A study of the preferences of the elderly in the design of ambulatory health care facilities

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A STUDY OF THE PREFERENCES OF THE ELDERLY IN THE DESIGN OF AMBULATORY HEALTH CARE FACILITIES

by

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of Architecture

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May, 1996
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University of Nevada, Las Vegas
May 1996
ABSTRACT

This research paper is a study of the preferences of the well elderly for the design of ambulatory health care facilities. The paper first explores the literature of health care needs and in particular the needs of the elderly segment of the population. Then the structural and physiological conditions of the elderly are discussed and linked to areas of design. A matrix is developed and used to construct a questionnaire that is used in structured interviews. Through a qualitative analysis of the interviews, the preferences of the sample group are determined. These preferences are compared to generally accepted rules of design to determine differences. Then the findings are translated into generalized guidelines that can be utilized for ambulatory healthcare facility design.
DEFINITIONS

Ambulatory. Refers to a person who is able to move about without the assistance of another person. This can include persons in wheel chairs or persons who use other aids for self movement.

Ambulatory Care Facility. Usually a free-standing facility for the offices of medical practitioners in numerous specialties. The intent is to care for the individual who is not bed-ridden and who does not require an overnight stay at a hospital for the treatment given. The trend in the past ten years is for the facility to be a one-stop shop for all medical needs. In some communities the idea has expanded to include other services for the patients similar to a shopping mall (Matson, various pages).

Primary Care Organization. Health facilities that can provide care for patients without the need for overnight observation, i.e. the care is out-patient.

Health Maintenance Organization. An organized group of health care practitioners and their subscribers. Fees are based on regular subscription payments by the members. Coverage is for primary care and other care that is funded by these payments similar to medical insurance.

Well-Elderly. Persons over 65 years who are ambulatory, i.e. not bedridden, but who may be experiencing the effects of aging as described in Chapter 2.
# TABLE OF CONTENTS

VERIFICATION ................................................... ii

ABSTRACT ...................................................... iii

DEFINITIONS .................................................... iv

TABLE OF CONTENTS ................................................ v

CHAPTER 1  INTRODUCTION ........................................ 1
    Supposition and Presuppositions ...................... 3
    Problem Statement .................................. 4

CHAPTER 2  BACKGROUND AND ISSUES .............................. 5
    Importance of Issues ................................ 5
    Healthcare Reform .................................. 6
    Healthcare Design for the Elderly ................... 10
    The Aging Individual ............................... 12
    Physiological Conditions ........................... 13
    Aspects of Health Facility Design ................. 18

CHAPTER 3  RESEARCH METHOD .....................................23
    Objective .........................................23
    Scope ............................................. 23
    Choice of Analysis Method ......................... 24
    Method .............................................. 27
    Conduct of the Interview ......................... 28
    Linking Needs to Design ........................... 30
    Questionnaire Construction ....................... 36
    Coding ............................................. 48
    Analysis ........................................... 49
    Rigor ............................................... 51
    Reliability ....................................... 52

CHAPTER 4  FINDINGS .......................................... 54
    Analysis ........................................... 54
    Design Guidelines ................................. 65

CHAPTER 5  DISCUSSION ........................................ 74

APPENDIX I  Questionnaire ..................................... 80

APPENDIX II  Protocol Form for Research Involving Human
              Subjects .................................... 87

BIBLIOGRAPHY ................................................... 90
CHAPTER 1

INTRODUCTION

"When Bhudda was still Prince Siddartha he often escaped from the splendid palace in which his father kept him shut up and drove about the surrounding countryside. The first time he went out he saw a tottering, wrinkled, toothless, white-haired man, bowed, mumbling and trembling as he propped himself along on his stick. The sight astonished the prince and the charioteer told him just what it meant to be old. "It is the world’s pity," cried Siddartha, “that weak and ignorant beings drunk with the vanity of youth, do not behold old age! Let me hurry back to the palace. What is the use of pleasures and delights, since I myself am the future dwelling place of old age?" (Simon de Beauvoir, Coming of Age, p. 1)

The purpose of this paper is to study preferences of the elderly for architectural design aspects of ambulatory care facilities.

In order to give a complete picture of the importance, need, and rationale for the study, this paper addresses:

- background of ambulatory care with the beginning of managed care and health maintenance organizations, and
- scope of ambulatory care task.

To give the rationale for the analysis and support for the conclusions this paper addresses:

- mental and physiological conditions of the elderly.
- design solutions to fulfill needs of the elderly.
- differences between standard accepted design solutions and solutions based on preferences.

A qualitative analysis is used in a grounded theory approach to find preferences.
Within the population of the elderly (defined as 65 years and older) this paper makes two divisions. The first division includes the well, frail and ambulatory elderly. The second group includes the non-ambulatory and demented elderly.

In the first group, as with most of the elderly population, there are signs and effects of aging. These people will in varying degrees experience diminished capacities for hearing, sight and smell and have some difficulty getting around. But with the second group the needs are much different. Usually convalescence or in-patient care in a hospital or nursing home is necessary. For this group, much has been written about their special design needs. A quick review of the bibliography demonstrates this. However, for the first group, little research has been done and little has been written about their needs.

In the text, *Hospitalable Design for Healthcare and Senior Communities*, George Baker wrote in an article entitled "Aging and the Built Environment" that scant attention is directed at what is all around us in the built environment, where we live, work, and play and the tools and gadgets we use in our everyday lives with respect to the aging process (Bush-Brown, p12). He asks how accommodative is that environment toward optimizing our functional capacity as we grow older or are impaired. The need for broader research into design for the well-elderly is evident. There is growing demand. Society’s attention to the needs of the elderly is increasing. And the proportion of the population that is elderly is increasing.

The basic rules and methods for architectural design are not static and should continue to evolve with the right research to meet the needs of a changing population. As John Dewey said about the creative
process, "If the artist does not perfect a new vision in his process of 

doing, he acts mechanically and repeats some old model fixed like a 

blueprint in his mind (John Dewey, in Art as Experience, 1935, p. 50). Therefore, the process of research can aid the design process to perfect 
a new vision and bring about accomodative change for the elderly.

This agenda is full of opportunities. Yet, it is overlooked and 
probably hidden as we almost imperceptibly experience decrements in many 
physiological functions throughout the mid- and later decades, in the 
absence of disease and dementia. Normative biological aging brings 
decreases in visual, auditory, and physical capacities that urge the need 
for an environment that is hospitable, "where... doors, faucets, and 
buttons respond readily even to the arthritic hand (Bush-Brown, p. 14)."

Supposition and Presuppositions

The supposition for the research is that there are 
unique design needs for this particular group.

Presuppositions which support this are:

- needs of the elderly are different than those of younger 
  persons,

- the well-elderly have needs that are different than the 
  non-ambulatory elderly,

- the preferences of the well-elderly are not documented, and 
  there is little research to substantiate design guidelines for this 
  group,

- the literature for long-term care design is prevalent but 
  not applicable in large measure to the needs of the well-elderly.
-the elderly, especially, have will and consciousness that have been seasoned with the experience of associating with other people and cultures and have a well grounded idea of likes and dislikes.

**Problem Statement**

Beginning in about the middle 1970's the organization of healthcare facilities began a radical change that was spurred in part by rising costs in health care and the changing role of government in providing for the welfare of individuals. At the same time the number of well-elderly persons has grown and will continue to grow. This segment of the population has largely been ignored in the literature and in the special design considerations for primary care facilities because of the focus on the “un-well” population. The well-elderly population has specific needs for which a health facility must respond by recognizing changing abilities in sensory, cognitive and motor skills.

The level of dependence of the elderly in activities of daily living, their physical and/or mental impairments, and their illnesses and disabilities have been the focus of many studies or surveys. Collecting more information on the well and independent elderly will contribute to a better understanding of the factors that lead to positive health and the conditions under which the elderly are able to cope effectively with advancing age (Gilford, p. 32).

Specifically, optimum healthcare facility design with respect to spatial layout, scale and wayfinding for the well-elderly is not well known and design guidelines are not written.
CHAPTER 2
BACKGROUND AND ISSUES

To convey the current importance and provide perspective for this research, a discussion of the current demographic issues, healthcare reform and healthcare design is necessary. And to understand the subject of the research an understanding of the effects of aging on the individual is also necessary.

Importance of Issues

As can be extrapolated from the following chart (simply read down in the "%" column), a shift in demands for social and health services will occur due to the anticipated rapid rate of growth of the elderly (65 years or older). This will make opportunities but will also tax the system of healthcare if there is no growth in support or facilities to meet the demand.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Population</th>
<th>65-74 years</th>
<th>75-84 years</th>
<th>85 years</th>
<th>65 years and over</th>
<th>65 and over</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. %</td>
<td>No. %</td>
<td>No. %</td>
<td>No. %</td>
<td>No. %</td>
<td>No. %</td>
</tr>
<tr>
<td>2000</td>
<td>268.0</td>
<td>17.7 6.6</td>
<td>12.2 4.6</td>
<td>5.1 1.9</td>
<td>35.0 13.1</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>283.1</td>
<td>20.3 7.2</td>
<td>12.2 4.3</td>
<td>6.8 2.4</td>
<td>39.3 13.9</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>296.3</td>
<td>29.8 10.2</td>
<td>14.3 4.8</td>
<td>7.3 2.5</td>
<td>51.4 17.3</td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td>304.3</td>
<td>34.4 11.3</td>
<td>21.1 6.9</td>
<td>8.8 2.9</td>
<td>64.3 21.1</td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td>308.0</td>
<td>29.2 9.5</td>
<td>24.5 8.0</td>
<td>12.9 4.2</td>
<td>66.6 21.6</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>308.9</td>
<td>30.0 9.7</td>
<td>21.0 6.8</td>
<td>16.1 5.2</td>
<td>67.1 21.7</td>
<td></td>
</tr>
</tbody>
</table>
The federal system of entitlements will be heavily burdened. In the 4 years until the year 2000, it is anticipated that the very old (80 years or older) US population will be the largest single federal entitlement group, consuming $82.8 billion in benefits (Gilford, p1). To meet the challenge the "Panel on Statistics for an Aging Population" recommended that:

"A wise investment strategy would support spending health care dollars to lengthen the period of life spent in vigorous health. Expenditures for health promotion may well lead to more years of good health than equal expenditures on medical care directed to treating disabilities and serious or irreversible disease. Related policy issues include how health promotion activities can be advanced among the elderly, whether the federal government should fund health promotion and disease prevention activities, and if so which ones." (Gilford, p. 16)

Related to this is the observation of this writer and others that the literature rarely addresses the primary (ambulatory) care of the well-elderly. This growing segment of the population has been largely ignored due to more attention being paid to in-patient care (Kantrowitz, 1993, p. 6). The well-elderly's needs for health care and the facilities to support it need attention too. Another related fact (Carstens, 1993, p. 15) is that the present trend for the elderly in daily living is toward independent and age-segregated housing. Design solutions must respond to the elderly being independent and unassisted. Locally, in the Las Vegas area, the well-elderly part of the population is growing faster than in most parts of the country as many senior citizens see the community as an ideal retirement location.
Healthcare Reform

At the same time of the need for recognizing and improving the design of health care facilities there is a growing recognition that much of the current system of health delivery has high administrative costs, gaps, and discontinuities of services. The delivery system is not integrated. It focuses on illness rather than wellness, is provider and payer focused rather than patient focused and discourages individual responsibility (Gold, 1993).

There is a growing recognition that no health care reform approach will work unless it involves a restructuring of the delivery system to include (summarized from Fraser, 1993, p. 80):

- a focus on wellness rather than illness,
- a realigned continuum of care with greater emphasis on and access to preventive and primary care and less emphasis on in-patient care,
- a more patient-friendly and patient-centered system,
- greater coordination and continuity of care,
- more economic discipline on the part of providers, and
- more clinical and financial accountability on the part of providers to patients and the community.

In the same article Fraser states that “a revolutionary shift in thinking and culture will need to occur for prevention to assume its rightful role.” Ensuring needed access to the right services will require a substantial realignment of the continuum of care so that preventive and primary care are more readily available and therefore emergency services are less necessary.
Diane M. Howard in "The Future of Ambulatory Care" (Matson, ed. p. 167) writes that the US health system is not prepared to deal with the elderly population in the broader nature of the services they will need. Ambulatory care services will need to be expanded to allow access to adult day-care services, respite care, and ambulatory rehabilitation services that will require integration with home care and long-term care services. She says that because of the fragmentation in the current health care system, independent programmatic service units have developed in hospitals to cater to narrow market niches and to the elderly. According to her these narrow markets will have to be discontinued as the need grows for a more rational and integrated system to serve the growing population of elderly persons. There is good news in the fact that the movement in HMO’s to develop programs specifically for the elderly has already started. In Las Vegas, Dr. Neila Schumaker (a geriatrician) is working with Sierra Health Services for just such an endeavor.

Another positive trend for managed healthcare is the legislation in process to support it. In her address at the sixth Health Facilities Design symposium, Robyn Dermon (President of “Health Futures Inc.”) stated that though managed care has been around for a long time it is especially in the spotlight today because of the pending changes in health care legislation. She said that the change of many people to Health Maintenance Organizations (HMO) will mean increased visits to health providers (a managed prevention approach) and therefore the number of facilities and their mode of service will change. She cites the use of converted shopping centers and residential areas to medical malls and (in some cases) shared occupancy with active shopping areas.
The trend is to make the HMO and Center a convenient part of the community that is easily accessed and welcomed by everyone (thesis writer’s personal notes from the symposium).

Austin and Massimino in the Journal of Healthcare Design, Fifth Symposium (1993) state that the life expectancy of 75 years today will increase to 80 years in the next decade. They also state that the enrollment in HMO’s continues to rise by leaps and bounds and that it has quadrupled since the early 1980’s. They both represent Family Health Plan (FHP), an HMO, and say that of the 800,000 commercial members of FHP, 275,000 are over 65.

