



[SMALLHOUSE DESIGN – A HUMAN APPROACH TO ELDER HOUSING]

Powerful dynamics are occurring as the Long Term Care marketplace prepares for the successful aging of our elders that will flood the system for the next three decades. Current trends in deinstitutionalizing the nursing home in to more of a residential environment referred to generally as the “smallhouse” are addressed. The Affordable Care Act and its impact on the building and operations of elder facilities and care are reviewed in order to synthesize what new models of care will advance. Other tools, namely biophilic design and tapestry segmentation are identified as potential tools in orchestrating a higher quality of life for residents as our society develops new models for aging. Our study reveals further research required in how families and caretakers should be trained in new models of quality care utilizing for instance, gerotranscendence methodology. In addition the merging of assisted care (a less clinical model) and skilled care the predominate vehicle of smallhouse design require further policy and regulatory review to fully embrace quality elder care.

The Smallhouse: A Human Approach to Elder Housing

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INTRODUCTION:

Approximately 10,000 boomers a day will turn 65, a trend that is to continue for the next 17 years. Preparation for the unprecedented “elder culture” is underway with the various smallhouse model’s emergence. Beyond the physical plant, the Affordable Care Act (ACA) will make integrated care models the norm. Malcom Gladwell defines a “tipping point” as having three characteristics. 1) Contagiousness 2) Little causes that lead to big effects 3) One dramatic moment vs. gradual change (Gladwell, 2002). Systems Theory embracing many multi-disciplinary theories in the new science of emergence would concur. The Long Term Care industry (LTC) is positioned to quantum leap in a new paradigm that will impact all with aging relatives or that plans to grow old themselves. Ageism is prevalent in this country where a youth culture dominates. This paradigm shift will change how we age and our perception of aging. But first we must make the journey to the “tipping point” and educe its direction.

The term “culture change” has become contagious in the industry. The Green House Model of elder care, popularized by Bill Thomas and endorsed with funding from the Robert Wood Johnson Foundation was a “little cause” with a big effect. The Veteran Administration’s (VA) adoption of a similar model for veterans coupled with a new national health care policy constructs a “dramatic moment”. The smallhouse is one of several specific models discussed in this overview, but it is the predominate idiom utilized to collectively reference the concept. The concept of humanizing elder housing.

THE HISTORY OF LONG TERM CARE:

The Hill-Burton Act of 1946 was the beginning of government regulation of hospital delivery focused on quality standards and equality of service to the poor and minority groups of their community. The policy tied federal funding to hospital’s physical plant development shaping the autocratic and hierarchical style of hospital management. The passage of the Omnibus Reconciliation Act (OBRA) in 1987 defined policy to regulate nursing homes through a similar monetary incentive (Medicaid and Medicare) creating a host of quality standards and a “patient bill of rights.” This act created a highly regulated industry, as the term “nursing home” gave way to “long-term care” (LTC) management models. Today, the U.S. still cares for our elders in a system that mirrors the institutional hospital both in the clinical “professional” model and the management role. For example, to counter reports of abuse, the government imposed penalties on the nursing home. Resident weight loss was one item that became monitored, which led to new dietary intake standards. “Culture change” is shifting this and other policy driven initiatives to individual choice, including eating on one’s schedule vs. the facility’s time clock. (Brune, 2011) In another example, “overtreatment” is found in the use of more than six different daily medications prescribed to the average resident, many of these psychotropic drugs in amounts that would be unhealthy for any population, particularly the frail elderly. (Thomas, 1996, p20) The American Healthcare Association imposed guidelines on its members to achieve a 15% reduction in psychotropic drugs utilized in LTC facilities. To date, facilities have averaged around a 4% reduction as reported by Alice Bonner the director of the division of nursing homes of the Centers for Medicare & Medicaid Services.

The term “culture change” was coined in 1997, following the first meeting of the nursing home pioneers, now known as the Pioneer Network. (Brune, 2011) In 2005, the Robert Wood Johnson Foundation rewarded geriatrician and physician activist, Dr. William Thomas’ efforts for elder care and housing reform by announcing a five-year, ten million dollar grant to support the launch of Green House projects in all fifty states. Dr. Thomas, and his wife, in 1991 had created an alternative to traditional nursing homecare, called the Eden Alternative and later defined the parameters for a separate initiative called “The Green House.” Dr. Thomas’ was a practicing emergency room physician when he reluctantly accepted a position as the “nursing home” doctor at Chase, an eighty bed SNF in rural New Berlin, NY. (Thomas, 2007) This facility created the Petri dish for Thomas’ work over the next decades, and his documented success in creating a scalable “human habitat” for this population will have implications for generations to come. As of May 2012, the National Green House Replication initiative is active in 32 states with 134 homes open and 106 in development. (<http://blog.thegreenhouseproject.org>)

THE GREEN HOUSE MODEL:

The Green House model of licensed nursing home care is defined by a decentralized housing of a maximum of 12 residents each residing in a private room with a private bath. The resident rooms open onto a shared living, dining and kitchen space, all of which the residents have access too. Green House adopters commit to implement and sustain core principles and practices of the model in exchange for the use of The Green House Project Trademark. The Eden Alternative, (EA) which Dr. Thomas also founded, maintains a philosophy challenging administration to identify the residents, in terms of who they had been and how they could still add value to the greater community. To be a registered EA facility, the home must agree to abide by ten project principles, register with the EA Registry and participate in the ongoing Eden development process of continual commitment to transform the institution into a warm, human habitat while improving resident quality of life. One premise of the program is that human beings thrive in garden-like environments, partly due to the “life purpose” this offers in the “demands” that maintaining a plant, bird or pet involve. The Eden culture is made up of pets, children and plants. Dr. Thomas’ model employs the theory of gerotranscendence, a concept defined by Lars Tornstam, a Swede writing in the field of gerontological sociology.

