code plus

PHYSICAL DESIGN
COMPONENTS FOR AN
ELDER FRIENDLY HOSPITAL

A guide to support decision-making for:

- administrators
- healthcare professionals
- architects
- purchasing staff
- maintenance staff

Co-authored by:
Belinda Parke MSN GNC(C) PhD
Kathleen Friesen RN BSN MA

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About Fraser Health

Fraser Health is one of the largest health organizations in Canada and the fastest-growing health authority in British Columbia. It represents 22 municipalities, ranging from rural communities to large suburban centres, and serves close to 1.5 million people, about one-third of the province's population.

Fraser Health operates 12 acute care hospitals with approximately 2,000 acute care beds. Its emergency departments treat over 400,000 people annually and it provides over 115,000 surgical procedures. Fraser Health also maintains more than 7,000 residential complex beds alongside its hospitals or in the community.

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Code Plus: Physical Design Components for an Elder Friendly Hospital is the result of the authors' two years of work on the Code Plus initiative in collaboration with many colleagues and experts.

About the authors

Belinda Parke is a Clinical Nurse Specialist in Older Adult Health with twenty-five years of practice experience, and an Adjunct Professor in the University of Victoria School of Nursing. She has been engaged in academic research related to older adult health and hospitalization since 1991, and has published widely on the subject. Ms. Parke is a frequent guest speaker at national and international health and gerontological conferences.

The concept of an "elder friendly hospital" originated as part of Ms. Parke's clinical practice and concurrent academic research while at the Vancouver Island Health Authority. She first published on the subject in 1999. Through her continued clinical practice and doctoral research, Ms. Parke went on to develop a four dimensional model for creating an elder friendly hospital, which is described in the introduction to Code Plus: Physical Design Components for an Elder Friendly Hospital. In 2003, Ms. Parke joined Fraser Health Authority as a Clinical Nurse Specialist in Older Adult Health, and subsequently became part of its Geriatric Clinical Service, Planning and Delivery Team, where she teamed with Ms. Friesen to develop the physical design component of her elder friendly hospital model.

Kathleen Friesen is Director, Geriatric Services for Fraser Health. In her role, she leads the planning, implementing and evaluating of sustainable geriatric services, improvement initiatives and delivery systems across the organization. Ms. Friesen has over two decades of practice experience in various nursing specializations and has served in both nursing and program management capacities. Over her career, she has held leadership roles in the areas of Acute and Specialized Geriatric Programs, Rehabilitation, Emergency and Health Promotion. Ms. Friesen is also a well-regarded educator who has trained professional staff and community leaders, and is a frequent guest speaker at conferences.

Due to her strategic skills and track record developing and implementing leading geriatric programs, Ms. Friesen was able to build management support and bring together the necessary resources and expertise within Fraser Health to develop the initiative. She partnered with Ms. Parke to bring the elder friendly hospital concept to the Fraser Health geriatric team, which adopted its framework, and then co-lead the Code Plus initiative, taking responsibility for strategic planning and management of the project.

Preface Moving Toward "Elder Friendly Hospitals"

Any Western developed country that is experiencing an aging population will be challenged in providing health care and services to older adults. As a large local health organization, Fraser Health exemplifies a far-reaching problem. Older adults are frequent users of Fraser Health's twelve acute care hospitals: people over age 65 account for approximately 33% of acute hospital encounters, but occupy 55% of total patient bed days. Therefore, over 50% of Fraser Health's hospital operations presently revolve around older adults (Fraser Health Seniors Profile, 2005).

Use of hospital services increases with age, and older adults also tend to stay in hospital longer. In Canada, older adults are frequent users of hospital services. In 1997-98, older adults accounted for 35% of the three million discharges from Canadian hospitals, 52% of the 21 million patient days, and nearly one-third of all primary diagnostic and surgical procedures.[1] Current demographics indicate that there will be more older adults using hospitals in the future. In the next 40 years the population of adults aged 85 and older is projected to quadruple, suggesting a corresponding increase in the demand for hospital services. Countries with similar demographics will encounter the same issues.

The complex health profile of older adults entering acute care hospitals presents administrators and staff with a new challenge. Not only must the care provided respond to an acute health care crisis, it also must recognize the developmental phenomena associated with aging, and the likelihood that chronic illnesses are present, and compounding, both diagnosis and treatment. In the face of a rapidly growing aging population, a new approach to hospital care is imperative — one that takes into account the special considerations of being old in a system of care focused on acute illness episodes.

The fundamental aims[2] of an elder friendly hospital are to:

- **promote excellence in hospital care for acutely ill older adults and their families through the provision of evidenced-based service delivery and patient/family-focused care**
- **ensure that gerontological principles are incorporated in practice standards across patient care programs and hospital services**

An elder friendly hospital is family-centered, responsive to the developmental needs of older adults, and offers a holistic focus that combines a gerontological developmental approach with a hospital diagnostic approach to care.

"FOUR DIMENSIONS" OF AN ELDER FRIENDLY HOSPITAL

Creating an elder friendly hospital requires that four interrelated dimensions of hospital culture, care and operations be rethought and addressed.[3] These are:

- **physical design**
- **social behavioural climate**
- **policies and procedures**
- **care systems and processes**

In an elder friendly hospital, these dimensions work together to promote safety, minimize functional decline, and mitigate adverse social and medical outcomes for older adults in the following ways:

[1] Canadian Institute for Health Information. (2000). *Canada's elderly primary users of hospitals reports Canadian institue for health information*, March, www.ccihi.ca.

[2] Parke, B. & Brand, P. (2004). An elder friendly hospital: Translating a dream into reality. *Nursing Leadership*, 17(1), 32-77.

[3] Parke, B. (2007). *Understanding the hospital environment and older people: A social ecological analysis*. Unpublished doctoral dissertation, University of Victoria, British Columbia, Canada.

Physical design **the observable built environment and all its architectural features**

In an elder friendly hospital, the physical environment is properly equipped to support the abilities of older adults and their families. This includes physical configuration, equipment, furnishings and décor, which combine to promote independent function. Elements of physical design are reflected in the degree of privacy offered by the setting, ease of communication through inanimate objects like signage and wayfinding, and physical amenities.

Social Behavioural Climate **the atmosphere that is expressed through interpersonal relationships and organizational influences**

Social climate is reflected in observable behaviour related to communication between staff, older patients and family members; teamwork; and the degree of conflict and stress experienced by older patients. In an elder friendly hospital, all interactions and communications take into account older adults and their families' experience of coming to, being in, and leaving the hospital.

Policies and Procedures **the rules, regulations and bureaucratic conditions that affect the older person and their family's freedom to choose, and ability to act on their wishes**

In an acute care hospital, the bureaucratic conditions and influences that affect policies and procedures may be explicit or implicit, and are often enforced through cultural pressure that encourages conformity. In an elder friendly hospital, all policies reflect a culture, attitude and atmosphere that considers and values older adults, and gerontological excellence is fostered among hospital employees.

Services and care systems and processes **the organization of care and the provision of service in the hospital**

These systems, processes and services are affected by formal and informal bureaucratic conditions, and by the political and economic forces that influence how work is completed and how the mission of the hospital is fulfilled. When service delivery becomes gerontologically sensitive, hospital systems and processes ensure that age-related changes are included in assessment and risk-based screening; that diagnostic investigations and procedures reflect age-related changes; that the primary care physician is involved in coordinating hospital care; that there is appropriate transition support in discharge planning; and, that processes and education are family-centered.

When all four dimensions are operating optimally in an acute care hospital, these critical objectives are achieved:

- a physical environment and approach to care in all acute medical, surgical, emergency room and diagnostic areas that support abilities, and recognize the need for both gerontological interdisciplinary expertise and knowledgeable staff to assist recovery in older patients
- early identification of risk factors and problems to prevent the preventable, reverse the reversible and, when necessary, support and palliate
- respect for the older person's ability to make choices about the services they receive
- recognition of lifelong patterns and family relationships

As described, creating an elder friendly hospital requires a multi-dimensional and synergistic approach. But, more importantly, it requires a shift in thinking. *Code Plus: Physical Design Components for an Elder Friendly Hospital* is a place for this shift to begin.

This guide addresses one core dimension of creating an elder friendly hospital; therefore, users are encouraged to consider its recommendations in light of the remaining three dimensions of the elder friendly hospital model. All four dimensions are integral to fully achieving the significant positive benefits for older adults, families, hospital staff, and the larger acute health care system, that a move toward elder friendly hospitals will facilitate.

Introduction

Planning and designing hospital environments is a complex endeavour. Today, the dual realities of an acute health care crisis and an aging population require that a new set of considerations become fundamental to the hospital physical design process. The Code Plus approach acknowledges that creating a supportive, elder friendly physical environment in hospitals can promote functional ability to reduce stress, encourage healing and recovery, and enhance safety in older adults.

Code Plus: Physical Design Components for an Elder Friendly Hospital responds to the pressing question:

> **"How can hospitals create physical environments that support functional abilities in older adults who are: admitted to emergency rooms and acute medical-surgical areas, undergoing diagnostic investigations, using common waiting areas, and visiting family members?"**

In doing so, it lays the groundwork for systematically addressing the many hospital design elements that impact on older adults' health and well-being.

As the name "Code Plus" reflects, the information in this guide goes beyond the minimum requirements of the building code. The physical design considerations it proposes are intended to extend, and not contradict, existing legal building code requirements to ensure that independent functional ability in older people is supported by all relevant aspects of facility design.

Code Plus: Physical Design Components for an Elder Friendly Hospital can be applied to large-scale new construction, renovations of existing structures, or smaller scale changes in facility maintenance and upkeep. It is written for health professionals, hospital administrators and operational staff, architects and others who fashion what a hospital will be through planning, resource allocation, policy formation, design and construction, and management of the physical environment.

Designed as a guide to support decision-making, *Code Plus: Physical Design Components for an Elder Friendly Hospital* weaves theory with practical information and tools. The extensive research and development work supporting the Code Plus initiative has ensured that the guide takes full account of the physiological changes associated with normal aging, their affect on older adults' independent function, and the best ways to promote and support such function in the design of acute care hospitals.

This guide is not intended to be prescriptive; its goal is to ensure that consideration of older adults' needs and abilities becomes fundamental to the critical thinking that goes into all decision-making regarding the hospital physical environment. This means incorporating the Code Plus principles and recommendations into a larger commitment to elder friendly thinking that considers older adults' functional abilities and safety

in balance with other operational criteria such as systems, resources, and site-specific issues relevant to the communities served.

WHY A NEW APPROACH TO HOSPITAL DESIGN IS NEEDED

It is well-documented that the hospital can be a stressful and dangerous place for old people, arising from traditional patterns of care that ignore normal physiological and social age-related changes. This places older adults at greater risk for an adverse event, which in the context of hospitalization is defined as an unintended injury or complication that results in disability at the time of discharge, death, or prolonged hospital stay.

RESEARCH SHOWS THERE IS A LACK OF FIT BETWEEN OLDER PEOPLE AND THE HOSPITAL ENVIRONMENT.

The Code Plus initiative is concerned with the role that the hospital physical environment plays in contributing to functional decline in older adults. It recognizes that the interaction between people and their physical environment can either increase their stress and impede recovery, or reduce their stress and promote recovery.

There is a lack of fit between older people and the hospital environment. As part of this, physical design that does not consider the needs of older adults, serves to exacerbate their stress, fear, anxiety and worry. Elements of design can pose a barrier to independent way finding, promote deconditioning that limits recovery, and interfere with family support by making visiting difficult.

The ramifications of hospitals not being elder friendly are felt at the individual, human level and at the health care system level. For older adults, poor hospital environments mean poor health outcomes, which are well-documented. For the system, poor hospital environments translate into significant financial costs both at the local hospital level, and also rippling out to the larger health care system when older adults who lose their independent function require more complex care. While some financial costs are not immediately evident, such as those associated with prolonged lengths of stay, others are clear and direct. An example is falls among older adults – high-cost, preventable injuries that occur frequently in hospitals. Some of the environmental risk factors that cause older adults to fall in institutional facilities include poorly designed and maintained buildings, slippery floors, poor lighting or contrasts, and lack of handrails. The direct health care cost of falls among older adults in British Columbia is estimated at $180 million annually,[4] with one hip fracture alone costing approximately $30,000. This does not even begin to consider the costs related to liability when older adults fall while in hospital.

The rationale for Code Plus revolves around these key points:

- **Sensory impairments are prevalent in an aging population. Over 40% of men and women living in institutions have a hearing impairment; 89% of those require the use of hearing aids. A natural decline in smell and taste begins after age 60. Visual impairments affect 9% of older Canadians and 38% of all people become functionally visually impaired after age 64.[5, 6]**
- **Chronic illnesses tend to accumulate with advancing age to the point where deterioration in functioning and a rise in disability and dependence are common in older people; later life is typically characterized by increasingly complicated co-morbid patterns.[7]**

[4] Smartrisk Risk Foundation. (2001) *Economic burden of unintentional injury in British Columbia.*www.smartrisk.ca p.5
[5] Statistics Canada. (1990). The health and activity limitations survey: Highlights – disabled persons. (Catalogue 83-603). Ottawa: Statistics Canada.
[6] Statistics Canada. (1996). Canadian Censure. Ottawa: Health and Welfare Canada. www.hc-sc.gc.ca/seniors.
[7] Longino, C.F., & Murphy, J. W. (1995). *The old age challenge to the biomedical model: Paradigm strain and health policy.* New York: Baywood Publishing Company Inc.

