

Residential Hospice Environments: Evidence-based architectural and landscape design considerations

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Abstract / The residential hospice care movement is increasingly accepted and supported globally, and yet, unfortunately, the amount of literature on best practices in the planning and design of residential hospice facilities and adjacent outdoor spaces remains relatively small. This paper reports on a compendium of architectural and landscape design considerations that reflect the fundamental dimensions of the residential hospice experience: site and context, arrival spaces, communal and private spaces of the residential milieu, transitional spaces, and nature connectivity. Additionally, key staffing and administrative ramifications of this built-environment compendium are addressed, as are prognostications and challenges for the future.

Résumé / Les centres en milieu résidentiel de soins palliatifs sont de plus en plus encouragés et acceptés dans la société; malheureusement, il n'y a que très peu de publications traitant de la meilleure façon de planifier et de concevoir ces centres de soins et leurs espaces extérieurs adjacents. Cet article rend compte d'un compendium traitant de considérations importantes sur l'architecture, l'aménagement extérieur et le paysagement de ces centres spécialisés et des aspects fondamentaux devant prévaloir lors de leur création. On y traite de leur emplacement et du milieu environnant, de l'entrée principale et de la réception, des espaces communs et des espaces privés du milieu résidentiel, des espaces de transition, et de leurs liens avec la nature. En plus de ces considérations d'ordre matériel, il est également question des ramifications administratives et du personnel-clé travaillant dans ces environnements, des pronostics et des enjeux pour le futur reliés à ces centres.

INTRODUCTION

Residential hospice environments continue to evolve globally. Geographical and culture-based traditions as well as attitudes toward death and dying adapt to ever-changing determinants. Indigenous building traditions, the degree of support provided by local medical communities, whether a given program is for profit or not for

profit, and fundraising and operational issues are but a few of the myriad determinants shaping hospice care (1). As the global hospice movement advances, we are able to discern a typology of care settings: hospital-based care programs in dedicated centralized units; decentralized hospital-based care programs that are not housed in a single wing or on a single floor; autonomous, free-standing residential hospices built solely for end-of-life care; buildings repurposed as residential hospices; autonomous pediatric hospices housed either in repurposed facilities or in facilities newly constructed for that function; and, finally, home-based hospice care programs, of which there are many thousands, and which provide the vast majority of care to individuals in their final weeks and days (2). Palliative care is offered in outpatient clinical settings, in long-term care facilities, in adult day-care settings, and in assisted living facilities.

The US Facility Guidelines Institute has issued this definition of hospice care:

Hospice care supports terminally ill persons through the dying process with a focus on maintaining dignity and quality of life while providing palliation or controlling unpleasant symptoms to the extent possible. Hospice care is provided by a team of professionals that may include nurses, social workers, certified nursing assistants, dietitians, therapists, volunteers, and clergy as well as physicians who may visit on a scheduled basis or in response to a crisis. No curative interventions are used. Inpatient hospices are part of a continuum of palliative care. They have been developed as new facilities and through renovation. (3)

The majority of hospice programs are home-based and combine the services of a visiting nurse with the assistance of family caregivers. Palliative care, by contrast, is typically provided within a

facility by a team of healthcare professionals. Timing for hospice care is usually predicated upon a diagnosis of terminal illness or a prognosis of six months or less, while palliative care is not governed by time restrictions. Palliative care can be received by a patient at any stage of an illness, which can be either terminal or chronic; it can be administered while the patient is receiving other forms of treatment. Hospice care focuses on comfort rather than on the disease itself or on life-prolonging treatment. This discussion is concerned with end-of-life hospice care.

The groundbreaking work of the late M. Powell Lawton provides the conceptual framework for

this discussion. Lawton, a gerontologist whose decades of interdisciplinary research focused on the relationship between the built environment and the aged, developed 11 precepts, each of which addresses a tangible outcome corollary within the built environment (Table 1). Lawton called these precepts “facility indicators” in reference to their direct implications for facility planning and design (4). Each outcome and its corresponding facility indicator express a discrete aspect of the environment-behaviour transactions that occur within residential hospice settings. Most hospices — freestanding or otherwise — have between 8 and 12 beds; midrange facilities have

Table 1 / Resident Outcomes and Implications for Residential Hospice Environments

Resident outcomes	Implications for residential hospice environments
Autonomy. Residents take the initiative and make choices about their lives and care.	Facility policies and practices and staff behaviour permit and encourage residents to take the initiative and make choices.
Individuality. Residents express their preferences and pursue their past and current interests, maintaining a sense of personal identity and continuity with the past.	Facility staff are aware of residents’ preferences and interests. Facility policies and practices and staff behaviour promote each resident’s individuality. Staff behaviour and residents’ immediate environment reflect residents’ backgrounds and present interests.
Dignity. Residents perceive that their dignity is intact, that they are respected; they do not feel belittled, devalued, or humiliated.	Facility policies and practices and staff behaviour maintain and promote residents’ sense of dignity and do not belittle, devalue, or humiliate residents.
Privacy. Residents have a sense of physical privacy, are able to keep personal information confidential, and have sufficient opportunity to be alone and to communicate and interact with others in private.	Facility policies and practices and staff behaviour show sensitivity to residents’ modesty, residents’ desire to decide how and to whom their information and feelings will be disclosed, as well as to residents’ need to be alone or to be unobserved when they are with others.
Satisfaction. Residents express or exhibit personal satisfaction, verbally and nonverbally. Conversely, they do not express or exhibit unhappiness, distress, or dissatisfaction.	Facility policies and practices and staff behaviour promote residents’ personal satisfaction.
Meaningful activity. Residents engage in discretionary behaviour, either through activity or passive observation, that they find interesting, stimulating, and worthwhile.	Facility policies and practices and staff behaviour encourage residents to engage in tasks and activities that interest or stimulate them.
Relationships (interactions). Residents engage in meaningful person-to-person interaction, the purpose of which is social.	Facility policies and practices encourage residents to have meaningful person-to-person interaction with other residents and staff, and with family.
Security/safety. Residents feel secure and confident about their personal safety and the security of their possessions, and they are clear about rules and practices.	The facility does everything possible to create the perception of safety and security, enable residents to move about freely, guard residents’ possessions, express expectations clearly, and apply rules fairly and flexibly.
Comfort. Residents experience minimal physical discomfort, including symptoms such as pain, aches, nausea, dizziness, constipation, and itching; they do not feel too cold, too hot, thirsty, or uncomfortable in a physical position. They perceive that staff notices and attends to their physical comfort.	Staff members notice and attend to residents’ physical comfort; this includes actively determining whether those residents who cannot easily express themselves need assistance.
Spiritual well-being. Residents perceive that their needs and concerns related to religion, prayer, meditation, moral values, and meaning in life are met.	Facility policies and practices and staff behaviour respect each resident’s religious beliefs, practices, and moral values and facilitate religious observation, prayer, and private meditation.
Functional competence. Residents function independently in keeping with their individual abilities and preferences.	Facility policies and practices and staff behaviour encourage residents to be independent with regard to self-care and personal mobility.

