code plus

PHYSICAL DESIGN
COMPONENTS FOR AN
ELDER FRIENDLY HOSPITAL
2nd Edition

A guide to support decision-making for:

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

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

fraserhealth

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 centers, and serves close to 1.6 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.

The recommendations, standards and guidelines contained in *Code Plus: Physical Design Components for an Elder Friendly Hospital, 2nd Edition* provide general advice and are not intended to exhaustively address every situation. Nor are they a substitute for proper training, experience, or professional judgment.

Health professionals are invited to copy the Physical Environment Design Assessment Tool located in Part 4 to assist in the assessment, development and implementation of quality improvement activity to achieve elder friendly physical design in their health care facilities.

Code Plus: Physical Design Components for an Elder Friendly Hospital, 2nd Edition was made possible by a grant from the British Columbia Ministry of Health to Island Health, Scholar-in-Residence Program. This grant was administered by the University of Alberta - RES0021724. Additional funding was provided by the University of Alberta, Faculty of Nursing Establishment Grant - NO31000686. In-kind contributions were also received from Fraser Health.

ISBN: 978-1-55195-348-9

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About the authors

Belinda Parke is an Associate Professor in the Faculty of Nursing at the University of Alberta, and a Clinical Nurse Specialist in Older Adult Health with twenty-five years of practice experience. She has been engaged in academic research related to older adult health and elder friendly hospitals since 1991, and has published widely on the subject. Dr. 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 Dr. 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, Dr. Parke went on to develop a four-dimensional model for creating an elder friendly hospital, which was described in the introduction of the first edition of *Code Plus: Physical Design Components for an Elder Friendly Hospital*. This model now informs the approach to dementia-friendly acute care.

In 2003, Dr. 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. Now, in 2015 she has teamed with Ms. Friesen to expand the original Code Plus document to address the needs of older people living with dementia who encounter the built environment of the hospital setting.

Kathleen Friesen is Director, Population and Public Health for Fraser Health. In her role she leads health promotion, and disease and injury prevention across the life span. In addition, she co-chairs the Healthy Aging committee in Fraser Health. She previously led the planning, implementation and evaluation of sustainable geriatric services, improvement initiatives, and delivery systems across the organization.

Ms. Friesen has over two decades of practice experience in various clinical specializations and has served in both nursing and management capacities. Over her career, she has held leadership roles in the areas of Acute and Specialized Geriatric Programs, Rehabilitation, Emergency and Health Promotions. 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 in developing, implementing and 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 first Code Plus initiative. She partnered with Dr. Parke to bring the elder friendly hospital concept to the Fraser Health geriatric team, who adopted the framework. Ms. Friesen then took responsibility for strategic planning and management of the overall project.

Acknowledgement

We must not forget our history. When Code Plus was first written in 2005 many stakeholder groups contributed their practice wisdom (see Appendix A: How Code Plus was Developed).

Many people have also contributed to the 2nd Edition of *Code Plus: Physical Design Components for an Elder Friendly Hospital*. The 2nd Edition represents a partnership between Fraser Health, the British Columbia Ministry of Health, and Island Health.

We express our appreciation to the British Columbia Ministry of Health for a grant to conduct a literature scoping review, which made this endeavor possible. The literature scoping review provided the addition of dementia-friendly physical design content in acute care.

We acknowledge Marguerite Rowe, Executive Director, Island Health who supported the administration of the grant to the University of Alberta through the Scholar-in-Residence Program.

In keeping with the scoping review methodology, an international advisory consultation occurred to ensure that the search strategy, and the grey and empirical literature bibliographies were comprehensive. This consultation helped ensure that our content was robust. We acknowledge and appreciated the wisdom of reviewers, and wish to thank the following individuals:

Mohamed Nadim Adi, PhD - Postdoctoral Researcher, Faculty of Engineering, University of Alberta - Canada

Mohamed Al-Hussein, PhD - Researcher, Faculty of Engineering, University of Alberta - Canada

Dr. Marilyn Bater - Geriatrician, Island Health - Canada

Marie Boltz, PhD, CRNP - Researcher, Boston College of Nursing - United States

Margaret Calkins, PhD - President, IDEAS Consulting Inc.; Coordinator, Health Care Facilities Certificate Program, Kent University - United States

Thane Chambers, MLIS - Health Information Scientist, University of Alberta - Canada

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Cliff Cornish BA MLS, Regional Manager, Library Services, Island Health - Canada

Fabio Feldman, PhD - Manager, Fraser Heath; Simon Fraser University - Canada

Gloria M. Gutman, PhD - Researcher, Simon Fraser University, Gerontology Research Centre - Canada

Herbert Habets - Geriatric Clinical Nurse Specialist, Orbis Medical Centre / Senior Lecturer, Zuyd University of Applied Science - The Netherlands

Chloe Hood - Programme Manager, Royal College of Psychiatrists' Centre for Quality Improvement - Great Britain

Kathleen F. Hunter, PhD - Nurse Practitioner, Researcher, Faculty of Nursing, University of Alberta - Canada

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Preface Continuing to Move Forward "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. The number of older people in Fraser Health is increasing rapidly with the population of seniors age 65 and over expected to more than double from 249,852 to 521,694 in the next 20 years. Older adults are frequent users of Fraser Health's twelve acute care hospitals: people over age 65 account for 59% of all hospitalization days and 53% of all hospital inpatients. Therefore, over 50% of Fraser Health's hospital operations presently revolve around older adults.[1]

Since the first edition of Code Plus in 2005, population aging continues to occur in all regions of Canada.[2, 3] Both the number and the proportion of older adults in the population will continue to climb. Although older adults account for 14% of the overall Canadian population, they make up 40% of acute care activity.

As age increases, the number of visits to hospitals made by older adults increases. They also have longer hospital stays.

By 2031, Canada's largest birth cohort will become 65. These individuals were born between 1946 and 1965.[2] The fastest growing older adult segment of the population are those 85 years and over. As such, older adults will remain the primary users of hospital services in Canada for the foreseeable future.[2]

Older adults live life with multiple chronic health conditions.[4] The complex health profile of older adults entering acute care hospitals presents administrators and staff with new challenges. 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 and/or dementia are present. These confound both diagnosis and treatment of acute clinical problems, and challenge existing hospital systems and processes.

The physical space of in-patient hospital units are man-made therapeutic environments. They are clinical spaces where health care professionals do their work but they are also healing spaces where older people can begin the journey of recovery without acquiring new functional problems. The possibility of returning home must always be protected. Quality of life when at home must not be complicated by newly acquired functional problems that emerge as a result of being in hospital, particularly when hospital aquired problems are preventable.

Protecting maximum independent function by creating an elder friendly environment through effective physical design is one way to preserve quality of life when older people return home from hospital. Avoiding admission to long-term care because of functional decline is an achievable goal in an elder friendly hospital.

In the face of a rapidly growing aging population, efforts to actualize a new approach to hospital environments is an imperative. Although the principles of universal design are important, more is needed. The new approach must take into account normal physiological and social aging considerations, along with acute episodic illness.

Older adults are a heterogeneous population; physical design in hospital must therefore address sub-populations of older adults and their caregivers. Those living with dementia who require hospitalization can no longer be avoided. They require a suitable hospital environment to recover. To overlook their built environment needs sets the stage for additional stress and anxiety, poor patient outcomes, and health care professional injuries.

The built environment of nursing homes have long since emphasized design features that support the needs of all older adults, and their family caregivers. This industry has also been a leader in built environments for older adults living with dementia. We have drawn from the nursing home literature where appropriate. Translating this evidence to the hospital setting is however, challenging. The challenge most often arises from differences in the practice mandates of each setting, and the work and care goals that follow those mandates.

We have tried to address the issue of dementia-friendly acute care in the update of *Code Plus: Physical Design Components for an Elder Friendly Hospital, 2nd Edition* by:

- Expanding all sections to integrate physical design elements that relate specifically to dementia-friendly design;
- Re-organizing previous sections for reader ease and access;
- Refreshing the evidence to include new reference materials and relevant websites;
- Providing useful definitions to clarify language found in the references; and
- Conducting an international consultation to ensure our coverage of available information was accurate and robust.

