healing garden will be seen as an essential, intrinsic component of every healthcare setting"
—Clare Cooper Marcus
(Cooper Marcus 1995)

Much has been written and studied about healing gardens in healthcare environments, but the most convincing piece of evidence is the one that we already understand instinctively—when we imagine a place of healing, it is a most often a place dominated by nature. This intuitive notion is widespread among different cultures. Studies show that spending time in natural settings with plants,

mountains, lakes, streams, or ocean breezes has a calming, stress-reducing effect—particularly by increasing perceived control (Cooper Marcus and Barnes 1999). Although the trends in healthcare architecture in the last 20-30 years have been focused on the clinical, sterile environments that characterize our hospitals, this tide is turning as more and more healthcare professionals are looking to incorporate gardens and other natural elements into their facilities.

Gardens and open space are critical for sustainability. Sustainably designed landscaped areas reduce the urban heat island effect, infiltrate storm water on site, recharge the aquifer, reduce water pollution, reduce water use, require less maintenance, and support local wildlife.

Healing gardens should have the following qualities:

1. Sense of control and access to privacy— options within the garden for exposure or privacy

2. Social support—space to sit and chat

3. Physical movement and exercise—safe accessible paths for walking, spaces designed specifically for games or sports or gardening

4. Natural distractions—lots of plants, flowers, flowing water, sounds of wildlife (Ulrich 1999)

Keith Diaz Moore's research into gardens for those with dementia identified the following characteristics of gardens that are particularly restorative:

Being away
Contrast between the space you were before and where you are now.

Fascination
Elements with patterns, variation, visual intrigue. Natural environments are inherently fascinating.

1. Transportation options for non-drivers (walking & public transportation)
2. Neighbors who can support and get support from nearby facility
3. Views of and safe access to natural environments
4. Things to do with visitors within safe walking distance

Figure 2: Neighborhood
Skilled-nursing facilities can
be designed to fit in existing
neighborhoods providing easier
access for families, residents and
those living nearby

Extent
An experience that engages a substantial portion of one's mind; that engages multiple senses.

Compatibility
Providing the necessary resources for what one wants to do (also referred to as "fit"). Resources include physical components like safe paving, seating, easily accessible bathrooms, and spatial qualities like being easy to navigate (Diaz Moore 2007).

Family and Community

"They would be qualified to be institutionalized or moved to a nursing home, and because there is public transit service or also some meal service, they can stay in their homes."
—Jill Hough, Director of the Small Urban and Rural Transit Center in Fargo, North Dakota (Albright 2012)

The LEED rating system rewards buildings that are connected with the surrounding community. Credits are awarded for building on infill sites, building at densities high enough to support successful public transportation, and choosing

a site within walking distance of parks and services.

The literature on housing for the elderly stresses that maintaining connections to friends and family is beneficial to one's health and sense of well-being. Patients who have a social support network have improved recovery time and survival rate in acute care settings (Cooper Marcus 1999: 43). Care facilities designed to provide for more family involvement are associated with improved clinical outcomes (Rashid 2010). Convenience to family and friends is the second most common deciding factor when it comes to selecting a home for an elderly family member (Regnier 1994). Locating skilled-nursing in close proximity to public transportation, work centers, and retail centers makes it easier for friends and family to visit and sustain social support for residents (Cantor 1975). Integrating the facility into the existing city or town enables easy access via foot, train, bus, and bike, and decreases the amount of materials needed for infrastructure.

Sustainable buildings get big points for being built at higher densities that strengthen the viability of public transportation and other

city services, and reduce the need for new infrastructure. Eventually most older adults lose the ability to drive, but those in denser cities with successful public transportation can remain at home and continue living vibrant independent lives without a car. Seniors in towns and cities take more trips outside the home than those in the suburbs, regardless of health condition or socioeconomic status (Lynott 2009). It's been shown that older adults who can no longer drive are more likely to end up in a skilled-nursing facility regardless of their medical need to be in such a care environment (Freeman 2006). More than half of non-drivers over the age of 65 stay home because they lack transportation options, making fewer shopping trips, social trips, or trips to the doctor (Bedney 2010).