Source: Adapted from Lawton (4).

from 12 to 25 beds, and larger ones have as many as 40 beds. Change is a constant factor, as new hospice care settings are being built globally in highly diverse geographic locales (5). I conducted on-site postoccupancy evaluations of nearly 30 residential hospice facilities in Europe, Japan, and North America (6). At each site, I undertook focused interviews with staff, patients' family members, and, sometimes, residents themselves (see Appendix 1). I have also interviewed and corresponded with many architects who have designed hospices in a range of geographic locales. The aim of this discussion is therefore twofold: to report evidence-based precepts for application in the planning and design of residential hospices, and to outline challenges as well as opportunities for residentially centred hospice care.

The planning and design considerations are structured and reported in a holistic manner — that is, they are focused on hospice as a general building type, although distinctions are drawn between those precepts geared primarily to adult care settings and those geared to pediatric hospices. Beyond this, the compendium should be considered as a single lexicon, applicable in various ways across various site contexts. A total of 58 architectural planning and design considerations are reported here under the headings Site and Context, Arrival Spaces, Residential Milieu/Communal Spaces, Residential Milieu/Private Spaces, Transitional Spaces, and Nature Connectivity. An additional seven planning and design considerations under the heading Caregiver Support and the Total Hospice Environment address the needs of direct caregivers in relation to hospice operational management. These are not reported in Figure 1 as they pertain to the total care environment.

This compendium is for the use of architects, interior designers, direct care providers and their organizations, home healthcare agencies, non-governmental organizations, administrators and their governing boards, fundraisers and philanthropists, elected officials, health policy specialists, patients and their families, and patient advocacy organizations. In the following discussion, it is parenthetically indicated whether a given proviso is centred on adult hospice (AH), pediatric hospice (PH), or both (AH/PH). This permits the reporting of these different settings as though they were one and thus functions as a seamless walk-through from arrival on-site to entry into the most private interior realms. It also precludes the need for any further typological subdivision, which would have resulted in fragmentation.

As for the relationship of the planning and design considerations to Lawton's typology of resident outcomes and their implications for a

hospice setting, each is grounded in one (and often all) of the outcomes shown in Table 1: autonomy, individuality, dignity, privacy, satisfaction, meaningful activity, relationships and social interactions, security and safety, comfort, spiritual well-being, and functional competence. For example, with regard to meaningful activity, this outcome asserts, "Residents engage in discretionary behaviour, either through activity or passive observation, that they find interesting, stimulating, and worthwhile." The facility corollary states, "Facility policies and practices and staff behaviour encourage residents to engage in tasks and activities that interest or stimulate them." Some provisos express this dimension of hospice, including those that speak to spending time outdoors and in other realms where residents can socialize. Other provisos speak to the role of staff in encouraging and enabling residents to seek out privacy and respite. Unfortunately, space limitations preclude the full interpretation of all of Lawton's outcomes in this manner. At the very least, what follows can be taken as a broad discussion of Lawton's outcomes and facility indicators — a discussion generally applicable to all residential hospice settings, and one that is centred on evidence-based precedents.

SITE AND CONTEXT

Community and Neighbourhood Support

There are many rural, suburban, and urban hospices around the world. No signature hospice type exists, due to the diverse philosophies of caregivers, coupled with myriad place-specific demographic, socioeconomic, cultural, and logistical factors. In general, hospices in older, dense urban neighbourhoods have somewhat less physical autonomy, and yet they are often well accepted by the communities that house them. By contrast, those situated among single-family dwellings in suburban communities may require zoning variances and may be subject to the NIMBY ("Not in my backyard!") factor. Due diligence must be undertaken to determine: land acquisition costs; access to medical facilities, commercial areas, schools, parks, and recreation facilities; and access to major roads and public transit (AH/PH).

Hospices in Commercial Settings

When perusing site options in urban, mixed-use neighbourhoods, one may discover that elevated land values render it difficult to purchase enough land to provide adequate space for both the facility and its outdoor amenities (such as a garden), or even to furnish the number of surface parking stalls required by law. It can also be a challenge in such scenarios to have any resident bedrooms on

Figure 1 / Architectural and Landscape Design Considerations in Residential Hospice Environments



the ground floor. Difficult trade-offs will be required. Transit options, however, may be more attractive in urban settings, and this factor must be taken into consideration during site selection, especially when the hospice building is to be repurposed (AH/PH).

Adaptive Use Strategies

Many hospices operate in adapted older structures or in former hospital inpatient units (7). The Houston Hospice, in Houston, Texas, has as its administrative wing a converted 1927 private residence. Jerusalem House for people with HIV / AIDS, in Atlanta, Georgia, adapted a donated

private residence for its purposes. Maitri, a residential AIDS hospice with a courtyard / terrace in San Francisco, California, is housed in a former auto repair garage. Pediatric hospices require more outdoor space to accommodate play activities, not only for residents but also for their visiting siblings and friends. The aim is for the hospice to blend into its surroundings and not stand in stark contrast to the neighbourhood (AH/PH).

Edge Sites on Medical Centre Campuses

The site for a freestanding hospice, where feasible, should have an existing infrastructure, including parking, underground utility systems, and kitchen

and laundry facilities; it should also have a desirable land parcel donated by a parent or sponsoring healthcare institution. Such connections constitute an umbilical cord to an institutional mother ship and can be mutually advantageous — freeing up funds for the facility itself and for landscaping in support of therapeutic goals (AH/PH).

Cultural Diversity and Hospice Environment

In most countries, hospices are becoming more ethnically, racially, and socioeconomically diverse. Multiculturalism should be fostered, supported, and fully expressed in the architectural environment and in the facility's immediate environs (8). Overnight accommodations for family members should be designed with consideration given to diverse cultural traditions and behaviours (AH/PH).

Control of Unwanted Sounds

Unwanted sounds should be buffered within the hospice environment — that is, noise emanating from street traffic or nearby commercial establishments or industrial installations. The terminally ill are already under stress due to their condition and should not be subjected to further stress caused by the immediate built environment. Sound-absorbing wall, ceiling, and flooring materials should be used, and sleeping areas should be located away from noise sources. Garden walls, building setbacks, trees, porches, and terraces can double as acoustic buffers. By extension, indoor odours, while not an architectural factor, should also be controlled to avoid forcing inhabitants to limit their use of any room in the hospice (AH/PH).

Decentralized Clusters of Parking

Multiple clusters of parking and adjacent perimeter parking for staff, volunteers, and visitors are preferable to a single large expanse of asphalt. Parking clusters should be screened from residential areas, particularly bedrooms and meditative spaces. Lattice fences, walls, shrubs, berms, and trees are effective in this regard. Cars should not be visible from gardens and other outdoor spaces, and service driveways should not be visible from the public arrival zone (AH/PH).