- **The risk of functional decline increases with a corresponding increase in the number of risk factors, suggesting that the predisposition to functional decline may result from the cumulative effects of multiple patient and hospital environment factors.**[8]
- **Being hospitalized is a stressful event; stress can impede healing.**[9]

Through the Code Plus initiative, these and other factors have been carefully considered in relation to hospital design. The resulting recommendations contained in this guide are intended to minimize the negative impacts of hospitalization on older adults by preventing those risk factors in the hospital physical environment that create adverse events.

ENACTING AN ELDER FRIENDLY PHILOSOPHY

Most hospitals do not have a vision or mission statement that specifically applies to older adults. Fraser Health is a leader in this regard, having had a geriatric philosophy of care in place for several years. It was the fact that this philosophical environment already existed within the organization that allowed it to embrace the elder friendly hospital concept and support the innovative Code Plus initiative.

The Fraser Health philosophy that guided the development of *Code Plus: Physical Design Components for an Elder Friendly Hospital* centers around two major precepts: first, that each person is an individual of inherent worth and dignity with unique needs, expectations, hopes and dreams; and, second, that those needs are best met in a thoughtful, collaborative and professional way. This philosophy, enacted, can be seen as a model for an elder friendly acute health care system.

Elder Friendly Philosophy

WE BELIEVE THAT OLDER ADULTS:

- are unique and that their well-being comprises physical, psychological, intellectual, social, cultural, spiritual, emotional and sexual dimensions;
- have the right to be involved in decisions affecting their care and environment; and
- have the right to effective methods of prevention, diagnosis, treatment, and care in health services.

WE BELIEVE THAT QUALITY CARE FOR THE OLDER ADULT:

- will focus on maximizing the individual's functional abilities and minimizing the effects of chronic illness; and
- is comprised of a continuous and cyclical process of Planning, Service Delivery and Evaluation which is client-centered and enhanced through participation from individuals, families, and the community.

Planning:

- is carried out in accordance with identified needs and projected trends within the community;
- ensures the availability of a full range of prevention, diagnosis, treatment, and health promotion services; and
- involves the Client/Family as active participants in the process.

Service Delivery:

- is individualized;
- is based on the outcome of the planning process;
- is a continuum of flexible, well-coordinated, and accessible services;

[8] The citation for these refrences are located in the Reference & Annnotated Biliography section, reference #8, 49.
[9] The citation for these refrences are located in the Reference & Annotated Biliography section, reference #39, 52.

- uses a holistic approach that addresses the multi-dimensional needs of individuals;
- promotes empowerment of the individual and is enhanced when provided in a setting as close to theindividual's natural, nurturing environment as possible;
- is based on current knowledge and practice that is strengthened through an exchange between a variety of health care providers and educational institutions;
- provides a supportive environment for formal and informal care givers; and
- is interdisciplinary.

Evaluation:

- is based on continuous outcome and process data;
- requires input from individuals, families, community, and service providers; and
- results are made freely available to consumers, interest groups, and the general public.

HOW CODE PLUS WAS DEVELOPED

In 2003 Fraser Health adopted the elder friendly hospital framework. In light of the organization's extensive planned facility renovation and construction, it was decided that Fraser Health would focus on integrating elder friendly design considerations into its upcoming construction projects. To achieve this, an initiative was established within the Fraser Health Geriatric Clinical Service, Planning and Delivery Team to develop the physical design dimension of the elder friendly hospital model. The initiative was led by the co-authors of *Code Plus: Physical Design Components for an Elder Friendly Hospital*, who took an interdisciplinary evidence-based approach to its development. This entailed two years of synthesizing data from research, clinical expertise, and older adult preferences. In all, 36 professionals and experts in related disciplines, as well as older adult users of hospital services, contributed to the project (Appendix). The multiple strategies Fraser Health employed to determine how best to create an elder friendly physical hospital environment ultimately led to the same conclusions, which are captured in this guide.

THESE WERE THE KEY PHASES OF THE DEVELOPMENT PROCESS:

Strategic Planning

The first stage of the initiative involved the development of a comprehensive strategic plan to establish process, milestones, required resources and deliverables. The authors determined that the initiative would require the input of both administrators and clinicians. Presentations were made to internal stakeholders and the authors recruited the participation of a range of management personnel, specialists and experts whose input would be critical to the project.

Literature Reviews

The authors, both trained academic researchers with extensive clinical expertise, undertook an extensive literature review to source existing literature on best practices in caring for hospitalized older adults. They reviewed all of the available literature and prepared abstracts of the relevant information. The authors then commissioned Simon Fraser University to conduct a second comprehensive review of literature on physical environment elements pertaining to older adults, and to compile a comprehensive reference list (Gutman, 2005). The purpose of the second literature review was to validate the first review as well as to find further sources of information. The second review essentially validated

that the authors had sourced virtually all of the existing literature, and that there was little else available on the subject. The authors then conducted another critical analysis of the literature from both reviews, comparing it to practical evidence and extrapolating content that would form the database for the next phase of the project.

Key Stakeholder Input and Draft Document

After the literature reviews were completed, the authors sponsored a key stakeholder meeting to consider elements of physical design in relation to older adult function and safety. Materials were prepared and distributed reflecting the work done to date. A wide range of stakeholders participated, including professionals knowledgeable in acute care operations, gerontological clinical practice, housekeeping and facilities planning. Interdisciplinary representation included nursing, medicine, occupational therapy, architecture, social work and physiotherapy.

Information from the stakeholder meeting and the literature review were complied to create the first draft of Code Plus: Physical Design Components for an Elder Friendly Hospital.

Expert Panel Review

The draft document underwent an expert panel review. Again, the reviewers included professionals knowledgeable in acute care operations, gerontological clinical practice, nursing, medicine, occupational therapy, architecture, social work and physiotherapy, housekeeping, and facilities planning.

The purpose of the expert review was to look at both the content and the assessment tools, and to determine the workability and user-friendliness of the information. The review process assisted the task group in determining what would, and would not, work and how the tools could be incorporated into the operational work environment of those responsible for acting on the physical design recommendations.

EDUCATION REMAINS A CORE STRATEGY IN OPERATIONALIZING CODE PLUS AND ENSURING THE INITIATIVE IS SUSTAINABLE.

Older Adult Focus Group

In addition to the expert panel review, the task group conducted an older adult focus group to determine the views of older users of hospital services. Participants were asked to identify which aspects of hospital physical design were elder friendly and which impeded their independent physical function. The findings from this focus group supported the findings of the task group's research, the professional stakeholder input, and feedback from the expert review.

Final Guide and Implementation Program

Once the final guide was developed, the authors presented their findings to the Fraser Health executive, who endorsed it unanimously. The authors then commenced an extensive education and training program throughout the organization. Education remains a core strategy in operationalizing Code Plus and ensuring the initiative is sustainable. The authors also spoke at the International Interdisciplinary Conference on Emergencies in Montreal in June 2005 about creating elder friendly environments within hospital emergency departments, and they continue to consult with clinicians and operational management to support Code Plus implementation.

USING THIS GUIDE

The core content of *Code Plus: Physical Design Components for an Elder Friendly Hospital* is structured in three parts because each hospital will differ in its requirements. The information is organized in ways that will serve varied needs in order to promote the autonomy of local service areas in decision-making.

The guide focuses on generic components of physical design, and brings forward only those issues that pertain to preserving functional ability and safety of older adults in specific areas of the hospital. While some content may seem fundamental, it is included because it serves to underscore the complexity between design and function.

All information is referenced to either the bibliography at the end of the guide or a footnote located at the bottom of a page. An annotated bibliography is provided on page 53 to assist users who might be interested in obtaining more detailed information.

PART 1

Part One: **Aging: Potential Physiological Alterations** highlights the special features of an aging population in relation to preserving functional abilities, independence and safety. This part of the guide serves two purposes. First, it provides a rationale for the selection of design considerations put forward in the document. Second, it assists those using the document to understand the relationship between the normal consequences of physiological aging on function and safety, and the elements of physical design.

2

Part Two: **Physical Design Recommendations for an Elder Friendly Hospital** provides detailed information on certain components of physical design, and offers recommendations for specific areas within the hospital. The components were selected according to factors that are known to contribute adverse affects on functional ability and safety in older adults, and to identify additional physical design elements that go beyond industrial building codes and standards.

3

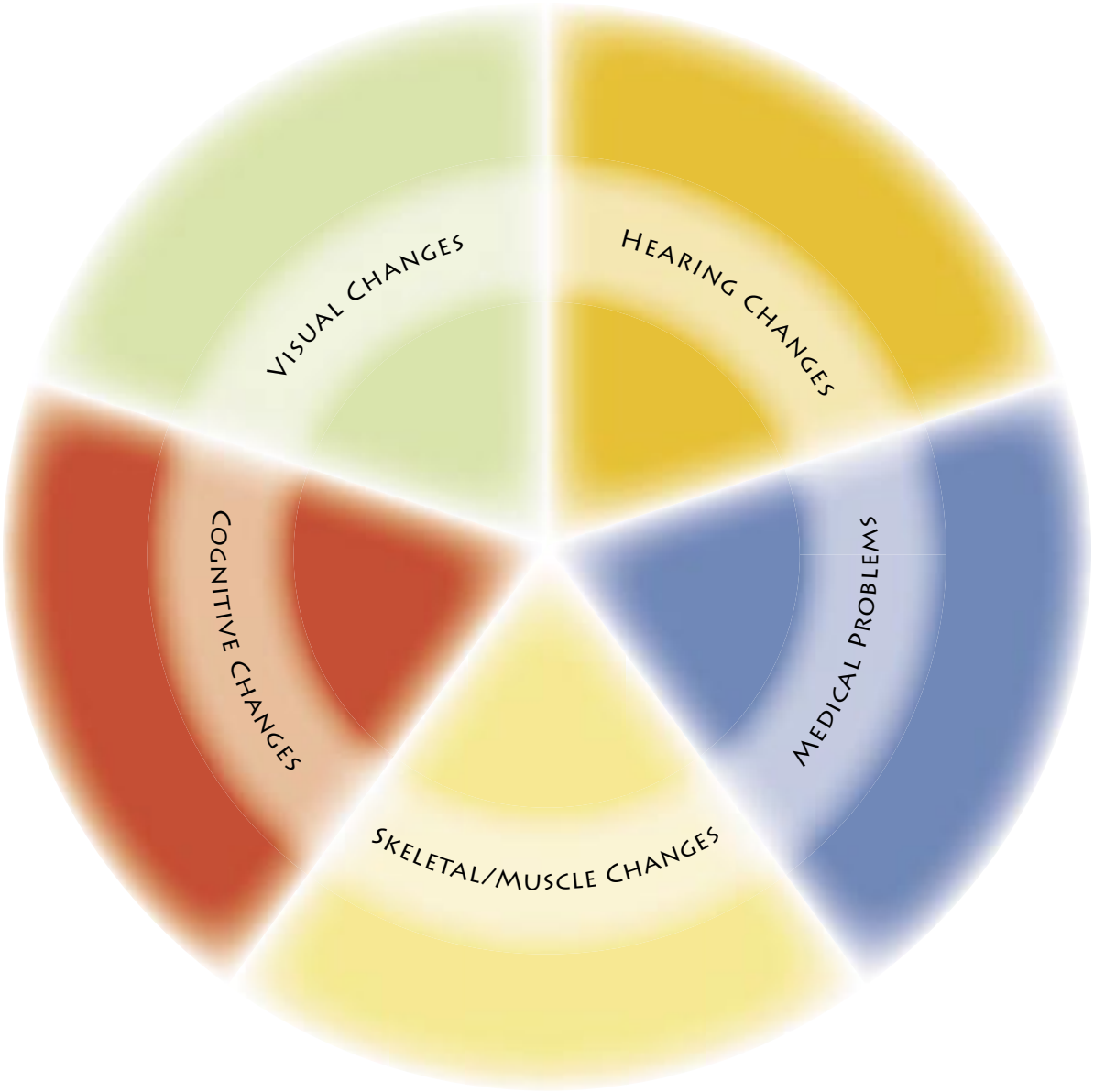
Part Three: **Physical Environment Design Assessment Tool** The assessment tool is provided to support decision-makers in their ability to assess existing hospital physical spaces, and to assist them in developing older adult sensitive plans for new construction, physical re-design or renovations.

It is important to be aware that the benefits of the Code Plus approach are realized as a result of the interplay between several physical design elements simultaneously. An example of this is colour as it relates to surface finishes and lighting to produce glare: adjusting just one element will not meet the requirement because it is the combined effect of multiple elements that creates problems for older people with visual acuity changes.

Another example is wayfinding: age-related visual changes combined with medical problems such as glaucoma, cataracts and macular degeneration can compromise older adults' ability to read signage or determine location independently and safely. As well, varying degrees of illnesses may affect cognitive functions and are another consideration in the physical design of an elder friendly hospital environment.

Aging Potential Physiological Alterations

part 1



POTENTIAL PHYSIOLOGICAL ALTERATIONS 8; 9; 12; 18; 28; 34; 36; 37

Although the table identifies key features in separate columns, these key features work together to produce a synergistic affect on both older people and hospital environments.

