A PILOT TESTING OF ERHAP:
ELDERLY RESIDENT HOUSING ASSESSMENT PROGRAM

A Thesis
Presented to
the Faculty of the Graduate School
University of Missouri-Columbia

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

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July 1987
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ABSTRACT
This study is part of a larger ongoing line of inquiry to develop information useful in promoting the independence of elderly individuals in their homes. This study utilizes an artificial intelligence system to develop an accurate evaluation tool used to evaluate the homes of elderly individuals.

The specific purpose of the current pilot test is to determine the accuracy at which ERHAP identifies inadequacies in the homes of elderly individuals. A sample of fifty elderly individuals 65 years of age and older participated in the study. The elderly household member was interviewed by the researcher using the ERHAP questionnaire. ERHAP simultaneously examines the functional capabilities of the elderly individual and the environment in which the elderly individual lives.
The undersigned, appointed by the Dean of the Graduate Faculty, have examined a thesis entitled

"The Pilot Testing of ERHAP (Elderly Residential Home Assessment Program)."

presented by Susan M. Ray

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and hereby certify that in their opinion it is worthy of acceptance.

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ACKNOWLEDGMENTS

This thesis is dedicated to my parents, Edwin and Mary Ray who have supported me throughout my educational endeavors. To my thesis committee, Ruth Brent, Ronald Phillips, and Edward Brent, I owe a great debt of gratitude for helping me in my professional growth and for providing support during the development of my thesis. Also a note of thanks to Anna Catherine Yost and Carolyn Brown for providing access to the participants of my study.

A special note of thanks to Joan Brock for being a sounding block during the developmental stages of my thesis.
Chapter I

Introduction

1.1 Background

There exists a severe problem of housing inadequacies for many elderly who are also poor and in ill health. While the literature indicates that the home environment promotes independence for elderly, there are few mechanisms and incentives to improve housing quality so that an elderly individual may stay in his/her own home as long as possible. One step towards enhancing the quality of elderly housing is to provide housing inspections and recommendations for adaptive purposes. The goal of this research project is to promote, develop, and analyze a method by which to enhance the quality of elderly housing.

"Tournier (1972) has written ...at every stage in our lives it is important that our dwelling should suit the sort of life we live in it. Unfortunately many find themselves living in dwellings which fail to meet their needs as they become infirm" (Mortimer, 1982, p. 15). Many elderly persons' homes exhibit the phenomenon of "aging-in-place." "Aging-in-place" refers to an elderly person's home falling into disrepair because of dwindling income or changes in the composition of the
neighborhood which may leave the elderly individual isolated from society (McPherson, 1983). The elderly, due to health problems, are often living in homes which are increasingly unsuitable as the years progress.

The housing needs for any person include warmth, security, convenience, and adaptability (Bennett, 1977). The needs are especially critical for the vulnerable elder who may spend virtually all his time within this environment. Often the environmental atmosphere in which the activities take place within the home are more important than the square footage or the configuration of the rooms of the dwelling.

Riesenfield (1972) found that elderly persons prefer to remain in their own homes, but that there is also a lack of information in converting or modifying existing homes for the needs of the elderly. Because 7.7 million elderly persons live alone, a vast majority of the elderly live in private housing (Urban Land Institute, 1983). This demonstrates some degree of functional independence as well as a personal preference to remain in their own homes (Urban Land Institute, 1983). Therefore elderly individual should be encouraged to remain in his/her home through modification and adaptation of the interior.

1.2. Research Objective

The overall objective of this research is to develop information which will be useful in promoting independence of the elderly individual and to increase
their housing options by delaying institutionalization and enhancing the viability of staying in their own home as long as possible.

The specific purpose of this research is to determine whether a computerized artificial intelligence system is a more accurate evaluation tool than the experience of designers in assessing housing and interior needs of the elderly. Recommendations from experienced environmental designers will be compared with recommendations from the (ERHAP) Elderly Resident Home Assessment Program in order to determine which assessment provides more consistently accurate evaluations and recommendations in solving housing and design problems of the elderly individual.

By implementing ERHAP, it is anticipated that healthcare providers and others useful in the improvement of elderly home environments may disseminate knowledge. An expert system, such as ERHAP, could aid an advocate for an elderly person (or the elderly himself) in improving housing adequacy.