Security and Well-being

Patients and their families deserve a safe, secure, and supportive care environment (9). Having a safe place to store personal items and a sense of personal safety is paramount, particularly in urban hospices. The threat of theft or disruption within one's personal space undermines the core hospice mission. Buffer zones (thresholds) must be protected from adjoining streets; hospice residents must be shielded from identifiable threats (AH/PH).

Environmental Sustainability and Site Selection

An abandoned greyfield hospital or a brownfield industrial facility may be offered as a site for a hospice. The donated building may be in a run-down condition, and the offer may be a take-it-or-leave-it one. This option may be cost-effective, unlike building on an open greenfield site. In the United States the LEED (Leadership in Energy and Environmental Design) system, which is administered by the US Green Building Council, promotes the adaptation of existing buildings for new uses. Recent progressive efforts in the US have been aimed at classifying hospices as large group homes instead of as hospitals. There is a need for consistency on this (AH/PH).

Climate and Hospice

Climate variations have significant effects on free-standing hospice requirements. In hot, humid regions, narrow building footprints, operable windows, and rainwater cisterns are needed. In hot, dry regions, a compact building design, courtyards, thick walls, and flat roofs with extended overhangs are desirable. In regions with a moderate climate, pitched roofs capable of handling snow loads, operable windows, and moderate roof overhangs are important (10). Cold regions require a north-south-exposure/heat-loss-ratio balance, pitched roofs, natural ventilation, and substantial insulation (AH/PH).

Involvement in Planning and Design Decisions

Successful capital improvement campaigns will include the input of diverse hospice constituencies: physicians, nurses, administrators, nursing assistants, dietitians, therapists, social workers, patients and their families, chaplains, nuns, volunteers, facility managers, exterior grounds personnel, and other stakeholders. Key off-site administrators and community-based advocates should be involved as well (AH/PH).

ARRIVAL SPACES

Architectural Identity

Most freestanding hospices seek to express an antihospital architectural image, regardless of whether the facility is contemporary or traditional in its architectural style. Carbon-neutral site-planning and building-design strategies need not eschew conventional architectural elements. These might include pitched roofs and indigenous materials such as stained exterior wood beams, siding, and trim; local building traditions could also be followed (AH/PH).

Protected Arrival Sequence

The facility's front entrance is where critical first impressions occur. A covered canopy will protect residents being dropped off at the main door from inclement weather. If space permits, this canopy could be made large enough to shelter multiple vehicles and disembarking occupants simultaneously. Such a protective device, especially when connected to a covered walkway, symbolically reaches outward. In cold climates, a weatherized vestibule should be constructed at the main entrance as a buffer (AH/PH).

Serialized Entry Zone

A porte cochère at the main entrance leading to the reception and living areas establishes a welcoming atmosphere. A central reception station is a symbolic gateway and the main control post for intercepting potential intruders (11). Adjoining spaces are needed where visitors can gather, or wait to receive the go-ahead to proceed to a resident's bedroom or another indoor or outdoor hospice space. Avoid way-finding systems that confuse residents, staff, and visitors (AH/PH).

Universal Design in Palliative Care

Adapted buildings are unsuitable for palliative care unless they are compassionately transformed to be accessible to persons of all ages and levels of ability (12). A universally designed environment will empower as opposed to disempower, and it will be anticipatory rather than restrictive (13). Hospices located in communities where they are defined by law as long-term care facilities will often have to comply with complex and daunting building and fire codes (AH/PH).

Expressions of Remembrance

Philanthropic gifts and bequests from individuals and foundations advance the core mission of the hospice. This is an essential dimension of care, and it may be manifested in a remembrance for a deceased loved one. The built environment provides a canvas for it: one can dedicate an in-hospital palliative care unit in the name of a family or a family member, donate artwork, fund an outdoor performance stage or a stained-glass chapel window, purchase furniture, establish a resource library, or even fund the construction of an entirely new building (AH/PH).

RESIDENTIAL MILIEU/ COMMUNAL SPACES

Living Rooms

A living room near the main front entry zone but not in full view of the entryway or the reception

area can function as the hospice's nexus of social activity. Such a room in a residential hospice can feature a large hearth, full-height windows, and an adjoining terrace (6). Also desirable are sofas, side tables furnished with reading lamps, built-in bookshelves, and a TV/audio system. At the George Mark Children's House in San Leandro, California, the living room adjoins a solarium. Wireless Internet access should be available throughout the facility and its grounds (AH/PH).

Day Rooms

Spaces are needed that can be adapted to accommodate a broad range of social activities. This will draw together the different families that come to the hospice rather than foster their isolation. Furnishings should be moveable and durable. There should be built-in shelving units, an alcove to house a flat-screen TV, wireless Internet access, a sound system for playing music, and a full-height storage closet for games and supplies. Half-height walls, room-to-room windows adjoining a hallway, and Dutch doors can permit visual connectivity with adjacent spaces, including the kitchen-dining area. Room-to-room windows are those that are located on an interior wall and allow for light and air to enter into an adjacent room or circulation space, such as a corridor. If feasible, multiple-activity zones should be established in different parts of the hospice (AH/PH).

Activity Rooms for Young Children

Some hospices offer rooms for play, quiet activities, birthday parties, reading, music and art therapy, group therapy, and physical therapy. A TV/DVD/audio system would be needed in such a space. Lighting and furnishings should be adaptable to a variety of activities, and the space should be equipped with sound-absorbing floor and wall surfaces, built-in bookshelves, storage closets, and a bathroom with fixtures scaled for young children, such as the one at the Hospice of the Central Coast, in Monterey, California (PH).

Activity Rooms for Adolescents and Young Adults

At the George Mark Children's House, there is a dedicated teen activity room with an electric piano, a drum kit, an audiovisual system, and a storage closet (6). The message is clear: create. Music therapists encourage children to engage in creative activity because it is a way for them to spend time away from adults. Required for this are sound-absorbing wall, floor, and ceiling surfaces, and at least one window. Soothing colours, artwork (perhaps a mural), chairs, a sofa, and tables will enhance such a space (PH).

Multisensory Rooms

A multisensory room is a place where a child can be immersed in light, sounds, colours, and smells. It is a stimulating environment. Fibre-optic technologies can facilitate sensory immersion via advanced aromatherapy, visual stimuli, and soundscaping (14). Such a space should be transformable and flexible; outside light should be controllable. Atmospheric therapy of this type requires carpeting, comfortable furnishings, pillows, and accommodation for wheelchair-bound residents. These rooms can be designed and programmed for the edification of adult residents, as well (6). An excellent example can be found at Bear Cottage, a children's hospice in Manly, New South Wales, Australia (AH/PH).

Art as Therapy

The therapeutic benefits of artwork cannot be overstated. Two- and three-dimensional art, wall tapestries, stained-glass windows, hand-painted murals, and landscape images can provide respite for hospice occupants (6). Tapestries line the walls at the Houston Hospice, doing double-duty as noise absorbers. Murals adorn the walls of the George Mark Children's House, including in bedrooms. Buddhist-themed art graces the public areas of Maitri. It is also desirable to provide a room for making art, which is an important activity for residents and their families (AH/PH).