Visual Changes

- Decreased visual acuity – visual field reduced and peripheral vision reduced[5; 16; 27]
- Greater incidence of glaucoma, cataracts and macular degeneration[16; 27]
- Increased sensitivity to glare[5; 16; 27]
- Decreased field of vision[5; 16; 27]
- Distorted depth perception[16]
- Decreased vision in low light[16; 27]
- Eyes adjust to changing light levels with greater difficulty and more slowly[16; 27]
- Lenses 'yellow' with age[16; 27]
- Greater incidence of poor colour vision – decreased ability to distinguish blue-green colours[5; 16]
- Ability to differentiate between contrasting surfaces is lessened[16]

Hearing Changes

- Decreased hearing abilities[16; 27]
- Greater sensitivity to high frequency noises[16; 27]
- Increased reaction to environmental vibration increased[27]
- Poor ability to distinguish different pitch levels[16]
- Ability to identify sound direction or source is reduced[16]
- Background noise causes problems for older adults who can have difficulty ignoring ambient sounds[27]

Cognitive Changes

- Greater incidence and varying stages of dementia or decreased cognition[16; 27] affects:
  1. Ability to reason and think in the abstract is reduced[16; 27]
  2. Ability to focus on pertinent details is reduced[16]
  3. Ability to form new associations impaired[16]
- Memory decreased and information retrieval impaired[16; 27] affects learning, slower time to process information
- Communication abilities altered[27]
- Slowed information processing may affect speed of learning[38]
- Difficulty with orientation, time and place, slower response to stimuli[16; 27]

Skeletal/Muscle Changes

- Muscle strength reduced up to 40% – 60%[5; 16; 27]
- Decreased flexibility[16; 27]
- Decreased coordination with drastic reduction in fine motor coordination[5; 16; 27]
- Decreased balance with loss of equilibrium[5; 16; 27; 38]
- Reaction time and reflexes reduced[16; 27]
- Dexterity reduced[27]
- Joint stiffness increased, neck involvement[16]
- Poor grip[5]
- Limited reaching range[5]
- Increased fatigue[12]
- Slowed reaction time[38]

Medical Problems

The consequences of the combined effects of medications. cardiovascular, and neurological problems contribute to:

- Falls[38]
- Poor mobility, weakness[38]
- Susceptibility to delirium[27]
- Susceptibility to Incontinence[5]
- Thermal response is reduced: sensitivity to abrupt temperature changes increases and older patients' ability to tolerate lower temperature ranges[16; 17; 38]
- Susceptible to dehydration, hypotension, changes in skin integrity[12]

Older adults are unique and their well-being comprises physical, psychological, intellectual, social, cultural, spiritual, emotional and sexual dimensions.

Physical Dimension

Design Recommendations for An Elder Friendly Hospital

part 2

In light of the physiological changes associated with aging outlined earlier, a number of design elements are identified that can affect the independent function and safety of hospitalized older adults.

A number of design elements remain relatively uniform throughout the hospital, changing little from area to area yet there are also areas within the hospital that require area-specific recommendations. For example, the elder friendly design recommendations for lighting in patient rooms vary little from recommendations for lighting in common areas, while recommendations for elevators are area-specific.

Together, the following tables provide evidence-based design recommendations for the physical design dimensions of an elder friendly hospital; only those pertaining specifically to older adults have been selected. Common design elements with corresponding recommendations for elder friendliness include:

- **Lighting**
- **Colour**
- **Flooring & Walls**
- **Hallways, Doors & Windows**
- **Handrails**
- **Wayfinding & Signage**
- **Walkways, Ramps & Stairways**
- **Acoustic Considerations**
- **Special Considerations**
  - Parking
  - Equipment
  - Furniture
  - Elevators
  - Washrooms

Lighting (natural & artificial)

e.g.
glare from lights on walls and floor are disorientating

- At entrances, maintain a gradual change in lighting as older adults enter the building. Some ways to reduce abrupt changes in lighting are: [25; 27]
  1. Install a skylight just inside each entrance;
  2. Place awnings and other covers over each entrance;
  3. Place a brighter light inside each entrance.
- Minimize glare by ensuring that lighting is even, soft and well diffused and by using full spectrum lights (such as type T5 and type T8 lamps) or soft lights (i.e., 170 watt incandescent with ultra-high diffusion coating).[11; 14; 16; 25; 27; 31]
- Avoid pooled lighting or cove lighting by ensuring consistent light levels throughout the hospital especially between adjacent areas.[16; 25; 27; 31]
- Provide a minimum of 300 lux from overhead lighting [25] between 50 [25] to over 300 lux [31] on floor surfaces and stairs by using a system of several low-level, downward directed lights.[31]
- Combine direct (i.e., ceiling mounted fluorescents) with indirect lighting (i.e., high pressure, floor-standing up-lights or diffuse reflector and covered lamp shining down). Using multiple light sources reduces glare while increasing lighting beyond normal levels.[14; 31]
- In areas where too much daylight/glare results, consider installing exterior shading devices, glazing or other methods to reduce glare from direct sunlight, especially in staff work areas and patient care areas. In areas where daylight is insufficient, consider using light coloured shelves placed around the window to reflect light and increase the depth of sunlight penetration into deeper areas.[3; 23]
- On wayfinding cues and signage, provide direct, focused, non-glare lighting.[27]
- Just outside washrooms, place night-lights 300 mm (12 in) from the floor and install illuminated light switches in washrooms.[6; 9]
- In patient areas, provide patient-controlled lighting.[24]

EXPERT PANEL RECOMMENDATIONS

Where possible, use natural lighting; place night lights in bathroom also and near doorway; use dimmer switches; ensure control mechanism is appropriate size for ease of locating and manual dexterity.

Note: Recommended lighting levels are given in 'lux,' a common measure of illumination used in the International System of measurement. One 'lux' is equal to one 'lumen' per square metre where a 'lumen' is equivalent to the amount of light given out through a solid angle by a source of one candela intensity radiating equally in all directions.[25]

Colour

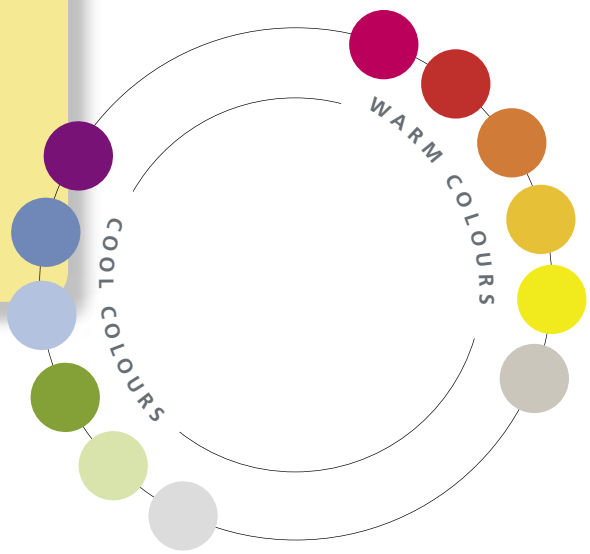
e.g.
decorate with warm colours

- Decorate with warm colours which are easier for older adults to see than cooler tones. Avoid bold patterns, especially on floors and walls, as the visual over-stimulation can exacerbate confusion in older adults.[13; 16; 27; 31]
- Avoid placing blue and green colours together as older adults have difficulty distinguishing these colours; also avoid pastels which are difficult for older adults to see.[14; 27]
- Use contrasting colours to highlight doors in patient areas; to reduce unwanted use, camouflage exit doors and out of bounds areas by using the same colour on the doors as used on nearby walls.[11; 16; 25; 27]
- Differentiate walls from floors by using different, contrasting colours for each surface.[11] (See *Floors & Walls* pg. 16)
- Handrails should be in a colour that contrasts with the floor and the wall to help older adults with visual impairments to locate the handrails.[27]

Note: See also *Wayfinding* pg.19

EXPERT PANEL RECOMMENDATIONS

- Warm colours include combinations of red, orange, and yellow. Cool colours are made from blue, green, and purple combinations. Colour is an added dimension which can evoke moods and make statements. Used effectively, color helps to highlight items in the environment for easy access or to hide items in the environment making them difficult to find.
- When managers are implementing these guidelines and principles it is suggested that they consult with Plant Service and Maintenance Departments.



Flooring & Walls

- When choosing building materials, consider the height and width of floor joint components, keeping joint components less than 2 mm (1/25 in) high. [31]

e.g.
reflective surfaces increase glare

- Carpeting is preferable to hard surface materials as it minimizes glare and noise. Securely install low pile carpeting, with pile less than 13 mm (1/2 in) thick and with either a firm or no underpad. Must not impede wheelchair and walker mobility. [25; 27; 31]

- Ensure flooring and walls are in a solid colour; avoid bold patterns, flecking, or glossy finishes which present visual perception challenges for older adults. [10; 16; 25; 27; 31; 32]

- Avoid glossy finishes on flooring and do not use wax or polish which make floors shiny as reflective surfaces increase glare and are visually challenging to older adults. [16; 25; 27; 31]

- Ensure walls and floors are in a matte (non-shiny) finish which reduces glare (consider using non-glare paint to achieve a glare index ≤20). [16; 25; 27; 31]

- Keep the walls behind handrails smooth to prevent abrasion injuries to knuckles as older adults navigate the hospital. Apply a non-abrasive finish to walls. [25]

- Use contrasting colours to differentiate baseboard, floor, and wall (see *Colour* pg. 15). [16; 27]

Note: All flooring materials should be in a non-slip, non-glare finish to support older adults with limited mobility and/or visual impairments. It is also recommended that flooring materials be designed to reduce noise reverberation.

EXPERT PANEL RECOMMENDATIONS

- Issues of carpet maintenance and infection control are an important consideration. New products and floor technology may provide other suitable options (i.e., cork floors, rubberized tiles).

- Recommend a review of new products prior to determining the flooring chosen for an area. Consideration must be given to service area functions and patient populations being served.

- Solid colours on walls may be made more aesthetically pleasing by placing pictures to support orientation and wayfinding.

- Additional reference: Healey, F. (1994). Does flooring type affect risk of injury in older in-patients? *Nursing Times,* 90 (27), 40-41.

Hallways, Doors & Windows

- At entrances, install automatic doors; consider sliding doors equipped with an adjustable opening/closing delay system programmed to keep doors open for a longer duration than required by code as older adults withz mobility impairments require additional time to clear the doorway.[6; 25]

- Install doors equipped with lever-style handles that do not require twisting and can be opened with one hand. Doors require maximum 8 lbs pull force or 14 lbs push force; with closing mechanism to allow at least 4 to 6 seconds for older adults with mobility problems to clear the doorway before it closes.[4; 6; 16; 25; 27; 31]

e.g.
long hallways discourage walking

- In all hallways, provide between 1470 mm and 1830 mm (4 ft 11 in – 6 ft 1 in) between handrails (see *Handrails* pg.18 for details) to allow 2 wheelchairs to pass.[12; 15; 24]

- Make hallway corners at least 1200 mm (4 ft) wide so older adults can turn a wheelchair/walker comfortably.[12; 24]

- Avoid long hallways which discourage older adults from moving around – break up long hallways with recessed rest areas (see *Furniture* pg. 26) at least 30,000 mm (100 ft) apart. Windows installed in long hallways creates a visual effect that shortens hallways to encourage older adults to move around.[10; 15; 16; 17; 24; 25; 26; 27; 31]

- In patient rooms, install side-hinged windows which are easier to open than lift-up styles.

- In patient rooms, install patient controlled drapes, blinds, or an energy efficient transparent sunscreen system to shade windows while letting in natural light. Controls should be easy to operate by people with limited dexterity and within reach from a wheelchair.[3; 24; 25]

Note: The importance of **barrier free access** in all hospital areas cannot be over emphasized. Ensure that all equipment and supplies are stored in convenient locations as the removal of clutter helps to support older adult independence and promotes mobility.[15; 16]

EXPERT PANEL RECOMMENDATIONS

- Open windows preferable; limit width opening for safety; install window screens.

- Attempt to keep thresholds barrier free.

- Opaque automatic doors have been suggested in the literature but often visibility is important for safety reasons in areas like emergency departments. In addition, orientation and site specific conditions must be considered in the use of opaque automatic doors.

Handrails

- When handrails are terminated or interrupted, consider a tactile signal (i.e., a notch cut into the rail) 100 mm from the end point or have the rail curve and connect back to the wall.[4; 16; 25]
- Install handrails 850 mm (3 ft) from the ground. Handrails should be between 40 mm and 45 mm in diameter with a non-slip texture.[4; 5; 16; 25; 28; 40]
- Install handrails on both sides of stairways and hallways and on at least one side of ramps.[4; 16; 25; 27; 29; 31; 40]

e.g.
handrails are inaccessible due to items being stored in front and under them.