Gerotranscendence: Tornstam suggests that human longevity includes the potential for a transcendent movement away from the materialistic and rational point of view common in the first half of life. (Thomas, 2007, p27) His research suggests that the successful completion of such a shift is accompanied by an increase in life satisfaction. The process includes a redefinition of the self and of relationships to others. Becoming less self occupied while also being more selective about social encounters, meaningful conversations, solitary time and less emphasis on the often superfluous activities that exist in many organized retirement communities. (Tornstam, 2011)

Research shows a lack of meaningful social interaction and a depth of conversation lacking in today’s LTC facilities. Much of the conversation occurring in the typical clinical model regards the physical ailments and effects of aging and chronic illness. Training caretakers to engage in conversations that stimulate personal growth and techniques to encourage reminiscing vs. a preoccupation with the body is effective in assisting this process. This method treats the resident as a unique individual, forging a relationship with the caretaker vs. just a clinical interaction. Creating meditative space, allowing meals to be taken in the room and making life reviews part of normal behavior for older people helps create the place for this experience to occur. Utilizing these techniques promotes healthy aging, which when optimized ends in a new and qualitatively different perspective on life. (Wadensten, 2010). How then, can we create the “place experience’ that best facilitates this natural transition?



Culture Change And The Green House Model: From an operations perspective, the redesigned role of certified nursing assistants (CNA) who are specially trained universal workers call shahbazim (Dr. Thomas' term) perform the duties of personal care, meal preparation, housekeeping, laundry and activities. This role does not maintain the "professional distance" that traditional front line workers - the registered nurse (RN) and licensed nurse practitioner (LPN) exhibit. The shabaz work in self-managed teams performing all the personal care and homemaker tasks required to meet the needs of the residents. They work typically 4 hours per resident per day and they report directly to a Guide, often the nursing home administrator. The organization's clinical staff form a clinical support team (CST). Nurses on that team typically spend 1 to 1.5 hours per resident per day with the remaining clinical professionals visiting the house on a routine or as needed basis. (Hammer, 2011) This clinical team of nurses, social workers, activities director, therapists, nutritionists, pharmacists and medical director, must now partner with the caregiver. This is quite a power shift, from the typical hierarchy and signals a heightened need for "culture change". The CNA's role, who through their increased interaction with the resident become primary knowledge holders of their condition. (Sharkey S, 2011)

Outcomes of The Green House Model: There is a growing body of data available to assess the effectiveness of The Green House model on residents, operations, family members and of the financial implications for management. Research continues to show improved quality of life, care, family satisfaction and staff satisfaction, specifically 23-31 minutes more per resident per day in staff time spent on direct care activities in the Green House homes due to the ability of the CNA to perform their housekeeping roles while interacting with the resident as the frontline caregiver source. Even as Cutler's Green House (as cited in Brune 2011) research shows improvement over traditional care models, questions remain regarding quality of life as well as health and functioning deficits including socialization. The lack of organized activities may place more responsibility on the CNA and activities director to customize these opportunities per resident. There also remain, unresolved questions regarding the financial sustainability of both staffing and the additional cost of the required decentralized design.

Since wage expenses account for nearly half of total operating costs in nursing homes nationally (California Health Care Foundation, 2003 as cited in Hammer, 2011) several studies of the traditional model vs. The Green House underlines the operating expense savings (average 26%) in administrative staff due to the increased role of the direct care staff. These savings typically come from a decrease in unit secretaries and charge nurses that coordinate care and maintain records in the traditional model. A slight decrease in Full Time Employee (FTE) social work positions (7%) is also noted. Other encouraging news in the studies is the Green House residents maintained self-care abilities longer with fewer experiencing decline in late loss Activities of Daily Living (ADL's) such as eating, toileting and transferring as well as depression. A significantly higher incontinence than those in the comparison group was reported, but in general the quality of life measures (privacy, dignity, meaningful activity, relationship, autonomy, food enjoyment, and individuality) all scored significantly higher compared to the residents living in traditional settings. (Hammer, 2011)

In regard to capital cost of the physical plant the Green House model averages more than double the cost of a traditional facility. The cost per bed in the traditional model, assuming the national average of \$128 per square foot (psf), allocates \$30,592 (329 sf per resident) with the standard mix of semi-private rooms and \$40,704 (318sf per resident) if the facility is all private rooms. This compares to \$83,200 for the cost of the Green House at 650sf per resident. The argument presented is that capital costs are fixed, and actually decline when measured on a per resident day basis as the number of resident days increases. If culture change impacts occupancy the assumption that a more meaningful measure of "per resident day" basis vs. a cost per bed basis of measuring outcomes should be utilized. Theoretically, if a home increased its census by 3.2% (the average increase in occupancy that Green House adopters achieved between 2007 and 2009) it would serve an additional 3.2 residents per day generating \$320 more per day of net resident revenue (revenue less variable costs). This reduces the differential in the capital

cost gap. Additionally, the number of private-pay days increased an average of 24% among the five Green House adopters that began operations in 2007. (nursing homes experienced a 5% decline during this same period) The average Medicaid payment in 2009 was \$167 per day as compared to the private-pay average of \$219, a difference of \$52 per day. Inserting these numbers into the equation significantly offsets increased capital costs, adding \$92,817 in additional revenues per year for an average facility size of 102 beds. A study conducted by Calkins & Casella in 2007 (as cited in Hammer,2011) show older adults prefer private rooms by a ratio of 20:1 and nationally, private-pay residents pay 11% more for these rooms over semi-private accommodations. (Hammer, 2011)