We sincerely hope that our revision of Code Plus will meet the needs of those who are creating healing spaces for all older people admitted to hospital. For older people living with dementia and their care partners walking the hospitalization journey, we hope that the addition of dementia-friendly design considerations will make a difference to their hospital experiences.

Using This Guide

The core content of *Code Plus: Physical Design Components for an Elder Friendly Hospital, 2nd Edition* is structured in six parts. The information is organized in ways that will serve various needs and promote the autonomy of local service areas in decision-making because each hospital is located in jurisdictions that differ in their requirements.

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

1 Part One: Aging: Potential Physiological Alterations highlights the special features of an aging population in relation to preserving functional ability, independence, and safety. This part of the guide serves two purposes. First, it provides rational 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: Dementia-Friendly Acute Care provides detailed information on the impact of this progressively degenerative syndrome and hospital physical design. This section highlights areas of design that can support abilities while diminishing opportunities for the occurence of responsive behaviors.

3 Part Three: 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 their contribution to adverse functional ability and safety in older adults. Additional physical design elements that go beyond industrial building codes and standards are suggested.

4 Part Four: Physical Environment Design 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, and design renovations.

5 Part Five: References and Annotated Bibliography is provided to assist users who might be interested in obtaining more detailed information. All information is newly referenced.

6 Part Six: Appendices provides the addition of definitions and a list of websites related to dementia as well as other information.

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 reduce 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, which are another consideration in the physical design of an elder friendly hospital.

Introduction

The fundamental aims for an elder friendly hospital[5, 6] are to:

- promote excellence in hospital care for acutely ill older adults and their families through the provision of evidence-based service delivery and patient/family-focused care;
- ensure that gerontological principles are incorporated in practice standards across patient care programs and hospital services; and
- create a built environment that promotes, protects, and maintains safe maximum independent function.

Planning and designing hospital environments are a complex endeavor. The Code Plus approach offers a new set of considerations for hospital design processes.

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.

An elder friendly hospital is family-centered, responsive to the developmental needs of older adults, and offers a holistic gerontological developmental approach in combination with a diagnostic approach to hospital care and service delivery.[6, 7]

"FOUR DIMENSIONS" OF AN ELDER FRIENDLY HOSPITAL

An elder friendly hospital is multi-dimensional. A synergistic affect results from four interrelated dimensions:[6, 7]

- physical design
- social behavioral climate
- policies and procedures
- care systems and processes

The synergy from these four dimensions affects hospital culture, care delivery, and acute care operations. The four dimensions work together to promote safety, minimize functional decline, and mitigate adverse social and medical outcomes for older adults.

When all four dimensions are operating, an elder friendly hospital can be characterized by:

- a physical environment in all hospital settings (e.g., medical, surgical, emergency room and diagnostic areas) that supports functional abilities in all older people;
- available gerontological interdisciplinary expertise to assist recovery in older patients;
- an approach to care that fosters early identification of risk factors and clinical 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; and
- recognition of life long patterns and family relationships.[5, 6]

This guide addresses only one core dimension of an elder friendly hospital, *physical design*. Users are encouraged to consider its recommendations in light of the remaining three dimensions (social behavioral climate, policies and procedures, care systems and processes). All four dimensions are integral to fully achieving positive benefits for older adults, families, hospital staff, and the larger acute health care system.

Code Plus: Physical Design Components for an Elder Friendly Hospital 2nd Edition 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 older adults' health and well-being. See Appendix B for additional website information sources.

Many important concepts are discussed in the physical design literature (e.g., accessibility, universal design, LEED, infection control). These concepts are interrelated and they offer a means to safe quality physical design in a cost effective manner for all people. Integrating these concepts into hospital design is well known. However, age-friendly design goes further, emphasizing abilities associated with normal age related changes. Age related changes are normal, and universally experienced by all people in varying degrees, which is different from the presence of disease and illness. Useful definitions are found in Appendix C to provide clarity for a select number of concepts. Clarity in language will also promote understanding of the dimensions associated with the needs of older adults.

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 legislation, and legal building code requirements within particular jurisdictions. The overall aim is to ensure that maximum independent function in all older people is supported by aspects of facility design.

Code Plus: Physical Design Components for an Elder Friendly Hospital 2nd Edition 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, this guide 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 elder friendly hospital strategy. Commitment to the strategy considers older adults' functional abilities and safety in balance with other operational criteria such as: infection control, operational systems, available resources, and site-specific contextual issues that are relevant to the communities being 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 older people.[6, 8, 9, 10, 11, 12, 13] This arises from traditional patterns of care that ignore normal physiological and social age-related changes resulting in disability at the time of discharge.

The rationale for Code Plus therefore, 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.[2, 4, 14, 15]

- 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.[2,4]

- 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.[4,11]

- Being hospitalized is a stressful event; stress can impede healing.[13,16]

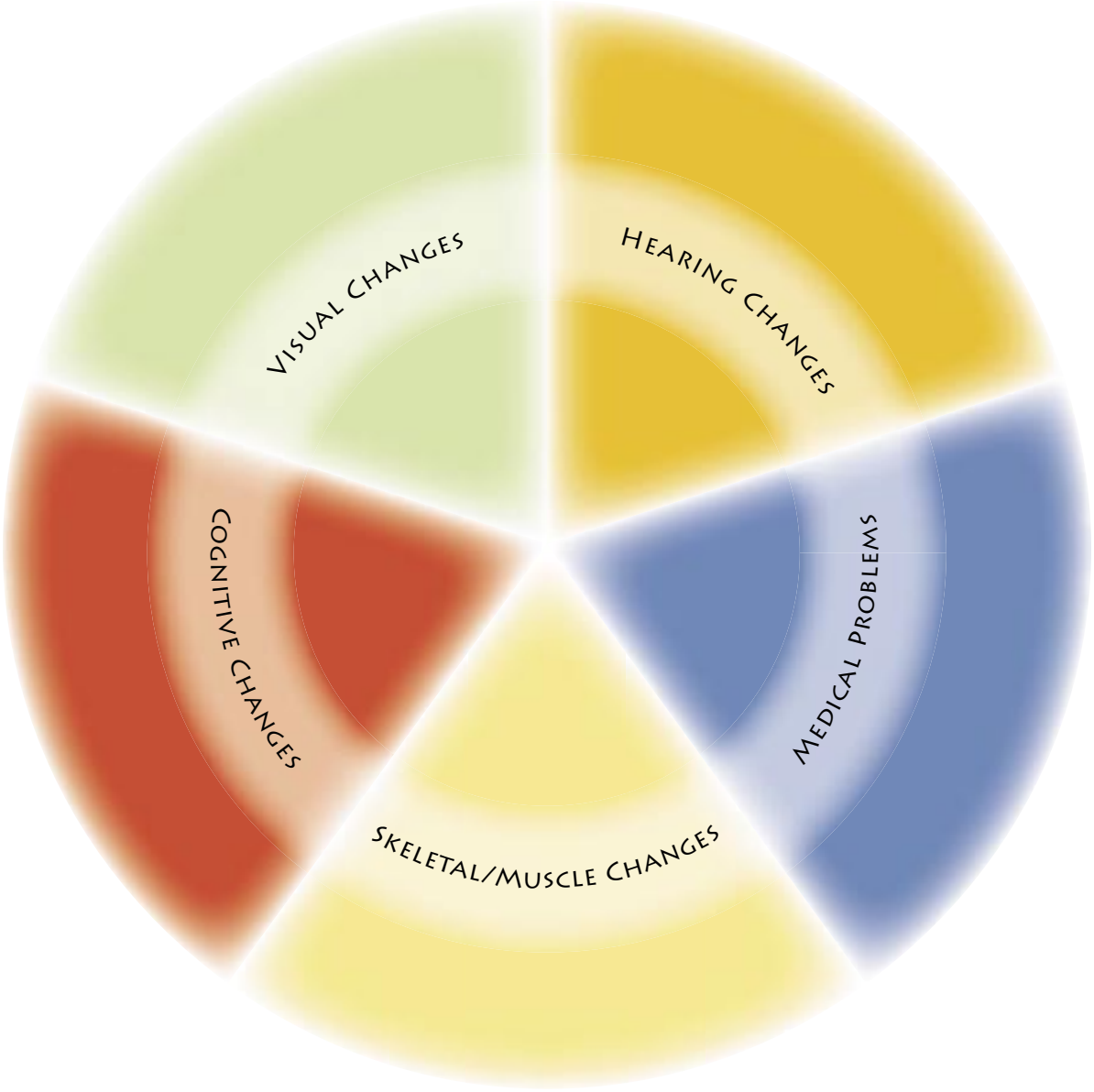
The Code Plus initiative is concerned with the role that the hospital physical environment plays in contributing to functional decline in older adults. It recognizes that the interaction between people and their physical environment can either increase their stress and impede recovery, or reduce their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

There is a lack of fit between older people and the hospital environment.[6] Elements of design can pose a barrier to independent wayfinding, promote deconditioning that limits recovery, and interfere with family support by making visiting difficult. As part of this, physical design that does not consider the needs of older adults serves to exacerbate their stress, fear, anxiety and worry.