1.3 Conceptual Framework

There are two overriding concepts which will be considered in housing the elderly. First, the housing situation is a dynamic process. Second, there is a hierarchy indicating a priority of housing needs. These two concepts are responsible for development of the ERHAP program.
1.3.1. Dynamic Environment and Health Needs

The environment in which individuals live is dynamic. As a person ages, there are numerous physical (e.g. loss of hearing and sight) and psychological health changes which compound the problem of deteriorating housing. Within the field of interior design, there is a growing awareness of the aging population and the lack of knowledge available in understanding the changing needs of the elderly. Ideally, these needs could be met by a computer system which could provide design recommendations and simultaneously consider health and housing needs of the elderly individual. If design recommendations concerned with housing inadequacies could be evaluated on a continuous basis, then the computer program could meet the dynamic needs of the elderly and their environment.

1.3.2. Hierarchy of Needs

Both Bennett (1977) and Maslow (1954) have defined the needs of individuals by using hierarchies. Maslow's hierarchy of needs is comprised of five levels, ranging from the lowest level of physiological needs to the highest level of self actualization. Maslows's hierarchy must be met at the lowest and most fundamental levels before proceeding to the next levels of need (Maslow, 1954). For example, physiological needs must be met before the safety needs of the individual are dealt with.
Bennett (1977) developed a design criteria hierarchy which has four design criteria levels, the lowest level being safety and the highest level being aesthetics. Bennett's hierarchy is similar to Maslow's hierarchy in that each criterion must be fulfilled before proceeding to the next design criteria.

Adapting the Maslow and Bennett model Brent, Ray, Phillips, and Brent (1986) developed a model (see figure 1.1) that illustrates a hierarchy of primary needs of safety, function, and comfort.

1.4. Specific Objectives

The proposed research will document the utility of ERHAP in assessing the environmental needs of the elderly.

The research will be a descriptive comparative analysis, rather than hypothesis testing. This analysis will be implemented to determine the differences and similarities between ERHAP and the panel of design experts in identifying safety, function, and comfort problems in the homes of elderly residents.

Research questions which will be addressed are 1) What problems did the computer identify that the panel of experts did not identify? 2) What problems did the panel of experts identify that the computer did not identify? 3) What problems did ERHAP and the panel of experts both identify?
CONCEPTUAL MODEL

NEEDS
comfort

function

safety

INTERIOR DESIGN CONCERNS
flooring
stairs
lighting
doors
communications

RESIDENTIAL ROOM AREAS
bedroom

kitchen

living room

bathroom


FIGURE 1.1
Chapter II

Review of Related Research

2.1. Aging and the Environment

Three primary issues will be discussed in the review of the aging and environment research: 1) vulnerability and dependence, 2) housing inadequacies; and 3) viable tools useful in assessing the housing needs of the elderly population. These three issues were selected by the researcher to demonstrate that there is a need for a repeatative method to evaluate and assess an elderly individual's home.

2.1.1. Vulnerability and Dependence

The elderly population may be considered highly vulnerable to their environment. In other words, the environment has a greater impact (either positive or negative) on the elderly because of health, housing, and socioeconomic problems. For example the diversity of problems exist as one engages in self-maintenance tasks such as dressing or cooking for oneself paralleled with declining health status and financial resources. To compensate for these disabilites, an environment that is safe, functional, and comfortable can have a positive impact. These environments are therapeutic environmental milieus.

The extent of individual vulnerability may be related to the level of dependence one has during the
life cycle. Cantor (1980) explains:

From the life cycle perspective there are two significant stages in which the culture more often accepts dependency needs--at the beginning and at the end. It is therefore considered appropriate for infants and children to be nurtured by the parents and significant others as they are socialized into a culture. But even with this nurture, the emphasis is on independence and self-mastery. And, again, as persons grow older and more frail society looks with greater tolerance on their needs for assistance and support. In the case of old age, however, as the balance shifts from independence to dependence, the potential for normative conflicts increases. Thus, an older person is caught in a dilemma: adherence to deeply rooted cultural norms of self-sufficiency and independence characteristics of adult years on the one hand and concrete needs for assistance on the other, as health, physical strength, mobility, and other economic resources decline (p. 131-132).

The impact of the environment is more of an issue than heredity in improving the quality of life for individuals at the end of the life cycle (Barrowclough and Pinel, 1984). Since heredity cannot be as easily manipulated as the environment, an argument can be made to emphasize environmental factors. With improvements made in environments, the elderly individual has an increased capacity to structure and adapts to an environment which could offer restorative potential for the elderly individual (Lindsey and Hughes, 1981).