In managed care the provider is paid for the number of enrollees, or capitation. Thus the provider’s incentive is to reduce the amounts and types of services provided (but which can be a perverse incentive) (Donker, in Matson, ed. p 151). The allure of managed care is especially appealing to the elderly because, logically, the objective of the elderly should be to maintain good health as long as possible and avoid chronic debilitation’s (anecdotal evidence and opinions of this writer).

The provider has an incentive to help them reach this goal by providing education, screenings and other preventive measures to help keep the enrollees from becoming ill, and to develop innovative ways to treat patients effectively but less expensively. Effective treatment is insured because ineffective treatment would likely involve readmission or at least much more outpatient care.

This has also caused the rise of such outpatient services as oncology centers, “freestanding urgent care centers”, and pain clinics which were almost unheard of prior to ten years ago.
Support for managed care comes from the Office of Technology Assessment which says that the health promotion and disease prevention approach is one of a number of possible strategies to deal with what has increasingly become a hallmark of the current times: the prevalence of chronic illness and multiple illnesses or functional impairments among the elderly (Gilford, p. 109). While it will not replace medical care either for the treatment of acute diseases or for acute flare-ups of chronic illness, this approach has promise for reducing the incidence and prevalence of chronic and acute disease among both the general population and the elderly.

The US Department of Health, Education, and Welfare published a report entitled, "Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention" which stated goal is “To improve the health and quality of life for older adults and to reduce the average annual number of days of restricted activity due to acute or chronic condition for people aged 65 and older.” And the Public Health Service established the Preventive Services Task Force to develop recommendations for the appropriate use of preventive services in clinical settings. An outgrowth (Gilford, p. 111) of this was establishment of “centers for research and demonstration with respect to health promotion and disease prevention.” In fact, the University of Washington has a center which focuses just on the elderly. These federal initiatives have had obvious implications for the private sector.

**Healthcare Design for the Elderly**

In his book on primary health care centers, Martin Valins (Valins, 1993) says that the trend to construct these centers can offer medical
care providers and architects a chance to break away from the often negative images of the hospital which at worst was typified by the 19th century hospital building. In his book he has case studies of facilities already constructed in the US, Sweden, Great Britain, Finland and Denmark. This trend offers opportunities for design that considers the needs of the well-elderly. Guidelines for design should be readily available in the popular literature. But these books on design talk about residential settings, hospitals and nursing homes, and do not talk about ambulatory health care facilities or clinic design for the well elderly. For example in Howell (Design for Aging), the six chapters talk about “housing history, high-rise living, shared spaces, and private space.” In Carstens (Site Planning and Design for the Elderly), the four parts talk about subjects ranging from “defining the issues (no mention of health care facility design), site planning, outdoor design, and recreation and pleasure.” In Salmon (Caring Environments for Frail Elderly People) the content is about hospitals with geriatric units and nursing homes, however there is a chapter on “day hospitals” for the elderly, but these are not part of a larger ambulatory care facility. The most current edition of the catalog of publications of the American Hospital Association lists publications for geriatric units in hospitals but there are no listings for publications with guidance on elderly preferences in ambulatory health care facilities. The Marshall Erdman Company publishes a planning book on ambulatory healthcare facility design, but it does not address special needs of the elderly. The book, Better Buildings for the Aged, talks about nursing homes and residential considerations. And last, in the book, Design That Cares, the authors state, “Although a great deal of research has investigated the
environmental requirements of aging, most of this has focused on housing or long-term care facilities (especially nursing home facilities) rather than on healthcare facilities...the design-related needs of the older patients and visitors clearly deserve special research attention in the future (Carpman, et al, 1986)." This review of the extant literature also indicates a need for study of elderly preferences related to ambulatory care facilities.

The Aging Individual

Next in the background of this thesis, the aging individual is studied and assessed for those physical needs that are peculiar to the aging process and which can be satisfied or helped through better design.

With increasing longevity the new elderly, as well as younger age groups, can be expected to live through longer periods of exposure to risk factors, including those posed by the environment, diet and nutrition, and personal behavior and lifestyle, and will have more time to develop symptoms than past generations.

With more risk and exposure there is greater need for maintenance and recurrent visits to a health practitioner. And with more visits there will be a need for more ambulatory care facilities. The design of these facilities should take into account the special needs of what might perhaps be their largest group of users, the well elderly.

The following section describes most of the general conditions and areas of the human being that are affected by aging. In the next chapter some of these aspects are discussed again as they are used in the research for preferences.
Physiological Conditions

Musculoskeletal System (Mobility).

Muscular strength, agility, and fine motor control diminish with age. The reduced resiliency of the skeletal system, required attention to safety, security, and environmental negotiability, as injury may be more devastating for older people (Carstens, p. 13). In a study in the UK (Coni, et al., 1988, p. 97) it was found that over one-half of people over 75 years had some difficulty with movement. This ranged from discomfort climbing stairs to being totally bedridden. Modern medicine and surgery can modify, reverse, or control many of the pathologies that can impair walking.

According to Shaw, there is a tendency to let muscles atrophy and therefore strength and endurance decrease. In a discussion with Dr. Neila Schumaker, a medical doctor and gerontologist with the Clark County Health Center, she mentioned that this is a major problem among the patients that she sees.

Arthritis is the most common cause of falls. People who have exposed individual joints to particularly excessive wear and tear throughout their life are the most likely to develop the pathological changes of osteoarthritis.

Hips and knees are commonly involved and, when painful, this affects walking, while shoulder involvement affects many activities of everyday living. The spine is also frequently affected.

Rheumatoid arthritis is less common but it may be more severe and has a tendency to be more crippling than other forms of arthritic
pathology. It can affect any joint, but involvement of the joints of the arms and hands make it very effective in decreasing mobility.

Gout is most typically associated with aging. The caricature of the excessively debauched old man with an excessively painful foot, enlarged toe, and short temper is well known. The joints become painful because of inflammation caused in the joint cavity by the precipitation of small crystals of uric acid.

Falls are unpleasant and dangerous and unfortunately become more common with increasing age. In homes falls are most likely to occur in the living room or on the stairs. In hospitals and long term care homes falls happen most often when rising from a chair, bed or toilet. Some of the disabilities which may lead to falls are:

1. arthritis and rheumatism;
2. stroke;
3. Parkinson’s disease;
4. peripheral neuropathy (numbness of feet);
5. ear disease - deafness, tinnitus, and loss of balance;
6. visual impairment.

Disabled people should therefore take great care, especially when changing their position (for instance rising from sitting) or when changing direction or turning.

“Turns” are more frightening than trips (Shaw, p. 27). Changes in consciousness may happen at any time and the patient will feel powerless to control the episode. Turns are usually symptoms of underlying problems of heart or brain disease. Sudden changes in heart rate or rhythm may lead to a fall. Heart palpitations may be a clue to the cause. Sudden changes in blood pressure also can lead to falls - these
may also be secondary to changes in heart rate but also to the side-effects of drugs. Sudden changes in brain function, as in epilepsy, may lead to blackouts and falls. This can develop in late life. Reversible and transient changes in the blood supply, both in quality (such as reduced sugar levels) or quantity may also lead to fits or small transient strokes. Persons with these conditions need availability of railings, chairs, emergency signaling devices, and soft, padded walls.

Dizziness and Syncope

Dizziness and syncope (transient loss of consciousness) can be caused by hypotension, sensory deficits and a multitude of other causes (Mader in Yoshikawa, p. 305).

Genitourinary System

Incidence of incontinence increases with age. Easy and frequent availability of restrooms is necessary.

Vision

As one ages the lens of the eye thickens, yellows and may become increasingly opaque. These changes impair color vision. The yellowing of the lens filters out violet, blue and green, particularly along the dark end of the spectrum. Yellow, orange and red are thus easier to see than darker colors or those in the blue-green range. Depth perception may also be impaired. Aging and disease may make it difficult to discriminate fine detail or even faces, particularly after the age of 70. “The separation between reds and greens may become visually unstable and the distinction between related colors e.g. blues and greens may be lost. The importance of strong colors in overcoming failing visual perception has to be emphasized despite the objections of
the staff.” (Putsep, p. 239) The ability to discriminate between similar colors, tones and hues becomes more difficult - another reason for stronger intensity in the applied colors (Shaw, p. 33).

Stereognosis is the recognition of form; this ability decreases with age. And the ability to distinguish objects against a background tends to diminish. Depth perception becomes impaired progressively while visual peripheral fields tend to contract (Shaw, p. 33). There is a decreasing ability to function in the dark. An eighty year-old person may need 300 percent more light than does a normal twenty-year-old.

Glare reactions are important considerations. Many elderly people are unable to tolerate glare and the recovery time from glare is usually increased significantly.

Artificial light sources should not deviate markedly from the lighting environment under which humans evolved in nature. The widest use of daylighting in a facility is obviously a design goal. General room lighting, arranged advantageously, should come from several sources to create an even intensity as it is fatiguing to have to work between areas of greatly varying light intensity.

Design of a facility should strive to minimize or eliminate decorative lighting and to use task lighting whenever possible, because it is more efficient than general illumination (Shaw, p. 33).

Critical flicker fusion is a significant problem especially in the use of fluorescent lights. And some people suspect seizures may be triggered.

Blindness may start as an intermittent loss of vision. The permanent forms may come on suddenly or gradually. It is the transient episodes and gradual deterioration which are of greatest importance.
Most fleeting episodes of blindness are due to abnormalities in the blood supply to the retina or the part of the brain which receives and interprets messages to the connecting nerve pathways. A reduction in blood flow may result from an alteration in the effectiveness of the circulation, a fall in blood pressure, or an alteration in the rate or rhythm of the heart. (Coni, 1992, p 97)

Kinesthesia (conscious sense of movement and position) tends to diminish (Shaw, p. 33) with age because of changes in joint sensation, compression tension, muscle and tendon sensation and in the labyrinths and neck.

Hearing

Elderly individuals become increasingly deaf with the years. There is a progressive loss of higher sound frequencies in the initial stages progressing further until the lower frequency sounds are involved as well. As a result of these effects a person may have difficulty understanding another person especially when there are background noises.

Central Nervous System and Cognitive Function

Concept formation ability and reaction time may be reduced. They are able to cope if they shift from speed to accuracy in their functional performances. When rapid sequential stimuli are presented the slowed reaction time usually result in a poor performance.

Temperature Adaptation.

There is reduced ability to adapt to changes in temperature. This is primarily due to decreased resilience of blood vessels and decreased circulation.
Disease

There is a susceptibility to chronic diseases as the immune system loses effectiveness and health in general runs down.

Skin Problems

The skin becomes drier and loses elasticity. Dry skin causes itching. Chronic sun exposure causes spots, other abnormalities.

Foot Problems

Foot problems are common among elderly persons. Disorders of the foot usually arise from "local skin and nail problems, biomechanical abnormalities, and selected systemic diseases" (from Helfand in Yoshikawa, p. 397).

Nutrition

Weight loss is a more important problem than weight gain for older persons. Depression and medications are the most common treatable causes of weight loss in older persons. Unusual attitudes toward eating and body image are not rare among older persons and these attitudes can interfere with the management of weight problems.

Mental Health

Depression from many causes is a problem among older patients but it may be masked by other symptoms. Suicide is common among elderly patients (Yoshikawa, p 346).

Aspects of Healthcare Facility Design

The principles to follow in healthcare design for the elderly are taken from the literature on healthcare design "standards" and common sense. The main concepts in the design are to provide protection, ease
of movement and comfort while at the same time providing challenge (Carstens, p. 7).

Design for the elderly is also discussed in the book by Albert Bush-Brown (Hospital Design in Healthcare and Senior Communities). The book alludes to the fact that the design professions rely heavily on the hospital institution as a model. He says the "clinical or laboratory model" (a traditional hospital) does not anticipate the requirements of the elderly who are the largest group of healthcare consumers. His references are both to the long-term institutional setting and to the day clinic or ambulatory care center. He says that for the elderly the previous imagery of the immobilized, confined, and isolated patient must be replaced by one that nurtures physical, social, and intellectual activity. Spatial planning must reflect patients' need for both privacy and community. A sense of membership must be nurtured by sequences of common or public spaces related to concourses. Circulation patterns should reduce conventional arrangements of corridors, elevators and stairs, and introduce dedicated paths, concourses, atriums and agoras. He says that designers must rid themselves of spatial enumeration and diagrams that are collections of boxes. Now this can be applied to any segment of the population, but he explains throughout that the elderly have always been victims of an architecture that doesn't seem to care about the older person.

Aside from the humanitarian call to better architecture, the work by Bush-Brown lays down some hard facts. Bush-Brown says that on the national and local levels, planners must recognize that successful healthcare and lifecare requires social and architectural nurture of privacy and membership within stimulating communities that are
integrated into both their local contexts and their regional medical systems (Bush-Brown, p. 12).

The article expands its breadth by saying that design for healthcare and senior communities must start fundamentally with a full program of spatial needs followed by site planning and completed by shaping and connecting the needed spaces, always with sensitivity to proportion, scale, light, acoustics, color and furnishings.

Aspects of proximity to community functions must be considered. Selection of a new location might depend most on ease of transportation for the elderly who in many cases do not drive but depend on public transportation.

The route from the transportation terminus and then inside the facility must be carefully considered. The current literature in wayfinding provides a basis for general design. In an article by Janet Carpman (Bush-Brown, p. 99) she says that wayfinding refers to five simple ideas: knowing where you are, knowing your destination, knowing and following the best routes, recognizing your destination upon arrival and finding your way back.