There are certain neighborhoods that naturally tend to have higher numbers of older independent residents. Usually these are walkable neighborhoods, with easy access to needed services and enjoyable social activities. Groups have started identifying these communities as "NORC's"—naturally occurring retirement communities and are putting in place programs to enhance the advantages these neighborhoods already have. This means providing supplemental services such as meal delivery, transportation, housekeeping, exercise classes, recreation, and social events, as well as organizing volunteers to provide these services; essentially the program is simply a framework that organizes older residents in a community helping out other older residents in the community (Bedney 2010). If there was a weekly community meal down the street, your grandmother would be able to walk there and get a nutritious meal, have an interesting conversation, and see a doctor, but if that same community meal was a drive away in a gated community it would require twice as much effort to get there and she would be much more likely to just stay at home alone. If skilled-nursing facilities were designed in such a way as to fit comfortably into existing neighborhoods, these organizations could share space, staff, and other resources, and provide needed services to independent community members at home at a lower cost. When an

independently living community member needs the additional help of a skilled-nursing facility, they can move in and remain a part of the same neighborhood with the same social network of caregivers and friends.

Design is what makes the difference here. While there are problems that arise from having a skilled-nursing facility in close proximity to loud buses and dangerously fast skateboarders in the city, these problems can be successfully mitigated through thoughtful design. Building a skilled-nursing facility on a green field on the edge of town with a large secure fence around it will solve some of these problems, but it creates health problems (depression, abandonment, dependency) and environmental problems. Designers need a vision for future successful urban skilled-nursing facilities that provide services not just to residents, but also to elders at home in the adjacent neighborhood. The building must be thoughtfully located and designed to provide safe, healthy, and quiet spaces for residents while being connected to the community and (of course) achieving net zero energy.

Households

"I do not want to die here because it's so ugly."
—Michael Graves
(Perman 2006)

Culture change empowers residents and staff so that the decision making is done at the household level rather than the institutional level (Zigmond 2009). This means adopting a framework for decision making that can take into account the individual needs of particular residents, at a particular time, in a particular place. Sustainable design thinking is similar. True sustainability requires the careful consideration of the particular characteristics of each site, community, and microclimate, and tailoring the building design to fit (and adapt in the future) to those particular circumstances. No culture change facility will be exactly like another; similarly no sustainable building will be exactly like another. This underlying mindset is truly the most synergistic and will enable facilities to adopt sustainable

Care facilities designed to provide for more family involvement are associated with improved clinical outcomes (Rashid 2010).