The elderly individual is typically dependent upon
his/her environment at various levels. Independence, however, is enhanced if the elderly individual can remain in the community and in his or her own private dwelling. Cantor (1980) states that elderly individuals are fiercely independent and desire to manage on their own, and an elderly individual's independence should not be threatened because of declining health status, etc. While housing can provide and promote high levels of independence, some say that it can also destroy a person's independence, if their choices are limited. Kaplan and Kaplan (1982) argue that an individual actively seeks preferable environments and will attempt to maintain and improve these environments. Additionally, they argue that all individuals search for stimulating and challenging situations in their environment, and when the elder has a choice possibilities, his/her feelings of self-worth and independence are enhanced. Cantor (1980) further stated that "...independent living for older people is impossible without adequate income, health services and decent housing (p. 142)."

There are several theoritical models which are concerned with vulnerable elderly individuals and their environment. Two models to be discussed here are the competence and environmental press model (Murray, 1938; Lawton, 1972, 1970; Helson, 1964) and the Person Environment Congruence Model (Kahana, 1982).

2.1.1.1. Competence and Environmental Models

Murray (1938) developed the competence and
environmental press model to predict levels of elderly derivation. Murray defined competence as functional and psychological characteristics exhibited by the individual. Environmental press (Murray, 1938) is defined as environmental qualities which demand something of the individual. The behavior of the individual is a result of the functional capabilities of the individual and the individual's interaction to his/her environment. In other words, an elderly individual's behavior will be determined by the characteristics exhibited by the individual and the demand that the environment places on these characteristics.

Helson (1964) proposed another perspective of the competence and environmental press model. Helson stated that a neutral point could be reached between environmental press and competence. This neutral point is called the adaptation level (AL). At AL there is a positive effect in the behavior of the individual. The individual is receiving an adequate amount of stimulation (environmental press) to meet the level of competence that the individual exhibits. Each person can experience environmental press and establish an adaptation level. The elderly population exhibits lower competence levels and is unable to tolerate or adapt to high degrees of environmental press.
Lawton (1970) defined the elderly individual's inability to tolerate environmental press as the "environmental docility hypothesis."

...the individual is more susceptible to environmental influence as his competence diminishes. According to this hypothesis, people of higher competence should be able to tolerate greater diversity; those of lowered competence (poor health, low morale, involuntary isolation) perhaps require a more homogeneous environment (Lawton, 1970, p. 40).

Lawton (1972) also considered the importance of the competence and environmental press model. He defined competence as the upper limits of capacity by which an individual can function in the areas of biological health, sensation-perception, motor coordination, and cognition. Lawton went a step further than Murray by stating the behavior of a vulnerable elderly individual, at any level of competence and faced with an environmental press, is likely to exhibit signs of adapting or maladapting to the environment (Lawton, 1972).

2.1.1.2. Person Environment Congruence Model

Kahana developed the congruence model of person-environment fit. This perspective describes behavior as the function of the relationship between the person and his environment (Kahana, 1982). The congruence model suggests that individuals with certain needs will seek and find environments that are congruent with their needs. If the individual does not have a choice there is
a result of high stress levels. When an elderly individual is refused the option of selecting an environment, stress and discomfort will occur.

Consistant with Kaplan & Kaplan (1982) the congruence model, suggest that individuals seek environments which are healthy and supportive of their needs. When an environment does not fulfill the needs of the individual, negative attributes occur in the behavior of the individual.

2.1.2. Housing Inadequacies

The second issue to be discussed as a part of aging and the environment is housing inadequacies. Housing is often inadequate for the aging members of our society. The environment and the more ablebodied members of our society are often unable to adjust to the changing needs of the elderly individual. The environment often falls short of meeting the changing physical and psychological needs of the elderly individual. Government programs provide assistance which is often insufficient and incapable of adequately responding to such a diverse and large population as the elderly (Mayer and Oslon, 1981). The major limitation of federal housing programs is that, unlike social security or medicare, housing assistance is not an entitlement.