OTHER MODELS:

Other models of delivering long term care have been incubating since the late 90's but the movement is reaching a tipping point, as evidenced by the Veteran Administration's adoption of Community Living Center's (CLC) in 2008. In addition, a plethora of private companies are conducting training sessions to administrators and clinical staff on "culture change" and the flattened hierarchy required in the new smallhouse setting. Significant changes are occurring in the built inventory of existing nursing homes (with the physical plant hard to convert to a household model) and in new construction for SNF building programs. These changes often proliferate first in the

not for profit sector of senior living (defined primarily by faith based Continuing Care Retirement Communities or CCRC's), before becoming mainstream in the private sector, as awareness and demand for the services increase.

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The Smallhouse Model

The splinter models falling out of the Green House revolution are referred to as "neighborhood / household" clusters characterized by units within larger facilities that feature decentralized living and dining areas but rely on centralized resources for laundry, food preparation and other services. The term "smallhouse" is differentiated from the neighborhood / household model in that they are typically freestanding structures designed to accommodate a smaller number of residents, typically 16-20 residents. A comparison of square footages: traditional nursing homes average 239 gross square feet per resident but with private rooms becoming more the norm, an average of 318 sf would be more typical. The Smallhouse and the Green House models average 748sf per resident with neighborhood / household models averaging around 654sf per resident. (Hammer, 2011)



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The Household Model

One of the more notable private companies, implementing this change is Action Pact. LaVrene Norton and her company, Action Pact were the first to speak of the Household Model. They defined it and articulated its philosophy and values. In 1997, the first households within this model opened at Northern Pines (now Bigfork Valley) in Bigfork, MN, developed by Linda Bump and guided and supported by Action Pact. LaVrene Norton immediately encouraged Bill Thomas (Green House) and Steve Shields (Meadowlark Hills) to visit this innovation. They went on to develop their own successful household environments and soon the long-term care world was buzzing about the possibilities for a real home to replace the nursing home. Each small group of residents (10 – 20) living in private rooms around a shared kitchen, dining room, living room, front door and back yard. (<http://actionpact.com>) The smallhouse model is an emerging model in the SNF industry with little empirical evidence available regarding a metrics comparison to The Green House. The presumption the financial sustainability in both initial cost but more importantly long term operation cost will be reduced by a household size of 16-20 residents. The quality of life outcomes with the larger than “family” size has yet to be studied.

The Community Living Center Model

The VA has mandated replacing the former nursing home model for all new VA Skilled Nursing Facilities. In addition, the guidelines establish changes in care practice in existing VA homes. The environment of care defined within the new standards dictate the creation of neighborhoods or households that engage residents, family and staff to name, decorate and own their place of residence and work. The implementation of Eden Alternative or Greenhouse frameworks is strongly encouraged. (VHA Handbook ,2008) Currently there are 20 facilities in construction or operation. The VA’s model still rely’s on considerable square footage devoted to a “community center” space or amenity space providing areas where the households congregate as well as centralized commercial kitchen, laundry facilities, administration and physical therapy areas.

With the current number of nursing homes in the US numbered at 16,100 (compared to Medical campuses at 5000), containing 1.7 million beds and maintaining an 86% occupancy the 77 million boomers moving onto the Medicare rolls in the next ten years will be carving out new models and options for their parents care and ultimately their own care as they move into their last decade of life. (<http://www.cdc.gov/nchs/fastats/nursingh.htm>) Studies indicate a critical shortage in the near future of LTC facilities. In part the supply of housing is due to the lack of new construction since 2008 created by the recession and bank lending practices. This trend, coupled with the onslaught of boomer’s who will be arriving in need of a higher level of care in the coming decades and the growing interest in household and smallhouse alternatives creates a mechanism for change. The traditional SNF model of Long Term Care is ready for renaissance. This transition will be driven in part by the new Affordable Care Act, currently weaving its way into all facets of our health delivery systems.



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THE AFFORDABLE CARE ACT: IMPACT ON LONG TERM CARE

Currently housed in a fragmented system of delivery, we are confronted with rising demands from an aging, overweight population prone to multiple chronic illnesses and extraordinary end-of life-care needs. These are just some of the reasons for the astounding increase in health care cost. U.S. spending on health care per capita is substantially higher than any other nation, yet 20% of our non-elderly (50 million Americans) have no health insurance coverage. Of greater concern is the pace with which medical expenditures have been rising in relation to the overall growth of our economy, currently making up 17% of our GDP. If the current growth rate continues, as much as 40% of our GDP could be allocated to health care by 2080. Our health care system has been the Achilles heel of our country for several decades and it is an unsustainable delivery model for the future. By contrast, in 2019, with the proposed health care reform in place, we would spend \$46 billion more on medical care than we do today, but this amounts (in 2010 dollars) to only \$800 per newly insured person, vs. the \$5050 average single premium paid today. (Gruber, 2011). Complimentary medicine, the idea that an individual is in large part responsible for his or her own health and healing has ascended over traditional medicine.