Wayfinding is a system coordinating numerous factors not merely signs. According to Susan G. Drew in Hospitable Design in Healthcare and Senior Communities, these include layout, visual access, circulation systems (corridors, stairs, elevators), room numbering, emergency exit information, interior and exterior landmarks (such as sculpture, paintings, a fountain, or pavilion), color coding, and environmental features. (Bush-Brown, p137).

Inside the building the interior treatments can have a profound effect on the patient. For many patients sounds, smells, colors, and
textures tend to become sharpened and gain special significance. The role which environment plays in influencing the state of mind of a patient facing an operation or another complicated treatment is obvious. But he (Bush-Brown, 1992, p. 12) says that there are still no positive studies that clearly link how the physical environment affects human beings. The best advice that designers have comes from instinct and simply knowing what people prefer.

And there are many generally recognized principles for design. One example that has become obvious in hospital design is that people do not like to be in places where there is no ambiguity and their sensibilities are strongly directed in one way. The expectation of people for diversity in their built environments is strong and almost limitless - this being an impetus to stay away from box-like institutional design.

In general, according to Carstens (Carstens, 1993, p. 14), facility design for the elderly is based on at least one important principle. She states that a prosthetic approach to design (challenge and support) offers support when needed but allows for independence, challenge and learning. When environmental challenges exceed the individual's ability to cope, frustration, anxiety and withdrawal may result. If not enough challenge, boredom and lethargy result. Long term effect without challenge may be loss of skills and abilities. Other issues mentioned for design include: appropriate location, near existing medical facilities, near to community services, near shopping facilities, spatial arrangements, radial layout, linear Layout, detailing, site hardware, door knobs versus latches (Bush-Brown, p.95). Age characteristics of a population being served can offer many
suggestions as to appropriate services. For example, according to the
AMA, elderly patients use more services provided by primary care
physicians, radiologists, and surgeons than other people do. In
addition, adults have more surgery than children. Programs such as day
care centers for patients with Alzheimer’s disease and other age-related
services may also be successful among the elderly. However, an elderly
population may be resistant to change, which must be considered when
moving services from inpatient to outpatient settings.
CHAPTER 3

RESEARCH METHOD

Objective

The objective is to produce a set of design guidelines derived from preferences of the elderly that can be used in the design of healthcare facilities. Establishing these design guidelines is increasingly important in the context of the forecast increase in use of ambulatory care facilities by the elderly. And, as stated earlier, this research is intended to fill a gap that exists in the knowledge of the preferences of the elderly.

The guidelines need to be specific yet broad enough to be a basis for design of many other aspects in healthcare design. The analysis must have a level of rigor that makes the results convincing and the guidelines usable in design.

Scope

This thesis addresses a limited number of the areas of elderly needs that were described in the background to the study. The scope of the study was limited to the most visible areas of architectural design. The analysis is based on recurrence of ideas, likes and dislikes. Different populations of people were not tested to see if there are generation or age differences. It is assumed that if a design is based on the preferences of the elderly, then that design will be good for everyone. The rationale is that these preferences will make a facility
safer to use by a person who has increasing difficulty with mobility, vision, etc. Of course this must be tempered with the architect’s judgment in the actual design.

**Choice of Analysis Method**

Qualitative methods were used for the analysis. This choice is supported by various sources but especially by the text "The Discovery of Grounded Theory" by Glaser and Strauss (p. 17). The authors say that some areas of study naturally lend themselves more to qualitative types of research. The examples of research that they offer are attempts to uncover the nature of persons' experiences with a phenomenon. These examples are illness, religious conversion, or addiction. Though not always a religious experience or addiction, a person's reaction to a building is similar. It is a reaction to phenomena of space, light, sound, proprioception (ability to sense things nearby), distance and scale (this researcher's observations).

The technique for the analysis was a combination of methods taken from texts by Patton, Miles and Huberman, and Glaser and Strauss. The findings were not arrived at by means of statistical procedures or other means of quantification. The research was conducted in three parts as Strauss recommends and says is the most common approach (Glaser and Strauss, p 57):

a. **data interviews and observations.**

b. **analytic or interpretive procedures** - used to arrive at findings. These procedures included techniques for conceptualizing data - encoding in the case of this research.
c. written and verbal reports - the typical third component of qualitative research - in this case the writing and presentation of this thesis.

Glaser and Strauss elaborate on the benefits of qualitative analysis. They argue that qualitative data are a source of well-grounded, rich descriptions and explanations of processes in identifiable local contexts. One can see which events led to which consequences, and derive sensible explanations. Their method results in theory that they call "grounded" in the observations and coding. In this case the theories are the preferences which become a basis for the design.

The use of qualitative analysis puts the art of architecture into the research. That is, the answers are not crisp and clean and backed up by the rules of stochastic phenomena derived from nature. This method reinforces the presupposition that people have a will and consciousness and will follow their judgment based on logic seasoned with experience. But it puts the rigor, bias and judgment of the evaluator on the line for producing valid results.

A quantitative approach was considered and rejected for various reasons. Quantitative analysis is not designed to encourage the offering of additional information from persons. The use of a quantitative approach limits the knowledge gained to the nature and comparisons of the responses. The value of the responses also depends on the wisdom and prior knowledge of the researcher in asking the right questions. So, insightful ideas from the sample population are not gained. And if the individual being tested gives spurious responses,
the researcher will be unlikely to discover and eliminate that from the sample.

Additionally, according to the references cited, qualitative analysis has the advantage of being very productive of insights to a situation. And the technique allows the researcher to draw out more information from the interviewee or limit the inputs.

In a qualitative evaluation a person's ideas are considered significant and important if there is a persistence of similar ideas among others in the study group. This is simply common sense. Another basis for credibility and value comes from cognitive anthropologists (Marshall and Rossman, 1989, p.10) who say that a person's perspectives are organized into cognitive or semantic schemata-categories of meaning that are systematically related to one another. This implies a network of related ideas. For the case of an architect trying to improve design, to gain new ideas and to learn the preferences of a particular group, the qualitative approach can be argued to be more fruitful and well suited to the pursuit. And in the case of the elderly their thinking is mature and preferences ingrained. There is a strong likelihood that their responses are not fad and that a small sample will provide a very reliable indication of general preferences. However the researcher must still be cautious to avoid claiming a preference that might turn out to be simply popular but not stand the test of time.

Looking at the use of qualitative analysis in other similar disciplines adds some credence to the value of it to architects. For example, qualitative research is used by anthropologists in their observations of culture and society, a similar regime to architectural design as architects observe how people move about and what spaces they
prefer (Marshall and Rossman, 1989, p. 10). Therefore, in the case of preferences of the elderly, observing (or interviewing) elderly participants makes good sense.

A weakness of the method might be the fact that the questionnaires are structured, yet the interviews were conducted as open ended. In some cases a choice was given for a particular preference (e.g. type of door knobs) which might have led the person to a particular choice of preference when the ideal was to get their unbiased preference for a particular situation.

Confidence in the findings is a problem that might not go away until Qualitative Analysis becomes better known. According to Miles and Huberman (in Qualitative Data Analysis, p.1) this approach is more and more used in public administration, business studies, health care, urban planning and educational research. Methods are often automated by software programs that use the text of interviews and observations to find patterns and trends.

Method

Several qualitative methods were considered:

1. Observe persons at a health care facility and determine the special considerations for the elderly. Use qualitative methods to analyze the written observations.

2. Send questionnaires to elderly persons at local senior centers and convalescent homes. Use text analysis to find trends and preferences.

3. Send a questionnaire that asks preferences for aspects of design to a sample population of various ages and then compare results
statistically to determine if there are truly different preferences for different ages.

4. Conduct a structured interview using questions that are directed to the purposes of the research and can be analyzed qualitatively.

The last choice was selected for reasons mentioned above.

**Conduct of the Interviews**

Twenty-two interviews were conducted in Las Vegas. Two were conducted at Sierra Health Service’s Senior Dimensions Office on Rancho Drive, two at Cannon Senior Center, and the rest at the six waiting rooms of the Veterans’ Administration Medical Center (VA).

The interviews were all conducted at random times in the afternoon. People who appeared alert, that is not sleeping or appearing drowsy and not debilitated by an illness were selected. Additionally, to avoid being offensive or disturbing anyone, the selection was from people who were not busy with reading or talking to others. When one interview was completed the next interview was started in another waiting area. If no one in the next waiting room appeared to fit the criteria for interview fitness the interview was tried in another area.

The intention was also to interview equal numbers of male and female elderly persons. However the final mix was six female and twelve male elderly at the VA and an even mix elsewhere. This reflects the observation that the patient population of the VA clinic was largely male. At the other two locations, interviews were done by appointment with elderly staff or volunteers who worked at the locations. At the
Cannon Senior Center clinic, the chief physician and one administrator were interviewed. At Senior Dimensions, a patient volunteer and the front desk receptionist were interviewed.

Twelve of the interviewees were aged 65 to 74, nine from 75 to 79, and one person was 80 years old.

The interviews were conducted after the interviewees were told the reasons for the interview. They were informed that their identities and responses would remain confidential. During the course of the interviews with the prepared questions the interviewer intervened when necessary to keep the responses on track and to elaborate the intent of the question if the interviewee seemed to not understand. In all locations the surrounding structure was used as a reference for questions which required judgment of widths, heights, etc.

During the interviews the questions were simply read one at a time and the interviewees were asked for their comments. The questions were designed so that they could be answered in simple terms such as yes/no/no opinion, or in varying degrees of agreement or disagreement. However in all but a few cases the interviewees offered reasons for each of their answers. Each interview was tape recorded (with the permission of the interviewee) and both during and after the interviews notes were made on the questionnaire sheets as backup and as elaboration on the comments. The interviews were transcribed from the tapes within two days. Coding (see p. 47) did not take place for several weeks after the interviews. The interviewer consciously tried to encourage or respond without leading the interviewee to a response that might be biased.
All interviews were conducted within the guidelines of disclosure for research involving human subjects as prescribed by the University of Nevada, Las Vegas, Office of Research Administration.

**Linking Needs to Design**

Interview questions were developed by focusing on the categorized needs of the elderly as discussed in Chapter 2. Using this information, questions were created that linked preferences to the areas of design.

Table 1, *Table of Needs Versus Current Design Standard*, shows this process. In the table, the column labeled “Designed Areas of Structure” contains in abbreviated form the areas whose design can be based on the preferences of the user. The column labeled “Current Standard/Recommended Solution” refers to applicable codes or standards of practice and typical design solution(s) to meet particular needs. The typical design solutions were taken from a “standards of practice” book such as “Callendar’s Building Standards” or “Ramsey and Sleeper’s Architectural Graphic Standards.” Additionally, several other books were used which talk about design for the elderly or health facility design. Examples are Carstens, 1993 and Malkin, 1982.

The table not only links the conditions and needs to design, it also links the questions (discussed later in this chapter) that were created and used for the structured interviews (for example, references to questions are labeled “Q6”). Then in a very simple way the results of the qualitative analysis can confirm (or not confirm) whether the “Current Standard/Recommended Solution” is valid and addresses the needs and preferences of the elderly or a new preference might be discovered and that can be listed.
<table>
<thead>
<tr>
<th>Condition or Need</th>
<th>Designed Areas of Structure</th>
<th>Current Standard/ Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Mobility/Getting Around</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Decreased Joint Flexibility</td>
<td>Steps (Q6, 18)</td>
<td>Building Codes</td>
</tr>
<tr>
<td>b. Balance</td>
<td>Inclined ramps (Q5)</td>
<td>Architectural Graphic Standards</td>
</tr>
<tr>
<td>c. Energy/stamina</td>
<td>Location of facility relative to demographics and transportation (Q3, 4, 4a)</td>
<td>ADA - use ramps with handrails and landings. Control changes in elevation of surface</td>
</tr>
<tr>
<td></td>
<td>Hardware on doors, to include handles and closers (Q7,25)</td>
<td>Door hardware should also be easily distinguished and easy to grasp (Valins, 1993). Where possible external doors should not be highly sprung but easy to open (Valins, 1993).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>... hidden barriers..problems with floors, sidewalks, doors stairs ramps, can trip up an elderly person who has a slow shuffling tentative gait. Doors can be an obstacle. Hinging systems should require less strength to open - sometimes automatic doors or two-leaf doors are appropriate. Elderly often use walkers, have diminished strength, control, and reach, and may grab household fixtures for support.... manipulation of switches, knobs buttons and controls... devices that respond to the palm or an arm... as lever-type door handles and push button light switches.</td>
</tr>
<tr>
<td>d. Physical Therapy and Fitness Equipment</td>
<td>Exercise facilities (Q19)</td>
<td>Locate facility near to a club or provide a facility to encourage exercise (Kantrowitz, 1993)</td>
</tr>
<tr>
<td>e. Use of cane, walker</td>
<td>Sidewalks, steps, ramps (Q6)</td>
<td>Steps should be provided as well as ramps for those using a cane or walker. These should also be</td>
</tr>
<tr>
<td>Condition or Need</td>
<td>Designed Areas of Structure</td>
<td>Current Standard/ Recommended Solution</td>
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<tr>
<td>provided with easily gripped and visually distinctive handrail (Valins, 1993).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At the door set raised thresholds could prove a hazard. Levels on both sides of the front door should therefore be equal (Valins, 1993).</td>
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</tbody>
</table>

### 2. Vision

**a. Sensitivity to glare**
- Daylighting in reception area
- Type of artificial lighting in waiting or exam areas (Q26)
- Use of glass in doors and windows at entrances (Q7)
- Canopy to provide shade (Q8)