The ramifications of non-elder friendly hospital design are felt at the individual or human level, and at the healthcare system level. For older adults, poor hospital environments mean poor health outcomes, which are well- documented.[6, 9, 11, 12] For the system, poor hospital environments translate into significant financial costs both at the local hospital level, and at the larger healthcare system level. This is evident when older adults who lose their independence cannot return home because they require more complex care. The recommendations contained in this guide are intended to minimize negative impact of hospital design on this population.

part 1

Aging Potential Physiological Alterations



POTENTIAL PHYSIOLOGICAL ALTERATIONS [2, 4, 16, 17, 18, 19, 20]

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

Hearing Changes

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

Cognitive Changes

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

Skeletal/Muscle Changes

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

Medical Problems

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

- Falls
- Poor mobility, weakness
- Susceptibility to delirium
- Susceptibility to incontinence
- Thermal response is reduced: sensitivity to abrupt temperature changes increases and older patients' ability to tolerate lower temperature ranges
- Susceptible to dehydration, hypotension, changes in skin integrity

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

Dementia-Friendly Acute Care part 2

The New Frontier for Hospital Physical Design

Dementia is a population health issue. As a progressive degenerative syndrome, it results from a variety of diseases. Although dementia is not a normal part of aging, the risk of developing dementia does increase with age, particularly in the later years. It is characterized by a decline in mental functioning that is expressed in a gradual loss of independent functioning.[4, 15, 21]

Dementia, as a population health issue has international implications.[22, 23, 24, 25, 26, 27]

The World Health Organization (WHO) predicts 135.5 million people will be afflicted with dementia by 2050.[26] Meeting the needs of older people with dementia is a challenge for all health care systems.[24, 27, 28, 29, 30, 31]

In Canada, the Alzheimer Society published a report titled, Rising Tide: The Impact of Dementia on Canadian Society.[22] The report indicates that 500,000 Canadians are living with dementia, 430,000 of whom are 65 or older. With a population of 4.3 million Canadians over 65,[3] this means that approximately 10% of older adults in Canada could be affected by dementia. Further, the impact of dementia on Canadian society is projected to increase 2.3 times, reaching 1,125,184 people by 2038.[22]

Alzheimer's Disease (AD) represents 64% of all cases of dementia in Canada.[15, 22, 23, 32] Acute care hospitalization for patients with AD in Canada increased by 39% between 2000 and 2005. The median length of stay in hospital when AD is the primary diagnosis was 21 days; this accounted for 1.5 million patient days.[15] In Fraser Health, the impact of dementia will continue to grow as the proportion of seniors age 85 plus grows over the next 20 years. Dementia shares a complex relationship with frailty, these are often found together as comorbid conditions.[33]

What makes dementia-friendly physical design in hospital clinically important?

The hospital is a fast paced environment that is naturally organized to support the needs of professionals carrying out their work to interrupt biological crises. To an older person with diminished cognitive capacity, it is however, a hostile environment. There is a corresponding need to support knowledge translation in dementia-friendly design practices.

The Code Plus: Physical Design Components for an Elder Friendly Hospital, 2nd Edition, is meant to bring the challenges of acute care physical design for an aging population to the forefront. Aspects of the physical design of a hospital can enhance the abilities of all older people. Special attention is needed for the vulnerable group of older people who live with dementia. When we speak about the vulnerability of this older population, we include their family members.

Family caregivers are partners in care; they often actively participate in all facets of hospital care. These individuals are champions for successful transitions back home.

By enhancing functional abilities in older people living with dementia we can lessen the effects of confusion, memory loss, disorientation, and changes in mood and behavior. In doing so, the physical design of hospitals can contribute to the safety of these healing environments. Safety occurs by preserving and maximizing independent function. Behavioral symptoms may be lessened and caregiving harms for both staff and caregivers avoided. Hence, positive clinical and functional outcomes become achievable for older people, and the hospital system. These are complicated outcomes to achieve because there are muliple competing, and conflicting factors and priorities that occur together at any given time.

Dementia-friendly acute care (D-FAC) design features

To achieve safe and healing D-FAC environments we advocate for considerations that: a) distract attention away from objects or areas that are unsafe in the environment; b) direct attention toward environmental cues; c) camouflage or highlight distinct features in the environment; and d) reduce anxiety to produce a calm behavioral response. These design considerations are challenging to achieve because multiple user groups are functioning in the hospital, and these groups have different abilities and needs. Both patient groups and health care professional needs occur in the same location at the same time. The hospital is a multi-use clinical setting.

Critical thinking and judgment is needed to translate the evidence into design practice because one approach is not possible or recommended; no one approach or combination of design features will suit all possible acute care scenarios.

Case Example: Color and Lighting to Aid Toileting in the Washroom

To illustrate the complexity of D-FAC design we take the idea of independent toileting to highlight how normal age related physiological changes can be supported through effective use of color and lighting in the physical design of a bathroom in a patient room.

Toileting and all activities are intended to meet a older adult's elimination needs. This requires a design that integrates coming into and leaving the bathroom. Therefore, the following should be considered:

- Visually locating the bathroom
- Getting out of bed/wheelchair
- Moving from the bed/wheelchair to the bathroom
- Entering the bathroom
- Visually locating the toilet and shower upon entering the bathroom
- Finding the toilet (moving to stand to sit or sit to stand)

Color has been reported to optimize patient outcomes that include: safety from falls, maximizing independent function, and diminishing anxiety. Color can be used to achieve and maximize independent function. As an aid, color has been shown to facilitate the interpretation of the environment. Color cues in combination with "standard" pictorial forms (signage) can also help improve recognition. In some studies this enhances memory, which some suggest can improve day to day functioning and independence.

Older adult populations have different physical and functional abilities. These abilities translate to different needs that must be understood for effective multi-use design. For example, there are some older adults' that have:

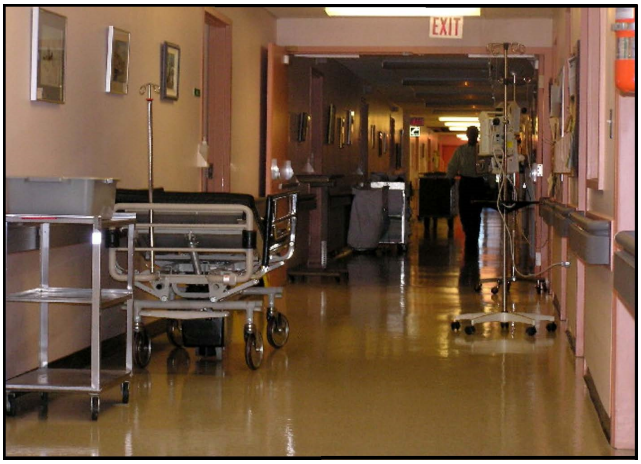
1. Multiple chronic problems but who have normal cognition to make independent decisions; or

2. Vision impairment but have normal independent function in all other aspects including cognition; or

3. Cognitive deficits that might or might not have vision or other medical diagnoses (arthritis; cataracts, glaucoma, macular degeneration) who are unable to problem solve without assistance to determine the most appropriate self-care action.