In 2009, 145 million people, or almost half of all Americans were living with a chronic condition such as diabetes, heart disease, or dementia. These are the heaviest users of healthcare services and account for 84% of healthcare spending. Although the majority of these individuals are under age 65, the potential to be diagnosed with chronic disease obviously increases with age, as does our responsibility and cost to treat this population. Most of the uninsured in the country are the “working poor”, caught between our two large social systems, Medicaid which provides coverage for the poor and focuses on children, and Medicare with its focus on the elderly. Our system has created a “class disparity” among the recipients of care. For example, infant mortality rates for blacks (1.35%) remain twice as high as white infant deaths (.57%). (Gruber, 2011)

On the other side of the population spectrum, a minority of Medicare beneficiaries with five or more chronic conditions represent almost 80 percent of all Medicare spending. Our current delivery system is equally lacking for our elder population’s health care needs, driving the middle class into poverty before offering only the least favorable option to most, a semi-private room in a nursing home. Though recent polling shows the majority of older Americans prefer to age in their homes, our model has favored institutional care. For Americans older than 65, there is a 70% chance they will require some form of long-term care service and support in their lifetime. On average, these support services will be required for three years, with roughly 20% requiring five years or longer. (O’Shaughnessy, 2010 cited by Gruber)

The core of the Affordable Care Act (ACA) which was implemented into law in 2012 is a “three legged stool.” The first leg reforms the non-group insurance market consisting of the uninsured that are not offered health insurance through their employers, or their own health status renders them ineligible for a sensibly price policy or insurance covering a pre-existing condition. Lessons were learned from five states, in the 1990’s who worked to reform their non-group insurance markets by implementing insurance reform to outlaw discriminatory practices and guarantee reasonably priced insurance with no exclusions. The impact of this reform “beta test” created large groups of people who didn’t purchase health insurance until they needed it, leading to higher prices as the pool now buying insurance was sicker than average. Thus, the second leg of the stool mandates that everyone must purchase health insurance. The problem with this mandate is the impact to those who cannot afford to buy insurance which motivates the third leg of the stool: government subsidies to make insurance affordable for lower income individuals. (Gruber 2011)

Perhaps the most significant impact of the ACA on our elderly population is the extension of the Medicare Trust Fund by an additional twelve years. Other impacts include closing the “donut hole” in Medicare Part D drug reimbursement as well as, annual wellness visits and personal prevention plans as part of the standard package to Medicare coverage. (Gitterman, Daniel P, 2011). Additional impact of the ACA include the establishment of a system for the public search of Nursing Home “records of care,” allowing the consumer easy access to data, enabling a more educated decision. The outline of this system exists today, primarily in the Assisted Living Market, where often people have more time to make a qualified decision. The nursing home decision is often made at discharge from a hospital or after a life event such as a fall or a memory related incident that leaves little time for due diligence with inconsistent and often absent data. In addition, the creation of new entities include: 1) Center for Medicaid and Medicare Innovation (The Innovation Center) 2) The Federal Coordinated Health Care Office (The Duals Office) to streamline services currently offered to dual eligible, or those who are both Medicaid and Medicare beneficiaries. 3) Independent Payment Advisory Board, charged with re-designing reimbursement of providers under Medicare to lower costs and ensure quality.

The most substantial program relating to elders is the proposed CLASS (Community Living Assistance Services and Supports). Performing like Long Term Care Insurance, this program would provide the middle class with an affordable opportunity to plan for and access supportive services in their preferred “setting” without impoverishing themselves to the level of Medicaid eligibility. Due to the high cost of long term care insurance coupled with the low savings rates among those nearing retirement, only about 7% of our population carries this insurance. (Kaplan, 2011). This program will reframe the concept of long-term care from one of poverty, sickness and loneliness to one of choice, community, and personal responsibility. With the average cost of a nursing home care at \$6000 per month and nursing home care for part-time in-home health averaging \$1800 per month, few individuals can afford either service. CLASS would function like long-term care insurance with the individual being assessed based on their income. A vesting period of five years is required before they can utilize the fund. Benefits would be cash payments averaging no less than \$50 per day which could be used to purchase various services such as homecare, adult day care, assisted living or other institutional care. This benefit equals approximately \$1500 per month or \$18,000 per year which supplements other resources to make home health care or another option attainable for the masses, without having to meet the poverty test. *State Balancing Incentive Payments Program (SBIP)*, a pilot program for eligible states, offers financial incentives for states to shift Medicaid beneficiaries out of nursing homes and into home and community based settings. (Kaplan, 2011) At the time of this writing, the CLASS program has been suspended due to the required minimum participation requiring a national mandate, much like universal health insurance. This leaves a sizable gap in the ACA’s ability to provide affordable long term care.

Another pilot program the ACA establishes is a “Medical Home” program for Medicare beneficiaries with chronic conditions offering states the option to enroll Medicaid beneficiaries in “health homes” and offering states an incentive to join the program. Medical and Health homes are models that include a “whole-person orientation” for coordination and responsibility of an individual’s full array of health care services using this team-based approach. Accountable Care Organizations (ACO’s) are also established and expanded under the act with a focus on physician and hospital services coming together an incented to provide and document a higher quality of care for specific populations. However, this SBIP Incentive Payments program would reach beyond the hospital and physicians, into the array of community-based supportive services creating multidisciplinary teams

to provide person-centered care. As a component of the Medicare Shared Savings program, these ACO's would be incented to maintain wellness in the elder population.