<table>
<thead>
<tr>
<th></th>
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<th>Illuminating Engineering Society of North America – standards</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Use of canopy (Valins, 1993).</td>
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<tr>
<td></td>
<td></td>
<td>Use warm, bright (diffuse) lighting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prevention of glare is key.</td>
</tr>
<tr>
<td></td>
<td>Glare caused by windows at the end of a hallway, a strong light source, light spilling across a corridor from an open doorway can confuse an elderly person and obscure definition of the space. By considering texture, window location, and diffused light, and by carpeting hallways, we can reduce glare dramatically (Bush-Brown, p.137).</td>
<td></td>
</tr>
</tbody>
</table>

**b. Reduced Visual Acuity**
- Long Corridors (tend to distort approaching people (100-200 ft) (Howell, p. 10) (Q7, 10, 18)
- High vs. low ceilings (Q15)

<table>
<thead>
<tr>
<th></th>
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<th>A path (to apartments) should contain articulation and differentiating cues (Howell, p10).</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Provide good view to see ahead</td>
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<tr>
<td></td>
<td>Door ironmongery should also be easily distinguished and easy to grasp (Valins, 1993).</td>
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<tr>
<td></td>
<td>Ceiling-mounted fluorescent lighting, while economical, can reinforce an institutional feel and should be avoided. Softer wall-mounted lighting should be considered (Valins, 1993).</td>
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<tr>
<td>Condition or Need</td>
<td>Designed Areas of Structure</td>
<td>Current Standard/ Recommended Solution</td>
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<tr>
<td>- Nooks, crannies, protrusions, etc. in hallways (can be distracting or confusing) (Q18)</td>
<td>By the use of changes in color and texture, ample warning of any change in level should be clearly indicated (Valins, 1993).</td>
<td></td>
</tr>
<tr>
<td>- Lighting Systems in long corridors</td>
<td>- Recessed lighting, equidistantly placed</td>
<td></td>
</tr>
<tr>
<td>- Visibility of complex images (Q18) - decreased peripheral vision and lessened ability to discern color differences - The aging eye adjusts to light slowly</td>
<td>Need high general illumination levels and a lighting design that avoids distractions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sudden junctures of light and dark should be avoided. Moving from a dim corridor into a bright room, or from the outside into a dark lobby, can cause momentary blindness that obscures the edge of a rug or a step. Give the eye time to adjust; a softly lighted vestibule between the corridor and a bright room, or porch lights that raise the lighting level act as a transition zone. Changes in floor level should be postponed until eyes have had a chance to adjust.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This is related to the research on wayfinding by Passini and others. They say that spatial orientation is based on ability to form a cognitive map. This map is based on three interrelated processes: decision making, decision execution, and information processing.</td>
<td></td>
</tr>
<tr>
<td>Condition or Need</td>
<td>Designed Areas of Structure</td>
<td>Current Standard/ Recommended Solution</td>
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<td>-------------------</td>
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<td>----------------------------------------</td>
</tr>
<tr>
<td><strong>3. Hearing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Loss of sensitivity to certain pitches</td>
<td>-Lighting (Q25,26) -Signage, visual alarm systems</td>
<td>-Good lighting required for accurate lip reading (Salmon, p. 11)</td>
</tr>
<tr>
<td>b. Acute sensitivity to a certain range causes annoyance</td>
<td>-Waiting rooms (Q15,16,18, 26)</td>
<td>Provide quiet areas by signage or operation or acoustical means</td>
</tr>
<tr>
<td></td>
<td>-Telephones</td>
<td>Should be placed in an acoustically padded alcove, especially for the privacy needed while under stress in a clinic. Pen and pencil should be available with good light and a place to use them in this alcove. YOU ARE HERE maps are helpful in healthcare facility lobbies. Electronic bulletin boards and cablegrams inform patients and visitors about available services such as the location of bank machines the chaplain's telephone number, restaurant locations and menu specials (Malkin, p.54).</td>
</tr>
<tr>
<td><strong>4. Central Nervous System and Cognition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Symptoms of confusion</td>
<td>-Corridors, entrances, exits, spatial layout of activities. -Layout and orientation (Q21,22,23).</td>
<td>Use layouts and plans that are easy to understand Building layout can be confusing if signage alone signals specific floors and rooms. Residents with vision problems, perhaps also with decline in some other senses or memory loss, need as many location indicators as possible. Sameness and repetition are the chief sources of disorientation. Similar layouts and a regular pattern of doors give elderly residents no cues to distinguish one room from another. Creating</td>
</tr>
<tr>
<td>Condition or Need</td>
<td>Designed Areas of Structure</td>
<td>Current Standard/ Recommended Solution</td>
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<td>-------------------------------------------</td>
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<td>---------------------------------------</td>
</tr>
<tr>
<td>Variety in lobbies, corridors and entries helps to identify the spaces. Distinguishing features help: a special space on each floor near the elevator; distinctive furniture; clear signage and color coding;</td>
<td>- Entrance and exit separate.</td>
<td></td>
</tr>
<tr>
<td>- Spatial layouts</td>
<td></td>
<td>Use contrasting colors</td>
</tr>
<tr>
<td>- Numerous nooks, crannies</td>
<td></td>
<td>Can be used as resting areas along path to exam areas</td>
</tr>
<tr>
<td>b. Reduced proprioceptive ability and sense - i.e. degenerative changes associated with age in the dorsal columns with consequent impairment of proprioceptive system.</td>
<td>- Walls, shadows, reflections (Q7, 10 11, 21, 24)</td>
<td>Use of mirrors on walls to see one’s gait, posture, movement. Particular attention to scale e.g. huge lobby &amp; vestibule with adjacent small waiting area can be frightening (patient’s defenses are already compromised)</td>
</tr>
<tr>
<td>c. Forgetfulness in placing object, belongings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Symptoms of fright or flight</td>
<td>- Exits, areas of isolation or dead ends</td>
<td>Provide easy to see route of escape</td>
</tr>
<tr>
<td><strong>5. Temperature Adaptation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow adaptability to temperature change</td>
<td>- Indoor climate control</td>
<td>“...use of a draught lobby is seen as desirable from the viewpoint of security, heat loss..” (Valins, 1993).</td>
</tr>
<tr>
<td>- Lobby</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Furniture</td>
<td></td>
<td>Use other than vinyl</td>
</tr>
<tr>
<td><strong>6. Disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition or Need</td>
<td>Designed Areas of Structure</td>
<td>Current Standard/ Recommended Solution</td>
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</tr>
<tr>
<td>Susceptibility to chronic disease</td>
<td>-Commingled waiting rooms (i.e. with children) (Q12, 14)</td>
<td>Create cloistered waiting areas. Create separate waiting area for elderly.</td>
</tr>
<tr>
<td></td>
<td>-Ventilation system</td>
<td>Return ducts at floor and baseboard level, use of positive pressures</td>
</tr>
<tr>
<td>7. Skin Problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Protection from direct sun</td>
<td>Use canopy from front door to drive-up or parking area.</td>
</tr>
<tr>
<td>8. Foot Problems</td>
<td>(Q3, 4, 4a, 6, 10)</td>
<td>Minimize walking distances. &quot;Length of a corridor should be kept to less than 100 feet (Valins, 1993).&quot;</td>
</tr>
<tr>
<td></td>
<td>-waiting area, education rooms (Q20)</td>
<td></td>
</tr>
<tr>
<td>10. Mental Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Symptoms of depression.</td>
<td>-Pictures and notices on walls, wallpaper (Q7).</td>
<td>Post objects that will not create anxiety (Valins, 1993).</td>
</tr>
<tr>
<td></td>
<td>-Reception and waiting areas. (Q23, 21)</td>
<td>Security of reception desk with barriers to general view of others (Valins, 1993).</td>
</tr>
<tr>
<td>b. Need for privacy - post procedure</td>
<td></td>
<td>Separate areas for recovery until release</td>
</tr>
</tbody>
</table>

**Interview Questionnaire Construction**

Guidance for writing the interview questions for the preference evaluation came from several sources. The type of evaluation is described in Patton (1980, p. 202). This is the "Standardized Open-ended Interview." As stated there, the major reasons that make this
method best for this research are that "the exact instrument [the questionnaire] used in the evaluation is available for inspection by decision makers and information users" and "the interview is highly focused so that interviewee time is carefully used." And each interviewee is asked the same questions so it is easy to find trends and common preferences.

Patton (1980) describes some weaknesses to this approach. The interview cannot be varied to cover new topics that might come up and the interview is constrained in the use of different lines of questioning with different people based on their unique experiences (Patton, 1980, p. 204). However, Patton also says that the structured interview supports the fundamental need in qualitative research - "to provide a framework within which respondents can express their own understandings in their own terms." He also says that this type of interview is what makes qualitative analysis distinct from quantitative analysis. It does not require the subject to force their feelings, opinions and knowledge into the evaluator's categories.

A set of questions was derived by simply following a mental route through the building and creating related questions. This was done to make the thought process logical and sequential in the hope of capturing the semantic schemata and linkages as described in Marshall and Rossman (p. 10). The questions have a basis in the literature or in experience and anecdotal evidence as described in the accompanying paragraphs. Provided along with the paragraph of explanation is a list of codes that were chosen at the time of questionnaire construction. The list of codes was revised several times after the interviews began because new
concepts arose several times due to the insight of the interviewees. The process of using the codes in the analysis is described later. But in brief, the codes represent ideas in the questions that are either rejected, supported or extended by the interviews.\(^1\) 

NOTE: The questionnaire is presented in its entirety in appendix I.

### 3. The Center should be located near a shopping area.

This question is addressed in Carstens (Site Planning and Design for the Elderly, p. 17) under the "Issue" heading "Access to Community Services, Facilities and Information." Carstens states that the elderly person often needs easy access to public facilities such as community centers, shopping, etc. due to the "process of aging." This, meaning the elderly often have a reduction in resources and access to private transportation. However Carstens does not address the question of access to medical facilities.

<table>
<thead>
<tr>
<th>Codes:</th>
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<tbody>
<tr>
<td>P - parking</td>
</tr>
<tr>
<td>TR - transportation convenience, i.e. on a node</td>
</tr>
<tr>
<td>COL - convenient link to other services, i.e. you can do many things in just one stop.</td>
</tr>
</tbody>
</table>

### 4. The Center should be located near a hospital.

This is in the same vein as the previous. But the finer point is to find a preference for this particular issue. Some hospitals are building ambulatory care clinics as an addition to the hospital, while others will try to site the clinic according to where a market or demographic study shows the target population is located. If there is a preference to have the clinic near a hospital, then perhaps demographics (i.e. whether it is near to a particular group) should not be the determining factor for location.

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<th>Codes:</th>
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<td>TR - transportation convenience, i.e. on a node</td>
</tr>
<tr>
<td>LTH - link to hospital is important for medical support</td>
</tr>
</tbody>
</table>

\(^1\) Questions "1." and "2." were used to ask the interviewees about their state of health and are not included here. Therefore these questions begin with "3."
4a. **Location of the Center is not important.**

This question was simply used to find if there is any preference at all. Perhaps it really doesn’t matter. The trend seems to be that there are known preferences for locations of “HMO” type facilities. In her address at the sixth Health Facilities Design symposium, Robyn Dermon (President of “Health Futures Inc.”) stated that though managed care has been around for a long time it is especially in the spotlight today because of the pending changes in health care legislation. She said that the change of many people to Health Maintenance Organizations (HMO) will mean increased visits to health providers (a managed prevention approach) and therefore the number of facilities and their mode of service will change. She cites the use of converted shopping centers and residential areas to medical malls and (in some cases) shared occupancy with active shopping areas. The trend is to make the HMO and Center a convenient part of the community that is easily accessed and welcomed by everyone (reference is the writer’s personal notes from the symposium).

| Coding: | TR - transportation convenience, i.e. on a node |
| COL - convenient link to all things needed |
| DEM - located to be near a demographic center |

5. **The Center should include all services for health such as ophthalmology and dentistry.**

In *The Challenge of Aging* the author (Fraser, p. 34) states that “a revolutionary shift in thinking and culture will need to occur for prevention to assume its rightful role.” Ensuring needed access to the right services will require a substantial realignment of the continuum of care so that preventive and primary care are more readily available and therefore emergency services are less necessary. The intent here was to get some idea of

| Coding: | TR - transportation convenience, i.e. on a node |
| COL - convenient link to all things needed |
| CON - continuum of care, prevention |
the strength of this concept. Additionally the question tries to get some idea of the preference for “one-stop shopping” in the health care area. This question alludes to needs of the population rather than the individual.

6. The main entrance, if higher than the sidewalk, should not have steps but should have a ramp instead.  

Intent is to find whether steps are a nuisance and should be deleted altogether. Steps are likely to be harder to negotiate than a simple ramp. However people using canes or walkers have difficulty on ramps.

 Coding:
 RMP - ramp exclusively
 STP - steps, too
 BTH - both

6a. Steps are of no consequence at the entrance.

Clarifies 6 by asking directly if steps are an issue. Additionally tests the design suggestion in Valins (p. 11) to provide steps with ramps due to awkwardness of ramps for those who use canes or walkers.

 Coding: This question was deleted about one-third of the way through the interviews as it became redundant.

7. The main entrance door should have as much glass as possible to allow sight into the lobby and reception area.

Finds whether there is a need to see well ahead and prepare for entrance. That is to take away chance of being surprised.

 Coding:
 VIS - important to see ahead
 EASE - A doorway that is easy to use
 NA - Doesn’t matter
8. The main entrance should have a cover that extends as much as possible into the parking area and drop off area.

| Coding:           | PROT - Protection from sun, rain
|                   | NA - Doesn't matter |

Simply looks for preference of having some kind of canopy, porte de cochere, or awning for the walk to a car or bus. Indicates preference for protection from the sun.

9. There should be an area for parking and securing bicycles.

| Coding:         | ACC - Accepted in principle
|                 | REL - reluctance to accept |

Finds if riding bicycles is accepted. And if so this might give an indication of how many racks are required. Or might be an indication if it is accepted for others.