- On ramps and stairways, extend handrails 300 mm (12 in) beyond the end of the ramp and consider installing a safety rail along with the handrail at 200 mm (8 in) above ground, a curb at the same height.[16; 25]
- Curve the end of handrails down to 680 mm (27 in) for easier detection by visually impaired older adults using cane technique.[16; 25]
- In stairways, continue handrails through and around landings, especially in long stairways.[25]
- In elevators, provide handrails on both sides of the cabin at a height between 800 to 1000 mm (32 in to 40 in).[5; 25]
- Handrails should be in a colour that contrasts with the floor and the wall to help older adults with visual impairments to locate the handrails; consider Braille on end of handrail.[27]

Note: All handrails must be able to withstand a force of 2 kN pressure. As part of the International System of measurement, a kN (or kilonewton) is an unit of force equal to 1000 newtons, with one newton representing the amount of force required to accelerate a one kilogram mass at a rate of one metre per second squared.[25]

EXPERT PANEL RECOMMENDATIONS

- Consider handrails in out patient clinics where patients undergo medical diagnostic testing.
- Make handrails continuous and uninterrupted; details available in building code specifications.

Wayfinding & Signage

- Use a decentralized design to allow older adults to proceed directly to specific treatment or service areas avoiding confusing, crowded central areas. Place directional signs at all major intersections and place signs in consistent locations.[6; 15; 23]

- Include simple, explanatory graphics on signs using universal symbols wherever possible (i.e., the International Symbol of Access).[16; 25; 27]

- Reception/information counters should be no higher than 840 mm (34 in) to allow access from wheelchairs or walkers.[11; 25; 31]

- Place maps, including "you are here" maps, and large font informational handouts at reception areas.[10; 25; 39]

- Use colour coding to facilitate wayfinding and to indicate safe older adult routes by using a standard colour and texture throughout hospital grounds.[25; 27]

- Provide minimal information on all signs, ensuring signage is uncluttered, logically structured, and uses consistent language on all signs. Aim to keep words and phrases within a sixth-grade reading level and avoid the use of technical and/or medical language; avoid jargon.[6; 13; 25; 27]

- Use high contrast colour combinations on signs: preferably light letters on a dark (i.e., black, brown or red), matte finish background; but **AVOID** the following combinations which are difficult for many older adults to differentiate:
    - yellow lettering on black
    - yellow on green
    - green on blue
    - red on green[25; 27]

- For older adults with vision deficiencies the font size should be at least 16 mm (5/8 in) high on small signs and at least 40 mm (1-1/2 in) high on larger signs. Helvetica is the recommended font. Tactile letters should be raised 1 mm (1/20 in). Use a combination of capital and lower case lettering.[11; 12; 16]

e.g.
avoid confusion, ensure instruction, help people problem solve

- Use very large signs visible to people with visual deficiencies and hang signs between wheelchair and standing heights – 910 mm to 1320 mm (3 ft to 4 ft 5 in) high or as low as 50 mm (2 in) above handrails.[13; 33]

- Post important signs in high profile places, but also out of main traffic areas to allow older adults time to self-pace their examination of the information without being rushed.[6; 13; 16]

- Place large numbers indicating the floor number outside of elevators; using contrasting colour combinations (see *Colour* for further details).[16]

Wayfinding & Signage (cont.)

EXPERT PANEL RECOMMENDATIONS

- Remember wayfinding is about problem-solving and signage is an aid to help with wayfinding. Signage serves different groups (e.g., older people and hospital employees).
- Eye level defined by code means straight across, typical height of 5 ft 8 in or 5 ft 9 in – this could be too high for an individual in a wheelchair or who suffers from kyphosis.
- Put signs in expected places and use in conjunction with landmarks in key places.
- Consider signs in different languages and the use of symbols.
- Be consistent in the method of wayfinding.
- The larger the letter size the better: on small signs, the minimum letter height is 16 mm (5/8 in); on larger signs, the minimum letter height is 40 mm (1-1/2 in).
- Avoid using wavy lines or dots in text print.
- Avoid using all italics, all capital letters, and underlined type.
- Additional references: Division of Aging and Seniors (2005). Communicating with Seniors: Advice, Techniques and Tips. Health Canada Ministry of Health. www.hc-sc.gc.ca/seniors-aines; Nini, Paul (2006). *Typography and the Aging Eye* (Electronic). American Institute of Graphic Artists. Available: www.aiga.org.

Walkways, Ramps & Stairways

- Avoid abrupt changes in ground levels keeping any surface relief (i.e., curbs) to under 25 mm high (1 in) with rounded edges.[25; 27]
- Walkway and ramp surfaces should be firm and slip-resistant (i.e., rough concrete or treated cement).
- Keep grids or grates on the ground to less than 20 mm (4/5 in) wide for older adults using walkers, wheelchairs or canes, as mobility aides may become stuck in the grid.[16; 25; 27; 31]
- Design walkways and ramps to be at least 1625 mm (5 ft 4 in) wide, providing space between handrails that allow two wheelchairs to pass or a walker; and with landings at a minimum of 1625 mm (5 ft 4 in) at the bottom and top of a ramp. Consider corners that are at least 1220 mm (4ft) wide, to allow for a comfortable turning of a wheelchair/walker.[15; 16; 25; 31]
- Separate walkways and ramps from out of bounds areas with a barrier at least 100 mm (4 in) high in a suitable colour to distinguish it from paths and grass (see *Colour* pg. 15 for details).[25; 31]
- Clearly identify the edges of ramps and stair risers (steps) with a yellow strip or contrastive colour to help older adults with visual impairments to see the edges between surface levels (see *Colour* pg. 15 for details). Also, make ramps and stair risers a different colour from adjacent level surfaces with clear demarcation of either end.[25; 27; 31]
- Avoid long or winding stairways, keeping to a maximum of 10 risers per flight. Provide rest areas/landings every 10 risers (steps) on long flights of stairs and try breaking up long walkways or ramps with rest areas (with appropriate seating – see *Furniture* pg. 26) every 9000 mm (30 ft.).[16; 25; 27; 30]
- Handrails should be in a colour that contrasts with the floor and the wall to help older adults with visual impairments to locate the handrails; consider Braille on end of handrail.[27]

Note: Wherever possible, avoid doorstops or raised thresholds which are tripping hazards for older adults. If unavoidable, try to keep doorstops and thresholds less than 20 mm to 25mm (4/5 to 1 in) high.[31]

e.g.
entrances with smooth surface walkways promote independence.

EXPERT PANEL RECOMMENDATIONS

- Floors before stairs should be in different color.
- Walkways with a gradient of 5% or less do not require handrails but is recommended for the older adult population.

Acoustic Considerations

- Reduce environmental noise to recommended signal-to-noise ratio of +10 decibels (i.e., towel dispensers, ice machines, pill crushers, wheeled carts and trolleys, overhead paging systems).[14]
- Install: solid-core doors with sound stripping to reduce noise transfer; silent or quiet type switches; quiet heating and ventilation systems; and double-glazed windows which help reduce outside noises from penetrating the hospital environment.[4; 5; 16; 27]
- Ensure that fluorescent light ballasts are of a type which do not interfere with hearing aides and consider providing hearing amplifiers in all patient areas (i.e., Pocket Talker).[16; 25; 27]
- Single occupant patient rooms are preferable to multi-occupant rooms – less noise and fewer disruptions which can exacerbate confusion and delirium in older adults.[16; 25; 27; 31; 32]
- In patient rooms and special function areas, install voice-paging systems with volume controls that can be turned off in geriatric units and/or patient rooms in areas with high proportion of older adults (i.e., orthopaedics, cardiovascular, surgery services).[16; 25; 31; 32]

Note: When designing hospitals and/or specific hospital areas, remember that sound reverberates off **all surfaces,** with hard surfaces creating more reverberation than soft surfaces Select materials that are designed to muffle noise and to reduce acoustic reverberation – especially on walls and floors separating patient rooms and medical areas; design the layout to reduce noise reverberating into areas frequented by older adults.[4; 16; 25; 27; 28; 31; 32; 39; 40]

EXPERT PANEL RECOMMENDATIONS

- Single rooms can be isolating. Better to have a combination of single and double occupancy patient rooms.
- Earphones and earplugs need to be available to control television noise.
- Pagers would be better than overhead paging.

Parking

- Ensure bright, non-glare overhead lighting for security[25; 31] (see *Lighting* pg.14 for details)
- Close to each entrance, provide wheelchair accessible parking stalls designated with the International Symbol of Access. The required number of wheelchair/walker accessible stalls relates to population density and will therefore differ at each facility. Accessible spaces should be 3900 mm (12 ft 9 in) wide on a level ground surface for safer transfers from vehicle to wheelchair and vice versa.[7; 10; 25]
- Equip some parking spaces with locking pincers to block wheelchairs and keep them in place when transferring older adults.[31]
- Avoid ground surface grades exceeding a slope grade ratio of 1:20 as the steep inclines are difficult to negotiate for people with mobility deficiencies and people using wheelchairs or walkers.[25]

e.g.
ensure ease of access, avoid steep inclines

EXPERT PANEL RECOMMENDATIONS

- Double number of handicap parking spaces near Ambulatory Care area.
- Consider special parking for "older spouse" with frail family member or "Elder Person" parking spaces – similar to "Moms & Tots" at shopping malls and recreation centres.
- Have designated covered parking for scooters.

- Provide a direct route that avoids vehicle paths from each parking lot to the nearest building entrance. Highlight pathways to building entrances using appropriate, well lit signs (see *Wayfinding & Signage* pg.19 for details) which also indicate which treatment areas and/or services are adjacent to each entrance.[25; 27]
- Provide a sheltered drop-off area for taxis and cars and a sheltered pedestrian walkway leading from parking areas to entrances in order to protect older adults from severe environmental conditions.[25]

Equipment

ASSISTIVE DEVICES/TELEPHONES:

- Near each building entrance, in common areas, in special function areas, and in patient rooms, provide a variety of assistive mobility devices (i.e., wheelchairs, walkers, and canes).[16; 25; 27]

e.g. telephone accessible from a wheelchair

- At each information counter and reception area, provide hearing amplifiers, pressure reduction furniture and lumbar support cushions.[16; 25; 27]
- Locate public telephones close to each entrance. At least one telephone should be accessible from a wheelchair – with coin slot, dial and handset less than 1370 mm (54 in) from the floor, a handset cord at least 1000 mm (33 in) long, and partitions between phones at least 800 mm (32 in) apart.[25; 31]
- Black telephones with large, white push buttons and contrasting numbers and letters are accessible to older adults with visual impairments and/or limited dexterity.[27]
- Provide a directory and a flip-up seat at telephones so that older adults can rest while they converse.[25]
- Telephones with volume control features are preferable – especially those suitable for use with hearing aides and/or equipped for T-switch reception (which allows sound to be transferred directly from the handset to the user's hearing aid[1]). However to reduce interference and static, avoid installing telephones with T-switch reception near electrical or electronic installations, such as transformer coils or dimmer switches.[25; 27]
- Have TDD/TTY apparatus (which enables older adults with hearing or speech problems to communicate over telephone lines using special keyboard equipment) available for public use.[1; 25]

Note: Here we avoid recommending individual products as product and technological development is rapidly changing. The intent is to support decision making by providing general guidelines. To recommend specific products is not within the mandate of this monograph. It is suggested that the design recommendations offered here be considered in consultation with the product purchasing department of Fraser Health.

EXPERT PANEL RECOMMENDATIONS

- Finalize decisions only after user input.
- Access to telephones for patients confined to bed

SPECIAL FUNCTION & PATIENT AREAS:

- Provide height adjustable treatment tables.[7; 16]
- Provide a blanket warmer for each patient care area.
- Install a wandering system to monitor confused mobile older adults.[4]
- In patient rooms, offer beds with four adjustable, split side rails and avoid side rails which fold down to the floor.[16] Beds that can be adjusted (electronically) to 450 mm (18 in) or lower are preferable, but if beds are not adjustable, ensure the availability of beds at the same low height.
- Aim to have pressure-reducing mattresses on all beds, or emergency stretchers at the very least; ensure availability of a few speciality mattresses in patient care areas frequented by older adults.[5; 7; 15; 27]
- In patient rooms, provide both full lifts, transfer lifts and ceiling lifts; and ensure there is adequate room to use lifts and/or stretchers without disturbing other beds and patients in the room.[7; 31; 33]
- In patient rooms, provide adequate room between beds to allow for a full wheelchair turning radius (a minimum 1500 mm [60 in] diameter). Also try to make sure that there is adequate space for emergency equipment, physiotherapy aids, and other equipment to be operated without disturbing patients, beds, or moving furniture.[7; 16; 25; 27; 31]
- In patient rooms, try to ensure that controls are easy to operate by older adults with limited reach and dexterity (i.e., for lighting, the nurse call system, the television, and audio equipment). Ensure that controls can be reached from the beds and are no more than 1200 mm (48 in) from the floor. Also, install a nurse call system that has "soft touch" controls.[7; 24; 25]
- Provide appropriate commodes. The seat of an ideal commode is soft and padded and is also tilted slightly backward to prevent falls. The padded arms can be locked in place for support and arms move toward the patient as they are set in place. An ideal commode is equipped with foot-operated brakes and the bedpan is sited low on the commode frame to ease waste disposal.[6]
- Provide raised toilet seats where appropriate.
- Provide physical conditioning equipment accessible to older patients, where appropriate.

e.g.
adequate space for staff and patients improves independent function

EXPERT PANEL RECOMMENDATIONS

- Commodes height should permit feet to be flat on floor.
- Some toilets should be lower so raised toilet seats can be used and adjusted to the needs of older patient (FH is moving toward all patient and public toilets 18 inches in height).