Palliative Colours

Relatively few studies have been conducted on the impact of colour in healthcare environments, although it has been found that regional and cultural preferences are main determinants of colour choices for certain healthcare settings, and that pinks, mauves, and taupes reduce stress and anxiety among the aged (15). Prior research in long-term care settings suggests that while cool colour palettes are preferred for private spaces, warm colour palettes in public spaces tend to encourage social interaction (16). To date, there has been no empirical research published on the therapeutics of colour in hospice environments (AH/PH).

Dining

Spaces for dining should be designed with the flexibility to allow for both communal and individual dining options. Sharing a meal with others is a deeply rooted human predilection. By providing semiprivate spaces for residents, we enable those who desire privacy to dine without feeling isolated. Tables and chairs should be easy to move in order to facilitate a variety of seating options,

both indoors and outdoors. A sustained connection with nature — views of the outdoors — should be provided (AH/PH).

Central Kitchen and Dining Spaces

Providing the means for palliative care unit patients and their family members to prepare food independently is generally not feasible; neither is it viable in facilities where food is prepared off-site. Hospices should feature direct access between the kitchen and the dining room, as well as direct access for delivery and trash removal (6). Supplies need to be received without intrusion upon the ambiance of any adjacent living area. At Maitri, the dining room and kitchen open onto the main entrance and communal spaces (AH/PH).

Informal Dining Options

The preferred option is multiple zones for food preparation and an island countertop where, for example, a sandwich can be prepared at midnight. Counter seating situated between a commercial-grade kitchen and a dining room allows for extended personal choice (6). Installing a mini-kitchen next to the main kitchen for after-hours use will permit residents to dine alone or with a loved one at a time of their choosing. One example of this arrangement is the intermediate kitchen at the Essa Flory Hospice Center in Lancaster, Pennsylvania (AH/PH).

Resource Library

A resource library equipped with wireless Internet access as well as books and magazines can serve as a social nexus within the facility (17). Semiprivate niches furnished with moveable tables and chairs and built-in window seats, such as those found at the North London Hospice, in London, UK, can accommodate such a resource (6). The library should not be situated near an activity room for small children or adolescents. A connecting door to a garden will foster a connection to the natural world while simultaneously allowing for a quiet reading session (AH/PH).

Accommodations for Pets

Meaningful contact with a beloved pet can reduce the stress experienced by residents and their family members. Provisions should be made for unobtrusive and hygienic pets, both within residential areas of the hospice and in close proximity to them. The George Mark Children's House has a freestanding kennel and horse shelter (6). Pets reaffirm the rhythms of life and contribute to residents' sense of well-being (PH).

RESIDENTIAL MILIEU/PRIVATE SPACES

Palliative Bedrooms

The bedroom is an extremely important component of the hospice setting. It should not resemble a hospital room (6). Windows and views are important. Serving as a space for socializing, sleeping, meditating, and grieving is its core function. The bedroom should feature wall sconces, as well as incandescent task lighting and ambient lighting that can be controlled by the resident; a fluorescent fixture should also be installed near or above the bed, where a high level of illumination is often required. A headwall should conceal all medical gas and oxygen feeds. In adult hospices, swing rooms should be allocated that can be adapted for residents and their families (AH/PH).

Personalization Options

Residents require an easily accessible closet with drawers and a wardrobe section in which to store their personal belongings. Their family members should be permitted to furnish the room with a special chair, rug, and photos or other mementos. This will assist residents to make the transition from hospital or home to hospice (6). Moveable within-room partitions afford privacy, and the zones they create can be modified by folding the partitions or sliding them into a wall recess, as with a Japanese shoji screen. Bedpans should be easily accessed but stored out of sight (AH/PH).

Transprogrammation

Bedrooms should be designed so that they can be reconfigured in response to their occupants' changing needs and preferences. It may be desirable from a staffing perspective to have a private room that can be altered by adding a privacy screen to allow for a second bed. As need dictates, interior dividers can be added or removed — for example, a wall mounted on ceiling tracks that staff can pull across the room. A transprogrammable room, therefore, is one that can accommodate more than a single concurrent use or can be adapted to house more or fewer beds. Most adults prefer a single room, while younger residents tend to prefer a semiprivate one (AH/PH).

Articulated Residences

Semi-autonomous dwellings can be connected to various support spaces, like single-family dwellings. This effect is attainable even in dense urban settings. A former warehouse in an industrial district, for instance, can symbolize a village — every bedroom-dwelling is distinguished by means of its colour, materials, skylights, recesses, textures, setbacks, balconies, and patios (AH/PH).

Lightness/Darkness Continuum

Natural light is life-affirming. Residents may crave natural daylight upon first arriving at hospice, but as their health status declines they may begin to shut down, gradually rejecting brightness in favour of a darker, almost cavelike atmosphere. Near death, many will want the blinds and curtains closed. Of course, windows and views are still important — the point is to give residents the power to regulate the lighting as their condition changes (AH/PH).

Infection Control/Personal Hygiene

The prevention of contact-spread infection is of paramount importance in healthcare settings. The need to mitigate pathogens such as methicillin-resistant *Staphylococcus aureus*, *Clostridium difficile*, and vancomycin-resistant *Enterococcus*, which survive on interior surfaces and furnishings, is determined by a thorough risk assessment. This is a critically important issue and must be viewed as a facility-wide priority. All equipment and furnishings must be assiduously sanitized. Private or semiprivate bath/shower rooms, to be shared by no more than two residents, should be provided. Also, one or more isolation rooms should be designated within the facility (6). A closet and a cabinet with drawers, a compartmentalized commode, and a shower stall/tub unit are needed for these rooms, and, where feasible, artwork, murals, attractive yet durable wall coverings, and an indirect daylight source should be considered. At the Aichi Hospice Association Hospice in Aichi Prefecture, Japan, the commode and sink are next to the bed, and the commode is hidden from view by a privacy curtain (AH/PH).

Family Overnight Accommodations

Family members of residents may have to travel a long way to the hospice (18). Hospices in diverse physical locations — rural, suburban, or urban — should provide convertible or pullout beds for family members and other visitors (6). A small number (perhaps two or three) efficiency apartments should be available to these visitors from afar; the units should be near the hospice yet autonomous from it (AH/PH).

Nursing Stations

Nursing stations should be constructed for the hospice that are fully functional but do not resemble hospital nursing stations. Assisted-living centres in the US eschew institutional, hospital-like, iconic nursing stations. Hospices should endeavour to blur these traditional barriers between patient and caregiver (6). However, the spatial configuration, size, and amenity of the

nursing station should still allow for routine tasks to be performed. The station should include a medication dispensary alcove for a Pyxis (or equivalent) automated medication management system, an alcove for food service carts so they do not block circulation paths, and an adjoining break room in which staff and volunteers can eat or simply rest (AH/PH).