10. The receptionist should be located within five steps of the entrance.

| Coding:         | IMP - Very important
|                 | INFO - Needed for directions
|                 | FAR - farther away than five steps |

To see whether the need for help very near to the entrance is important. An operational and design decision must be made about whether reception area is needed at the entrance in addition to the reception and scheduling areas for each of the functions and practices. Or - based on proximity's - should the distance be greater to provide more room.

11. The reception area should be out of hearing distance of the rest of the waiting patients.

| Coding:          | PRI - Need for privacy
|                 | QUIET - For quiet and to lessen confusion.
|                 | NA - neutral, no feelings either way |

Determines need for privacy of the person at the desk or to maintain privacy and quiet in the waiting area.
12. The waiting area should be one large room.

Tries to determine how "cozy" the waiting area should be and whether the waiting areas should be broken up into smaller areas. Interviews were given in smaller waiting areas outside of the separate clinics.

Coding:
- MIX - good to have mix
- MULTI - Need several areas
- CONTAG - Worried about contagion

13. The waiting area should consist of several rooms, but should have at least one room for each doctor's patients.

(Not used)

14. There should be a separate waiting area that is available for parents with children.

This is simply based on a common notion that the elderly prefer a quiet waiting area that does not have the intrusion of anxious children. This also has the practical notion of keeping away children who have contracted and are contagious with the typical childhood diseases and who do not have hygienic habits.

Coding:
- QUIET - For quiet and to lessen confusion
- CONTAG - Minimize contagion.
- MIX - Good to have mix, many people, some chaos

15. The waiting area should have ceilings that are at least twice as high as I am tall.

This is related to the "coziness" of the waiting area, that is, do you agree or disagree? Also related to the question is the idea that a high ceiling means higher room volume and the dissipation of noise and some of the chaos that might be typical of a lower-ceiling room.

Coding:
- AVE - Meaning the average height is 10-12'
- HI - Higher is better
- COST - Worried about costs for heating and cooling.
- NA - Not important.
16. Ceiling height in waiting areas is not important.

This question simply picks up where the previous question left off and asks if there is any preference at all in ceiling heights. In the case of this study, the Las Vegas Veterans Administration Medical Center was used as a reference for the question. During the interview the ceilings of the interview area and adjacent ceilings were pointed out and considered for the responses.

<table>
<thead>
<tr>
<th>Coding:</th>
<th>NA - Not an issue, not important.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOME - Prefer a homelike atmosphere.</td>
<td></td>
</tr>
<tr>
<td>COST - Worried about costs for heating &amp; Cooling</td>
<td></td>
</tr>
<tr>
<td>IMP - it is important</td>
<td></td>
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</tbody>
</table>

17. Wallhangings in the waiting area should not depict illustrations of historical medical events.

This question was intended to see if the mental state of patients was antagonized by provocative depiction’s. It also was intended to get some response about the way that elderly patients felt that the decorations should make the atmosphere of the waiting areas.

<table>
<thead>
<tr>
<th>Coding:</th>
<th>HOME - Prefer a homelike atmosphere.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC - Anything of educational value is good.</td>
<td></td>
</tr>
<tr>
<td>NA - Not an issue, not important.</td>
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</table>

18. A corridor with straight smooth walls (i.e. no recesses for doors or water fountains) is a good design.

This question is intended to raise several issues. First, the aesthetics of hallways that are straight and smooth, that is an "institutional" look; second, the practicality of making everything "smooth" so

<table>
<thead>
<tr>
<th>Coding:</th>
<th>VAR - Need for variety, changes.</th>
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</thead>
<tbody>
<tr>
<td>NA - Not an issue, not important.</td>
<td></td>
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</tbody>
</table>
that there is no or little chance of bumping or catching canes, crutches, walkers or wheelchairs; third, whether the use of alcoves along hallways to break up the length, and last, the forbiddingness of the long hall without benches or rails where a person can stop, brace or catch one's self or just rest.

19. The facility should include an exercise room with showers and locker room available.

This is in response to the literature on ambulatory health care facility and HMO design to see whether the opportunity for using exercise rooms is really important to the elderly.

20. The facility should include an education room with computer terminals for researching questions about health.

In an article by Dianne Davis (Bush-Brown, p. 29) she talks about the need for maintaining communication and suggests the use of computer terminals. She anticipates the surge in computer literacy and friendliness by the coming great number of persons over 65 who have had experience much of their lives with typing and could quickly learn to use the word
20. The facility should include an education room with computer terminals for researching questions about health.

... processing capabilities of computers. In fact there is a group called SENIORNET, accessible through America On Line who are promoting just such a thing. Their stated mission is to acquire a membership of over-55’s who are linked via modem. Currently there are over 14,000 members of SENIORNET. In the new ambulatory center then, there is opportunity for a room to promote this use; that is, an education center for the use of computers. This will help to remedy what Richard T. Conrad (Bush-Brown, p. 23) calls circumstantial senility. This is a condition where with lack of activity the mind and body become atrophied as a condition of retirement or fitting into some social conception of being old.

21. Rooms in the facility should be based on a square plan with straight corridors leading to the exam and consultation offices.

22. Rooms in the facility should be based on a circular or wheel-like plan with offices located at the spokes of the wheel.

Since these two questions were very similar they were combined after a few interviews to eliminate redundancy. These questions attempt to find the arrangement that is easiest to figure out, i.e. easiest for wayfinding (Carpman, 1986). With a square plan, it is assumed that the first attempt to find the destination is difficult, but then it is assumed that future trips will be uneventful. That is, it is assumed that the rectangular is easy to

Coding:  
SQ - Preferred  
CIR - Circular preferred  
NA - No choice - neither is better.
remember. If the arrangement is radial, then it is assumed that initially the destination will be easy to find since from the center of the circle, one can be easily directed to the correct “spoke of the wheel.”

23. I prefer to have the choice of an exit that is separate from the entrance.

This question tests the preference of having a way to leave the facility without walking back through the waiting area. The idea is to provide a choice of leaving the facility that will provide some privacy.

Coding:
- P - Parking and convenience
- NA - no choice - neither is better
- OK - Good to have

24. In your opinion, corridors in this facility should be the width of [number] persons

This attempts to get a preference for the hall width that is sensed as comfortable and convenient for the traffic carried. In addition, it helps to give some sense to the idea of scale, and to the idea of "home-like" feeling versus an institutional feel.

Coding:
- SAF - Safety, accessibility
- 3,4,5,6
- OPP - Oppressive feeling if too narrow

25. My preference for door knobs is: round or straight-lever.

This simply refers to preferences in view of difficulty with aging joints and muscles.

Coding:
- JOI - Straight lever due to joint or muscle use
- OTH - Other
- NA - no choice - neither is better
26. The waiting room lighting that I prefer is:

incandescent, fluorescent, either one.

This questions the prevalent designer’s notion that warm, task (or table) lighting provides the closest atmosphere to “homelike.”

<table>
<thead>
<tr>
<th>Coding:</th>
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<tbody>
<tr>
<td>NA - no choice</td>
</tr>
<tr>
<td>- neither is better.</td>
</tr>
<tr>
<td>COST - worried about costs</td>
</tr>
<tr>
<td>IN - incandescent</td>
</tr>
<tr>
<td>FL - fluorescent</td>
</tr>
</tbody>
</table>

27. Of this lighting preference, I prefer: overhead, task (table), either one.

Elaborates on previous question.

<table>
<thead>
<tr>
<th>Coding:</th>
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</thead>
<tbody>
<tr>
<td>NEU - Neutral, no choice</td>
</tr>
<tr>
<td>OVH - Overhead</td>
</tr>
<tr>
<td>TSK - Task</td>
</tr>
</tbody>
</table>

28. In the patient consultation room I prefer lighting that is: incandescent, fluorescent, either one.

This question was not asked of all interviewees.

<table>
<thead>
<tr>
<th>Coding:</th>
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</thead>
</table>
Coding

The art of coding is as implied, a subjective method and technique for finding patterns, preferences and trends. In this study, the questions were first written and codes applied according to the intent of the question and the judgment of the writer.

For example, in question 14:

14. There should be a separate waiting area that is available for parents with children.

This is simply based on a common notion that the elderly prefer a quiet waiting area that does not have the intrusion of anxious children. This also has the practical notion of keeping away children who have contracted and are contagious with the typical childhood diseases and who do not have hygienic habits.

Coding:
QUIET - For quiet and to lessen confusion
CONTAG - Minimize contagion.
MIX - Good to have mix, many people, some chaos

Only the two codes QUIET and CONTAG were used initially, but as the interviews were conducted it became apparent that some of the interviewees preferred to have some kind of noise and "light" chaos. It gave them a distraction from thinking about the intent of their visit and provided some entertainment. It is possible that it even gave more of a "home" atmosphere if they were accustomed to having a lot going on about them. So, the code "MIX" was added.

In the process of analyzing "MIX" the objective was to count the number of "hits" on words, phrases or innuendo of preferring a "MIX."

This raw number based on the number of interviewees gave a rough indication (though subjective) of whether "MIX" was preferred. Or, if the number is very low, then perhaps the preference was just that of one
person and not significant. For design purposes, the idea that some people prefer some "MIX" can be helpful to deciding whether noise is to be avoided or ignored.

This process of writing codes that represent a preference based on frequency of occurrence of ideas, words, meanings and needs was applied to all of the questions. As the reading and counting process proceeded through the transcribed interviews, it became apparent that some other preferences were being expressed that the question had not intended to bring out. New codes were written and all of the responses were evaluated again to detect and count this new preference.

Analysis

After the entire coding process of labeling and counting, the number of occurrences of a code in a response was counted. Then for all of the responses to each question, an evaluation was made of the significance of the number of codes counted. This process is where the evaluator's objectivity is tested. If a small number of codes were counted for a particular question, the context of the responses must be researched to determine if the item is important or not. Perhaps only a few people were able to observe a very subtle aspect that is important to the others. Then the evaluator must use the opportunity gained by this insight. After codes were evaluated, each question was then evaluated against the responses to determine an answer that can be used in the design guidelines. According to Glaser and Strauss this answer is grounded theory (Glaser and Strauss, p. 54). For these purposes, the theory can be used as a guideline for design and applied to the needs/design matrix to compare standard design guidelines with the derived guidelines.
Since the statement that the subjective evaluation of codes and the collective effect of them in a response can be summarized and synthesized to form a theory is contentious at best, some elaboration of "grounded theory" is needed. According to Glaser and Strauss, a grounded theory is one that is inductively derived from the study of the phenomenon it represents. That is, it is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon. Therefore, data collection, analysis, and theory "stand in reciprocal relationship with each other" (Glaser and Strauss, p. 56). As in any other science, one does not begin with a theory and then recreate it. Rather, one begins with an area of study and then what is relevant to that area is allowed to emerge. This process is very similar to the research techniques of Christopher Alexander and others while working on the book, A Pattern Language. In their research, they simply observed people's behavior and found those that were acted out over and over again. These behaviors were determined to be the "pattern" for a particular situation, and a design suggestion or "pattern" was written to support it. This pattern is like the theory that Glaser and Strauss discuss (personal notes from a conversation with a co-author of the book - Sara Ishikawa, in March 1995).

According to Glaser and Strauss:

A well constructed grounded theory will meet four central criteria for judging the applicability of theory to a phenomenon: fit, understanding, generality, and control. If theory is faithful to the everyday reality of the substantive area and carefully induced from diverse data, then it should fit that substantive area. Because it represents that reality it should also be comprehensible and make sense both to the persons who were studied and to those practicing in that area. If the data upon which it is based are comprehensive and the interpretations conceptual and
broad, then the theory should be abstract enough and include sufficient variation to make it applicable to a variety of contexts related to that phenomenon. Finally the theory should provide control with regard to action toward the phenomenon. This is because the hypotheses proposing relationships among concepts - which later may be used to guide action - are systematically derived from actual data related to that (and only that) phenomenon. Furthermore, the condition to which it applied should be clearly spelled out. Therefore, the conditions should apply specifically to a given situation (Glaser and Strauss, p. 56-58).

In another book (Basics of Qualitative Theory), Strauss states in more succinct terms the idea of grounded theory:

In developing Grounded Theory, the method needed to include: (a) the need to get out into the field, (b) the importance of theory grounded in reality to the development of a discipline; (c) the nature of experience as undergoing and continually evolving; (d) the active role of persons in shaping the worlds they live in; (e) an emphasis on change and process, and the variability and complexity of life and (f) the interrelationships among conditions, meaning, and action. (Strauss, 1990, p. 25)

Rigor

According to Patton (1980, p. 338) the onus for rigor in qualitative analysis falls on the rigor of the evaluator. He says that there are no clear cut rules about how to proceed. That the onus for the rigor falls on the evaluator is probably fair for a researcher with architectural design interests in mind. Patton also quotes Nobel prize-winning physicist Percy Bridgman on the idea of the researcher using personal training and insight for drawing parallels and conclusions from the research. Bridgman says, “There is no scientific method as such, but the vital feature of scientist’s procedure has been merely to do his utmost with his mind, no holds barred.”
Reliability

The use of qualitative data raises issues that question the reliability of the research. These issues are (1) distinct possibility of researcher bias, (2) the adequacy of sampling, (3) the generality of the findings and (4) the credibility of conclusions.

1. **Researcher Bias.** To avoid or minimize bias, the collection of data was structured prior to the interviews. Each person responded to the same questions. However, when some of the questions needed elaboration, the interviewer supplied it. The transcribed taped conversations indicate what was said. In the analysis this information is weighed in with the rest of the question.