- Emergency room stretchers should be able to serve diagnostic needs but also aid function of older adult.

Furniture

- Arrange furniture to promote barrier free access and try to avoid furniture with jutting or recessed bases.[16; 24; 27]
- Provide sturdy framed, 4-legged furniture. Seat cushions and pads should provide a slight forward angle to support older adults as they raise themselves to a standing position. Avoid furniture with back tilting options and avoid furniture on castors as older adults with mobility problems will use furniture to steady themselves.[5; 11; 14; 16; 27; 31; 32]
- Consider matte finish, non-slip fabrics for seating upholstery (especially on the chair arms as older adults may use furniture as an aid to stand upright).[5; 27; 31]

e.g.
avoid chairs without arm rests

- Avoid patterned or flecked upholstery on furniture as such patterns can present visual perception challenges for older adults.[11; 16; 27; 31]
- Provide height adjustable treatment tables and wide based stools.[7; 16]
- Upholster furniture in colours which contrast from the surrounding environment to differentiate furniture from floor and walls; ensure non-upholstered furniture is also in contrasting colour from floor and walls. Use contrasting colour combinations to define furniture edges.[11; 16; 25; 27]
- Provide stable tables with rounded corners that are accessible from a wheelchair.[11; 16; 25; 27]
- Recommended chair seat dimensions are between 450 mm to 475 mm (18 in to 19 in) high, and between 450 to 500mm (18 in to 20 in) deep with firm cushions and lumbar support.[5; 27]
- To meet the diverse needs of older adults, provide diverse types of comfortable furniture (i.e., some chairs without arms to facilitate transfer to/from a wheelchair) in warm colours which contrast with the floor and walls.[5; 25; 27; 31]
- In patient rooms, to help orient confused older adults, mount large faced clocks and oversized calendars where patients can see them from hospital beds.[16; 25; 27]

EXPERT PANEL RECOMMENDATION

- Arms of chairs should cover the full length of the seat base.

Elevators

- Locate elevators close to wheelchair/walker accessible entrances and place them in visible areas that are directly accessible from main entrances and important circulation paths on each floor.[3; 16; 25]
- Outside each elevator provide a waiting area that is 1600 mm by 1600 mm (64 in x 64 in) to enable easy wheelchair or walker manoeuvrability. Also, door openings should be at least 810 mm (32 in) wide, with an automatic reopen safety feature.[25]
- Place elevator call buttons 1200 mm (4 ft) from floor. Call buttons should be at least 18 mm (3/4 in) square with 16 mm (5/8 in) high characters raised 1 mm (1/16 in) in appropriate colour combination (see *Colour* for details).[25]
- Arrange furniture to promote barrier free access and try to avoid furniture with jutting or recessed bases.[16; 24; 27; 31]
- Recommendations for elevator cabin size depends on the elevator's intended use.
- For all-purpose elevators, cabins should be at least 1300mm by 1300mm (4 ft 4 in x 4 ft 6 in).[25]
- To accommodate wheelchairs, cabins should be at least 1370 mm by 1725 mm (4 ft 6 in x 5 ft 9 in).[25]
- To accommodate stretchers, should be at least 1300 mm x 2030 mm (4ft 4 in x 6 ft 10 in).[25]
- When elevator cars arrive at designated floors, the gap between the building floor and the elevator cabin should be no more than 15 mm (1/2 in) high.[25]
- Inside elevator cabins, provide appropriate handrails on both sides of the cabin at a height between 800 mm to 1000 mm (32 in to 40 in).[5; 25]
- Inside elevator cabins, floor designation buttons should be in contrasting colours (see *Colour* for details), with numbers at least 40 mm (1-1/2 in) high and raised 1mm (1/16 in), on both sides of the door jambs and located between 900 mm and 1500 mm (3 ft to 4 ft 6 in) above the floor.[25; 27]

e.g.
large elevator call buttons and contrasting colours support independent wayfinding

Washrooms

- Washroom doors that open outward and are at least 810 mm (2 ft 8 in) wide to allow space for a wheelchair/walker to pass through enables caregivers to enter washrooms and assist disabled or frail older adults. Provide space for full wheelchair turning radius 1500mm by 1500 mm (5 ft x 5 ft) diameter.[4; 25]

- In public washrooms, it is recommended that modesty vestibules (or 'privacy stalls') be between 940 mm (38 in) and 1200 mm (48 in) wide. Doors to modesty vestibules that swing outward are preferred as they are more accessible, but if the door swings inward vestibules should be at least 2000 mm (6 ft 6 in) long.[11; 25]

- In each public washroom, provide at least one wheelchair/walker accessible modesty vestibule with enough space for a caregiver and room for mobility devices to be turned around. In accessible modesty vestibules, provide a wheelchair turning radius of 1500 mm by 1500 mm(5 ft x 5 ft) diameter along with space for caregivers to aid older adults.[4; 25; 30; 31]

- In public washrooms, a D-shaped handle mounted horizontally on the inside of modesty vestibule doors near the hinge side are easier for people with limited dexterity to operate than other handle styles.[25]

- A toilet mounting height between 430 mm (1 ft 5 in) and 450 mm (1 ft 4 in) is preferable to the normal height of 380mm (1 ft 3 in) because older adults can have difficulty lowering themselves into a sitting position. Aim to keep the toilet's centre line 450 mm (18 in) from the side with the grab bar installed.[3; 4; 5; 25]

- Provide back support if toilets are not a tank style, ensure flushing mechanism is easy to reach, easy to operate and that toilet paper is positioned within easy reach for people with limited mobility and dexterity (i.e., not behind the toilet).[4; 5; 16; 25]

- Mount urinals 450 mm (18 in) above the floor or mount urinals without a step to reduce the risk of falls by older adults.[25]

- Provide an appropriate chair for caregivers and so older adults using walkers can sit when using wash basins.[30]

- For wheelchair access, we recommend mounting wash basins 800 mm (32 in) high, and no higher than 860 mm (34 in). Provide a clear space under basins that is 680 mm (27 in) high and 200 mm (8 in) deep.[4; 5; 16; 25]

- Faucets with single arm controls mounted where they can be reached from a wheelchair are preferable to other faucet styles; mount faucets at the side of basins.[16; 25]

- Inside and outside patient washrooms, place night lights about 300 mm (12 in) from the floor and install illuminated light switches in washrooms.[11]

- In at least some patient washrooms, install assist tubs and/or wheelchair/walker accessible showers with non-slip finish on standing/sitting surfaces. It is best to install them in all patient rooms which are frequently occupied by older adults. The bath and shower controls should be accessible from a wheelchair and operable with one hand.[16; 25; 27; 31]

- To promote independent voiding by older adults, place grab bars near urinals and adjacent to the toilet – on both sides is preferable.[25; 30] All grab bars must be capable of withstanding a force of 2 kN.[3] There are different ways to install grab bars, for example:

  a) One 600 mm (24 in) long installed at an angle with the lower end 100 mm (4 in) in from the toilet edge.[25]

  b) An L-shaped bar 900 mm (36 in) long installed adjacent to toilet.[25]

- To promote independent bathing by older adults, install grab bars in patient washrooms:

  a) Install a horizontal grab bar on wall alongside tub/shower, 70 mm (30 in) above bathroom floor.[25]

  b) Install a vertical grab bar on the same wall as tub/shower at least 600 mm (24 in) long (can be L-shaped).[25]

  c) Install a vertical grab bar above the edge of the tub near the tub/shower faucet.[25]

- Install towel dispensers and other accessories no higher than 1200 mm (48 in) from the floor to be accessible from a wheelchair. However, when mounting accessories make sure they are not placed where they may be hazardous to visually impaired people.[4; 16; 25]

- Mount coat hooks no higher than 1400 mm (56 in) from the floor so people with stooped or hunched posture can reach easily.[25]

- Provide adequate commodes in all patient washrooms. (See *Equipment* pg. 25 for commode recommendations)

EXPERT PANEL RECOMMENDATION

- A double arm faucet is standard in Fraser Health. Consider motion centered touchless faucet in acute care where infection control poses a high risk, a cost sensitive issue in other areas.

Older adults have the right to be involved in decisions affecting their care and environment.

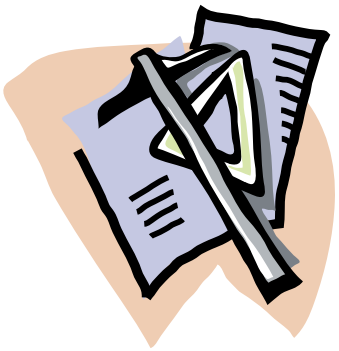
Physical Environment Design Assessment Tool

part 3

Older adults need a physical environment that:

- offers assistance with activities of daily living (ADL), to facilitate their own highest level of independent functioning;
- offers orientation cues to accommodate for sensory losses;
- facilitates and promotes individual mobility for safe independent function in order to support accessibility; and
- prevents early onset of potential clinical problems associated with hospitalization:

  Falls
  Confusion
  Warmth/Hypothermia
  Incontinence
  Loss of Privacy Dehydration



Instructions:

The tool is intended to support managers and other decision makers in assessing acute care areas for their degree of elder friendliness. The tool can also be applied to plans that are being considered for new construction and renovations.

The assessment tool is organized into common design elements relevant to the functional needs of older adults that are found in Part two of this document. To use the tool, start at the beginning or simply move to the section of the tool that is most relevant to your inquiry. Move through each section reviewing the statements listed under each category and respond by circling yes or no. Yes indicates the item has been addressed or is currently in place; No means the item has yet to be addressed. Items identified as No form the action plan.

Lighting

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Abrupt changes in lighting levels are avoided at entrances.		
Recommended types of glare-minimizing light bulbs or fluorescent tubes are installed.		
Lighting levels are consistent throughout hospital areas; pooled or cove lighting are avoided.		
The interaction between lighting, flooring, and other surfaces (i.e., walls, desks, tables) eliminates glare.		
Flooring, walkway, ramp and stairway surfaces are illuminated with additional lighting.		
Glare is eliminated using multiple light sources and combining direct/indirect sources, achieving recommended light levels.		
Windows are glazed or fitted with A) an exterior shading device to reduce glare from direct sunlight; and B) a reflective material to increase sunlight penetration into deeper areas.		
Wayfinding cues and signage are illuminated with recommended direct focused, non-glare lighting.		
Nightlights are installed appropriately inside and outside patient washrooms.		
In patient areas, patients can control light levels themselves.		

Comments:

Action Plan:

 (SEE PG. 14)

Colour

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Decor is in warm colour tones, with minimal use of blues, greens and pastel tones.		
Bold patterns and flecking are avoided on flooring, walls, equipment and furniture.		
Doors in patient areas (i.e., diagnostic/treatment rooms, acute care wards) are highlighted by using a colour which contrasts with walls and other adjacent surfaces.		
To reduce unwanted use, exit doors and doors to out of bounds areas are camouflaged by using the same colour as used on walls and adjacent surfaces.		
Floors and walls are coloured in high-contrast combinations to help older adults differentiate each surface.		
Handrails are highly visible and in a colour that contrasts with the floors and the walls.		

Comments:

Action Plan:

 (SEE PG. 15)

Flooring & Walls

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
All flooring material throughout the unit/area is non-glare, non-slip and designed to reduce noise reverberation.		
The height and width of floor joint components are kept to less than 2 mm high.		
Low-pile carpet has been installed, with either a firm underpad or no underpad to help reduce glare and noise.		
Flooring material **without bold patterns or flecking** has been installed consistently throughout the unit/area to avoid changes in flooring type (i.e., carpet or resilient) or colour.		
Walls and floors have a matte, non-glare finish.		
The walls behind handrails are smooth and non-abrasive.		
Floors, walls, and baseboards are visibly defined through the use of contrasting colours.		

Comments:

Action Plan:

 (SEE PG. 16)

Hallways, Doors & Windows

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Barrier-free access is provided throughout the unit/area with equipment and supplies stored out of the way.		
Doorsteps and raised thresholds are eliminated or kept within minimum height recommendations.		
At each entrance, automatic, opaque sliding doors are installed with an adjustable opening/closing delay programmed to allow a longer delay between opening/closing than is required by code (4-6 seconds).		
Hallways are wide enough to allow two wheelchairs/walkers to pass each other comfortably.		
Hallway corners provide the minimum recommended space to allow for an older adult to comfortably turn a wheelchair/walker.		
Long hallways are either avoided or broken up with rest areas providing appropriate seating at regular, recommended intervals.		
Door handles are lever style that can be opened with one hand and do not require twisting or turning.		
In patient rooms, drapes, blinds, or transparent sunscreen systems are installed with easy to operate, appropriately coloured controls accessible from a wheelchair.		

Comments:

Action Plan:

 (SEE PG.17)

Handrails

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Throughout the unit/area, handrails are installed at the recommended distance from the floor.		
The diameters of **all** handrails are within recommended parameters and with a non-slip texture.		
Handrails are installed on both sides of stairways and hallways.		
Handrails are equipped with safety rails and are installed on at least one side of ramps.		
Where handrails are terminated or interrupted, a tactile signal is provided 100mm before the handrail ends.		
Handrails extend the recommended distance beyond the end of ramps and stairways.		
The ends of handrails curve downward as recommended to enhance detection by older adults using the cane technique.		
In stairways, handrails continue through and around landings.		
In elevators, handrails are mounted at the recommended height and provided on both sides of the elevator cabin.		