2.1.2.1. Dynamic Environment

The ecological environmental perspective views the
environment as being dynamic. Irwin Altman (1975) offers this ecological perspective as 1) environment and behavior are closely intertwined, 2) people-environment relations are best viewed as an ecological system, with mutual and dual impact between individuals and the environment, 3) people-environment relationships are dynamic, and 4) people-environment relations occur at several levels of behavioral functioning and as a coherent system. For example, housing inadequacies may exist because there is not a static fit between the individual and the environment. Fit between the individual refers to an individual's capabilities and the level at which these capabilities are met by the environment. Housing inadequacies may occur because of deteriorating physical capabilities of an individual or because of declining socioeconomical constraints.

The aging individual is often faced with a new environment or with a modified existing environment. Ultimately, the individual must reorder his/her "life space" (Smith, 1977), or environment in which he/she has lived for several years and is familiar. If, however, the elderly individual can stay in his current environment and adaptations can be made, he/she is permitted to maintain self-hold as well as a sense of identity. The elderly individual often feels he/she is losing control if he is forced to move to a new environment, he also loses his sense of stability and identity (Smith, 1977; Kaplan and Kaplan,
Inman and Duffus (1984/85) found as the elderly individual's life becomes more limited, the environment will determine the elderly individual's ability to cope with fundamental needs of independence, security, and interaction with others.

Struyk (1984/85) found that most elderly individuals with mild impairments wish to remain in the community rather than be admitted to a health care facility. Therefore, environmental changes are often mandatory when the elderly individual becomes impaired. Homes of the elderly individuals often have many environmental hazards, including unstable furniture, frayed carpets, and poor lighting. Close to one-third of those age 65 and older living at home, suffer a fall each year. As a result of these disabilities, elderly individuals often lose their mobility not to mention their self-confidence. "Awareness of these factors can help prevent morbidity and mortality in such settings (Kane, Ousland, and Abrass, 1984, p. 141)."

As the elderly person's environment changes, dwelling-use problems often result, meaning the elderly individual can no longer physically function within the existing parameters of his or her living environment. For example, an elderly individual may have a shower which is large enough to accommodate a person in a wheel chair but the shower has a two inch stepdown, thus the elderly individual is unable to leave the shower once he enters it.
Limitations of such activities may mean the elderly individual is unable to benefit from the full potential of their dwelling.

Support services for individuals suffering from mild impairments can be reduced by various changes to the dwelling. One such change might include the addition of grab bars in the bathroom or ramps at the entrance/exit points of the dwelling (Struyk, 1984/85; Raschko, 1982; Paralyzed Veterans of America).

Elderly individuals should not be isolated in environments that hamper rather than contribute to their functional capabilities. Environments for the elderly should be designed to offer challenges to the individual; environments that are supportive and compensating often stifle the functional capabilities of the elderly individual. There seems to be a large gap between supportive and compensating environments and environments which offer little or no support. Designs for the elderly should promote and facilitate self-sufficiency, factors often lacking in the current environments of the elderly (Schwartz, 1975).

Struyk (1981) offers a conceptual model to develop an understanding of housing and environmental inadequacies including three measures: 1) dwelling condition, 2) housing budget allowance, and 3) satisfaction. He explains these measures as follows:

...the dwelling condition, as represented
by the presence or absence of a handful of key attributes [i.e. functional plumbing in the bathroom, refrigerator is in good working order]; the fraction of income spent on housing (sometimes called the housing expense burden); and the degree of satisfaction expressed with conditions in the neighborhood. Hence we ignore the potentially important mismatch problem, in which a unit may meet the physical standards but not be appropriate for a person— for example, the frail elderly may have a serious problem negotiating steps in an otherwise suitable unit. Judgements about potential private or public developments are judged by their impact on these measures and on their effect on the availability of housing alternatives (p. 514).

Despite economic concerns and inadequate housing many elderly individuals continue to remain in their private dwellings even though the environment in which the individual is living may be deteriorating, and the elderly person may be on a fixed or low income. Federal housing and voluntary organizations have made only a slight contribution to improving the housing inadequacies for the elderly (Storey, 1983; Bornat, Phillipson, and Ward, 1985). Bornat, Phillipson, and Ward (1985) found the three major expenditures facing the elderly homeowner deal with adaptations, heating, and insulation. Some housing maintenance costs, such as exterior painting, refroofing, and interior decoration, may be anticipated; whereas, other repairs, such as new plumbing and heating systems, often come unexpectedly. Many, if not most, large repair jobs exceed the elderly individual's income (Bornat, Phillipson, and Ward, 1985), not to mention the
need exhibited by most to make some adaptations to their home suitable to their particular need.