Spa/Hydrotherapy Rooms

Water can be key in pain management (19). Hospices should avoid having windowless, hospital-like compartments for hydrotherapy (6). At Robin House Children's Hospice in Balloch, Scotland, the hydrotherapy room features large windows affording expansive views of a rural landscape. The whirlpool at Bear Cottage has natural wood indoor decking, full-height windows with landscape views, and an adjoining outdoor deck. Provision should be made for massage therapy, acupuncture, and alternative medicine treatments in accordance with the philosophy of the organization. Particular attention should be paid to the gurney, the bathing unit, the unit's placement and access, systems for tub-to-commode transfer, lighting, artwork, systems for mitigating unpleasant odours, linen storage, infrared heaters, and blanket-warmer storage and retrieval (AH/PH).

Places for Young Visitors

A seating alcove should be set up in the resident's bedroom where a visiting child can read a book or just hang out within close physical proximity to the resident. Where space permits, a quiet activity area for a few young children and a door leading directly to an outdoor patio or balcony could be included. Acoustical control, an absence of physical hazards, and ease of child supervision are all desirable. No adult should ever be required, due to inadequate space design, to say to a child or adolescent: "Please don't touch that"; "Get off that"; or "Stay away from that." These spaces are meant to be safe, secure, easily cleaned, and either in (or in close proximity to) the bedroom (AH/PH).

Decentralized Storage

Storage space is limited in most hospices, yet personal items — a favourite chair, an area rug, clothing, or personal mementos — deserve a proper place. Stored items should be easily retrievable. Storage space must not be too small or at too great a remove. Freestanding and built-in drawers and shelving should be provided. Family members need a closet of their own on overnight stays; the number of family members spending time at the hospice will vary dramatically according to cultural, logistical, and economic factors (AH/PH).

Age Appropriateness

Pediatric hospices require beds, furniture, colour schemes, artwork, flooring, lighting fixtures, bathrooms, tub/shower units, and play/entertainment objects that are age appropriate, durable, easy to sanitize, and/or operable with relative ease. The facility should gear these fixtures, furnishings, and play objects to the needs, preferences, capabilities, and desires of young residents and their family members (PH).

Laundry/Housekeeping

In hospital-based and freestanding hospices, laundry and housekeeping services require more than a single dedicated room. They need a central workroom and storage units dispersed throughout the residential realm. Residents' family members should have a separate laundry room; it should be within the residential milieu, close to social interaction areas. It is desirable to equip this facility with a few chairs to encourage socialization and pair it with a mini-kitchen that has a microwave oven, sink, and refrigerator (AH/PH).

TRANSITIONAL SPACES

Variety of Circulation Paths/Nodes

The long, drab corridors found in most hospitals should not be a hospice feature. At the Willowbrook Hospice in St. Helen's, Merseyside, UK, bedrooms open directly onto a single loaded corridor with full-height glass windows that provide views of a landscaped courtyard. Corridors should be as short as possible; it is preferable to cluster residents' bedrooms, interspersing them with window-seat alcoves in the hallways, at path intersections, at the ends of corridors, and in outdoor patios and gardens (AH/PH).

Articulated Thresholds

Outside residents' bedroom doors there should be seating and art should be displayed on the walls. Above each door, a porch light should be installed; a small photo of the resident could be posted next to the door, and there could be potted plants. Such softening of the bedroom threshold gives a positive aesthetic impression while differentiating the corridor (outer) side from the bedroom (inner) side. When articulated thresholds appear along a bedroom corridor, the effect is welcoming — far more welcoming than the impression one receives when moving along corridors in a typical hospital or nursing home (AH/PH).

Window Seats

Semiprivate, recessed seating nodes located along a circulation path allow for periodic respite. Family stress levels are extremely high in the

hospice setting, and personal space of any type is difficult to find without exiting the building or even the campus. To rectify this situation, the hospice design can be made to include spaces where individuals can retreat, consult, and reflect without completely leaving the site. (AH/PH).

Meditation and Prayer

Meditative and prayer spaces to accommodate a range of faiths and cultures are few in hospitals (1, p. 78). In hospices, spaces for reflection and meditation are required to fulfill diverse needs and preferences (20). A single room is inadequate (6). These spaces must be available to all, staff and volunteers included; they should afford intimacy and security, and they should have windows and illumination sources. Examples of such meditation rooms can be found at Hospice Austin's Christopher House, in Austin, Texas, and at the North London Hospice, where large stained-glass windows function as visual attractors (AH/PH).

Grieving Rooms

Bereavement is a complex phenomenon. In hospitals, the deceased are whisked away to the morgue. Few hospitals are designed to accommodate grieving — the norm is "Wait out in the corridor" (21). In palliative care settings, the norm should be the exact opposite. The bereaved require adequate time and space to grasp the full ramifications of what has occurred. A grieving individual may or may not desire physical contact with others. In the hospice, space for grieving is needed indoors, in a semi-enclosed exterior space such as a covered terrace, or outdoors in an open space such as a garden (AH/PH).

NATURE CONNECTIVITY

Theraserialization

The term "theraserialization" is a hybrid of "therapeutic" and "serialization." It is exemplified by healthcare facilities that are designed to afford therapeutic amenities in a seamless, continuous, serialized manner — facilities where every space and every transition, zone to zone and room to room, expresses this goal. We should no longer think of outside versus inside. Instead, we should think of outside and inside as a single continuum. Landscape buffers can help to obscure the hospice from direct public view and thereby allow for more transparency and openness — for example, with landscape buffers ensuring privacy, additional windows could be installed that would naturally illuminate the end of a long corridor. A seamless continuum between the interior and exterior realms is desirable. Landscaping can con-

tribute to the creation of a theraserialized hospice site (AH/PH).

Windows, Views, and Doors

Empirical research conducted in hospitals over the past two decades points to the therapeutic value of affording patients a full view from their beds, a view that captures the ground plane, a midlevel layer, and the sky (6). The same precept applies to the hospice. Bed position relative to window location is a major design decision in any hospice. A door with full-height glass that leads to an outdoor space will permit an expanded view and allow even more light into the room. To be avoided are windows that yield a monotonous or partially obscured view; this would be tantamount to sensory deprivation. Yet residents can suffer sensory overload when their privacy is compromised by having the bed too close to a window, or when sunlight penetration is intense enough to cause discomfort (AH/PH).

Natural Ventilation

If private residences have operable windows, why can't hospices? Natural ventilation counters indoor air toxicity and the ill effects of fumes emanating from furnishings and cleaning chemicals. Hospices should take in fresh air via windows and aperture screening, but they must do so in a way that does not compromise the facility's HVAC (heating, ventilation, and air conditioning) systems. Having some control over fresh air intake will empower residents by allowing them a greater degree of personal choice — some will want to enjoy the smell of freshly cut grass, feel a morning breeze, or just listen to the sounds of life outside of the hospice while still being able to adjust their in-room thermostat (AH/PH).