Comments:

Action Plan:

HANDRAILS (SEE PG. 18)

Wayfinding & Signage

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
A decentralized design is used throughout the unit/area to allow older adults to avoid confusing, crowded central areas.		
At **all** major intersections throughout the unit/area, directional signs are posted in consistent places.		
Signs include simple, explanatory graphics.		
"You are here" maps and appropriate informational handouts are provided at reception/information areas.		
Colour coding is incorporated to facilitate wayfinding, with a standard colour and texture throughout hospital grounds.		
Signs are uncluttered and logically structured using consistent non-technical, non-medical language appropriate for a sixth-grade reading level.		
Wayfinding cues and signs are in high contrast colour combinations with light letters on dark, **matte** finish backgrounds.		
Inappropriate colour combinations are avoided on signs.		
On small signs, the font size at least 16 mm high and on large signs, the font size at least 40 mm high.		
Signs use the recommended font and lettering is tactile.		
Signs are made as large as appropriately possible for the posting area.		
Signs are posted at an intermediate height above handrails suitable for both older adults using wheelchairs/walkers and older adults standing upright.		
Signs are posted at high profile places, meaningful decision points, and key intersections.		
Signs are located out of the way of main traffic areas.		
Large, appropriately coloured signs indicating the floor number, are located outside of each elevator.		

 (SEE PG. 19-20)

Wayfinding & Signage (cont.)

Comments:

Action Plan:

WAYFINDING & SIGNAGE (SEE PG.19-20)

Walkways, Ramps & Stairways

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Walkway, ramp and stairway surfaces are made of slip-resistant materials.		
Grate and grid openings are small enough that wheelchairs, walkers, and/or canes will not become stuck.		
Walkways and ramps are kept as short as possible.		
Long walkways and ramps are broken up with rest areas and appropriate seating is provided at regular intervals.		
Walkways and ramps are wide enough to allow two wheelchairs/walkers to pass each other comfortably with sufficient space to manoeuvre around corners.		
The edges of ramps and stair risers are clearly identified with a yellow strip or contrastive colour.		
Ramps and stair risers are in a different colour from adjacent, level surfaces to clearly demark each end.		
Non-slip treads are applied to stair risers as recommended.		

Comments:

Action Plan:

 (SEE PG.21)

Acoustic Considerations

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Doors are solid-core with sound stripping installed.		
Silent or quiet type switches are installed.		
Heating and ventilation systems are of a quiet type.		
Double-glazed windows are installed.		
Fluorescent light ballasts are of a type that do not interfere with hearing aids.		
Hearing amplifiers are provided in all patient areas.		
In patient areas, a high number of single occupant rooms are available for older adults.		
In patient rooms and special function areas, the volume of voice paging systems can be adjusted and even turned off in geriatric unit/areas.		

Comments:

Action Plan:

 (SEE PG.22)

Parking

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Overhead lighting is sufficient for security.		
There is a sufficient number of wheelchair accessible parking stalls of appropriate dimensions located close to **each** entrance.		
Wheelchair accessible stalls are situated on a level ground surface with all surface grades a slope less than 1:20.		
Some wheelchair accessible stalls are equipped with locking pincers to block wheelchairs during transfer.		
There is a safe, direct wheelchair route connecting parking areas to accessible entrances without passing through vehicle pathways.		
Safe routes are clearly indicated with appropriate signage.		
A sheltered drop-off area and walkway leading to main entrances is available.		
There is adequate parking for scooters.		

Comments:

Action Plan:

Equipment

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Assistive Devices / Telephones		
Appropriate signage indicates where assistive devices for public use are located.		
A variety of assistive mobility devices are provided near each entrance, in common areas, in special function areas, and in patient rooms.		
Hearing amplifiers and specialty cushions provided for public use are located at **each** information/reception area.		
Appropriate telephones are located within close proximity to each entrance.		
Telephones meet recommended dimensions for mounting height, cord length, and partition size.		
Telephones are black with large, white push buttons and contrasting numbers/letters.		
Telephones are equipped with a directory and a flip-up seat.		
Telephones are equipped with volume control features and/or T-switch reception suitable for use with hearing aides.		
Telephones are equipped with T-switch reception located away from electrical or electronic.		
Telephones are equipped with TDD/TYY apparatus available for public use.		

Comments:

Action Plan:

 (SEE PG.24-25)

Equipment (cont.)

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Special Function & Patient Areas		
In special function areas, the height of treatment tables are adjustable.		
Blanket warmers are available in **all** patient care areas.		
In special function areas, a wandering system is installed to monitor confused mobile older adults.		
In patient rooms, beds have four adjustable, split aid rails which **cannot** fold down to the floor.		
In patient rooms, bed be adjusted to or are fixed at the recommended low height.		
In patient rooms, all beds are outfitted with pressure reducing mattresses.		
Full lifts, **partial lifts** and **ceiling lifts** are available in patient rooms.		
In patient rooms, adequate space is provided between beds to allow for use of lifts, stretchers, emergency equipment, physiotherapy aids, and other equipment to operate **without** disturbing other beds.		
In patient rooms, adequate space is provided for a full wheelchair turning radius.		
In patient rooms, controls for items are easy to operate and within reach from bed by older adults with limited reach and dexterity.		
Physical conditioning equipment is accessible to older adults.		
In all patient washrooms, an appropriate commode is available with a soft, padded seat tilted slightly backward and padded arms that can be locked into place.		

Comments:

Action Plan:

 (SEE PG. 24-25)

Furniture

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
There is a variety of comfortable types of seating available within recommended distance from entrances.		
Furniture is arranged to promote barrier free access.		
Furniture with jutting or with recessed bases is avoided.		
All pieces of furniture are sturdy-framed with four legs and **no** castors.		
Seats have firm cushions/pads that provide lumbar support (a slight forward angle and have backs that **do not** tilt backward).		
All furniture is upholstered in matte, non-slip fabrics **without** bold patterns or flecking.		
All furniture is upholstered in appropriate colours that contrast with surrounding environment (See *Colour* section pg. 15).		
Stable tables with rounded corners are provided and are accessible from a wheelchair.		
Seating options meet the recommended size dimensions for chair seats.		
In patient rooms, large faced clocks and oversized calendars are mounted where patients can see them from bed.		

Comments:

Action Plan:

Elevators

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Elevators are located close to wheelchair/walker accessible entrances.		
Elevators are located in visible areas, directly accessible from main entrances and in important circulation paths on each floor.		
A waiting area with chairs of appropriate size is provided outside of each elevator on each floor.		
The elevator **call buttons** outside the elevator, are in an appropriate colour combination and recommended font size, raised 1 mm, and at the appropriate height.		
Elevator cabin dimensions are within the size recommended for its intended use.		
When the elevator car arrives at a floor, the gap between the car and the building floor is less than 15 mm high.		
Appropriate handrails are provided inside each elevator cabin.		
Inside the elevator cabins, the **floor designation buttons** are located on both sides of the door jamb at the recommended height and in appropriate colour combinations with recommended font size raised 1mm.		

Comments:

Action Plan:

 (SEE PG. 27)

Washrooms

AREA EVALUATED: _____ **ROOM #** _____

	YES	NO
Doors leading into washrooms swing outward.		
All washroom doorways are wide enough for a wheelchair/walker to pass through.		
The space provided in washrooms allows for a full wheelchair turning radius.		
In public washrooms, **modesty vestibules** are within recommended spatial dimensions with doors that swing outward.		
In public washrooms, at least one **modesty vestibule** is provided which is wheelchair/walker accessible with additional space in vestibule for a caregiver.		
In public washrooms, handles on modesty vestibule doors are D-shaped and mounted horizontally on the inside near the hinge.		
In all washrooms, toilets are mounted at the recommended height and positioned appropriately.		
Toilets are a tank style or back support is provided when toilets are not tank style.		
The toilet flushing mechanisms and toilet paper rolls are within easy reach and not positioned behind the toilet.		
Urinals are mounted at the recommended height or without a step.		
In washrooms, an appropriate is chair available for caregivers or older adults using walkers.		
Wash basins are mounted at a height suitable for wheelchair access.		
A clear space of recommended proportions is provided under wash basins.		
Nightlights are near the door and inside and outside patient washrooms.		
In patient washrooms, tubs/showers have non-slip finishes.		
In patient washrooms, bath and shower controls are accessible from a wheelchair and operable with one hand.		
Toilets, urinals, showers and tubs are equipped with grab bars nearby.		
Towel dispensers and other accessories are at an appropriate height for wheelchair accessibility.		

 (SEE PG. 28-29)

Washrooms (cont.)

Comments:

Action Plan:

Older adults have the right to effective methods of prevention, diagnosis, treatment, and care in health services.

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part 4

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Bagwell, M. & Ludlow, E. (1980). The elderly patient in the hospital: Simple environmental changes can improve patient outcomes and enhance staff morale. *Supervisor Nurse,* 11(2), 32-35.

Through the presentation of case studies, the authors discuss how environmental manipulations can enhance older patient health outcomes by providing support for the sensory and physiological changes associated with the aging process. Although the authors discuss the hospital unit's physical environment, their report is more focused on patient assessment and changes to policies and procedures or the social climate rather than on the physical design of the hospital environment.

Barnes, S., Design In Caring Environments Study Group. (2002). The design of caring environments and the quality of life of older people. *Aging & Society,* 22(6), 775-789.

Focusing on dementia care in nursing home settings, the article reviews both architectural and psychological empirical studies on designing care environments. Describing the relationship between environmental design and patient quality of life, the authors make recommendations for the design of healthcare environments suitable for the needs of elderly patients, especially those with dementia.

Barrick, D., Karuza, J., & Levitt, J. (1999). Impacting quality: Assessment of a hospital based geriatric unit of care. *American Journal of Medical Quality,* 14(3), 133-137.

The article summarizes the authors' assessment of an inpatient geriatric acute services care (GACS) unit designed specifically to care for elderly care-home residents. Concluding that the GACS unit is a successful response to the complex issue of caring for older adults' acute needs, the authors describe their case study, but provide little detail on the physical design of the GACS unit itself.

Baseline improvements: A manufacturer's installations have shown the various possibilities of improving hospital flooring. (May, 2001). *Hospital Development,* 32(5), 40.

A paid advertisement discussing the installation of carpeting created by Bonar Floors, the article describes a carpet designed specifically for high traffic areas in health care facilities. A rubber and nylon compound flooring system, the carpet colours were designed following research on Alzheimer's patients' reactions to various colours and patterns. The carpets are said to reduce noise and to assist wheelchair access while withstanding the impact of castors.

Brawley, E. C. (1997). *Designing for Alzheimer's Disease: strategies for creating better care environments.* New York: John Wiley & Son.

Book is a comprehensive discussion on all elements of creating an environment that enhances the functional ability of older adults in care facilities. Some items are transferable to an acute care setting.

British Columbia Health Care. (2003). Output specifications. *Volume 1 Abbotsford Hospital and Cancer Centre*. BC: BCHC – Partnerships British Columbia.

The document discusses design concepts for a hospital and cancer centre in Abbotsford, BC. Volume 1 of 3, the document covers building design components and clinical service issues, offering detailed recommendations along with imposed building codes. Rather than focusing on an EFH design, the document recommends a universal design approach which promotes accessibility features for patients at any level of physical function or mental health.

Canada Mortgage and Housing Corporation. (1983). *Housing seniors.* Ottawa: CMHC.

Mandated to aid in the improvement of housing and living conditions for everyone living in Canada and recognizing the age-based needs of older adults, the CMHC reports their research findings pertaining to desirable housing standards specifically designed for older adults. Although many recommendations are applicable to an acute care setting, the CMHC advisory document is focused on the design of dwelling units geared to support older adults who are sufficiently healthy and mobile to live independently.

Canada Mortgage and Housing Corporation. (1989). *Maintaining seniors' independence: A guide to home adaptations.* Ottawa: CMHC.

Striving to help older adults maintain independent living despite some loss of physical autonomy, the CMHC sought to identify, implement, and evaluate minor, inexpensive home adaptations which can support older adults to carry out their daily activities. Through the presentation of case studies, the document offers easy and inexpensive home adaptations designed to support functioning for older adults and that account for the changes in sensory perceptions and motor skills associated with aging. While some ideas are transferable to an acute care facility, the document is intended to improve the older adult's home with the goal being to keep seniors out of nursing or care facilities. The document provides an assessment tool used to evaluate homes for supporting seniors in their activities of daily living and includes illustrations of elder friendly faucets, door knobs, electrical switches and plugs, bathtubs, utensils and mugs.

Canadian Study of Health and Aging Working Group. (1994). Canadian study of health and aging: Study methods and prevalence of dementia. *Canadian Medical Association Journal,* 150(6), 899-913.

The working group analyzed community and institutional data from across Canada, evaluating the prevalence of dementia by type, region, patient sex and age group. Describing the Canadian data, the authors demonstrate that different types of dementia topped the high ends of expected estimates and suggest that future trends in dementia prevalence require enhanced, specialized healthcare services. (No information on physical design features).

Carr, M. (2004). Responsive/restorative elder activating hospitals: R.E.A.C.H. program. Fraser Health Authority: Fraser North.