On a practical level, it is important to distinguish whether: a) the need is to locate and access an area because the older person has visual impairments, or b) visual impairment is not a problem but memory and recognition of what to do in a bathroom is the older adults' design need. In either case, color and design can help but the design solution could vary. The designer must determine: is the use of color to enhance vision? This in turn leads to maximizing independent function. Or, is the need to support recognition, which helps memory and recall. These are different goals. This is our challenge in purposefully built, multi-use hospital areas that aim to also be dementia friendly.

An overwhelming stressful milieu creates anxiety and responsive behaviors



Dementia-friendly hospital design is an integration of key principles that protects maximum independent function without inducing anxiety.

Physical Dimension

Design Recommendations for An Elder Friendly Hospital

part 3

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 design. For example, lighting in patient rooms vary little from recommendations for lighting in common areas. However, elevator recommendations are dependant on usage and location.

The following tables provide evidence-based design recommendations for the ***physical*** dimension 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 & Outdoor Spaces
- Acoustic Considerations
- Parking
- Equipment & Technology
- Furniture
- Elevators
- Washrooms
- Dementia-Friendly Attention

Lighting (natural & artificial)[34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55 56, 57, 58, 59, 60]

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:
  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).
- Avoid pooled lighting or cove lighting by ensuring consistent light levels throughout the hospital especially between adjacent areas.
- Provide a minimum of 300 lux from overhead lighting between 50 to over 300 lux on floor surfaces and stairs by using a system of several low-level, downward directed lights.
- Combine direct (i.e., ceiling mounted fluorescents) with indirect lighting (i.e., high pressure, floor-standing up-lights or diffuse refl ector and covered lamp shining down). Using multiple light sources reduces glare while increasing lighting beyond normal levels.
- 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.
- On wayfinding cues and signage, provide direct, focused, non-glare lighting.
- Just outside washrooms, place night-lights 300mm (12 in) from the floor and install illuminated light switches in washrooms.
- In patient areas, provide patient-controlled and task lighting,

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.[49]

Colour [49, 50, 51, 52, 53, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72]

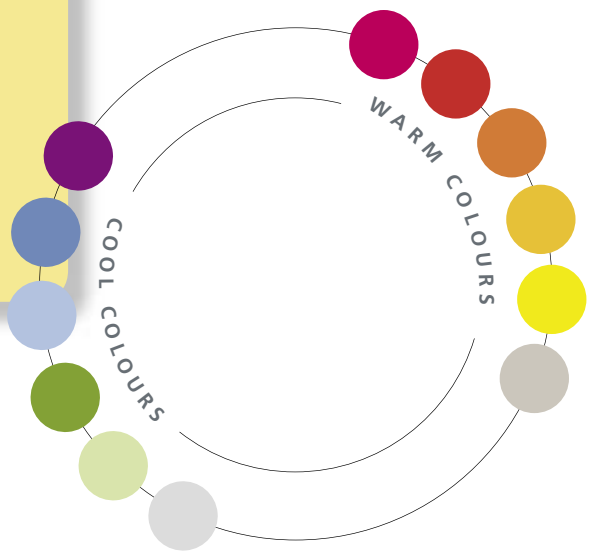
e.g.
decorate with warm colours

- 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. (See *Dementia-Friendly Attention* for details)
- 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.
- 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.
- Differentiate walls from floors by using different, contrasting colours for each surface. (See *Floors & Walls* for details)
- 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.

Note: See also *Wayfinding* for details

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 [49, 50, 53, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84]

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

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.
- Ensure flooring and walls are in a solid colour; avoid bold patterns, flecking, or glossy finishes which present visual perception challenges for older adults.
- 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.
- 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).
- 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.
- Use contrasting colours to differentiate baseboard, floor, and wall (see *Colour* for details).

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, ease of cleaning, infection control, and patient populations being served.
- Solid colours on walls may be made more aesthetically pleasing by placing pictures to support orientation and wayfinding.

Hallways, Doors & Windows [49, 50, 53, 55, 80, 85, 86, 87, 88, 89, 90]

- 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.
- 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.
- In all hallways, provide between 1470 mm and 1830 mm (4 ft 11 in – 6 ft 1 in) between handrails (see *Handrails* for details) to allow 2 wheelchairs to pass.
- Make hallway corners at least 1200 mm (4 ft) wide so older adults can turn a wheelchair/walker comfortably.
- Avoid long hallways which discourage older adults from moving around – break up long hallways with recessed rest areas (see *Furniture* for details) 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.
- 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.

e.g.
long hallways
discourage walking

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.

EXPERT PANEL RECOMMENDATIONS

- Open windows are 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 [49, 50, 53, 91, 92]

- 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.
- 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.
- Install handrails on both sides of stairways and hallways and on at least one side of ramps.

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 200mm (8 in) above ground, a curb at the same height.
- Curve the end of handrails down to 680 mm (27 in) for easier detection by visually impaired older adults using cane technique.
- In stairways, consider three factors: step visability, step geometry, previous of functional handrails. Continue handrails through and around landings, especially in long stairways.
- In elevators, provide handrails on both sides of the cabin at a height between 800 to 1000 mm (32 in to 40 in).
- 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.

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.

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

49, 50, 51, 53, 54, 55, 72, 85, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111

- Use a decentralized design to allow older adults to proceed directly to specific treatment or service areas avoiding confusing, crowded central areas.
- Include simple, explanatory graphics on signs using universal symbols wherever possible (i.e., the International Symbol of Access).
- Reception/information counters should be no higher than 840mm (34 in) to allow access from wheelchairs or walkers.
- Place maps, including "you are here" maps, and large font informational handouts at reception areas.
- Use colour coding to facilitate wayfinding and to indicate safe older adult routes by using a standard colour and texture throughout hospital grounds (see *Outdoor Spaces* for details).
- 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.
- 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
- For older adults with vision deficiencies the font size should be at least 16mm (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.

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 – 910mm to 1320mm (3ft to 4ft 5in) high or as low as 50mm (2in) above handrails.
- 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.
- Place large numbers indicating the floor number outside of elevators; combined with pictorial cues using contrasting colour combinations (see *Colour* for details).

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 5ft 8in or 5ft 9in – 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 pictures and symbols.
- Be consistent in the method of wayfinding.
- The larger the letter size the better: on small signs, the minimum letter height is 16mm (5/8 in); on larger signs, the minimum letter height is 40mm (1-1/2 in).
- Avoid using wavy lines or dots in text print.
- Avoid using all italics, all capital letters, and underlined type.
- Place directional signs at all major intersections and place signs in consistant locations.

Walkways, Ramps, Stairways & Outdoor Spaces[49, 50, 53, 85, 112, 113]

- Avoid abrupt changes in ground levels keeping any surface relief (i.e., curbs) to under 25mm high (1in) with rounded edges.
- 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 20mm (4/5 in) wide for older adults using walkers, wheelchairs or canes, as mobility aides may become stuck in the grid.
- Design walkways and ramps to be at least 1625mm (5ft 4in) wide, providing space between handrails that allow two wheelchairs to pass or a walker; and with landings at a minimum of 1625mm (5ft 4in) at the bottom and top of a ramp. Consider corners that are at least 1220mm (4ft) wide, to allow for a comfortable turning of a wheelchair/walker.
- Separate walkways and ramps from out of bounds areas with a barrier at least 100mm (4in) high in a suitable colour to distinguish it from paths and grass (see *Colour* for details).
- 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* for details). Also, make ramps and stair risers a different colour from adjacent level surfaces with clear demarcation of either end.
- Avoid long or winding stairways, keeping to a maximum of 10 risers per flight. Provide rest areas/landings every 10 risers (steps) on long fl ights of stairs and try breaking up long walkways or ramps with rest areas with appropriate seating (see *Furniture* for details) every 9000mm (30 ft.).
- 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.

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 20mm to 25mm (4/5 to 1in) high.

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 42, 49, 50, 52, 53, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139

- 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).
- 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.
- 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).
- Single occupant patient rooms are preferable to multi-occupant rooms – less noise and fewer disruptions which can exacerbate confusion and delirium in older adults.
- In patient rooms and special function areas, install voice-paging systems with volume controls that can be turned off on units and/or patient room areas with high proportion of older adults (i.e., orthopaedics, cardiovascular, surgery services).