There are many layers of additional costs and proposed savings that make up the Affordable Care Act. The controversial Act has overcome multiple hurdles, but most Americans still question the financial viability of the program and seniors voice concern regarding cuts to Medicare or the rationing of health care to the aging population. Some highlights of the cost savings enabling the mammoth program include: 1) reductions in Medicare spending including cuts to the Medicare Advantage plan (22% enrollment among Medicare participants) 2) Higher payroll tax premiums for Medicare hospital insurance on high income individuals and increased drug cost for current high income Medicare beneficiaries. 3) Payments to hospitals, home health, psychiatric and SNF's will provide an estimated savings of \$196.3 billion over 10 years (Congressional Research Service 2010). With the move away from "fee for service," incentives in favor of quality compliance will be enacted to increase reimbursements to these non-physician providers. (Physician reimbursement reductions could also be on the table but likely not until after the 2014 general election) Preventative medicine will also be

The smallhouse model will become mainstream offering new choices in the Long Term Care marketplace. Coupled with the implementation of ACA, which emphasizes a "care-team" and quality over quantity approach, the final stage of life will systemically produce a more meaningful experience.

reimbursed 4) The Implementation of CLASS was projected to save the government \$2 billion in federal Medicaid costs. 5) The Congressional Budget office (CBO) estimates that with the state exchange implemented, premiums would fall by 14-20 percent. 6) The CBO estimates the advisory board will achieve \$15.5 billion in Medicare savings alone between 2010 and 2019 and overall, a \$428 billion estimated savings over the first ten

years the ACA is implemented. (Scott) The nonpartisan analysis from CBO estimates that the Affordable Care Act will cost \$930 billion and reduce the deficit by \$210 billion over a ten year period. (Congressional Budget Office, 2011)

BIOPHILIC DESIGN:

Biophilia denotes an innate human affinity for the natural world. Utilized in the built environment, representations of nature, plants, outdoor views and the use of natural objects create positive health experiences. The World Health Organization defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. (<http://www.who.int/about/definition/en/print.html>) Both the Eden Alternative and the Green House models utilize nature to create "human habitats" enabling a healthy, generative environment. Generative space is defined as space that enhances over time in both a sustainable and systemic way. Bill McDonough an architect known for his work in sustainability, asks the question, "Do you want a sustainable marriage?" We must create space that is designed and maintained in a sustainable way yet also systemically improves over time. Meaning it organically improves or the people who inhabit it tend to make it better.

Biophilic design is the "human" ingredient which the U.S. Green Building Council's LEED standards and sustainable design in general have not addressed. European standards mandate that every worker is within seven meters of a window wall, for views, light and air. While this may be too restrictive for the American's production mentality, holding the natural world in high regard is the take away. Restorative environmental design is an approach that includes both low-environmental design strategy as well as biophilic design considerations in the intentional connection between people and nature. The most substantial argument to utilize biophilic design in

elder facilities rests on the premise around health and healing. Research clearly demonstrates measurable outcomes in regard to human performance metrics, such as productivity, emotional well-being, and stress-reduction, learning and healing. Roger Ulrich has demonstrated a depth of research connecting nature to the economics of healing. Showing patients recovering more quickly from surgery and requiring less pain medication. Ulrich states, “Distraction theory holds that pain absorbs attention; the more attention devoted to pain, the greater the experienced intensity. If patients are diverted by or become engrossed in a pleasant nature view, they allocate less attention to pain, and accordingly the intensity is reduced.” (Wilson, p326)

Contact with nature has been linked to cognitive functioning. Richard Louve, a noted author coined the term “nature deficit disorder” in his 2005 book about the decreased interaction of American children and nature, and the impact that has on the well-being of our society as a whole. His latest book, *The Nature Principal* defines “nature smart” people as having a hybrid mind. Humans possess senses beyond the five we readily identify with, such as echolocation (think bats and fish) or senses that read our blood-sugar levels, joint positions, etc. Louve suggests many of our senses simply go dormant from lack of use, or exposure to our natural settings. In a simple illustration, Louve shows a correlation in backpackers and enhanced proofreading skills, emphasizing the positive impact created by the complexity of composition, the variable lighting and the fresh air that all come together to produce better cognitive outcomes. With one in seven Americans over the age of 70 suffering from dementia (<http://ns.umich.edu/new/releases/6140>) and nursing home admission by age 80 expected for 75 percent of people with Alzheimer’s, compared to 4 percent of the general population an awareness of how to stimulate cognitive functions in elder housing is imperative. Denmark had outlawed nursing homes but brought the model back in 2003 due to the inability to take care of dementia residents in their homes.

Additional research involving the “nature connection” has shown people living in proximity to open spaces report fewer health and social problems. Communities with higher-quality environments reveal more positive valuations of nature, superior quality of life, greater neighborliness and a stronger sense of place than communities of lower environmental quality. These qualities occur both in poor urban as well as more affluent suburban neighborhoods. (Kellert, p 4) In a study conducted in Japan 260 participants who gazed on forest scenery for 20 minutes had a 13.4% lower concentration of salivary cortisol – a stress hormone – than those viewing urban settings. Reducing stress for residents reduces agitation and aggressive behavior often exhibited with dementia residents. The stress associated with the caretaker role in these communities also warrants this special consideration.