A discussion of the REACH program, an initiative from the Fraser North health services area which seeks to enhance elder care in the five hospitals within the region. The report is a presentation summary describing the program itself and provides a tool designed to evaluate the 'elder friendliness' of acute care units and the general hospital environment along. Components of elder-centered patient care and administrative support are also covered by the tool.

Counsel, S., Holder, C., Liebenauer, L., Palmer, R. M., Fortinsky, R. H., Kresevic, D. M., Quinn, L. M., Allen, K. R., Convincky, K. E., & Landefeld, C. S. (2000). Effects of a multi-component intervention on functional outcomes and process of care in hospitalized older patients: A randomly controlled trial of acute care for elders (ACE) in a community hospital. *Journal of the American Geriatrics Society,* 48, 1572-1581.

Acknowledging that hospitalized older adults often experience functional decline during their acute medical illness, the authors investigated whether the intervention called Acute Care for Elders (ACE) helps to improve functional outcomes. The article reports on the authors' findings and details their methodology and data analysis techniques along with a description of the ACE.

Creditor, M. C. (1993). Hazards of hospitalization of the elderly. *Annals of Internal Medicine,* 118(3), 219-223.

Discussing the normal aging process, the author details the physiological changes associated with aging and demonstrates how these physiological factors can contribute to a cascade to dependence for hospitalized older adults. Although focusing on the body's changes, the author also provides recommendations for modifying the physical environment of acute care facilities to support and enhance older adults' functionality.

Douglas, C. H. & Douglas, M.R. (2004). Patient-friendly hospital environments: Exploring the patients' perspective. *Health Expectations,* 7, (1)61-73.

The article reports on an exploratory study examining patient perceptions and attitudes to a constructed hospital environment. Through face-to-face interviews with patients, the authors' qualitative study identified what aspects of hospital care and design are perceived as most important to patients. The authors provide a summary table of their findings and suggest design themes to enhance patient perceptions of healthcare facilities and care received.

Dvorsky, T. & Pettipas, J. (2005). Elder-friendly design interventions: Acute care hospitals can learn from long-term care residences. *Implications* (Electronic), 2(7). Available: www.informedesign.umn.edu.

Learning from their experiences designing long-term care facilities, the authors describe a number of ways in which interior environments can be designed to aid hospitalized older adults to maintain and enhance physical functioning in a safe, aesthetic environment to promote longer, healthier lives.

Flaherty, J. H., Tariq, S. H., Raghavan, S., Bakshi, S., Moinuddin, A., & Morley, J. E. (2003). A model for managing delirious older inpatients. *Journal of the American Geriatrics Society,* 51(7), 1031-1035.

Describing the development, management and economic feasibility of a new care model for delirious patients, the article introduces the Delirium Room (DR) as an integral component of the Acute Care for the Elderly (ACE) unit. Along with data describing a cohort of delirious older patients, the article describes the renovations made in constructing both the ACE and the DR in comparison to standard, non-elderly specific hospital units.

Fottler, M. D., Ford, R.C., Roberts, V., & Ford, E.W. (2000). Creating a healing environment: The importance of the service setting in the new consumer-oriented healthcare system. *Journal of Healthcare Management,* 45(2), 91-106.

The authors provide a discussion of how to create an outstanding healthcare environment designed on principles guiding the guest service industry. Arguing for a customer service approach to be adopted throughout the healthcare system, the authors describe aspects of the physical environment that can be adapted to enhance patient and staff satisfaction.

Fozard, J. L., Gordon-Salant, S., Schieber, F., & Weiffenbach, J. M. (2003). *Sensory and Perceptual Considerations in Designing Environments for the Elderly* (Electronic). National Resource Center on Supportive Housing and Home Modification. Available: www.homemods.org/library/life-span/sensory.html.

Discussing age-related changes in sensory perception, the authors review potential interventions which may enhance sensory functioning for older adults. In light of sensory changes related to aging, the authors link environmental design features to physiological changes and make recommendations to enhance the quality of life of older adults through strategic design features such as lighting and noise levels.

Glanville, R. (2004). Impact of the built environment. *Practice Development in Health Care,* 3(3), 182-185.

Through a review of relevant literature, the author analyses the recent trend in hospital environment design which was driven by functional efficiency and cost effectiveness for many years and now demonstrates increasing interest in the notion that the physical environment contributes to patient well-being. The author provides a number of examples supporting her argument that hospitals can, and should, be designed as healing environments.

Gutman, G. M. (2005). *Critical elements of the physical features of an elderly friendly acute hospital environment.* Fraser Health Authority.

Having reviewed the relevant literature, Dr. Gutman summarized key elements of an Elder Friendly hospital and provides a thorough reference list of relevant studies and papers. Focusing on British Columbia's healthcare system, the author provides numerous recommendations for constructing an Elder Friendly hospital, and details many components necessary for the physical design component of such an acute care facility.

Hancock, T. (2003). The healthy hospital. *Hospital Quarterly,* 6(4), 68-69.

In a very brief column, the author suggests five things that policy decision makers must consider when designing healthy hospitals, but these are not focused on the physical design of the hospital or medical-surgical units. Rather, the author focuses on the social climate and policies and procedures that can enhance patient outcomes.

Harris, P. B., Ross, C., & Curtis, L. (2002). A place to heal: Environmental sourcs of satisfaction among hospital patients. *Journal of Applied Social Psychology,* 32(6), 1276-1299.

Through 380 telephone interviews with discharged inpatients, the authors identified elements of the hospital's physical environment which contribute to patient satisfaction. Interior designs, architecture and privacy contribute to patient satisfaction as well as housekeeping practices. Through their research, the authors offer suggestions for architects, designers, and healthcare providers, but their satisfaction survey was not aimed at older adults.

Harris, R. D., Henschke, P. J., Popplewell, P. Y., Radford, A. J., Bond, M.J ., Turnbull, R. J., Hobbin, E. R., Chalmer, J. P., Tonkin, A., Stewart, A. M., O'Brien, K. P., Harris, M. G., Champion, G., & Andrews, G. R. (1991). A randomized study of outcomes in a defined group of acutely ill elderly patients managed in a geriatric assessment unit or a general medical unit. *Australian and New Zealand Journal of Medicine,* 21(2), 230-234.

The authors conducted a randomized study to identify differences in medical management and clinical outcomes in a sample of older patients admitted to a designated geriatric unit or to one of two general medical units. Describing their research methodology in detail, the authors conclude that basing admission to a designated geriatrics assessment unit solely on age criteria is medically inappropriate and not cost efficient.

Health and Welfare Canada. (1984), *Facilities for the elderly in Canada: Design and environmental considerations. Vol. 1 Geriatric units in hospitals.* Ottawa: Health Resources Directorate, Health Services and Promotion Branch, Health Facilities Design Division.

Beginning with a discussion of the physiological changes in sensory perception and physical strength and mobility associated with the normal aging process, the report presents details recommendations for designing facilities to support outcomes for older adults. Along with a discussion of physical design elements, the report provides decision makers with the psychosocial rationale for designing hospital areas from within an elder friendly perspective.

Hendrich, A. L., Fay, J., & Sorrells, A. K. (2004). Effects of acuity-adaptable rooms on flow of patients and delivery of care. *American Journal of Critical Care,* 13(1), 35-45.

From an evidence-based design, the authors conducted a study exploring the impact that acuity-adaptable rooms have on patient flow, hospital capacity, patient dissatisfaction, sentinel events, and length of stay. The authors outline components of an acuity-adaptable bed and discuss the results of their empirical study which found that such rooms did produce positive outcomes in the 5 areas of concern.

Hiatt, L.G. (1981). The colour and use of colour in environments for older people. *Nursing Homes,* 30(3), 18-22.

Framed within her discussion of changes in visual acuity associated with the normal aging process, the author provides an analytical discussion of the use of colour to enhance environmental design for older adults. Arguing that the symbolic meanings associated with colour are far more subjective than suggested in many psychological discussions of colour and meaning, the author provides recommendations for organizations to more effectively select colours to aid older adults in any environment. Colour can be used to highlight or camouflage.

Hirsch, C. H., Sommers, L., Olsen, A., Mullen, L. & Winograd, C. H. (1990). The natural history of functional morbidity in hospitalized older patients. *Journal of the American Geriatrics Society,* 38(12), 1296-1303.

The authors conducted an empirical study exploring the effects of hospitalization on the functional independence of 71 patients over the age of 74. Although the study concluded that the patients over the age of 74 admitted to hospital units included in the study did indeed exhibit substantial functional decline, the authors do not discuss the role of the physical environment in maintaining patient functionality.

Horsburgh, C. R. Jr. (1995). Healing by design: Architecture of hospitals. *New England Journal of Medicine,* 333(11), 735-741.

Exploring the relationship between healing and architectural, spatial design, the article discusses 'four qualities of space' characteristic of good architecture in relation to designing hospitals to promote healing for all ages. The four qualities described are: orientation, connection, scale, and symbolic meaning.

Jones, L. (2004). The role of the physical environment in delivering better health care. *Practice Development in Health Care,* 3(4), 234-237.

The author argues that the physical environment of hospitals impacts patient outcomes. Supporting her article with research based evidence, the author describes ways in which the environmental features affect patient satisfaction, staff morale, and the length of patients' stays. The article does not focus solely on older patients in hospital environments, but offers common sense suggestions for enhancing clinical settings.

Koenig, H. G., George, L.K., Stangl, D., & Tweed, D.L. (1995). Hospital stressors experienced by elderly medical inpatients: Developing a hospital stress index. *International Journal of Psychiatry in Medicine,* 25(1), 103-122.

The article reports on a project which developed an index measuring experiences which elderly patients perceived as stressful during hospitalization. Describing their method for designing the index, the authors constructed a forty-item index called the *Hospital Stress Index* (HSI), including elements of the physical environment, such as noise and inadequate facilities (food, recreation, room fixtures).

Lomas, J., Hertzman, C., Barer, M. L., Pulcins, I. R., Evans, R. G., & Anderson, G. M. (1990). *The great transformation of the British Columbia hospital sector: Policy design or political accident for the elderly?* Vancouver; University of British Columbia: Health Policy Research Unit.

The authors present an analysis of policy changes in British Columbia's hospital sector over a twenty year span and outline how the changes affect the elderly. Arguing that together, the policy changes resulted in a transformation which represents the medicalization of elder care rather than a response to the needs of the age-related needs of older adults, the authors conclude that policies to support older adults must seek to overcome the medicalization of elder care, and must strive to address the psycho-social needs of older adults.

Martin, C. (2000). Putting patients first: Integrating hospital design and care. *Lancet,* 356(9228), 518.

The article reports on the 2nd International Conference on Health and Design held in Stockholm, Sweden from June 18 – 21, 2000. The author promotes the theory of supportive design and suggests that healthcare facilities be constructed and/or renovated under the theory's guiding principles of human centeredness and functional efficiency.

Martin, D. P., Hunt, J. R., Hughes-Stone, M., & Conrad, D. A. (1990). The Planetree model hospital project: An example of the patient as partner. *Hospital & Health Services Administrations,* 25(4), 591-601.

The article describes the Planetree hospital model, an innovative medical-surgical unit which fosters the concept of patients as partners in health care. The patient-centered approach emphasizes patient involvement in health care and is situated in a caring, homelike environment. The article describes the renovations which transformed a standard medical-surgical hospital unit into the Planetree model and suggests that such units enhance patient satisfaction while supporting improved health outcomes.

Moore, M. M., Nguyen, D., Nolan, S.P ., Robinson, S.P ., Ryals, B., Imries, J.Z., & Spotnitz, W. (1999). Interventions to reduce decibel levels on patient care units. Presented as a poster at the *66th Annual Scientific Meeting and Postgraduate Course Program*, Southeastern Surgical Congress. Atlanta, Georgia: January 21 to February 4, 1998.

Using a decibel meter to analyze noise levels on acute care units and intensive care units, the authors measured existing acoustic ambience and provide suggestions to educate staff and to reduce decibel levels to enhance patient experiences in hospital.

Mountain, G. & Bowie, P. (1994). The quality of long-term care for dementia: A survey of ward environments. *International Journal of Geriatric Psychiatry,* 10(12), 1029-1035.

The authors surveyed hospital wards at 11 different hospitals, assessing each unit for: institutionalization, available activities, reality orientation cues, ward condition and space availability. Focusing on elements to enhance outcomes for patients with dementia, the authors assessed the units and discuss the importance of reality cues for this population.

Murphy, E. (2000). The patient room of the future: State-of-the-art care — and what a view! *Nursing Management,* (Electronic). Available: www.nursingmanagement.com.

The author describes how modern hospital rooms are increasingly designed to incorporate soothing, healing environments grounded in research supporting the concept that environmental factors heavily influence patient satisfaction and can enhance the healing process. The author describes trends in patient room design and outlines design features that can support patient functionality and enhance healing.

National Advisory Council on Aging. (1992). Housing an aging population: *Guidelines for development and design* (2nd ed.) (Electronic). Ottawa: NACA. Available: www/phac-aspc.gc.ca/seniors-aines/naca/housing/pdf/hous-e.pdf.

The report offers detailed recommendations for planning, designing or modifying various multi-unit housing projects or single-family homes to enhance older adult functioning. Along with excellent diagrams illustrating key points, the report provides excellent recommendations for ensuring that building are accessible for seniors and are designed to support older adults; the concepts offered in the report can readily be transferred to clinical care facilities.