2. **Adequacy of sampling.** A rationale for sample size is taken from Patton (1980, p. 101) where he states that “decision makers and evaluators think through what cases they could learn the most from, and those are the cases that are selected for study.” In the case of this study, the sample size was limited by time and resources for the study. To get the most from a limited sample, and to find the interviewees that one could learn the most from, the interviewees were selected from among patients at the Las Vegas Veteran’s Administration Medical Center.

3. **Generality of findings.** This is left to the design professional to decide. The findings are theories of design for specific aspects of healthcare facilities and are intended as guidelines. The research is productive in that it tests the old theories (standard guidelines) and provides new theories if the old is inadequate.
4. **Credibility of conclusions.** A structured interview was chosen because it presents a good chance of not producing large amounts of excess data. Miles and Huberman (pp. 55-59) discuss the problems of huge amounts of extraneous data and say that (p. 55) "conceptual frameworks and research questions are the best defense against overload." They also say that since data collection is a selective process the use of a structured interview can produce a thinner collection of data, but to be cautious about too much selectivity - it can be a source of bias. The danger of data overload is an argument for quantitative analysis - i.e. reducing responses to numbers as soon as possible. With the large number of elegant programs to reduce the numbers to statistically meaningful comparisons of means and populations this method has its merits. However, for the design preference researcher, the use of words and the context and nuances that go along with interview and observation, the results are richer, more meaningful, and can lead to ideas for better design (Miles and Huberman, p. 56).

They go on to say that “The challenge [in qualitative analysis] is to be mindful of the purposes of your study and of the conceptual lenses you are training on it - while allowing yourself to be open to and reeducated by things you didn’t know about or expect to find.” Just for this fact alone, the qualitative research is a good exercise for the architect to get the facts and to get a "feel" for the subject.
CHAPTER 4

FINDINGS

Analysis

The following are the raw numerical responses for the selected codes (shown as a number listed in parentheses after the code). The number only has meaning given to it by the evaluator’s subjective rating given at the end of the question. For example, although 22 persons were interviewed, in some cases and for some questions and coding, not all 22 gave responses, or some of their responses were meaningless. The evaluation of a response of 4 for the code “P” could indicate that in the interviews, the notion of parking only came up in 4 of the interviews, so this probably means that parking is not an important issue but it still deserves some consideration.

Note again that these questions start with the number 3. Questions 1 and 2 were used in the questionnaire to record demographic information. The entire questionnaire is in Appendix I.
3. The Center should be located near a shopping area.

Codes and responses:

P - parking (4) The concerns were for enough parking.

TR - transportation convenience, i.e. on a node (8) Concern for being near to a transportation node, i.e. bus route, intersection and idea of shopping center being located at a node.

COL - convenient link to other services, i.e. you can do many things in just one stop (2) One respondent was a staff person who said it would be good if the shopping area had items to meet senior’s needs.

NA - neutral or against (7) The one against said that shopping area would be a distraction. His response was, “I don’t think so.” Of the neutral responses (5) the reaction was: it doesn’t matter.

Evaluation:
The design reference, to Carstens, seems to be supported. However the need for being near shopping is not that important. Importance was convenience, being able to easily get there.

4. The Center should be located near a hospital.

Codes and responses:

P - parking (1) A weak plea for parking.

TR - transportation convenience (2) In this case to be near the population center, so demographics is the concern.

LTH - link to hospital is important for medical support (14) A clear majority - but about half simply said it would be a good idea - i.e. not strong preference.

0 - neutral (5) These said it’s not essential, there are other ways to get the hospital advantage.

Evaluation:
The general feeling that this is a good idea won out over the idea of being near the population center. This supports the suggestion in the description of question construction.
4a. Location of the Center is not important.

Codes and Responses.

P - parking (1) Minimal concern was parking

TR - transportation convenience, i.e. on a node (9) - most responses were concerned about getting there - and if bus routes exist, or you can easily have access in a car (off of the freeway i.e. it's well located)

COL - convenient link to all things needed (0) No preference for location that is connected to shopping malls - preference is for bus transportation route or easy access off freeway.

DEM - located to be near a demographic center (3) Minimal concern with being at a demographic center.

0 - (1) Implies that nearly all had a feeling about this.

Evaluation:

Based on "current trend" in the Center for Health Design symposium speaker's remarks and a Post Occupancy Evaluation (POE) survey (Kantrowitz) where location in old shopping malls is encouraged - this trend is not a preference of the elderly, but it is not rejected totally. The preference is to have the location be a transportation node. As a note - the use of busses was frequently mentioned.

5. The Center should include all services for health such as ophthalmology and dentistry.

Codes and responses.

COL - convenient link to all things needed (17) Convenient link to all services - strong preference to them all in one location.

TR - transportation convenience, i.e. on a node (2) Idea of convenience of transportation to the facility - was a weak concern.

CON - continuum of care, prevention (2) idea of continuum of care as described by Fraser in "Challenge of Aging" but only a weak preference.

Evaluation:

Majority (or strong) preference for convenience of all being together was also linked to negative aspect of not being able to get the right provider's advice at the clinic and being referred to a clinic that was far distant from home.
6. The main entrance, if higher than the sidewalk, should not have steps but should have a ramp instead.

Coding:
- RMP - ramp exclusively (13) major preference over all choices.
- STP - steps too (0)
- BTH - both (4) Demonstrates that there is a strong feeling among some that ramp is just not good enough.
- 0 - (2) Both in this category think that there should not be an elevation change.

Evaluation:
In hindsight, this question is not valuable. But it shows that there is a strong preference for ramps for those people on wheelchairs. However 6 responders said that the ramp alone is not good enough or that the building should be level with the ground. There were some comments that ramps are hard to negotiate by people using canes or walkers.

7. The main entrance door should have as much glass as possible to allow sight into the lobby and reception area.

Coding:
- VIS - important to see ahead (6) Comments ranged from a short "yes" to "that would be very nice." So the preference doesn't appear to be strong.
- EASE - A doorway that is easy to use (5) Just so there is an easy entry, more important that it works for handicapped persons and that it is dependable, easy to use. So, AS LONG AS IT WORKS WELL is the criteria.
- NA - Doesn't matter (8) The ones who say it doesn't matter didn't address ease of operation as the others did.

Evaluation:
The responses were mixed, with a third saying that this doesn't really matter. So for the designer, there is probably no rejection of lots of glass. But as one of the interviewees said - be careful with reflection and glare.
8. The main entrance should have a cover that extends as much as possible into the parking area and drop off area.

Codes and responses:

PROT - Protection from sun, rain (16) Several responses suggested that for the early-comers and those waiting for buses - this is good.

NA - Doesn't matter (6) Of this group - the responders didn't see the need for the expense.

Evaluation:

Many of the responders referred to Chicago or New York or places where weather can be inclement. Overall they thought that this is a good idea and worth doing.

9. There should be an area for parking and securing bicycles.

Codes and responses:

ACC - Accepted in principle (12) [This question was just coded for acceptance only] This group - a majority - accepted with a very positive response. This leads one to believe that for such an obviously easy addition, the naysayers should be ignored.

REL - reluctance to accept (5) Of those reluctant to accept (but accepted anyway) there seemed to be an aloofness or reluctance to admit that they observe such things. But they accepted, implying that this is an accepted part of needs.

Evaluation:

This was a weak preference for bike racks. Of those questioned there was a reluctance to accept the idea of bike racks, as though that is not something that one does.

10. The receptionist should be located within five steps of the entrance.

Codes and responses:

IMP - Very important (15) One respondent said that security was an issue - i.e. keep it tight so it can be easily watched. Another said that both nearness and information are important so - one immediately discovers destination directions.

INFO - Needed for directions (2) Few raised the issue of having an information desk near to the entrance. This might be due to the phrasing which focuses on distance.
FAR - farther away than five steps (3)  The one's who said farther cited the need for space with long lines.

NA - Of those who thought there is no preferred distance - the idea of simply being able to see it or having easy access was important.

Evaluation:
The preference is that it is visible and that there is enough room for lines of people who come in during the early morning rush.

11. The reception area should be out of hearing distance of the rest of the waiting patients.

Codes and responses:
PRI - Need for privacy (5)  A small number felt need for privacy - and not a strong need.

QUIET - For quiet and to lessen confusion (14)  More than not - quiet was important.

NA - neutral, no feelings either way (5)  A small number saw no importance.

Evaluation:
There was a weak preference for privacy. They didn't seem to care if someone else overheard the information passed by the reception people. A significant number thought the quietness of being distant would be good.

12. The waiting area should be one large room.

Codes and responses:
MIX - good to have mix (6)  A small number felt mix was better and of those, the thought was "why make the extra expense."

MULTI - Need several areas (18)  Large number prefer this as is recommended by most design texts and guides. Reasons are for different activities and interests and not for segregation by age groups. In fact in the interviews, I didn't see an aversion to children.

CONTAG - Worried about contagion (2) few thought of this as a reason to have multiple rooms. But the design guides (for good reason) suggest this.

Evaluation:
Overall, there should be a large area with opportunities to find seclusion in some small areas. The use of a separate room for children is good.
13. The waiting area should consist of several rooms, but should have at least one room for each doctor's patients.

(Not used)  

14. There should be a separate waiting area that is available for parents with children.

<table>
<thead>
<tr>
<th>Coding</th>
<th>Codes and responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUIET - For quiet and to lessen confusion</td>
<td>Most said that this is a good idea in order to keep noise down.</td>
</tr>
<tr>
<td>CONTAG - Minimize contagion</td>
<td>Still (Reference question 12) there was not much concern about contagion.</td>
</tr>
<tr>
<td>MIX - Good to have mix, many people, some chaos</td>
<td>A small number said that having everyone in some room is OK. Of the 5 who advocated a mix, 3 were female.</td>
</tr>
</tbody>
</table>

Evaluation:  
Good idea.

15. The waiting area should have ceilings that are at least twice as high as I am tall.

| Codes and responses |  
|---------------------|---------------------------------------------------------------|
| AVE - Meaning the average height is 10-12' | Most responses but 4 cited cost.  
| HI - Higher is better | But in the vestibule in about half of the cases.  
| COST - Worried about costs for heating and cooling | Cost is always paired with the AVE responses.  
| NA - Not important | But there were no good reasons for this.  

Evaluation:  
Average height ceiling is preferred. But the use of a high ceiling in the vestibule is good as long as heating and cooling costs are not affected.
16. Ceiling height in waiting areas is not important.

Codes and responses:
NA - Not an issue, not important (5) Of the number of responders a "medium-sized" number felt that it doesn't matter.

HOME - Prefer a homelike atmosphere (1) Just one indication of preserving homelike atmosphere.

COST - Worried about costs for heating & Cooling (3) Small number were concerned.

IMP - it is important (3) Small number felt that ceiling height was important.

Evaluation:
Most thought that ceiling height in waiting areas is not important.

17. Wallhangings in the waiting area should not depict illustrations of historical medical events.

Codes and responses:
HOME - Prefer a homelike atmosphere (6) If homelike, remove things that remind of medical problems.

EDUC - Anything of educational value is good (9) Especially if about health related (happy) items.

NA - Not an issue, not important (4)

Evaluation:
Result - it is good to combine the themes of homelike and education.

18. A corridor with straight smooth walls (i.e. no recesses for doors or water fountains) is a good design.

Codes and responses:
VAR - Need for variety, changes (13) Need for place to sit down, concern with rounded corners, varied but with signs and easy to navigate.

NA - Not an issue, not important (1)

SMTH - Smooth, clean look without alcoves (7) Concern that gurneys can't get through. Of these, there were minimal comments or elaboration's.

Long, smooth, sterile hallways are frightening.
Evaluation:
Preference is for varied appearance and nooks, alcoves, places to sit down. Corners should be rounded, not sharp. Don't create long hallways that are smooth and sterile.

19. The facility should include an exercise room with showers and locker room available.

Codes and responses:
- SAN - an issue of staying clean and not sweaty or of using equipment that is dirty (2) A small number - worried about expense of keeping clean and fear of airborne contagion.
- INAP - Inappropriate - not appropriate for a clinic (5) Strong response - as though this is repugnant.
- PT - Should be part of physical therapy (5)
- OK - Good idea to have (8)

Evaluation:
There was a mix of responses and no consensus.

20. The facility should include an education room with computer terminals for researching questions about health.

Codes and responses:
- EDUC - Anything of educational value is good (14) Additionally, add information on social happenings.
- INAP - Inappropriate - not appropriate for a clinic (3)
- NA - Not an issue, not important (3)

Evaluation:
Preferences are for anything that is of educational value. Some people thought that few could use it, so there should be a library or place for books.

21. Rooms in the facility should be based on a square plan with straight corridors leading to the exam and consultation offices. 22. Rooms in the facility should be based on a circular or wheel-like plan with offices located at the spokes of the wheel.
Codes and responses:

SQ - Preferred (6)

CIR - Circular preferred (11) A majority, but not strong preferences.

NA - No choice - neither is better (5) These said that either could work.

Evaluation:

No preference, but some indication that a radial entry with wings that are laid out rectangular is OK.

23. I prefer to have the choice of an exit that is separate from the entrance.

Codes and responses:

P - Parking and convenience (2) Advantage with separate exit if parking is in the back and entrance is in the front.

NA - no choice - neither is better (1) Most people had an opinion or preference.

OK - Good to have (14) Just for minimizing congestion this is good.

NOT - (4) ...to keep parking at the entrance and exit.

Evaluation:

This is preferred. Basis is to minimize congestion.

24. In your opinion, corridors in this facility should be the width of [number] persons

Codes and responses:

SAF - Safety, accessibility (6) Safety concerns are mainly for accommodating wheelchairs and walkers. Some concern was for installing new equipment.

3,4,5,6 The average was 4.8 which means a hall width of 9-10’ is preferred.