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There are **six design elements** that form the framework for nearly 70 attributes contained under them. This provides the infrastructure on which to weave biophilic design into the tapestry of both the built and natural designed environments.



Environmental Features: water, air (natural ventilation), fire, daylight, natural materials, color, plants, animals, views and vistas and façade greening, relationship to geology and landscape



Natural Shapes and Forms: botanical and animal motifs, tree and columnar supports, shells and spirals, egg, oval, tubular forms, Arches, vaults and domes imitate natural elements, the lack of straight lines and right angles, simulation of natural features, Biomorphy (the bird like shape of the Sydney opera house), Geomorphology (embracing the geology in close proximity to the structure), Biomimicry (borrowing adaptations functionally found in nature)



Natural Patterns and Processes: including sensory variability, information richness, age and the patina of time, growth, bounded spaces, transitional spaces, integration of parts to the whole, dynamic balance and tension, fractals (similar but not exact copy, like snowflakes)



Light and Space: including natural light, filtered light, reflected light, light and shadow, light pools, warm light, spaciousness, spatial variability and harmony, inside-outside spaces



Place-Based Relationships: including geographic, historic, ecological, and cultural connection to place, indigenous materials, landscape orientation, landscape ecology, spirit of place (the built environment has a soul that motivates a long term stewardship and responsibility for its care)



Evolved Human-Nature Relationships: primal characteristics including prospect (the ability to find resources) and refuge, curiosity, metamorphosis, mastery and control, affection and attachment, attraction and beauty, information and cognition, exploration and discovery, reverence and spirituality.

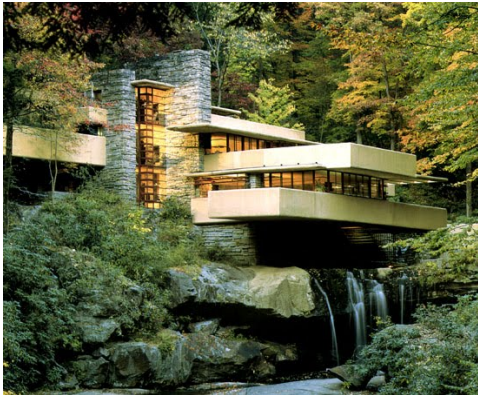
Place experiences aren't just about the built space but are often about the connection to the outdoor space. Buildings that help define courtyards, gardens and atrium spaces. Opening up to views and outdoor activities reinforce the indoor / outdoor connection and help create a strong sense of place. Sustainable healthy buildings are similar to sustainable, healthy humans. Vivian Loftness, a researcher and professor with Columbia University, characterizes the comparison like this, "they are physically fit vs. obese (thin floor plans, finger plans, and courtyard buildings); they have circulatory systems that take the heat from the core to the surface (e.g., air flow windows and water flow mullions; and they absorb sunlight and breathe fresh air." Victor Regnier, is an accomplished architect, professor and author with three decades of research on the European elderly housing model. Regnier reports the use of "winter gardens" that survive the cold and are typical on the balconies or roof terraces of multistory buildings in northern Europe. Also for consideration are atriums, Juliet balconies, balcony boxes or balconies that can become a screened in refuge in winter offering a nature refuge for the often home bound elderly.

Two areas of biophilic design closely complimenting sustainable design are lighting and indoor air quality. There is still much debate regarding the use of daylight to enhance the performance of visual tasks as glare related issues often compromise the results. However, compelling evidence shows the natural variability of daylight and sunlight, especially morning sunlight, reduces length of stay for patients recovering from surgery, bipolar treatment and seasonal affective disorder treatment Melatonin is a hormone released from the pineal gland regulating our circadian rhythm, sleep cycles and even cancer cell development. It is produced in the evening, most efficiently in a very dark room. The importance of time of day simulation to mimic natural circadian rhythm cycles has demonstrated significant improvement on short-term memory skills. Although this research has not been conducted with elderly populations the evidence is conclusive that the opportunity to spend time in the sunshine and have complete darkness at night has created significant improvement in hospital recovery rates. (Loftness, 121)

In regard to IAQ, ASHRAE recently updated their standards from, 10cfm to 20cfm per person minimum in offices, due to the overwhelming research between high outside air delivery rates and its connection to health. Biophilia hard liners would insist that natural ventilation far surpasses mechanical means where high temperatures, high humidity or high pollution are not prevailing issues. Allowing the choice of fresh air by having operable windows in a facility is optimal with a more involved study of cross ventilation, stack ventilation and thermally induced ventilation as a solution for site specific buildings held also as a consideration. Carnegie Mellon's BIDS research (a proprietary tool developed to support design based investment decisions) determined that natural ventilation and mixed-mode conditioning systems can provide 47-79 percent HVAC energy savings, 0.3-3.6 percent health cost savings and 0.2-18 percent productivity gains for an average return on investment of 120 percent. (Loftness, 125)

Unlike contemplating the design of an office or a public space where the objectives of movement, people flow and adjacencies are often driven by time pressures and "doing" activities, the "smallhouse" should be designed as a place to "be" with more emphasis on reflection and growth, as well as feeling connected and engaged. The organic nature of light quality and air flow in a facility are part of the subtle fabric that allow this experience. Light and fresh air utilized as a positive reinforcement tool in both prisons and psychiatric facilities, empathetic design would remind us that skilled nursing residents are not only similar to prisoners in their restriction of travel within a facility but even more so with the physical bodies decline which creates a different type of prison. So, providing these basic ingredients into their home should be a priority.