Balconies and Patios

Hospice residents can benefit from having contact with the outdoors while retaining a degree of privacy. A semiprivate window seat, a quiet patio, or a balcony off the bedroom accessible via a lockable door would offer this contact along with a sense of security. Residents' bedrooms should be fitted with sliding or conventional hinged doors allowing direct access to the outdoors; this would theraserialize the residential realm of the hospice. Privacy should be maximized. One option would be to have two adjoining bedrooms share a balcony or patio (AH/PH).

Connection to Nature

The terminally ill can derive significant palliative support from a connection to nature — in their bedrooms, in the day rooms, and in art therapy and music therapy spaces (6). A hospice site that

allows for views of the outdoors and has outdoor spaces where residents and their families can walk and find respite is desirable. If this is not possible, then the hospice should offer simulated views and multisensory virtual experiences, engaging residents with representations of the auditory, visual, tactile, and olfactory stimuli of the natural landscape — the sound of the wind, the smell of the ocean, the sight of seagulls flying overhead in a sunlit sky or a forest at dusk. Advanced digital technologies can be employed to re-create the seasonal rhythms of nature (AH/PH).

Outdoor Meditation and Respite

Outdoor extensions of the interior realm warrant consideration during hospice site planning and design. Places for respite are of particular importance in larger hospices. Arbours, alcoves, or a fountain or pond with running water and nearby seating allow residents and their family members to spend time outdoors without venturing too far; they offer spatial autonomy and the chance to spend a little time on one's own (AH/PH).

Gardens and Gardening

A tranquil garden featuring indigenous plants can be a source of aesthetic enjoyment and a means of promoting therapeutic physical activity (22). For those who are able to do it, gardening can foster a sense of accomplishment and pride. Platform gardens at wheelchair height facilitate resident gardening. A greenhouse on the grounds could also be beneficial. Whether they are situated in a greenhouse or outdoors, platform garden plots should be approximately 1.5 to 2 metres square, and near a water source (AH/PH).

Water as a Therapeutic Modality

Watching fish circulate in a pond, seeing sunlight reflected on the water's surface — these moments can hold great meaning for the terminally ill (6). The shallow pond that extends along the main-entrance walkway of Japan's AHA Hospice invites such introspection. At the Houston Hospice and at the St. Joseph's Hospice and the St. Christopher's Hospice in London, UK, exterior water fountains and ponds are popular features (AH/PH).

Semiprivate Courtyards

A small courtyard adjacent to a grouping of two to four residents' bedrooms would effectively draw residents and their families together outdoors. Hospices would be enhanced by having a small, shaded, protected, semiprivate courtyard directly adjacent to each bedroom cluster. Such spaces could have a few semiprivate niches that would be separated from both the facility's more public exterior spaces and the indoor realm. A table,

seating, a swing, and sliding glass or hinged doors with direct access to residents' bedrooms would all enhance the courtyard (AH/PH).

Outdoor Play Areas for Children

A child or adolescent who has the physical stamina can benefit from playing outdoors — even if he or she is alone, and even if only short play periods are feasible. Lack of exterior space or unsuitable outdoor surfaces can impede such activity. Young children, in particular, need to experience the empowerment that comes through play. They need flexible and stimulating spaces for imaginative outdoor play activity, and adults must be able to watch over them as they play in these spaces to ensure their safety (PH).

Ground Textures

Multiple types of ground textures are required to accommodate play. Children prefer grass, sand, soil, paving stone, and pebbles, although each has its drawbacks. Different materials can be used to symbolize water — for example, a footbridge can be built to span an imaginary riverbed composed of smooth stones fixed in place (6). An assessment should be made of the best uses of the available space in this regard, and consideration must also be given to which surface materials will permit wheelchair access (PH).

Natural Material Palette

Wood is of the earth. A tree grows in time, symbolizing the changing seasons. Wood has played a prominent role in sheltering humans across the millennia, so it is not surprising that it is widely used in hospice environments. By contrast, wood is virtually nonexistent in hospitals. Hospices should use laminate wood for flooring in bedrooms and in day rooms, and wood for ceilings, decks, balconies, and trellises (AH/PH).

CAREGIVER SUPPORT AND THE TOTAL HOSPICE ENVIRONMENT

Hospice staff members are essential to the day-to-day functioning of a successful hospice program. It is these people who provide compassionate care and counsel to patients and their families. Upon the death of a resident, staff members also need to grieve. Yet as professionals they have to somehow remain detached and able to move forward. This can result in pent-up emotions and eventual burnout. Some of the seven considerations presented in this section were included in the aforementioned reference work (6, pp. 80-84), while others extend beyond it. All, however, are centred on the integral role of direct caregivers.

Staff Fatigue Mitigation

A hospice nurse can walk as far as five miles during a single shift. If that is not taken into consideration during the planning phase, the hospice itself can be the cause of excessive demand. Inefficient staff flow patterns result from inefficient floor plan layouts. An additional consideration is staff members' need for spaces in which they can be alone — places where they can find respite and grieve privately. Lounges, break rooms, and outdoor patios can meet this need.

Family Orientation

Staff members play a major role in reducing the uncertainty and stress that a patient's family members feel when they first arrive at the hospice. A tour given by staff at this most sensitive of moments can help to dispel stereotypes and myths related to hospice care. Clear directional signage and room identification should be provided to help first-time visitors orient themselves. A facility with a convoluted, difficult-to-navigate floor plan does little to assuage the new visitors' fears.

Body Viewing and Removal

Staff members and clergy will counsel families who have lost their loved ones and are starting the grieving process. The hospice must have a grieving room to accommodate this process. At this point, staff members will assist the family to make decisions about, for example, whether to leave the deceased patient in the bedroom for a few hours or transfer the body immediately to the grieving room, or when to have the body removed from the hospice premises.

Inclement Weather Provisions

Providing staff members with a place to spend the night when they are unable to travel home due to inclement weather can help to alleviate their stress. Such accommodations could consist of two or three dormitory-style rooms with a shared bath/shower. These rooms could also be used to accommodate residents' families.

Administrative Spaces

Administrative staff members need a private workspace and a place to offer counselling. These spaces should be located away from the residential and social realms and sequestered from major activity areas. The volunteers' office is an exception. Volunteers can share an open-plan workspace with a large table at the centre ringed by workstations; this office should be situated near the hospice's main entrance, because volunteers are often called upon to provide assistance and general information to visitors.

Counselling Spaces

Counselling occurs anywhere and everywhere within the hospice and its grounds. Informal and formal meetings are arranged to discuss the admission of a patient, to review his or her status, and to counsel the patient's family members and others. The hospice needs to maintain offices for this function within the central administration suite, but much counselling also occurs in other quiet locations — on window seats and in outdoor spaces. Adequate alternative spaces for counselling should be thus be provided.