Repairs and/or adaptations may be needed for an elderly individual to continue to live in his dwelling. If an incongruence between the environment and the person exists, the likelihood of functional independence is reduced. The elderly individual may gradually disengage from any challenge the environment offers, thus rejecting the notion of recouping losses caused by the impairment. Informal (family members, friends) and formal services (Meals-on-Wheels, visiting nursing association) begin to perform daily activities for the elderly individual to compensate for the loss of functional independence (Soldo, 1981).

To be successful, it is imperative elderly housing meet the needs of a wide, heterogeneous population. By providing a wide range of alternatives in housing and in living arrangements, the elder's environment can support a diverse set of functional and social activities. It is important to remember that each elderly individual is unique, and his requirements are unique as well (Shuman, 1979).

2.1.2.2. Housing Programs

Housing programs and services for the aging should not be viewed in isolation from the community and the society. Housing for the elderly should provide networks
rather than isolated islands cut off from the community (Shuman, 1979). Jacobs (1985) questioned the ways by which housing adequacy is measured. One way is to measure the characteristics of homes and compare them with the professional standards of adequacy. The second approach is to assess how the elderly think and how they make their judgements concerning their housing.

Elderly individuals often lack the information necessary in obtaining housing assistance—others are often too proud to ask for help. The elderly must receive highly personalized attention in outreach programs, so that he/she can understand the availability of repair work and helpful services (Mayers and Oslon, 1981).

Housing programs and services are often based on guidelines or formulas set forth by the Federal Government. Mayer and Oslon (1981) explored various federal programs which targeted the low income elderly. Housing needs were defined as follows:

1) households whose home have substantial quality deficiencies—measures major physical inadequacies, ones that some homeowners may be able to correct with their own resources, 2) households who had both housing quality deficiencies and limited financial means [income of less than $6000]—identifies homemakers who have repairs and improvements to make and very likely are more systematically in need of outside aid to do so (p. 313).

They found no single standard to measure housing inadequacies—for either aging populations or for other
populations. Housing adequacy may also be defined by culture, time period, and location. The annual housing survey utilizes the indicators described in Table 1 to identify housing inadequacies.

TABLE 2.1

INDICATORS OF HOUSING INADEQUACY
from Mayer and Olson (1981, p. 313)

An inadequate unit has an inadequacy in any one of the following systems:

1. Kitchen-inadequate if any of the following components are inoperable or missing: a sink with piped water, a refrigerator, a range or cookstove.

2. Water-inadequate in any of the following components are inoperable or missing: hot and cold piped water; a flush toilet; a bathtub/shower; or a sewage disposal system which does not use chemical toilets, privies, or facilities in another building.

3. Heat system-inadequate if it uses, as a primary heat source, unvented room heaters, fireplace, stoves, or portable heaters. Also a heating system is inadequate if there are rooms without heat sources which require the use of additional heating equipment or if inadequate heat results in the closure of one or more rooms.

4. Electric-inadequate if any room is without a working plug or outlet or has unconcealed wiring. An electrical system is also inadequate if there have been two or more disruptions in service due to a blown fuse or tripped circuit breaker in the last 90 days.

5. Structure-dwelling inadequate if the roof leaks or more than one of the following are present: peeling paint or plaster, holes in floors, or open cracks or holes in walls or ceilings.
Struyk (1981) developed a list of indicators of housing inadequacy:

1. plumbing: unit lacks either complete plumbing facilities or household must share their use
2. kitchen: unit either lacks a complete kitchen or household must share its use
3. sewage: one or more of the following three services was unavailable or completely unusable for six or more hours at least three times during the past ninety days: (a) running water, (b) sewage system, (c) toilet
4. heat: the heating system was completely unusable for six or more hours at least three time during the past winter
5. maintenance: two or more of the following four conditions exist: (a) leaking roof, (b) substantial cracks or holes in walls and ceilings, (c) holes in floors, (d) broken plaster or peeling paint in areas larger than one square foot (p. 517).

Mayer and Oslon (1981) found that the low income elderly have the highest percentage of housing inadequacies. When low income is compounded with housing inadequacies, elderly individuals have a greater need for assistance. They also found that rural elderly even more so than the urban elderly suffer from housing inadequacies (Mayer and Oslon, 1981).