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.

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 [49, 50, 53, 80, 140, 141, 142]

- Ensure bright, non-glare overhead lighting for security (see *Lighting* 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 3900mm (12ft 9in) wide on a level ground surface for safer transfers from vehicle to wheelchair and vice versa.
- Equip some parking spaces with locking pincers to block wheelchairs and keep them in place when transferring older adults.
- 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.

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* for details) which also indicate which treatment areas and/or services are adjacent to each entrance.
- 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.

Equipment & Technology [49, 50, 53, 85, 86, 93, 143, 144, 145, 146]

ASSISTIVE DEVICES:

- 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).

e.g.
telephone accessible from a wheelchair

- At each information counter and reception area, provide hearing amplifiers, pressure reduction furniture and lumbar support cushions.
- Locate public telephones and direct like to taxi services close to each entrance. At least one telephone should be accessible from a wheelchair - with coin slot, dial and handset less then 1370mm (54in) from the floor, a handset cord at least 1000mm (33 in) long, and partitions between phones at least 800mm (32in) apart.
- Black telephones with large, white push buttons and contrasting numbers and letters are accessible to older adults with visual impairments and/or limited dexterity.
- Provide a directory and a flip-up seat at telephones so that older adults can rest while they converse.
- 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). 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.
- 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.

Note: we avoid recommending individual products because gerotechnology 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 the hospital.

EXPERT PANEL RECOMMENDATIONS

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

SPECIAL FUNCTION & PATIENT AREAS:

- Provide height adjustable treatment tables.
- Provide a blanket warmer for each patient care area.
- Install a wandering system to monitor confused mobile older adults.
- In patient rooms, offer beds with four adjustable, split side rails and avoid side rails which fold down to the floor. Beds that can be adjusted (electronically) to 450mm (18in) 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.
- 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.
- In patient rooms, provide adequate room between beds to allow for a full wheelchair turning radius (a minimum 15 mm [6in] 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.
- 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 1200mm (48in) from the floor. Also, install a nurse call system that has "soft touch" controls.
- 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.
- 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

- Commode 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 [49, 50, 51, 52, 53, 86, 145, 147, 148, 149, 150, 151, 152]

- Arrange furniture to promote barrier free access and try to avoid furniture with jutting or recessed bases.
- 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.
- 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).

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.
- Provide height adjustable treatment tables and wide based stools.
- 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.
- Provide stable tables with rounded corners that are accessible from a wheelchair.
- Recommended chair seat dimensions are between 450mm to 475mm (18in to 19in) high, and between 450 to 500mm (18in to 20in) deep with fi rm cushions and lumbar support.
- 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.
- In patient rooms, to help orient confused older adults, mount large faced clocks and oversized calendars where patients can see them from hospital beds.

EXPERT PANEL RECOMMENDATION

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

Elevators [49, 50, 53, 84, 153, 154, 155]

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

e.g.

large elevator call buttons and contrasting colours support independent wayfinding

Washrooms [49, 50, 51, 53, 77, 156, 157, 158, 159, 160, 161, 162]

- Washroom doors open outward and are at least 81mm (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 1500mm (5ft x 5ft) diameter.

- In public washrooms, it is recommended that modesty vestibules (or 'privacy stalls') be between 94mm (38 in) and 12mm (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 2000mm (6ft 6 in) long.

- 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 15mm by 15mm(5 ft x 5 ft) diameter along with space for caregivers to aid older adults.

- 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.

- A toilet mounting height between 430 mm (1 ft 5 in) and 45mm (1ft 4in) is preferable to the normal height of 38mm (1ft 3in) because older adults can have difficulty lowering themselves into a sitting position. Aim to keep the toilet's centre line 450mm (18 in) from the side with the grab bar installed.

- 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).

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

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

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

- 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.

- Inside and outside patient washrooms (see *Lighting* for details), place night lights about 300mm (12in) from the floor and install illuminated light switches in washrooms.

- 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.

- To promote independent voiding by older adults, place grab bars near urinals and adjacent to the toilet – on both sides is preferable. All grab bars must be capable of withstanding a force of 2kN. There are different ways to install grab bars, for example:
  a) One 600mm (24in) long installed at an angle with the lower end 100mm (4in) in from the toilet edge.
  b) An L-shaped bar 900mm (36in) long installed adjacent to toilet.

- To promote independent bathing by older adults, install grab bars in patient washrooms:
  a) Install a horizontal grab bar on wall alongside tub/shower, 70mm (30in) above bathroom floor.
  b) Install a vertical grab bar on the same wall as tub/shower at least 600 mm (24in) long (can be L-shaped).
  c) Install a vertical grab bar above the edge of the tub near the tub/shower faucet.

- Install towel dispensers and other accessories no higher than 1200mm (48in) 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.

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

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

EXPERT PANEL RECOMMENDATION

- Consider motion centered touchless faucet in acute care where infection control poses a high risk, a cost sensitive issue in other areas.

Dementia-Friendly Attention

31, 38, 42, 62, 80, 96, 115, 116, 137, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181

The science for dementia-friendly acute care design is inconclusive. We draw guidance from all design elements previously noted and from the principles of universal design.

The principles of universal design are:

1. Equitable use
2. Flexibility in use
3. Simple and intuitive use
4. Perceptable information
5. Tolerance for error
6. Low physical effort
7. Size and space for approach and use

Full discussion of these principles are found at the Centre for Excellence in Universal Design (see Appendix B).

The practice wisdom from experts in the field of dementia care emphasize three particular design elements: colour, lighting, and noise (*See Colour, Lighting and Acoustics* for more details). Colour, lighting and noise in hospital environments can contribute to positive or adverse outcomes in older people living with dementia.

Consider the following ***guiding principles*** when assessing specific hospital areas for impact on the safety of older patients with dementia:

- Colour is not neutral; it can affect mood, therefore, always consider the purpose of using color and the needs of the population being served.
- Colour can camouflage or highlight distinct features in the environment.
- Use colour to camouflage features to reduce unwanted use (exit doors and out of bound areas) by using the same color on the doors as used on nearby walls, or highlight distinct features of the environment to enhance visibility.
- Bright colours can be over stimulating, or blue green shades can be confusing for older people. Small features require larger (stronger) color differences to differentiate them from their surroundings
- Colour used as an assistive device in the environment has been shown to help people remember, and feel safer.
- Use colour cueing or coding techniques in conjunction with assistive devices.
- Colour tone and contrast with the floor is seen as important in the bathrooms – seat contrast for the toilet and toilet bowl is considered important for older people with dementia.
- Colour and lighting influence each other as powerful tools for cueing, coding, navigating and wayfinding.

EXPERT PANEL RECOMMENDATIONS

- Use art on a unit/ward for memory cueing
- Use memory aids (e.g., dry-erase board to provide written cues as needed)

- Lighting illumination on colour enhances contrasting effects – low levels of light decrease visibility, which in turn can add agitation or frustration in some people.
- Noise levels should be monitored to avoid over and under stimulation.
- Provide circular interior design pathways where possible for wandering.
- Smaller dining room and family visiting areas are preferred.
- Access to covered outdoor walkway areas are preferred to isolation in patient rooms.

EXPERT PANEL RECOMMENDATIONS

- Individualized manual temperature control in rooms.
- Provide 'rooming in opportunity', for family to stay overnight.
- Provide space that encourages patients to walk to locations.
- Use technology to encourage staying active and prevent functional decline

Safety and security needs in acute care environments challenge older adults' rights to be involved in decisions affecting their care.

Physical Environment Design

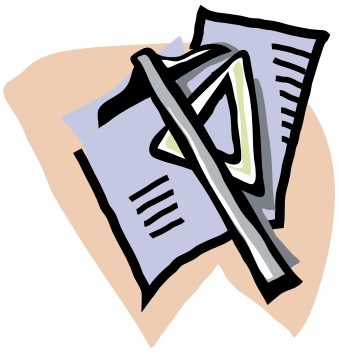
part 4

Assessment Tool

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
  Deconditioning



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:

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:

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:

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:

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:

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.		