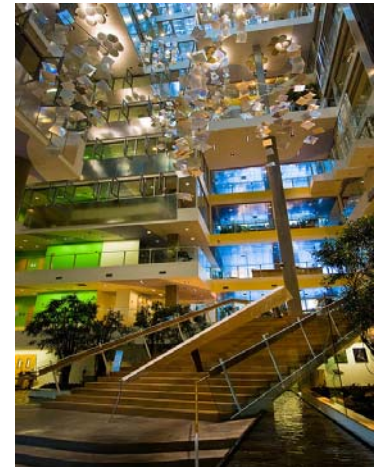
Perhaps the most obvious opportunity for nature integration into elder care environments are in outdoor gardens. The health benefits of this addition, physically, mentally and socially are incredible, although as with many other design implements this space must be managed and “programmed” for optimal benefit. Physically, hands-on gardening increases pinch and grip strength and improved dexterity. Studies have shown daily gardening associated with a 36% reduction in the risk of developing dementia. (Louve, 2011) Socially, providing a sense of purpose, and intergenerational opportunities provided by gardens are only two reasons to further promote incorporating nature into the design and development of the elder facility. Mental benefits of nature have been outlined but the understanding that in the role of “being” watching the cyclical nature of the seasons becomes even more valuable. Designing with fruit trees or grape arbors that eventually bear fruit, deciduous trees, trees with winter bark interest, spring wildflowers, vines or flowers (honeysuckle or jasmine) that offer the benefit of vertical cover and fragrance in the summer are all ways to aid in cognition and perception. Gerotranscendence theory also benefits from meditative spaces in nature, where elders can enjoy quiet reflective time. For a review of Best Practices for developing elder care facilities with Biophilic Design Principles see Appendix C.



1. Relationship to Nature



2. Natural Shapes and Forms



3. Light and Space

Figure 1: Falling Water, Frank Lloyd Wright, architect

Figure 2: Sydney Opera House, John Utzon, architect

Figure 3: Genzyme building, Cambridge, Mass.

Behnisch, Behnisch and Parner, architects.

(Kellert, 2008)

TAPESTRY SEGMENTATION

Furthering the delivery of generative space, both sustainably and systemically the awareness that people are rarely motivated to act as responsible stewards of the built environment unless they have a strong attachment to the culture of the “place.” In the aboriginal worldview, a person’s identity “incorporates the place and their relationship to it” (Zapf, 2005, p.637). This interconnectedness is nurtured by living in a place for many generations, and sensing that the place knows its people, just as the people know their place. The culture of people and place as determined by one’s community offer cues as to the direction of design, management and the marketing of Long Term Care facilities.

ESRI, or Environmental Systems Research Institute is a developer of geographic information systems (GIS) software and over a 30 year period, has evolved a system of demographic studies. Currently, in the fourth generation, they have trademarked a location modeling data base called Tapestry Segmentation, operates on the theory that people with similar tastes, lifestyles and behaviors seek other with similar tastes. The ESRI system combines the “who” of the community with the “where,” with specificity of their location. Utilizing census data they organize 65 segment summary groups that drill down into lifestyle traits and purchasing habits of households and the population. These 65 segments are categorized into 12 summary groups called “lifemodes” based on both lifestyle and lifestage. This makes the data particularly useful for defining market areas for senior living, which has nine lifemodes under the summary group, *Senior Styles*. As the inevitable life stage of requiring care for the “activities of daily living” (ADL’s) occurs, studies indicate a strong preference for elders to remain in the familiarity of their community. The other alternative often is being “shipped” to the oldest daughter’s or other family member’s city of residence, a move not typically optimal for the elder.

A comparison of two distinct geographies (and cultures) Charlotte, NC and Westchester, NY, provide insight into how Tapestry Segmentation might be utilized in forming a discovery culture document. A smallhouse project is currently being contemplated by Aldersgate a CCRC community in Charlotte, NC. Aldersgate began in 1943 as a Methodist Home for the Aging. Today it boasts nearly 100 acres, 500 Independent Living residents, 85 Assisted Living units and 100 Skilled Nursing Units. By contrast, the development group headed by Bruce Komiske is looking at the potential for a multigenerational component in this 80 acre site located in Westchester, NY. The campus would be contiguous with Westchester Medical Center / Maria Fareri Children’s Hospital, the medical and nursing schools, research buildings, hotel, retail, conference facilities and a future IMAX theatre, that could include a smallhouse concept. A review of the Tapestry Segment reports included in Appendix C reveal the following observations:

The Aldersgate (Charlotte, NC) report shows that within a 10 mile radius of the proposed site for a smallhouse project there are approximately 12,000 households that are age and income qualified at \$150,000 net worth over the age of 75. Westchester by comparison has 19,700 households that are age and income qualified. Although Westchester is a larger target audience, population growth in Charlotte from 2010 to 2015 (proposed) averaged 2.22% annually as compared to Westchester’s growth of .18%. This is measured against the national trend of .76% annual growth which shows continued strong growth in the Charlotte market. Both reports far exceed the minimum numbers required to perform a deeper market study to determine competition in the marketplace and deliver Market penetration rates which would calculate how quickly a project of 60 skilled nursing beds may absorb in the two different markets.