OPP - Oppressive feeling if too narrow (2) Two indicated that a narrow hall will cause an oppressive feeling.

Evaluation:

Comments - width depends on load. The VA had a high load and wider halls are needed. But a width of 9-10’ is preferred.
25. My preference for door knobs is: round or straight-lever.

Codes and responses:

JOI - Straight lever due to joint or muscle use (14) Most people responded as predicted - that the lever type is easier to use.

OTH - Other (6) Several votes said that:
- the use of panic bars instead of levers or knobs would be easier for the elderly to use,
- some people are accustomed to round knobs and anything else would not work,
- some prefer that whatever is used they all should be the same,
- there were comments that door closers should be low pressure or easy to open.

NA - no choice - neither is better (0)

Evaluation:
Strong preference for lever type, but make all of the ones in a building the same.

26. The waiting room lighting that I prefer is:
incandescent, fluorescent, either one.

Codes and responses:

NA - no choice - neither is better (1) Depends on location - incandescent better for reading.

COST - worried about costs (1) One person thought fluorescent is better due to cost savings.

IN - incandescent (4) Because fluorescent lights seemed not bright enough and not good for reading, there is a thought that fluorescent lights are only used to save costs.

FL - fluorescent (17) Good because ceilings are (relatively) high (about 10'). One person said that incandescent lights are depressing.

Evaluation:
Fluorescent lights are preferred.

27. Of this lighting preference, I prefer: overhead, task (table), either one.

Coding:

NEU - Neutral, no choice (1)
OVH - Overhead (19) So people don’t knock them down, practical way to get uniform, bright light coverage. Concern that the elderly might knock them over - almost the vision similar to a cat in a room full of rocking chairs - hard to get around.

TSK - Task (2)

Evaluation:
Overhead lights are preferred.

28. In the patient consultation room I prefer lighting that is: incandescent, fluorescent, either one.

This question was not asked of all interviewees. | Coding:

Design Guidelines

In the next section the preferences that were obtained from the foregoing analysis are compared to “Current Standard/ Recommended Solution” for the designed areas of structure. This table is a modified version of the table in Chapter 3. The second column lists the guidance prior to research, the third column lists the findings after research.

The deviations from the accepted standards are in bold in the third column. Both columns can be considered design guidelines for facilities that support an elderly population, however, where the new findings show a difference the designer must use judgment to select the guideline. (P) indicates that in the study sample there was a preference. (S) indicates a suggested design guide.
Table 2. Current Design Standard Versus Study Preference

<table>
<thead>
<tr>
<th>Designed Areas of Structure</th>
<th>Current Standard/ Recommended Solution</th>
<th>Preference (P) Suggestion (S) Note (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mobility</strong></td>
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<tr>
<td>-Steps (Q6)</td>
<td>ADA - use ramps with handrails and landings. Control changes in elevation of surface</td>
<td>(P) Use of ramps exclusively</td>
</tr>
<tr>
<td>-Inclined (ramps) (Q6)</td>
<td>Steps should be provided as well as ramps for those using a cane or walker. These should also be provided with easily gripped and visually distinctive handrail (Valins, 1993).</td>
<td>(S) Avoid change in elevation at building entrances</td>
</tr>
<tr>
<td>-Sidewalks, (Q6)</td>
<td>At the door set raised thresholds could prove a hazard. Levels on both sides of the front door should therefore be equal (Valins, 1993).</td>
<td>(S) If a ramp is used, be careful to eliminate imperfections in the surface that can hinder use of canes or walkers</td>
</tr>
<tr>
<td>-Location of facility relative to demographics existing hospitals and transportation (Q3, 4, 4a)</td>
<td>Locate near shopping area (Carstens, 1993)</td>
<td>(P) Locate the facility near to a transportation node that serves bus and private vehicle routes.</td>
</tr>
<tr>
<td>-All services in one facility (Q5)</td>
<td>Good to promote continuum of care with all services under one roof or with nearby shopping and commercial areas</td>
<td>(P) Good to have within easy walking or otherwise near and convenient distance.</td>
</tr>
<tr>
<td>Designed Areas of Structure</td>
<td>Current Standard/Recommended Solution</td>
<td>Preference (P) Suggestion (S) Note (N)</td>
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<tr>
<td>-Hardware on doors, to include handles and closers (Q7, Q25)</td>
<td>Door ironmongery should also be easily distinguished and easy to grasp (Valins, 1993). Where possible external doors should not be highly sprung but easy to open (Valins, 1993). ... hidden barriers...problems with floors, sidewalks, doors stairs ramps, can trip up an elderly person who has a slow shuffling tentative gait. Doors can be an obstacle. Hinging systems should require less strength to open - sometimes automatic doors or two-leaf doors are appropriate. Elderly often use walkers, have diminished strength, control, and reach, and may grab household fixtures for support.... manipulation of switches, knobs buttons and controls... devices that respond to the palm or an arm... as lever-type door handles and push button light switches.</td>
<td>(P) Door must always work, be easy to use. Door handles should be lever type, and should be consistent throughout the facility. (S) If pushbars (panic bars) are used, attach a paddle to the end or some indication of where to push. (S) Don’t put too much closer pressure on door. (S) Sliding (pocket and automatic) doors are best on main doorways</td>
</tr>
<tr>
<td>-Bicycle racks (Q9)</td>
<td></td>
<td>(P) Good to provide, but not high priority</td>
</tr>
<tr>
<td>-Exercise facilities (Q19)</td>
<td>Locate facility in mall with exercise center nearby (Symposium on Healthcare Design)</td>
<td>(P) Low priority for facility but OK to have (S) Keep the facility very clean and provide equipment to support the population</td>
</tr>
<tr>
<td>Vision</td>
<td>Ceiling-mounted fluorescent lighting, while economical, can reinforce an institutional</td>
<td>(P) Fluorescent lights are preferred (incandescent alone can be depressing)</td>
</tr>
<tr>
<td>Designed Areas of Structure</td>
<td>Current Standard/ Recommended Solution</td>
<td>Preference (P) Suggestion (S) Note (N)</td>
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<tr>
<td>-Type of artificial lighting in waiting or exam areas (Q26)</td>
<td>feel and should be avoided. Softer wall-mounted lighting should be considered (Valins, 1993). Use warm, bright (diffuse) lighting -Prevention of glare is key. Glare caused by windows at the end of a hallway, a strong light source, of light spilling across a corridor from an open doorway can confuse an elderly person and obscure definition of the space. By considering texture, window location, and diffused light, and by carpeting hallways, we can reduce glare dramatically (Bush-Brown, p.137). Use of canopy (Valins, 1993).</td>
<td>(S) Use mix of lighting. (P) Eliminate reflection and glare at entrances and exits. Use of glass at entrance requires special consideration for this. (S) Not important to have relatively large amounts of glass in entrances. Not necessary to &quot;see in&quot; before entering.</td>
</tr>
<tr>
<td>-Use of glass in doors and windows at entrances (Q7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Canopy to provide shade (Q8)</td>
<td></td>
<td>(P) Use of canopy from door to drop off area is good idea but in Las Vegas area with minimal rain, this is not very important. Could be an area to minimize expense</td>
</tr>
<tr>
<td>-Long Corridors (tend to distort approaching people (100-200 ft) (Howell, p. 10) (Q7, 10, 18) -High vs. low ceilings (Q15)</td>
<td>A path (to apartments) should contain articulation and differentiating cues (Howell, p10). Avoid long halls with strong light at the end (Malkin, p. 121) Provide good view to see ahead Door ironmongery should also be easily distinguished and easy to grasp (Valins, 1993).</td>
<td>(P) Need for corridors with variety and easy to navigate, i.e. there are markers or signs with indications for wayfinding. (P) Average height ceilings (about 12') best (S) Lobbies can have high ceiling but heating and cooling loads need to be a</td>
</tr>
<tr>
<td>Designed Areas of Structure</td>
<td>Current Standard/Recommended Solution</td>
<td>Preference (P)</td>
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<tr>
<td>Nooks, crannies, protrusions, etc. in hallways (can be distracting or confusing) (Q18)</td>
<td>By the use of changes in color and texture, ample warning of any change in level should be clearly indicated (Valins, 1993).</td>
<td>(P) Use of alcoves, nooks, variety. Rounded corners at all turns</td>
</tr>
<tr>
<td>Lighting Systems in long corridors</td>
<td>-Recessed lighting, equidistantly placed</td>
<td></td>
</tr>
<tr>
<td>Visibility of complex images (Q18)</td>
<td>Need high general illumination levels and a lighting design that avoids distractions. Sudden junctures of light and dark should be avoided. Moving from a dim corridor into a bright room, or from the outside into a dark lobby, can cause momentary blindness that obscures the edge of a rug or a step. Give the eye time to adjust; a softly lighted vestibule between the corridor and a bright room, or porch lights that raise the lighting level act as a transition zone. Changes in floor level should be postponed until eyes have had a chance to adjust.</td>
<td></td>
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<tr>
<td>- decreased peripheral vision and lessened ability to discern color differences -The aging eye adjusts to light slowly</td>
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This is related to the research on wayfinding by Passini and others. They say that spatial
<table>
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<tr>
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<th>Preference (P)</th>
<th>Suggestion (S)</th>
<th>Note (N)</th>
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<tbody>
<tr>
<td></td>
<td>orientation is based on ability to form a cognitive map. This map is based on three inter-related processes: decision making, decision execution, and information processing.</td>
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</tbody>
</table>

**Hearing**

- Lighting (Q26, 27)
- Signage, visual alarm systems

- Good lighting required for accurate lip reading (Salmon, p. 11)
- Contrasting colors with strong hues important to differentiate different objects and help with depth perception (Shaw, 1984, p. 18)

- Waiting rooms (Q15, 16, 18, 26)

Provide quiet areas by signage or operation or acoustical means

- Telephones

Should be placed in an acoustically padded alcove, especially for the privacy needed while under stress in a clinic. Pen and pencil should be available with good light and a place to use them in this alcove. YOU ARE HERE maps are helpful in healthcare facility lobbies. Electronic bulletin boards and cablegrams inform patients and visitors about available services such as the location of bank machines the chaplain's telephone number, restaurant locations and menu specials (Malkin, p. 54).

(P) Be consistent in use of door knobs, panic bars, etc.

(P) Use of alcoves and nooks to provide quiet and privacy.

(S) Average height ceilings OK in spite of higher noise reflection (than high ceiling).
<table>
<thead>
<tr>
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<th>Current Standard/ Recommended Solution</th>
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</thead>
<tbody>
<tr>
<td>Central Nervous System and Cognition</td>
<td>-Corridors, entrances, exits, spatial layout of activities. -Layout and orientation (Q21,22,23).</td>
<td>Use layouts and plans that are easy to understand. Building layout can be confusing if signage alone signals specific floors and rooms. Residents with vision problems, perhaps also with decline in some other senses or memory loss, need as many location indicators as possible. Sameness and repetition are the chief sources of disorientation. Similar layouts and a regular pattern of doors give elderly residents no cues to distinguish one room from another. Creating variety in lobbies, corridors and entries helps to identify the spaces. Distinguishing features help: a special space on each floor near the elevator; distinctive furniture; clear signage and color coding.</td>
</tr>
<tr>
<td>-Entrance and exit separate (Q23).</td>
<td>(no recommendation)</td>
<td>(P) Exit that is separate is preferred based on predicted amount of people congestion in entry area.</td>
</tr>
<tr>
<td>-Spatial layouts</td>
<td>Use contrasting colors</td>
<td></td>
</tr>
<tr>
<td>-Numerous nooks, crannies</td>
<td>Can be used as resting areas along path to exam areas</td>
<td></td>
</tr>
<tr>
<td>-Walls, shadows, reflections (Q7, 10 11)</td>
<td>Use of mirrors on walls to see one's gait, posture, movement.</td>
<td>(P) Average width of hallway preferred is 9-10' but must be based on judgment of traffic</td>
</tr>
<tr>
<td>Designed Areas of Structure</td>
<td>Current Standard/Recommended Solution</td>
<td>Preference (P) Suggestion (S) Note (N)</td>
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<tr>
<td>21, 24) Particular attention to scale e.g. huge lobby &amp; vestibule with adjacent small waiting area can be frightening (patient's defenses are already compromised)</td>
<td></td>
<td>supported e.g. gurneys, wheelchairs. (S) Long hallways to be avoided.</td>
</tr>
<tr>
<td>-Exits, areas of isolation or dead ends</td>
<td>Provide easy to see route of escape</td>
<td></td>
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<tr>
<td><strong>Temperature Adaptation</strong></td>
<td></td>
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<tr>
<td>-Indoor climate control -Lobby</td>
<td>&quot;...use of a draught lobby is seen as desirable from the viewpoint of security, heat loss..&quot; (Valins, 1993).</td>
<td>(P) Lobbies with high ceilings - but minimize heat/cool waste</td>
</tr>
<tr>
<td>-Furniture</td>
<td>Use other than vinyl</td>
<td></td>
</tr>
<tr>
<td><strong>Disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Commingled waiting rooms (i.e. with children) (Q12, 14)</td>
<td>Create cloistered waiting areas. Create separate waiting area for elderly.</td>
<td>(P) Provide small areas of seclusion off of main, large area. (S) Some mix of populations OK, a little chaos can be good. (S) Have separate waiting area for children.</td>
</tr>
<tr>
<td>-Ventilation system</td>
<td>Return ducts at floor and baseboard level, use of positive pressures</td>
<td></td>
</tr>
<tr>
<td><strong>Skin Problems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Protection from direct sun (Q8)</td>
<td>Use canopy from front door to drive-up or parking area.</td>
<td>(P) Use of canopy from door to drop off area is good idea but in Las Vegas area with minimal rain, this is not very important. Could be an area to minimize expense</td>
</tr>
<tr>
<td>Designed Areas of Structure</td>
<td>Current Standard/ Recommended Solution</td>
<td>Preference (P) Preference (S) Suggestion (S) Suggestion (N) Note (N)</td>
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<tr>
<td>Foot Problems</td>
<td>Minimize walking distances. “Length of a corridor should be kept to less than 100 feet (Valins, 1993).”</td>
<td></td>
</tr>
<tr>
<td>Nutrition</td>
<td>Create center for education.</td>
<td>(P) Provide room or area to use educational material (S) Books might be better than computers since many elderly do not know how to use computers.</td>
</tr>
<tr>
<td>Mental Health</td>
<td>Post objects that will not create anxiety (Valins, 1993).</td>
<td>(P) Pictures that show nature scenes or that give a “home-like” atmosphere (S) Wallhangings with educational material or notices of social events</td>
</tr>
<tr>
<td></td>
<td>Security of reception desk with barriers to general view of others (Valins, 1993).</td>
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<tr>
<td></td>
<td>Separate areas for recovery until release</td>
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CHAPTER 5
DISCUSSION

The use of qualitative data raises issues that question the reliability of the research. These issues are (1) distinct possibility of researcher bias, (2) the adequacy of sampling, (3) the generality of the findings and the credibility of conclusions.