Wayfinding & Signage (cont.)

Comments:

Action Plan:

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:

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:

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:

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:

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 1mm, 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 15mm 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:

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.		

Washrooms (cont.)

Comments:

Action Plan:

Dementia-Friendly Attention

AREA EVALUATED: _____ ROOM # _____

	YES	NO
Does the interior have a quiet, calm and unhurried milieu to prevent fear or cause disorientation? i.e., at appropriate times during day and night, is there a balance in stimulation. Ensure that it is neither too quiet nor too noisy.		
Does the interior and exterior design have crisp clarity? i.e., to the lay person, is the layout circular and understandable. The medical jargon on signage is minimal and visual cuing is present, effective use of colour and lighting to camouflage.		
Do walking areas have smoother but slip free surfaces with as few height changes as possible? i.e., hallways do not have bold patterns and are complete with a matte finish; other pathways outside have trip free materials and easy use for walkers and wheelchairs.		
Do interior and exterior lighting levels avoid shadows and glare? i.e., nightlights and light tracking is present; dimmer switches are available.		
Are seating and family areas smaller and conversational? i.e., chairs have arms and are sturdy; the furniture is structured in away to allow for sitting and standing options as well as ease of conversation.		

Comments:

Action Plan:

Older adults have the right to prevention, diagnosis, treatment, and care in health services that protect their functional abilities.

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part 5

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van Hoof, J., Kort, M. S. M., van Waarde, H., & Blom, M. M. (2010). Environmental interventions and design of homes for older adults with dementia: An overview. *American Journal of Alzheimer's Disease and other Dementia, 25,* 202-232. Doi: 10.1177/1533317509358885

van Hoof, J., Schoutens, A. M. C., & Aarts, M. P. J.,. (2009). High color temperature lighting for institutionalized people with dementia. *Building and Environment, 44,* 1959-1969. Doi: 10.1016/j.buildenv.2009.01.009

Wiseman, G. D. & Cohen, U. (1991). *Holding on to Home: Designing Environments for People with Dementia.* Baltimore: John Hopkins University Press.

Zuidema, S. U., de Jonghe, J. F. M., Verhey, F. R. J., & Koopmans, R. T. C. M. (2010). Environmental correlates of neuropsychiatric symptoms in nursing home patients with dementia. *International Journal of Geriatric Psychiatry, 25*(1), 14-22.

Annotated Bibliography

Alzheimer Knowledge Exchange. (2011). Noise Part 1 - Physical Design Interventions. Retrieved from http://www.akeresourcecentre.org/files/Design/Noise%20K2P%20Physical%20Design%20V6.pdf

The article discusses how persons with dementia experience noise. There is a definition of noise, as well as recommendations and strategies for unit layout and design, noise level assessments, reduction of noise echoes, noise production equipment, scheduling intrusive noises, background noises and fire alarms. The first part of this two part series is based on physical design interventions for the elderly person with dementia. Strategies are provided for each of the factors listed above.

Alzheimer Knowledge Exchange. (2011). Noise Part 2 - Social Design Interventions. Retrieved from http://www.akeresourcecentre.org/files/Design/Noise%20K2P%20Social%20Design%20V6.pdf

The article concentrates on noise reduction as part of the acoustic environment. It offers recommendations and strategies for encouraging appropriate noise and positive sound, ensuring staff understand environmental factors that contribute to problems with dementia patients, and how to assess and accommodate hearing and vision loss for persons with dementia. The second part of this two part series is based on social design interventions for the elderly person with dementia. Strategies are provided for each of the factors listed above.

Brawley, E. (2005). Design innovations for aging and Alzheimer's: Creating caring environments. Hoboken, NJ: Wiley.

Designs do not seem to relate specifically to hospitals, but the information could be valid across several environments that would include hospitals. Other topics include information on identification of dementia, care, built environment (with all Code Plus design elements identified), culture change, green design community, etc. as well as a section on identifying success. Design considerations are made across several design elements for both older adults and people with dementia where topics such as lighting, acoustics, mobility, colour, finish, fabrics, floorcovering and sustainability are examined in detail. There are also chapters on innovative care models and outdoor environments/gardens. An outline of the aging process is provided with information about Alzheimer’s disease, North American culture changes around aging and dementia as well as what success looks like for the centres that employ the design ideas mentioned in the book. Dementia and how to deal with this disease is provided. It gives an overall scope of how the body and mind ages over time, including items like diabetes, depression, osteoporosis, hypertension, stroke, and how to mitigate these items. The second chapter outlines Alzheimer’s disease specifically in more detail.

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.

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. (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. Although dated, the principles are relevant to current day physical design practices.

Calkins, M.P., Marsden, J., Briller, S. H., Proffitt, M. A., Perez, K., Bezchlibnyk-Butler, K. Z. & Jeffries, J. J. (2001). Creating successful dementia care settings (Vols. 1-4). Baltimore, MD: Health Professions Press.

This four-volume set is designed to work as a unit, examining the effects of cognitive impairment, how health care professionals can recognize and respond to care needs including responsive behaviors. The final volume deals with the how various models of care work, and what is involved in these models. Each of the volumes has transferrable information to hospital environments, however the focus is on care facilities. The books focus on residential design and how the elderly perceive the environment initially, how they perceive it over time with cognitive impairment and how the environment can be modified to assist this perception. Volume one outlines the senses and the stimulation (or lack thereof) that occurs with aging. The senses included are standard – sight, hearing, smell, touch and taste. Volume two outlines the functional abilities of the elderly, discussing myths, orientation and mobility. Volume three outlines care approaches responsive behaviour, particularly wandering, rummaging and hoarding, attempting to leave, and finally combative and socially inappropriate behaviours. Volume four is designed to address dementia issues, exclusively. Attention is given to home-based philosophy of care, personalization, privacy, roles and activities, and autonomy and control.

Calkins, M.P. (2008). Environment modifications: Institutional. In Capezuti, E., Siegler, G. & Mezey, M.D. (Eds.). The encyclopedia of elder care (2nd ed.). New York, NY: Springer Publishing Company.

The book is a compendium of references designed to include issues of concern for older adults. The authors intend to provide a resource for a wide audience. It features a broad array of writers on the topic of elder care. There is reference in the book to a number of physical design elements. In the cultural competencies, change and assessment sections they discuss beliefs, definitions, and behaviours that impact health care for elderly people. The environmental modifications section concentrates on homes and institutions with an emphasis on nursing homes, less on hospital care. There is reference to smart technologies; these technologies include health and routine (heating cooling, lighting systems that turn on and shut off automatically) monitoring. There is a segment in the environmental modifications that deals with lighting; however, this section is sparse. In the ergonomics section, there is a discussion on design and a user centred design approach that encourages consideration of age related capabilities, tendencies and preferences. The section on ergonomics discusses assistive devices like grab bars. The technology section refers to both high tech and lower tech technological solutions to assist older adults. These technologies are divided into enabling, operational, connective and telemedicine technologies. Enabling technologies are focused on helping the older adult age in place. Operational technologies increase efficiencies and reduce errors. Connective technologies facilitate communication between the elder and the world, whilst telemedicine is focused on providing medical information to healthcare providers who then deliver care efficiently. This could have application to hospitals. Care strategies for low vision include recommendations to reduce glare, however, the entire section is slated to home based environmental adaptions rather than any at a hospital level. Non-pharmacological therapy, (including special care (long term care) units), an overview of dementia, and pharmacological therapies are discussed.

Carpman, J. R. & Grant, M. (1993). Design that cares: Planning health facilities for patients and Visitors. Chicago, IL: American Hospitals Publishing.

The resource provides information related to designing hospitals for the patients and other visitors. It also provides a post-occupancy review process that would be useful to incorporate into a review process for retrofitting design elements into current hospitals. The book clearly breaks out the phases of hospital creation. It is separated out into three parts,

examining the background information on societal and demographic trends, providing design chapters for user needs, and then how to gain end user information for the design process. It is written to follow how the patient encounters the various environments of the hospital from arrival to the room he or she might inhabit.