Facility Management Best Practices

The field of facility management has developed significantly over the past decade. The facility manager keeps the hospice operating smoothly on a day-to-day basis, ensuring, for example, that all service deliveries are made at the service entrance, not via the main door. Facility management encompasses the full range of functional operations: maintenance, security, and landscaping. It also involves utilizing energy-efficient systems to achieve maximum cost savings (23) and complying with safety and building codes and the medical waste disposal regulations issued by all levels of government. In all of this, facility managers must work closely with direct caregivers.

CONCLUSION

With this discussion, I have sought to complement and extend prior literature on the planning and design of hospice facilities, including works by Ken Worpole (1) and the Facility Guidelines Institute (3). This growing body of literature also includes the *Hospice Design Manual for Inpatient Facilities* (24) and the *Children's Hospice Design Manual* (25). As for the future, I believe that four determinants will likely impact residential hospices:

Governments will fund supportive care environments for the terminally ill. The blueprint for global healthcare will hinge upon less costly alternatives to extended hospitalization until death: home healthcare; neighbourhood-based health education centres; community-based primary care; and specialized clinics for kidney dialysis treatment, minor surgery, and the like (26). The deinstitutionalization and demedicalization of care that was once delivered in hospital will accelerate (27).

There will be more intelligent hospices and palliative support. Rooms, furnishings, walls, ceilings, lighting, appliances, and ambient spatial features will sense occupants' status on a 24/7 basis. Memory chip implants will allow the terminally ill an unprecedented degree of control over their immediate surroundings. Advanced assistive technolo-

gies — robotics, holography, and nanotechnology — also hold great promise (28). Sony Corporation's SDR-4X biped personal assistant robot is designed to be used by people in their homes or in institutional settings (29). The hospice facility itself will be able to anticipate patient needs and respond prosthetically (30).

Carbon-neutral palliative architecture will become more popular. Many medical centres are reluctant to adopt a leadership position on energy conservation (31), but they are under increasing pressure to reduce the high volume of toxic waste they produce (32). In developing countries, premanufactured hospice facilities would represent a valid alternative (33). Such facilities can be rapidly commissioned and deployed, often at a lower cost, in a matter of weeks instead of months, or even years (34). The premade hospice option would allow for standardization of design and component construction, materials, and workmanship; but the manufacturing process must be flexible enough to accommodate local cultural traditions and certain vernacular building traditions in highly diverse geographic locales and climatic conditions (35).

Evidence-based research and design will increase. Research on the relationship between the built environment and human health can help us to understand the psychosocial, physiological, and cultural dimensions of terminal illness (36). It can link global biogerontology, palliative medicine and nursing, optical imaging, holography, and nanotechnology with advancements in industrial design, biomedical engineering, architecture, landscape architecture, and urban design (37).

There are some limitations to this discussion. It would have been useful to include floor plans and photographs to illustrate and amplify key issues and design strategies. Unfortunately, space limitations precluded this. It would also have been beneficial, if space allowed, to accord more attention to operational and staffing dimensions of the hospice experience that are direct corollaries of the built environment — for example, one could examine the ways in which art therapy rooms could be better suited to the programs they house, or, best practices in the staffing of outdoor spaces, such as gardens and courtyards. Future evidence-based research and design should focus on these and other staffing best practices across the various realms of hospice. It would also be prudent to research quantitative best practices in the application of this compendium as a basis for continued testing in the field, and as a basis for its continued evolution and improvement.

There are currently more than 250 dedicated hospices in the UK alone, and 8,500 hospice programs in 123 countries around the world. These

numbers are growing. In developed countries, the hospice movement was launched to address the physical, emotional, and spiritual needs of the dying (1). In developing countries, the rapid spread of HIV/AIDS has resulted in the need for many new programs and facilities, especially residential pediatric hospices. In South Africa, where 5.2 million persons are HIV-positive, the need is great (38), as it is in Eastern Europe (39).

This discussion both mirrors and extends the discussion I initiated in my 2006 book *Innovations in Hospice Architecture* (6). Hospices that are planned, maintained, and managed well can help to counter the inadequacies of a society that so often isolates patients from their families during their time of greatest need (40). Dying with dignity — without fear, anxiety, isolation, or societal marginalization — must triumph over cure (41). Patients who are able to enjoy aesthetic experiences, engage with nature, and reside in a care setting that nurtures rather than impedes their personal autonomy and affords them respite and self-reconciliation can achieve a sense of closure while simultaneously receiving day-to-day functional support. Whether one is building a new hospice facility, seeking funds to adapt an existing building, or renovating the ward or wing of a hospital to serve as a hospice, proper preparation and effective communication are essential. This task will require vision, resilience, commitment, and the strength to persevere against all odds.

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REFERENCES

1. Worpole K. Modern hospice design: the architecture of palliative care. London and New York: Routledge; 2009.
2. Brereton L, Gardiner C, Gott M, et al. The hospital environment for end of life care of older adults and their families: an integrative review. *J Adv Nurs* 2012; 68(5): 981-993.
3. Facility Guidelines Institute (FGI). Guidelines for design and construction of residential health, care, and support facilities. Dallas (TX): FGI; 2014.
4. Lawton MP. The physical environment of the person with Alzheimer's disease. *Aging Ment Health* 2001; (5 Suppl1): S56-S64.
5. Borneman T. Improving the end-of-life experience. *Oncology* 2009; 23(4 Suppl Nurse Ed): 17-18.
6. Verderber SJ, Refuerzo BJ. *Innovations in hospice architecture*. Abingdon (UK) and New York: Taylor and Francis; 2006.
7. Gardiner C, Cobb M, Gott M, et al. Barriers to providing palliative care for older people in acute hospitals. *Age Ageing* 2011; 40(2): 233-238.
8. Rowlands J, Noble S. How does the environment impact on the quality of life of advanced cancer patients? A qualitative study with implications for ward design. *Palliat Med* 2008; 22(6): 768-774.
9. Hales S, Zimmerman C, Rodin G. The quality of dying and death. *Arch Int Med* 2008; 168(9): 912-918.
10. Olgyay V. *Design with climate: bioclimatic approach to architectural regionalism*. Princeton (NJ): Princeton University Press; 1963.
11. Moorhouse T. *Hospice design manual for in-patient facilities*. Portland (ME): Hospice Education Institute; 2006.