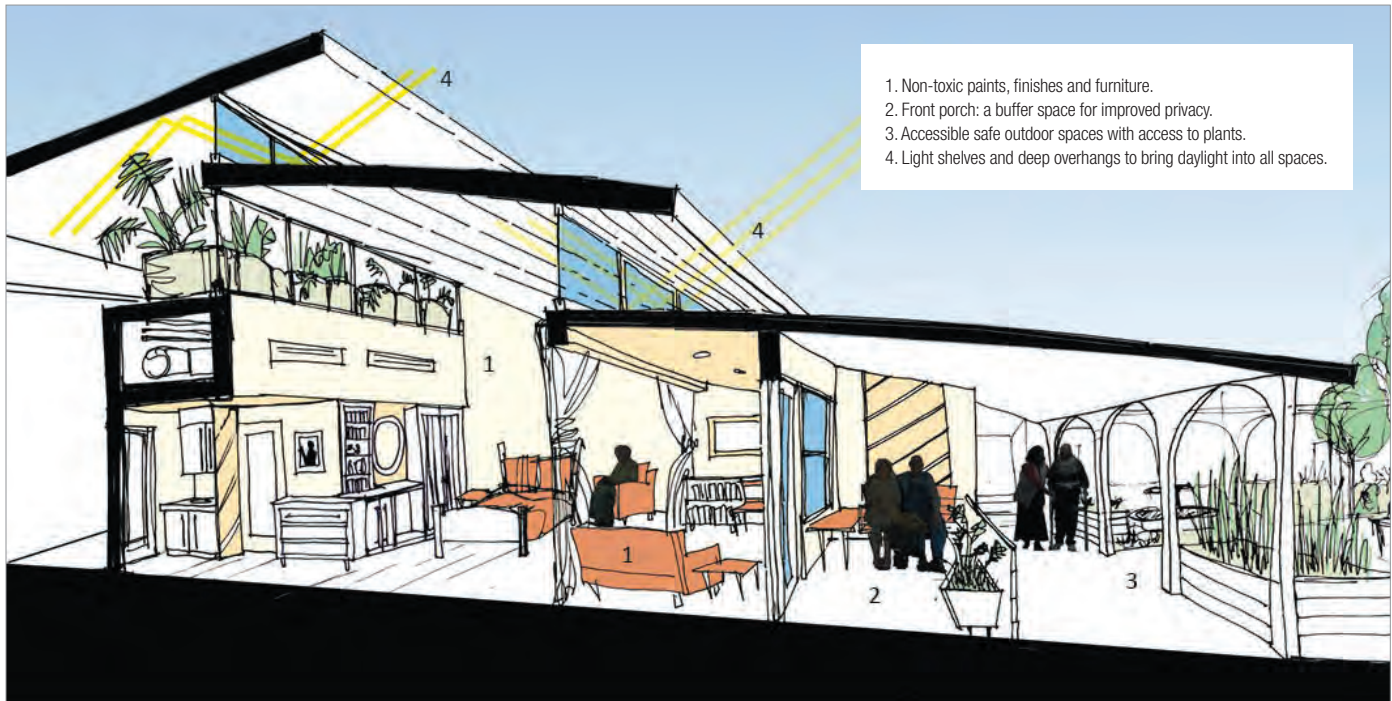technologies that are most effective for their particular circumstance.

It is recommended that designers create a home-like ambiance—an environment that is familiar and comfortable for the residents. Homes tend to feature smaller social spaces designed for specific activities, rather than larger multipurpose rooms (Diaz Moore 2007). Furniture should be arranged in smaller groups to facilitate socialization among elderly (Diaz Moore, Geboy and Weisman, 2006; Joseph 2006). People feel more comfortable in smaller groups, but this is especially important for elderly residents with hearing and mobility loss. One of the difficulties of using locally reclaimed, reused, local materials is that there is often a limited selection and limited quantity of items. As a designer you have to work with what is available; you may not have control over the exact material, exact color, etc. A series of several smaller spaces rather than a few large spaces gives a designer more flexibility to incorporate sustainable materials without compromising overall design quality. In other words, a patchwork of sustainable finishes may not be perceived as appropriate in a high-performance heart surgery center— where a feeling of slick scientific accuracy and dependability is desired. In long-term care facility a patchwork of materials and textures

can be designed to be beautiful, appropriate, modern, and beneficial to helping residents find their way and feel connected to the community they came from.

The other thing that makes a house a home is that it is socially comfortable. We know how to act, what to do, what to talk about in each room of a house. Skilled-nursing facilities can be designed to encourage this natural socialization by providing views in places that generate conversation among residents, residents and family, and residents and staff. This means not just views, but views of places where something interesting is happening: seasons are changing—people are talking and living—birds are eating—plants are growing (Joseph 2006). It is commonly observed that residents tend to congregate where there are things to watch, whether out the window, the nursing station, the facility entry, or one another (Cooper Marcus 1999: 395). Native plants in and around the facility will earn LEED points. They change with the seasons and interact with local flora and fauna in a way that helps to reinforce a sense of the seasons, which can be easily lost when one spends most of their time indoors. Reused local furniture and materials often come with a familiar story that can enrich, interest, and entertain residents and visitors alike—for example, reusing the seats from the old movie

Figure 3: Hearth
Entry, kitchen, dining, garden and living room space serving 10 to 15 residents

1. Low sills
2. Building energy monitoring
3. Accessible therapeutic garden
4. Light shelves
5. Deep overhangs
6. Native plants, Edible plants
7. Reused materials and furniture
8. Views that generate conversation

1. Non-toxic paints, finishes and furniture.
2. Front porch: a buffer space for improved privacy.
3. Accessible safe outdoor spaces with access to plants.
4. Light shelves and deep overhangs to bring daylight into all spaces.

theater in town or reusing old benches from the city park in the garden.