The following design elements are included: spatial relations (walls, halls, locations of departments represented through a diagram), parking, acoustics, lighting, colour, furnishings, and wayfinding. Each of the chapters that deals with a particular type of hospital, has within it information regarding aspects germane to the type of hospital. Chapter 2 examines various departments (diagnostic, international, therapy, and support); Chapter 3, planning, programming, interdepartmental relationships and specialized in-patient nursing units; Chapter 4, surgery, ophthalmology, proton therapy, psychiatric, emergency, women's healthcare, heart, cancer and dialysis centres as well as the adaptive use of space.

Color is dealt with in conjunction with texture and lighting, patterns and contrasts. **Lighting** is also a factor considered, emphasizing increased time required to move from light to dark and a heightened sensitivity to glare. **Acoustics** have minimal reference; the book merely mentions that ambient background noise and canned background music should be avoided. **Texture** is mentioned as an effective tool for comprehending spatial issues (as with flooring, handrails with notches, and wall surfaces). Hardware or **equipment** has recommendations as well, promoting elderly friendly options. **Flooring** recommendations include a call for carpeting, which reduces glare, softens falls and lessens the potentiality of slipping. The **Wayfinding** section recommends specifically memorable landmarks, font size and repeated directional signs amongst other more general recommendations. **Hallways** are referenced, noting that double handrails, benches, storage, glass wall and door markings are all important considerations for this user group. There also are recommendations for **washrooms, furnishings, electronics,** and **seating**. Older adult needs specific to requirements/environmental accommodations in bathrooms and for wayfinding are discussed. A chapter is dedicated to requirements for older adults. Note that this reference is dated to 1993. There is no discussion on dementia.

Cavanaugh, W.J., Tocci, G. C. & Wilkes, J. A. (2009). Architectural acoustics: Principles and practice (2nd ed.). New York, NY: Wiley.

The book is a guide to acoustics from understanding what the term means to building specific buildings for specific acoustical properties. Offers an introduction to architectural acoustics, a description of materials and methods, building noise control applications, acoustical design for listening, sound systems, innovations in acoustic design and sustainable design. There are references to hospitals, in terms of duct silencer noise control methods and LEEDs construction requirements. This book provides a sound understanding how acoustics works in any environment, however it is limited in its scope. Discussion on aging or dementia is absent.

Cooper Marcus, C. & Barnes, M. (1999). Healing gardens: Therapeutic benefits and design recommendations. New York, NY: John Wiley & Sons, Inc.

The book examines landscaping with an eye for effects, philosophy and design and the therapeutic benefits thereof. A chapter is devoted to Alzheimer's Treatment gardens and design. The introduction provides a background for the use of gardens as therapy. A discussion of the importance of the environment, gardens, wandering and walking, caregiving as related to gardening and familiarity with former activities. The chapter also discusses garden typology and the requirements that an Alzheimer's garden needs. The principles for the development of the Alzheimer's treatment garden match what a hospital would need to adhere to, to create a similar space on hospital property. These principles include how paths, places, landmarks, nodes, edges, views, furnishings plantings and symbolic cues are integrated into the garden. Case studies of various successful gardens are provided.

Day K. & Calkins, M.P. (2002). Design and dementia. In Bechtel, R. & Churchman, A. (Eds.) Handbook of environmental psychology (374-393). New York, NY: John Wiley & Sons.

Environmental design has emerged as a powerful therapeutic tool in Alzheimer's care. Care home design and their use the primary focus. Discussion includes institutional environments – special care units, skilled nursing facilities and other long-term care alternatives. Topics also include environmental pathology, women, children and persons with dementia in the environment, wayfinding, and noise pollution. Additionally, the resource documents the relationship between research and design. "Practice" approaches are covered in chapters that examine several institutions that have used the particular design element in question. Building configuration and physical environment is discussed, in terms of size, wayfinding, and corridor size. Signage is discussed as a code requirement and what constitutes optimal design. Signage for toilets is dealt with separately. Lighting is amalgamated with sensory stimulation and is discussed as a balance needed between

overloading the dementia patient with stimuli and not providing them with enough stimuli. Lighting is important for wayfinding, colour discrimination, and glare (in this context lighting is important for the ability it provides AND diminishes if done incorrectly. The book examines environmental psychology in great detail, and the section on dementia is one aspect of it. This section specifically targets both older adults and Alzheimer's disease. The chapter on dementia and the environment outlines two options for dementia care – integration and exclusion from the general populace.

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 aspects of hospital care and design that 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.

Facility Guidelines Institute. (2010). Critical access hospitals. In Guidelines for design and construction of health care facilities (185). Chicago, IL: American Society for Healthcare Engineering.

The book outlines planning; design construction and commissioning; site planning; common hospital elements; specific requirements for various types of hospitals, including ambulatory, general, residential hospitals, as well as other health care facilities. The resource covers many of the Code Plus design elements, as well as provides specific guidelines for installing/using/designing the elements. It is a good resource for how hospitals are constructed and the standards to which they must adhere initially. There are references made toward the needs of older adults but the focus is primarily on hospital design without application to specific patient populations. Dementia care is found in Chapter 2.5 – Specific Requirements for Psychiatric Hospitals, and Chapter 4.2 –Specific requirements for nursing facilities, under 2.2.3.2 – Alzheimer's and other dementia units. Information in this section is sparse, dealing primarily with hazard avoidance,

doors, windows, and outdoor and activity space. There are also references to major characteristics of Alzheimer patients that need to be considered, outdoor spaces, and the adherence to the Life Safety code where inconspicuous locks are to be installed on cupboards, wardrobes, and closets.

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 sources 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.

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.

Joseph, A. & Ulrich, R. (2006). Sound control for improved outcomes in healthcare settings. Retrieved from http://www.healthdesign.org/sites/default/files/Sound%20Control.pdf

The article focuses on sound and the issues related to it in a hospital environment. Environmental ways to mitigate sound, using architecture and design choices are discussed. It acknowledges that hospital noise has been increasing since the 1960s, and this increase has an impact on patients. Acoustics is the main design element for the article, however the author recognizes that flooring, walls and ceilings contribute to poor acoustics in hospitals. Solutions include: sound absorbing ceiling tiles, single bed rooms, soft flooring and reducing ambient noise. There is an argument for using music to induce relaxation and reduce stress in patients.

Kobus, R.L., Skaggs, R.L., Bobrow, M., Thomas, J., Payette, T.M. & Kliment, S. A. (2008). *Building type basics for healthcare facilities* (2nd ed.). New York, NY: Wiley.

The book provides a resource guide for architects and clients, acknowledging that time is constrained with constructing any building. As a result, the chapters present initially an overview of perspectives, then divides the remainder of the book into types of healthcare facilities. The typologies include: ancillary departments, inpatient care facilities, and ambulatory care facilities. It also provides a quick index to twenty essential questions in the flyleaf. Some topics also include: circulation, unique design concerns, site planning/parking/access, materials, acoustic control, lighting, interior issues and wayfinding. The book offers clarity around the planning and design of hospitals in general. Each of the chapters that deals with a particular type of hospital, has within it information regarding aspects germane to the type of hospital. Chapter 2 examines various departments (diagnostic, international, therapy, and support); Chapter 3, planning, programming, interdepartmental relationships and specialized in-patient nursing units; Chapter 4, surgery, ophthalmology,

proton therapy, psychiatric, emergency, women's healthcare, heart, cancer and dialysis centres as well as the adaptive use of space. Specialty geriatric departments or dementia design considerations are not included.

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.

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.

Preiser, W.F.E. & Ostroff, E. (eds.). (2001). *Universal design handbook*. New York, NY: McGraw Hill. Zeisel, J. (2001) Universal Design to support the brain and its development. Chapter 8. Calkins, M. Sanford, J.A., & Proffitt, M.A. (2001). Design for dementia: Challenges and lessons for universal design, Chapter 22

Preiser's book examines all design elements with an eye to universal access and international standards as well as case studies of well-designed buildings for this genre of building. The book is divided into an explanation of universal design, the premises and perspectives of it, guidelines and standards, current public policies, residential environments, universal design practices in the United States and abroad, case studies, information technology and finally the future of universal design. The author considers three levels of how buildings affect people – the passive level, the functional level, and the proactive level. A case study of a long term residence, and general implications for developing any space designated for people living with Alzheimer's (e.g., understanding people with dementia, environmental models, and design principles for dementia). The design principles include: minimal negative stimulation, maximal positive stimulation, familiarity, continuity, and regulated access. There is also a comparison between universal and dementia design principles.