NICHE – Nurses Improving Care for Health System Elders. Available: www.hartfordign.org

NICHE is unlike other programs in that it does not prescribe how institutions should modify geriatric care; rather, it provides the materials and services necessary to stimulate and support the planning and implementation process. The focus of NICHE is on programs and protocols that are dominantly under the control of nursing practice; in other words, areas where nursing interventions have a substantive and positive impact on patient care.

O'Keeffe, J. (2003). *Creating a senior friendly physical environment in our hospitals* (Electronic). The Regional Geriatric Assessment Program of Ottawa. Available: www/rgapottawa.com.

Guided by the physiological changes associate with aging, the author offers the physical design components of a senior friendly hospital and provides detailed suggestions for each component. Organized by the components of a senior friendly hospital, the article provides the guidelines for physical dimensions to be used in designing and/or renovating hospitals.

Palmer, R. M., Landefeld, C. S., Kresevic, D., & Kowal, J. (1994). A medical unit for the acute care of the elderly. *American Geriatrics Society,* 42(5), 545-592.

From a gerontological perspective, the authors outline the dimensions of existing hospital units for the acute care of the elderly, noting similarities and common themes identified through their literature review. The authors suggest that ACE units enhance older adult outcomes and provide information on designing similar units in hospitals; however, more details are provided on the multi-disciplinary approach and Prehab Program of patient centred care than on the physical design features of ACE units.

Panno, J. M., Kolcaba, K., & Holder, C. (2000). Acute care for elders (ACE): A holistic model for geriatric orthopaedic nursing care. *Orthopaedic Nursing,* 19(6), 53-60.

Employing Kolcaba's "theory of comfort," the authors describe aspects of an acute care model for addressing the special requirements of older patients. The model consists of a prepared environment within which an interdisciplinary team coordinates individualized care plans in light of physiological changes which occur with aging. The article discusses a pilot study undertaken by the authors which evaluated research outcomes to evaluate the model's applicability in a hospital environment, finding that the ACE unit intervention helped to promote and maintain older adult functionality.

Parke, B. and Brand, P. (2004). An Elder Friendly Hospital: Translating a Dream into Reality. *Canadian Journal of Nursing Leadership,* 17(1) 62-77.

Provides a description of an organization's move toward an elder friendly hospital. Key elements are discussed. Customized strategies are suggested and implementation processes are recommended.

Parker, J. (2001). Championing good design. *The Journal for Healthcare Design & Development,* 32(1), 8.

The article provides a summary of an interview between the author an Sir Stuart Lipton, chairman of the Commission fro Architecture and the Built Environment (CABE). During the interview, Lipton discusses design quality failures which occurred during public finance initiatives and provides his views on good hospital design.

Parks, B. (1994). "It's for seniors": An acute-care geriatric unit. *Nursing Management,* 25(11), 62-64.

The author outlines the rationale for constructing an acute-care unit especially designed for older adults within the framework of the physiological changes associated with aging. Supporting older adult functioning through appropriate physical design, the article describes a few physical features of a specialized, acute-care geriatric unit and details positive outcomes associated with such units which focus on maintaining older patients' pre-hospitalization lifestyles rather than on restoration post-hospitalization.

Pinto, M. R., DeMedici, S., Zlotnicki, A., Bianchi, A., VanSant, C., & Napoli, C. (1997). Reduced visual acuity in elderly people: The role of ergonomics and gerontechnology. *Age and Ageing*, 26, 339-344.

The authors define and explore "gerontechnology," the scientific study of the complex relationship between older adults and technological items within constructed environments. The article describes changes in visual acuity associated with normal aging, and offers suggestions for improving healthcare environments' fit with older adults' needs through enhanced lighting and appropriate furnishings, flooring, and doorways. Excellent diagrams are provided to depict the authors' recommendations.

Rader, J. & Tornquist, E.M. (Eds.). (1995). *Individualized dementia care: creative, compassionate approaches.* Springer Publishing Inc. New York, NY

The chapter outlines the rationale for redesigning physical environments to account for physiological changes which occur throughout the aging process and details elements of the organizational environment relative to elder care such as: philosophy, policy and procedures, staffing patterns, structure of the day, staff support and education, and equipment and supplies. The author provides a detailed discussion of each element, and provides an excellent resource for designing an elder-friendly physical environment.

Regnier, V. (2003). *Design principles and research issues in housing for the elderly* (Electronic). National Resource Center on Supportive Housing and Home Modification. Available: www.homemods.org/library/life-span/design.html.

The author reviews and outlines the theoretical approaches most common in research on aging and physical environments, noting four typical perspectives: place-oriented research, design-oriented research, research oriented to social and psychological processes, and research oriented to environmental policy. Through his analysis of empirical research studies, the author summarizes nine environment and behaviour principles to consider when designing care facilities for older adults: privacy, social interaction, control/choice/autonomy,

orientation/way-finding, safety/security, accessibility/manipulation, stimulation/challenge, sensory aspects and familiarity. The author recommends employing a universal design with an emphasis on supportive characteristics to enhance safety for all groups (children/physically handicapped/developmentally disabled) as well as the elderly.

Reid, E. (2001). Factors affecting how patients sleep in the hospital environment. *British Journal of Nursing,* 8(10), 912-915.

The author describes various factors which inhibit sleep on hospital wards, factors she categorizes as: environmental, physiological, and psychological. Describing changing sleeping patterns associated with the normal aging process, the author offers suggestions on reducing noise in hospitals and argues that many factors inhibiting patients' ability to sleep are subjective and often tied to the patient's illness or disease.

Siegler, E. L., Glick, D., & Lee, J. (2002). Optimal staffing for acute care of the elderly (ACE) units. *Geriatric Nursing,* 23(3), 152-155.

The authors surveyed 18 ACE units regarding unit size, configuration, staffing, training, and patient admission criteria along with an analysis of outcomes data on each unit. Focusing on staffing issues, the article compares ACE units at different hospitals and evaluates their impact on patient outcomes and staff satisfaction. Although the authors note that ACE units have specially prepared environments designed in consideration of supporting functionality in older adults, the article provides very little description of how to prepare the environment, focusing instead on interdisciplinary team functions, discharge planning and appropriate staffing.

Swan, J. E., Richardson, L. D., & Hutton, J.D. (2003). Do appealing hospital rooms increase patient evaluations of physicians, nurses, and hospital services? *Health Care Management Review,* 28(3), 254-264.

The authors conducted a field study investigating the impact that appealing hospital rooms had on patient evaluations of hospital services. Positing that patients in appealing rooms would give a more favorable evaluation of staff members and the care patients receive, the authors compared self-report evaluation responses from patients in appealing rooms and patients in standard, non-appealing hospital rooms. Little description of the aesthetic qualities of each room type is provided.

Topf, M. (2000). Hospital noise pollution: An environmental stress model to guide research and clinical interventions. *Journal of Advanced Nursing,* 31(3), 520-528.

Employing an environmental stress model to frame her discussion, the author discusses a three-part intervention strategy to reduce patient stress through the reduction of ambient noise pollution. The author's report discusses how redesigning the hospital unit with acoustical enhancements, the continuous reduction of sound levels, and ongoing education of stress reduction techniques for patients can enhance patient outcomes. Suggestions on redesigning the physical environment to reduce noise pollution and appropriate equipment are provided.

Ulrich, R., Quan, X., Zimring, C., Joseph, A., & Choudhary, R. (2004). *The role of the physical environment in the hospital of the 21st century: A once-in-a-lifetime opportunity* (Electronic). Available: www.healthdesign.org./research/reports/physical_environ.php.

Having reviewed a high number of empirical studies available through electronic databases and libraries, the authors compiled a thorough analysis of physical design components that can enhance health outcomes for patients. Linking a hospital's physical environment to patient and staff outcomes, the authors provide recommendations for enhancing the person-environment fit in acute care facilities.

Ward, D., Severs, M., Dean, T., & Brooks, N. (2003). Care home versus hospital and own home environment. *Cochrane Database of Systematic Reviews* (Electronic), 2. Available: www.update-software.com.

The authors reviewed articles describing research studies which analyzed differences in health outcomes for older adults admitted to hospital, long-term care facilities, or who received home care. Comparing the effects of care home settings versus hospitals or own home environments, through empirical review, the authors found that insufficient evidence exists to compare the effects of the different care environments as they pertain to older adults.

Williams, M. A. (1989). Physical environment of the intensive care unit and elderly patients. *Critical Care Nursing Quarterly,* 12(1), 52-60.

The author explores the relationship between the care of elderly patients and the physical environment in an intensive care unit (ICU). Conceptually distinguishing between the physical environment and the social environment, the author focuses her analysis on the physical design elements comprised of: the buildings and structures, space, light, colour, temperature, terrain, noise, weather, and 'other atmospheric elements.'

Wong, R. Y. M., Shaw, M., Acton, C., Wilbur, K., McMillan, M., Breurkens, E., Sowden, C., Trautman, S. M., & Chan, N. (2003). An interdisciplinary approach to optimize health services in a specialized acute care for elders unit. *Geriatrics Today*, 6, 177-186.

The authors provide the rationale for creating a specialize, Acute Care for Elders (ACE) unit, describing the interdisciplinary approach necessary for such a unit designed to enhance health outcomes for older adults. The article offers a thorough description of all dimensions of a successful ACE unit, including the enhanced collaboration of care workers and recommendations for the physical design of the elder friendly units.

World Health Organization. (2004). *Active ageing: Towards age-friendly primary health care* (Electronic). Available: www.who.int/hpr/ageing/af_report.pdf.

From the perspective that age-friendly primary healthcare benefits people of all ages, the WHO promote age-friendly principles in their analysis of global health care. Addressing three key dimensions of age-friendly primary health care, the article provides valuable information on: educating, communicating and training staff in clinical geriatrics; on health care management systems; and on the physical environment necessary to enhance outcomes for the world's aging population.

The following recent literature, which focuses on older adults' perceptions of being in hospital, was used to inform the Code Plus initiative subsequent to the original literature reviews:

Douglas, C. H. & Douglas, M. R. (2004). Patient-friendly hospital environments: Exploring the patients' perspective. *Health Expectations,* 7, 61-73.

Faulkner, M. (2001). A measure of patient empowerment in hospital environments catering for older people. *Journal of Advance Nursing,* 34(5), 676-686.

Huckstadt, A. A. (2002). Experience of hospitalized elderly patients. *Journal of Gerontological Nursing,* 28(9), 24-29.

Jacelon, C. S. (2004). Older adults and autonomy in acute care: Increasing patients' independence and control during hospitalization. *Journal of Gerontological Nursing,* 30(11), 29-36.

Li, H. (2005). Hospitalized elders and family caregivers: A typology of family worry. *Journal of Clinical Nursing,* 14, 3-8.

Appendix

KEY STAKEHOLDER AND EXPERT PANEL PARTICIPANTS

Ken Anderson – Plant Services

Brenda Bailey – Clinicial Nurse Specialist, Residential Care

Shelagh Brennan – MSN Student, UVIC

Janice Brown – Geriatric Clinical Specialist

Betty Ann Busse – Executive Vice President Health Promotion & Community Programs

Marcia Carr – Clinicial Nurse Specialist, Fraser North

Bonnie Catlin – Manager, Emergency Department

Helen Chow – Clinicial Nurse Specialist, Fraser South

Eileen Coles – Manager, Geriatrics

Jason Cook – Manager, Quality Improvement

Anne Earthy – Clinicial Nurse Specialist, Residential Care

Priti Flanagan – Pharmacist, Seniors Program

Kathleen Friesen – Director Geriatric Services

Dr. David Gayton – Geriatrician, White Rock/South Surrey

Theresa Guscott – Manager, Medicine & Palliative

Dr. Gloria Gutman – Professor, Simon Fraser University

Phyllis Hunt – Clinicial Nurse Specialist, Fraser Health

Gail Jang – Manager Health Services, New Westminster

Ian MacDonald – Facilities Planning

Don Mah – Architect, Facilities Planning

Belinda Parke – Clinicial Nurse Specialist, Older Adult Health

Carol Peel – Occupational Therapist

Dr. Peter O'Connor – Geriatrician

Dr. Willie Pillay – Geriatrician, Surrey

Janet Ray – Project Leader, Sub Acute Care

Irene Rohrer – Manager, Acute Medicine

Cathy Sendecki – CNE, Emergency Department

Irene Sheppard – Director Health Services, Abbotsford/Mission

Irene Sombathy – Facilities Planning

Marie Tanasiuk – Architect, Facilities Planning

Celso Teixeira - Director Health Planning & Systems Development

Ed Townrow – Manager, Housekeeping & Laundry

Rafael Verdejo – Manager, Housekeeping & Laundry

Dr. Chris Wallace – GP, Medical Director – Geriatrics

Angela Welton – Director Health Services, White Rock/South Surrey

Dr. Katie Wilson – Geriatric Leader, Chilliwack

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The recommendations, standards and guidelines contained in *Code Plus: Physical Design Components for an Elder Friendly Hospital* are intended to provide general advice and are not intended to exhaustively address every situation. Nor are they a substitute for proper training, experience, and the exercise of professional judgment.

Health professionals are invited to copy the *Physical Environment Design Assessment Tool* on pages 32-47 to assist in the assessment, development and implementation of elder friendly physical design components at their health care facilities.

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