The building's sustainable features could provide positive relevant activities or entertainment for residents. Green design features such as green roofs, on-site energy generation systems, healing gardens, and greywater collection could be great conversation pieces because they are relevant to daily life and change on a daily basis. Residents may find joy in monitoring the rainwater collection barrels as they talk about the weather; it is something common and timely to talk about. The maintenance and monitoring of the natural processes occurring in a sustainable facility could be an activity of interest to residents and provide another sense of control over their surroundings. Keith Diaz Moore's research identified a need for "extent"—activities and simulation that have depth, that change with the seasons, that are timely (Diaz Moore 2007). Many of these systems now have sophisticated monitoring systems that could take talking about the weather to a higher level—akin to tracking baseball statistics. The future may see on-site energy production elevated to the level of a local sport; building maintenance teams could compete with one another to produce the most energy on site. This requires daily responsibilities of monitoring building energy use and production that are important but not physically demanding and could be an enjoyable pursuit for some residents. Through technology, the monitoring of green building features could be the job of a resident, a low-impact activity that an able-minded resident could enjoy.

Safe Materials
"Consult your nose – if it stinks, don't use it."
Material Rules at transparency.perkinswill.com

It should go without saying that healthcare environments should be places of healing and peace, and should be free from harmful toxins, but most interior environments are full of toxic materials yielding very poor indoor air quality. Common paints, sealants, and finishes emit volatile organic compounds. Cheap pressed-wood products contain formaldehyde. These toxicants create poor indoor air quality that is associated with higher instances of asthma, respiratory illnesses, reproductive

Figure 4: Living Quarters
Private rooms include bathroom, nurses counter, ample storage, space for reading/study, space for guests and access to a secure courtyard

disorders, developmental disorders, and cancer, especially for those with compromised health who spend the majority of their time indoors (Vittori 2002). Healthcare professionals should be concerned with the indoor air quality of each healthcare space, and the impact on public health that results from the extraction, manufacture and transportation, and disposal of these materials. There are many great resources to help identify toxic products and viable alternatives including the following:

- www.noharm.org

- www.transparency.perkinswill.com

- www.practicegreenhealth.org

- www.healthybuilding.net

Finding alternatives to these toxic materials can be cost effective, sustainable and beautiful.

Conclusion

The design of long-term care facilities significantly affects the health and well-being of older adults (Lawton 1986). As one loses physical and mental functions, an appropriately designed home can enable one to continue living life to the fullest. As our life spans continue to increase, there will be greater numbers of people living with a need for part-time medical care, and we need to design better environments to meet this demand. Before culture change, skilled-nursing facilities followed acute care medical model architecture—they were institutional and sterile—meant to reinforce the expectation that you are ill and could expect to be cured in this place by scientific technology. For those with conditions that cannot be cured (such as old age) this expectation is downright unhealthy. Culture change is beginning to create a new architectural style for healthcare facilities for people who are well and need some medical assistance on a daily basis. These new environments are designed to uplift the spirit, and reinforce the idea that one can live well within whatever physical limits life has dealt you. This type of architecture more easily lends itself to sustainability, having more in common with multi-family housing (a sector that has made great strides in sustainability) than acute care medical facilities.

Incorporating sustainable design principles into all our future buildings will be mandatory for human survival on this planet. As architects we should know this by now; our clients may or may not. It is our responsibility to guide them through the transition to truly sustainable design, and we can make it less painful if we emphasize the ways in which sustainable features support our clients' therapeutic goals. The culture change movement is an opportunity to incorporate new ideas into skilled-nursing design, and sustainability needs to be one of them. By using the research and ideas in this paper we can honor our aging population with spaces that are healthy, uplifting, sustainable, and dignified.

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