However, assuming a fundable project based on a cursory look at market demographics in moving forward with a design for a smallhouse concept; what can we learn from the Tapestry Segmentation portion of the ESRI data? How will the “culture of place” differentiate how we design and market the two different geographies? A summary showing the attributes of the Tapestry LifeMode Groups from each location are outlined below to be utilized in the Discovery Phase of our Program development. Ideas for implementation follow the attributes in a format that would be taken into the schematic phase of project development. For a review of Best Practices for developing elder care facilities with Tapestry Segmentation Principles see Appendix C.

TAPESTRY SEGMENTATION UTILIZATION FOR SMALLHOUSE MODEL

Demographic Comparison

Charlotte, North Carolina

Prosperous Empty Nester/ Segment #14

- 40% are married
- Median Net worth \$261,595
- Professional and management careers; education and healthcare
- Rooted in same neighborhoods for years (single family)
- Focus on health and well-being
- Focus on financial investing
- Golf tournaments and college football
- Pride in neighborhoods – remodeling and lawn care
- Travel extensively
- Drive luxury cars
- Read several newspapers daily
- Watch news, golf and talk programs on TV

Westchester, NY

Retirement Communities / Segment #30

- 25% are married
- Median Net worth \$99,494
- White collar employment history
- Majority live in multiunit buildings
- Likely to play musical instrument or art
- Golf, tennis and baseball games
- Joiners of clubs, civic, fundraisers
- politically savvy
- Atlantic City or Disney world vacations
- Museums, theater, yoga,
- Adult education
- Drive domestic vehicles
- Read the newspaper daily
- Watch ESPN, Travel channel, Bravo

IMPLEMENTATION: A close relationship exists between building “program” and operational “program.” While the first references the physical plant and capital costs associated with building, the latter deals with the activities that occur within the building spaces. They are not independent of each other and careful consideration must be given to the culture of the end user before the building program is developed in order to properly plan the smallhouse.

The research will direct site selection (urban vs. suburban model) as well as the program of spaces to be built and the materials and finishes specified therein. The geography, climate, state and local regulations as well as site constraints will also dictate the physical plant. Focused however, on just the Tapestry Segmentation as displayed in the above comparison – how might the two facilities differ in program?

The population from a single family home dwelling might expect more generous spaces, a visual from the front door that looks like a single home and a connection to a lawn and garden. The Westchester population may be more amicable to living in a multi-story building with manicured gardens of which they do not take an active role. Whereas the Charlotte population are more couples, with interests that better facilitate dens and library alcoves, the Westchester group may utilize a music room, home theater space and a group activity room more readily. Materials and finishes with the Charlotte group would be of a slightly higher grade perhaps displayed in more moulding, wall panels and architectural details.

The operational program would closely coincide with the physical spaces in the spectator sports “event” may be focused on baseball for Westchester vs. College football for Charlotte. For the Westchester population, more educational offerings possibly influencing site considerations near local colleges. Also, a focus on music and art events and the hosting of local civic clubs vs. travel oriented entertainment and current events focus that would outline the agenda for the Charlotte group.

CONCLUSION:

Working in concert with smallhouse trends, gerotranscendence techniques, and biophilic design we create an optimal life quality. American culture, characterized by our nomadic qualities, lack of nuclear households and independent, pioneering traits has begun the journey of providing a supportive environment for this population. As Desmond Tutu once remarked, we must teach our old people how to how to “elder” emphasizing the value they still possess to society.

Bill Thomas has helped us develop an understanding for the importance of creating the “human habitat” by introducing plants and animals into the environment. The operations program reminds us that they are there to develop programs of care around creating meaning and life purpose for the resident. Further, we understand the role of the shabaz or caretaker as the frontline worker vs. the traditional clinical team. The shabaz, whose primary job is to work with residents as an “equal” as well as care and maintain the household for them. Gerotranscendence has underscored the importance of training both the caretaker and the family in drawing out our elder’s life stories and appreciating their need for quiet meditative time. Directing social activities with other residents can also develop this life phase. Providing space for both should always be in the building program. Snoozlyn rooms developed in northern Europe were places of refuge from the overstimulation of a typical nursing home. Today we are integrating visual spas, and other technology enhanced rooms to produce that “get away space”. Working with the family to develop CD’s from life events that could be utilized in these “spas” and updated from time to time are but one of many operations programming opportunities. These spaces should allow 24 hour access, play instrumental music, dimly lit, and provide headphones and comfortable seating for 3-5 residents at a time. In addition, a chair massage table could be utilized for times when a massage therapist could be available to offer loving touch.

ACA’s impact will play out and continue to morph over the next decade, however, the withdrawal of the CLASS program which would have provided long term care insurance for this population is a huge setback. Offering our elder population a subsidy for their home or facility care vs. the current system of mandating poverty before admission into the long term care system is a critical component. Perhaps the universal coverage will eventually demonstrate a positive impact so that a universal mandate on long term care coverage could be more easily introduced. However, the implementation of care teams and the electronic medical record are aiding the transition to home care. Coupled with the culture change occurring in nursing homes the potential to transition more skilled nursing facilities into assisted living with enhanced care is within sight. This transition would release homes from the mandate of having clinical staff on board as full time employees and allow the caretaker culture to predominate in the homes. After all it is the ADL’s coupled with chronic illness that drives elders to the SNF or the last level of care, and the greenhouse model is showing improved success with these activities. Wellness checks likewise and continued medical research and implementation will also allow chronic illnesses to be better managed, from the home or from an assisted living platform. We live on the cusp of the reformation of the way we live, elder and die. The boomers will assist in the evolution as they go through the current system with their own families. Together we will incite the change to a more successful aging model.

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