12. Universal design handbook. 2nd ed. Preiser WFE, Smith KH, editors. New York: McGraw-Hill; 2010.
13. Mayer RN, Rohde, JM. A clear path. *Healthcare design*. 2013 Mar.; 30-33.
14. Depledge MH, Stone RJ, Bird WJ. Can natural and virtual environments be used to promote improved human health and wellbeing? *Environ Sci Technol* 2011; 45(11): 4660-4665.
15. Tofle RT, Schwarz B, Yoon SY, et al. Color in healthcare environments. San Francisco: Coalition for Health Environments Research; 2004 July. Accessed Mar. 30, 2014. www.healthdesign.org/sites/default/files/color_in_hc_enviro.pdf
16. Leibrock CA, Harris DD. Design details for health: making the most of design's healing potential. 2nd ed. New York: Wiley; 2011.
17. Teno JM, Clarridge BR, Casey V, et al. Family perspectives on end-of-life care at the last place of care. *JAMA* 2004; 291(1): 88-93.
18. Andershed B. Relatives in end-of-life care — part 1: a systematic review of the literature the last five years, January 1999-February 2004. *J Clin Nurs* 2006; 15(9): 1158-1169.
19. Balogh Z, Ordógh BZ, Gász A, et al. Effectiveness of balneotherapy in chronic low back pain — a randomized single-blind controlled follow-up study. *Forsch Komplementarmed Klass Naturheilkd* 2005; 12(4): 196-201.
20. Neuberger J. Caring for dying people of different faiths. 2nd ed. London: Mosby; 1994.
21. Verderber S, Fine DJ. Healthcare architecture in an era of radical transformation. New Haven and London: Yale University Press; 2000.
22. Cooper-Marcus C, Barnes M. Healing gardens: therapeutic benefits and design recommendations. New York: Wiley; 1999. (Wiley Series in Healthcare and Senior Living Design).
23. Children's Hospice Association Scotland (CHAS). Design brief for the proposed new hospice — Balloch. Aberdeen: CHAS; 2000.
24. Hospice Education Institute (HEI). Hospice design manual for inpatient facilities. Machiasport (ME): HEI; 2006.
25. Hospice Education Institute (HEI). Children's hospice design manual. Machiasport (ME): HEI; 2010.
26. Francis S, Glanville R, for the Nuffield Trust and the RIBA Future Studies Group. Building a 2020 vision: our future healthcare environments. Norwich (UK): Stationery Office; 2001.
27. Coile RC Jr. The paperless hospital: healthcare in a digital age. Ann Arbor (MI): Health Administration Press; 2002.
28. Stewart A. A silver lining? Japan, Inc. 2002 Mar. Accessed Mar. 30, 2014. <http://www.japaninc.com/article.php?articleID=742>
29. Kageyama Y. Sony upgrade can sing and feign dialogue. *Japan Times*. Mar. 28, 2003. Accessed Mar. 30, 2014. www.japan-times.co.jp/news/2003/03/28/business/sony-robot-upgrade-can-sing-and-feign-dialogue/#.UzgxX61dW9A
30. Greimel H. Houses of tomorrow check health, dress you, tuck you in. *Times-Picayune*. Sept. 10, 2002.
31. Verderber S, Fauerbach J, Walter B. On the value of environmental stewardship and sustainability in health administration education. *J Health Adm Educ* 2008; 25(3): 191-211.
32. Ashton J. From sickness treatment...to sustainable development. *Green Futures*. 2002 May: 24-29.
33. World Health Organization (WHO) and United Nations Children's Fund (UNICEF). Global water supply and sanitation assessment 2000 report. Geneva: WHO and UNICEF; 2000.
34. Thurgood M. 2020 visions—and a zero waste world? *Green Futures*. 2002 July: 44-49.
35. World Health Organization (WHO). District health facilities: guidelines for development and operations. Geneva: WHO; 1998.
36. Ulrich RS, Zimring C, Zhu X, et al. A review of the research literature on evidence-based healthcare design. *HERD* 2008; 1(3): 101-165.
37. Toy M, Jencks C. Millennium architecture. New York: Wiley; 2000.
38. Wright M, Clark D. Hospice and palliative care in Africa: a review of developments and challenges. Oxford: Oxford University Press; 2006.
39. Clark D, Wright M. Facing death. Transitions in end of life care: hospice and related developments in Eastern Europe and Central Asia. Buckingham (UK): Open University; 2003.
40. Meyers F. Improvements in end-of-life care in selected populations. University of California, Davis, School of Medicine, Sacramento (CA), circa 2003. [Description of a project conducted as part of the Robert Wood Johnson Foundation's Promoting Excellence in End-of-Life Care program.] Accessed Mar. 30, 2014. www.mywhatever.com/cifwriter/content/41/pe1258.html
41. Kübler-Ross E. On life after death. Berkeley (CA): Celestial Arts; 1991.

Appendix 1 / Foundations of the Research

In 2002, I undertook a number of hospice site visits. As I toured each facility, I met with caregivers and administrators, conducting focused interviews structured on the four dimensions of a typical residential hospice environment: the patterns of use and occupancy followed by staff, residents/patients, volunteers, and patients' family members; maintenance and upkeep both on a day-to-day basis and a long-term basis; environmental control systems centred on human comfort, temperature, humidity levels, natural daylight, heating, ventilation, and air conditioning support, and ventilation options; and aesthetics and overall appearance and image. My interviews were compounded by many informal conversations with residents.

The survey-interview had three parts. Part I consisted of eleven questions (Q1 to Q11). These addressed the location of the facility, the number of parking spaces on-site and nearby, the year the facility was constructed, its principal construction type (frame, concrete, brick) and number of floors, the facility's former use (if applicable), its level of access for the disabled, its annual expenditures for repairs and maintenance, the length of time it had been open, whether or not it had undergone major expansion or renovations, the number of full- and part-time staff members and volunteers, the number of beds, the range of programs offered, the average age of patients, the role of the board of directors (if applicable), and the average weekly census.

Part II consisted of five items (Q12 to Q17), all requiring a yes/no/unsure response, that addressed: satisfaction levels with the facility's location and accessibility, its overall aesthetic

appearance and image, and its staff size and composition. Each item was accompanied by a 4-point Likert response scale, with column 1 indicating "not at all satisfied," column 2 indicating "somewhat satisfied," column 3 indicating "quite satisfied," and column 4 indicating "very satisfied." Additional questions (Q18 to Q35) focused on satisfaction levels with the facility's interior spaces — that is, size, lighting, noise levels, furnishings, colour scheme, security, degree of privacy/confidentiality afforded, views to the outside, layout and staff flow, directional signage and way finding, temperature levels, and the amount of storage space for residents and for staff medical supplies. Additional spaces assessed included therapy-activity rooms, day rooms, main foyer/lobby and receiving areas, administrative/staff offices, and exterior spaces such as patios and gardens.

Part III included five items (Q36 to Q40) that asked staff interviewees to state three or more interior physical features of the facility that they were particularly pleased with, and three or more that they would alter if they could. They were also requested to list three or more exterior physical features of the facility and/or its grounds that they liked, and three or more that they would change. The final question asked interviewees to name any major repairs to the hospice facility that they thought were necessary.

I read the questions aloud to interviewees sequentially. Interviewee groups ranged in size from two to five persons. Respondents were encouraged to make additional comments. The interviews lasted for approximately one hour. Each facility and its exterior environs were photographed. The information obtained was analyzed qualitatively via content analysis.

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