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.

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. They hypothesized 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.

Research shows there is a lack of fit between older people and the hospital environment.

Appendices part 6

APPENDIX A: 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. 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 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.[85]

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.

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.

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

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.

KEY STAKEHOLDERS 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

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Jason Cook – Manager, Quality Improvement

Anne Earthy – Clinicial Nurse Specialist, Residential Care

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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

APPENDIX B: GREY LITERATURE WEBSITES

American Association of Retired Persons http://www.aarp.org

Agency of Healthcare Research and Quality
http://www.ahrq.gov/

Alz-Caregiver (Dementia and Alzheimer's Caregivers Centre)
http://alz-caregiver.com

Alzheimer's Association
http://www.alz.org/

American Institute of Archietects Knowledge Net
http://network.aia.org/academyofarchietectureforhealth/home/

American Occupational Therapy Association
http://www.aota.org/

American Society of Healthcare Engineering of the American Hospital Association
http://ashe.org/

Architectural Record
http://archrecord.construction.com/

BrainXchange
http://brainXchange.ca

Building Information Research Knowledge Base
http://www.brikbase.org

Canadian Coalition for Seniors Mental Health
http://www.ccsmh.ca/en/dafault.cfm

Canadian Dementia Knowledge Translation Network
http://lifeandminds.ca/

Canadian Healthcare Engineering Society (CHES)
http://www.ches.org/

Canadian Mortgage and Housing
http://cmhc-schl.gc.ca

Centre for Excellence in Universal Design
http://universaldesign.ie/built-environment/housing

Centre for Health Design
http://www.healthdesign.org

Centre for Effective Practice
http://www.gacguidelines.ca

Chalfont Design
http://www.chalfontdesign.com

Dementia Challenge: Department of Health
http://dementiachallenge.dh.gov.uk

Dementia Net
http://www.ucalgary.ca/dementianet

Dementia Services Development Centre University of Stirling
http://dementia.stir.ac.uk

Design & Health: International Academy for Design and Health
http://www.designandhealth.com

Dignity in Practice, University of Cardiff
http://www.cardiff.ac.uk/socsi/dignity/dignityinpractice

Elder Friendly Design Resource Collaboration Centre
http://elderfriendlydesign.pbworks.com

Enabling Environments
http://www.enablingenviornments.com.au

European Union Geriatric Medicine Society
http://www.eugms.org

Facility Guidelines Institute
http://www.fgiguidelines.org/

Fight Alzheimer's, Safe Australia
http://www.fightdementia.org.au

Health Care Design Magazine
http://www.healthcaredesignmagazine.com/

Health Care Innovations Exchange
http://www.innovations.ahrq.gov/

Health Care Without Harm
http://www.noharm.org/

Healthleaders Media
http://www.healthleadersmedia.com/

Healthy Building Network
http://www.healthbuilding.net/

Home Modification Clearing House
http://www.homemods.info

Hospital Elder Life Program
http://www.hospitalelderlifeprogram.org

Hospitals and Health Network
http://www.hhnmag.com

Hospitals for Healthy Environment
http://www.hhnmag.com

Ideas Institute
http://www.ideasinstitute.org

Idea: Centre of Inclusive Design and Environmental Access
http://udeworld.com

Illuminating Engineering Society of North America
http://www.ies.org

Inclusive Design Tool Kit
http://www.inclusivedesigntoolkit.com

Indiegogo
http://www.indiegogo.com/

Caroline Monnin and Laurie Blanchard for the J.W. Crane Memorial Library, University of Manitoba Libraries
http://infoltc.blogspot.com

Informedesign
http://www.informedesign.org

Institute of Healthcare Improvement
http://www.ihi.org

International Dementia Design Network
http://www.international-dementia-design.org

International Federation of Hospital Engineering
http://www.ifhe.info/

Joint Commission Resources
http://store.jointcommissioninternational.org

Kings Fund
http://www.kingsfund.org.uk/

Mcgill Centre of Studies in Aging
http://aging.mcgill.ca/rt.htm

Modern Healthcare
http://www.modernhealthcare.com/

Murray Alzheimer Research and Education Program
http://uwaterloo.ca/murray-alzheimer-research-and-education-program/

National Archives, UK
http://webarchive.nationalarchives.gov.uk

National Center for Bitechnology Information
http://www.ncbi.nlm.nih.gov

National Council of Architectural Registration Boards NCARB
http://www.ncarb.org/

National Housing Federation
http://www.housinglin.org.uk

National Initiative for the Care of the Elderly NICE
http://www.nicenet.ca/

National Institute of Building Sciences
http://www.nibs.org

Niche
http://www.nicheprogram.org/

Northern Ireland Dementia Services Development Centre
http://dementiacentreni.org

NSW Government, Aging, Disability and Homecare
http://www.adhc.nsw.gov.au/

Partnerships British Columbia
http://www.partnershipsbc.ca/index.php

Practice Greenhealth
http://practicegreenhealth.org/

Provincial Ministry of Health
http://www.health.gov.bc.ca

Regional Geriatric Program - Ontaro. Senior Friendly Hospitals
http://seniorfriendlyhospitals.ca

Regional Geratric Program of Eastern Ontario
http://www.rgpeo.com/en.aspx

Regional Nurses Association of Ontario
http://rnao.ca

Royal College of Art
http://www.rca.ac.uk

Royal College of Nursing
http://www.rcn.org.uk

Royal Institute of British Architects
http://www.architecture.com

Senior Friendly Hospitals
http://seniorfriendlyhospitals.ca

Seniors Policy Lens Toolkit
http://seniorpolicylens.ca/

Society of the Arts in Health Care
http://www.thesah.org

The Dementia Centre
http://www.dementia.stir.ac.uk

University of Manitoba, Centre of Aging
http://umanitoba.ca

University of Worchester
http://www.worchester.ac.uk

Victoria Government Health Information
http://www.health.vic.gov.au/dementia/

Wandering in Familiar Spaces
http://www.wanderinginfamiliarspaces.com

Wellspan Research and Design
http://www.wellspandesign.com/

Whole Building Design Guide
http://wbdg.org/

APPENDIX C: USEFUL DEFINITIONS

The following definitions are provided to assist users clarify common language located in the references utilized in the Code Plus: Physical Design Components of an Elder Friendly Hospital, 2nd Edition.

Accessibility: The enabling of persons with disabilities to fully enjoy all human rights and fundamental freedoms with regard to physical, social, economic and cultural environment, to health and education and to information and communication.

Care Systems and Processes: In an elder friendly hospital, Services, Care Systems and Processes relate to 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.

Dementia: A general term for a decline in mental ability severe enough to interfere with daily life.

Infection Control: Measures that aim to ensure the protection of those who might be vulnerable to acquiring an infection both in the general community and while receiving care due to health problems, in a range of settings. The basic principle of infection prevention and control is hygiene.

LEED (Leadership in Energy and Environmental Design): A green building certification program that recognizes best-in-class building strategies and practices. To receive LEED certification, building projects satisfy prerequisites and earn points to achieve different levels of certification.

Physical Design: In an elder friendly hospital, physical design relates to the observable built environment and all its architectural features; 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.

Policies and Procedures: In an elder friendly hospital, policies and procedures relate to 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.

Social Behavioral Climate: In an elder friendly design, the Social Behavioral Climate refers to the atmosphere that is expressed through interpersonal relationships and organizational influences; Social climate is reflected in observable behavior 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.

Universal Design: The intent of universal design is to simplify life for everyone by making products, communications, and the built environmental space more usable by all or as many people as possible without adaptation or specialized design, and with no extra cost. Universal design benefits people of all ages and abilities without discrimination.

It is important to recognize that individual design elements are not enough to ensure maximum independence; integrating *all* of the design elements is key.

code plus

PHYSICAL DESIGN
COMPONENTS FOR AN
ELDER FRIENDLY HOSPITAL

2nd Edition

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