1. **Researcher Bias.** The use of coding, finding common words, phrases and ideas helps to eliminate bias. The transcribed, taped interviews were analyzed verbatim. No words of the researcher were used in the coding. For a structured interview, the technique tends to bring out strictly the words and ideas of the interviewee.

   Another source of bias might be the interviewer's interjections to keep the interviewee on track or to help explain the meaning of the question. That is, the interviewer could lead the interviewee to some one answer. This could occur, but in the case of the elderly - leading them to a conclusion that was not their choice was unlikely. They were very sure of themselves and had strong opinions. And besides this the interviewer was the evaluator and the researcher. The clear objective was to find truth.

2. **The adequacy of sampling.** The texts which explain the rules of qualitative analysis give leeway to the opinion of the investigator as to how much is enough. If the responses to the questions obviously start to follow a pattern and many of the same suggestions and insights
are repeated, it is apparent that any more questioning will not make a significant difference. In this paper one interviewer conducted all of the interviews, so it was readily apparent that all of the preferences were well tested and that more interviews would not produce more insight.

3. The Generality of the Findings and the Credibility of Conclusions.
The credibility of the findings (the guidelines) will be judged by each architect who chooses to use them in design. The fact that the interviewer can reiterate or ask for more information about a particular response makes the qualitative technique very credible and insures credibility from the interviewee. Generality also falls on the judgment of the architect. The responses were obviously influenced by the building where the interviews were conducted and by the particular sample of elderly people. All but four of the group consisted of veterans of the armed services who received injuries or disabilities that qualified them for this care. All of the interviewees were ambulatory. Factors about the building which could influence were the business of the facility, the crowded conditions in some cases and existing dimensions, treatments, lighting and all other aspects of that particular building. However these facts can also work to make the data better. There was a level playing field. All people used the same building for reference. So comparisons were often to this as a standard. This can easily be argued to be an advantage over the interviewees simply filling out a questionnaire because in that case there is not a standard, not just one obvious basis. The responses in that case would be harder to compare.
Other items which might affect the findings:

The study participants were age 65 or older. Of this group, the physiological condition of each person varied. The thought that these people can answer for the “well-elderly” is perhaps loose and assumes that they are all feeling the effects of aging. An advantage with working with this group is that this group of people seem to be free in their opinions and to add more information or opinion than asked. This makes for a rich information gathering experience. In all cases the interviewees seemed cheerful, positive and sincerely wanted to offer their opinion.

Coding was done several weeks after the interviews. Most of the texts suggest doing coding while still in the interview process. These texts were right. Having a fresh memory for the coding gives a better reliability of recalling the “flavor” of the interview.

The following is a discussion of the preferences that were at variance with the standard design theory or guideline.

1. (P) Radial at the main desk or information area then square plan beyond. (S) Rectangular or radial could work as long as signage and wayfinding aspects are optimized. This refers to the choice of a layout that is either radial or rectangular. There is an even split in preference. Some of the comments are that the radial plan with smaller branches based on a rectangular grid is allright. Only a few staff were interviewed. Their preference is that the hallways need to be visible from the nurse’s station or reception area so that they can see whether patients are having trouble.
2. **(P) Use of ramps exclusively.** The design standard is to provide steps and ADA compliance requirement is to provide ramps in addition to steps, so this preference is probably influenced by pervasive thought that ramps must be in existence around areas where people are in wheel chairs. The design standard for steps though is good because many people with canes and walkers have a difficult time with the continuous rise of a ramp.

3. **(P) Locate the facility near to a transportation node that serves bus and private vehicle routes.** This is in contradiction to the more popular thought of locating within a shopping area, though this may be a moot point as shopping centers usually create a node. Shopping centers are located for a variety of reasons: convenience, demographics, near a node. But the preference here is that it should be convenient for public transportation.

4. **(P) Locate near to a hospital if choice is between population center and hospital.** This preference was not strong. But the preference is simply related to the convenience of other medical services, and having the convenience of a hospital nearby in case of emergency.

5. **(P) Low priority for facility but OK to have.** This refers to the clinic having an exercise facility. This might be a issue of generation too. The younger generation is accustomed to seeing ads on TV with people exercising and most have been to schools with programs for exercise. But concerns were for sanitation, having enough machines to go around.

6. **(P) Fluorescent lights are preferred (incandescent alone can be depressing)** Contrary to this researcher’s belief, the
fluorescent lights were chosen as best for their perceived brightness, economy and quality. A few people thought incandescent lights were better because they thought incandescent was better for the eyes. But one person thought the incandescent lights seemed depressing when he saw an alcove that was lit with incandescent spotlights.

7. (P) Eliminate reflection and glare at entrances and exits. Use of glass at entrance requires special consideration for this. (S) Not important to have relatively large amounts of glass in entrances. Not necessary to “see in” before entering. This relates to the popular design of entrances with wide expanses of glass. There was no preference for glass at the entrances, but the caution was for glare and reflection.

8. (P) Average height ceilings (about 12’) best. (P) Lobbies with high ceilings - but minimize heat/cool waste. There was much concern for conservation, both of heating and cooling and the perceived expense of higher ceilings. This is a case where the prudence of the designer is required to decide whether to follow.

9. (P) Be consistent in use of door knobs, panic bars, etc. This is mentioned because there aren’t precautions in the popular design guides or standards about consistency in hardware.

10. (P) Exit that is separate is preferred based on predicted amount of people causing congestion in entry area. Most comments alluded to minimizing congestion and interference. There were no comments about one of the question’s intentions - to see if the privacy of having a separate exit is important. The impression was that the need for privacy which is mentioned often in the design literature for reception areas was not a requirement and not essential
for this group of people. However it just makes sense that privacy be insured in the layout of these areas.

11. (S) Some mix of populations OK, a little chaos can be good. This response was for the size and layout of waiting areas. Some people liked to do people watching and liked the noise and chaos whereas others didn’t. A good design would provide for both. The idea of a separate waiting area for children was mentioned, but the idea was for the sake of the children more than the sake of the adults.

In conclusion, the study produced a few results that were contrary to prevalent rules for design but in most cases simply reinforced the standards or confirmed common sense. The other productive discovery was that the literature doesn’t cover much about the preferences of the aging human. We are going to live longer, but we are going to be living in a body that reacts much differently to a certain range of stimuli than the typical young human’s body. And, the number of us who will become part of that older population will be proportionately very large and will continue to grow over the next fifty years. This creates opportunities and moral obligations for architects to acknowledge this large client body. Paraphrasing Siddartha, the architect can enhance the pleasures and delights of life in youth and in old age.
Health Care Facility Design Questionnaire

To the Participant:

This interview is part of my research in health care facility design at the University of Nevada, Las Vegas. It is part of the requirements for the Master of Architecture Degree. The goal of the research is to determine the preferences and special needs of well-elderly patients who use these facilities.

Your participation in this interview has the potential to benefit the future design of ambulatory healthcare facilities. I will use the attached questionnaire as a guide in the interview. Although the printed responses are short all of your comments will be valuable for the research.

A tape recording of this interview will be made with your permission. All tapes will be transcribed. All comments and suggestions will be analyzed to determine general preferences for health facility design. Your responses will be kept confidential.

For information or questions regarding this research, you may contact me at the University of Las Vegas, phone number 895-3031. For questions regarding the rights of human subject research, please contact the UNLV Office of Sponsored programs at 895-1357.

Your participation is voluntary and you may withdraw from this study at any time.

I thank you for your time and comments.

STEWART C. CLUCK
Graduate Student in Architecture
University of Nevada, Las Vegas
1. **Personal Information.**

Approx. age of interviewee

<table>
<thead>
<tr>
<th></th>
<th>65 - 74</th>
<th>75 - 84</th>
<th>85 - 94</th>
<th>95 or older</th>
</tr>
</thead>
</table>

Gender

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>F</th>
</tr>
</thead>
</table>

Former and current occupations:

2. **Interviewer opinion of interviewee’s health:**

<table>
<thead>
<tr>
<th>Category</th>
<th>POOR</th>
<th>FAIR</th>
<th>GOOD</th>
<th>EXCELLENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Mobility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Visual Acuity (with glasses if you typically wear them)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Hearing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Resistance to Glare</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Stamina</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Strength</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Condition of joint (arthritis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please circle the best answer for the following questions:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Disagree Somewhat</th>
<th>No Opinion</th>
<th>Agree Somewhat</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. The Center should be located near a shopping area.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4. The Center should be located near a hospital.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4a. Location of the Center is not important.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>5. The Center should include all services for health such as ophthalmology and dentistry.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>6. The main entrance, if higher than the sidewalk, should not have steps but should have a ramp instead.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>6a. Steps are of no consequence at the entrance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>7. The main entrance door should have as much glass as possible to allow sight into the lobby and reception area.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8. The main entrance should have a cover that extends as much as possible into the parking area and drop</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
9. There should be an area for parking and securing bicycles.

10. The receptionist should be located within five steps of the entrance.

11. The reception area should be out of hearing distance of the rest of the waiting patients.

12. The waiting area should be one large room.

13. The waiting area should consist of several rooms, but should have at least one room for each doctor's patients.

14. There should be a separate waiting area that is available for parents with children.

15. The waiting area should have ceilings that are at least twice as high as I am tall.

16. Ceiling height in waiting areas is not important.
17. Wallhangings in the waiting area should not depict illustrations of historical medical events.

18. A corridor with straight smooth walls (i.e. no recesses for doors or water fountains) is a good design.

19. The facility should include an exercise room with showers and locker room available.

20. The facility should include an education room with computer terminals for researching questions about health.

21. Rooms in the facility should be based on a square plan with straight corridors leading to the exam and consultation offices.

22. Rooms in the facility should be based on a circular or wheel-like plan with offices located at the spokes of the wheel.

23. I prefer to have the choice of an exit
that is separate from
the entrance.

In the following section, circle the best choice.

24. In your opinion, corridors in this facility should be the width of _______ persons.
   3    4    5    6

25. My preference for door knobs is: round or straight-lever

26. The waiting room lighting that I prefer is: incandescent fluorescent either one

27. Of this lighting preference, I prefer: overhead task (table) either one

28. In the patient consultation room I prefer lighting that is: incandescent fluorescent either one
APPENDIX II

PROTOCOL FORM

FOR RESEARCH

INVOLVING HUMAN SUBJECTS
DATE: April 8, 1996

TO: Stewart C. Cluck (ARC)  
M/S 4018

FROM: Dr. William E. Schulze, Director  
Office of Sponsored Programs (X1357)

RE: Status of Human Subject Protocol Entitled:  
"A Study of the Preferences of the Elderly in Health Care  
Facility Design"

OSP #721s0496-002e

The protocol for the project referenced above has been reviewed by the Office of Sponsored Programs and it has been determined that it meets the criteria for exemption from full review by the UNLV human subjects Institutional Review Board. Except for any required conditions or modifications noted below, this protocol is approved for a period of one year from the date of this notification, and work on the project may proceed.

Should the use of human subjects described in this protocol continue beyond a year from the date of this notification, it will be necessary to request an extension.

cc: M. Alcorn (ARC-4018)  
OSP File
DESCRIPTION OF STUDY:

1. **SUBJECTS:** Investigator has discretion to choose subjects.

2. **PURPOSE METHODS, PROCEDURES:** The study will determine preferences of the elderly for selected aspects in the design of ambulatory health care facilities. The method will be to conduct a structured interview using a series of written questions for each subject. The interviews will be tape-recorded and later transcribed for use in a qualitative analysis of the text. The procedure is to simply approach a person in the waiting areas of the VA Ambulatory Medical Center, make introductions, and ask the person if s/he will participate in the interview.

3. **RISKS:** Social risks might come from the fact that the people selected are selected because they are elderly. This might create a bad connotation for the people who do not wish to be considered elderly.

4. **BENEFITS:** The knowledge gained from the insights, suggestions and evaluation of this group of people who have had much more life experience than many of us can be beneficial to the future design of health care facilities.

5. **RISK-BENEFIT RATIO:** The risks should be negligible as the interview can be stopped if the investigator sees that there is resentment or hostility.

6. **COSTS TO SUBJECTS:** None.

7. **INFORMED CONSENT:** See cover letter on the attached questionnaire.

NOTE: The interviews at the Las Vegas Veterans Administration Ambulatory Medical Clinic were coordinated with and permitted by the Director of Public Relations, Mr. Tony Denagin.
BIBLIOGRAPHY


Stevens, Rosemary. History of the American Hospital System. 1989