What variables in the environment can influence the elderly individual as deficits continue to grow? Currently there is no available research that can describe person and environmental relationships in terms of long-range effects. Designs for the elderly will have immediate and long-range effects on the elderly individual whether they
are appropriate or inappropriate. Thus, designers will more than likely contribute to the adequate, good, or ill health of the elderly (Schwartz, 1975).

2.1.3. Assessments

The last issue in the discussion of aging and the environment is the availability of viable tools for assessing the environmental needs of the elderly. The ability to identify environmental supports needed to maintain activity in the community may be the critical difference between enabling an elderly individual to remain in their home or being institutionalized (Kane, Ouslander, and Abrass, 1984). These environmental supports can be identified through the use of assessment tools.

There are many assessment tools available for measuring the physical status of an elderly individual as well as physical functioning capabilities (Mangen and Peterson, 1984; Instruments for Measuring Nursing Practice and other Health Care Variables, 1979; Kane, Ouslander, and Abrass, 1984; Nasar and Farokhpay, 1985). Because of their application similarity to the ERHAP assessment, the following assessments will be briefly discussed: Activities of Daily Living (Lawton, 1972), Measures of Environment Fit (Kahana, 1973), the Functional Life Scale (Sarno, 1973), and the OARS Multi Dimensional Functional Assessment Questionnaire. These
assessments or measuring tools are often, if not always, viewed in isolation from the housing environment. There is a dearth of similar scales or tools to comprehensively measure the functional capabilities of elderly individuals living in their homes.

Lawton's (1972) Activities of Daily Living scale does not include how the person can interact with his environment. An assessment or scale of measurement is needed that will measure the quality of the home in relation to the health and income status of the elderly individual. Lawton's scale measures only the functional capacities of the individual.

Another elderly functional assessment approach was developed by Kahana (1973) entitled the "Measures of Person-Environment Fit." Environmental fit is the congruence between environmental characteristics of a residence and the personal characteristics of the older person living in the residence. Congruence is determined for the environment and the person by subjective perception of an observer or objective perception by the older person himself. Environmental and personal components which are assessed for congruence include activity-stimulation, independence, privacy, and changeability versus sameness.

Sarno, Sarno, and Levita (1973) developed the Functional Life Scale (FLS). The FLS was designed to measure the success or failure rehabilitation has on a
person who is suffering some level of disability and to
determine what capacities a person possesses to
function in daily living. The scale measures five
elements and four qualities of performance. The five
elements include cognition, activities of daily living,
activities in the home, outside activities, and social
interaction. The four elements include self-initiation,
frequency, speed, and overall efficiency.

Another functional assessment method is the "OARS
Multi Dimensional Functional Assessment Questionnaire
(OMFAQ)." This questionnaire was developed by the Center
for the Study of Aging and Human Development (1975) and
provides a systematic, multi-dimensional quantitative
evaluation of a person's functional status and service
needs. The goal of this questionnaire is to achieve a
reliable/valid practical assessment methodology which
would be applicable to individuals and populations alike.
The questionnaire is composed of five correlated
measurement dimensions: social resources, economic
resources, physical health, mental health, and the
capacity of self-maintenance. The instrument, initially
designed for an older population, has proved to be a
reliable and valid tool not only for application to the
elderly population but the impaired adult population as
well.

Research using one or more of the available
measuring tools has been focused on situations of elderly
relocation rather than on situations where elderly persons remain in their own dwelling. How can methods be developed to measure elderly capacities, needs, activities, and congruence simultaneously? Little (1982) discussed assessment methods through a conceptual model. There are the rational, empirical, and realistic methods of assessment. All three models can be either subjective or objective. "The rational approach is a professional estimate of the deviation from an ideal state of well-being and is more comprehensive, but is also more biased (p. 84)." The empirical approach measures actual demand for service and goods but is somewhat unrealistic in its natural assumption that when people demand certain items or services they receive them. The realistic method provides assessments by way of consensus. The majority of the population feels that certain generic environments should be built for the elderly population, thus all the facilities for the elderly population follow this general consensus.

Eisdorfer and Cohen (1980) suggest testable questions to evaluate the interaction between the process, person, and the situation:

...(1) How does the older individual perceive the environment? (2) How is the knowledge of the environment represented in the brain? (3) What is the motive of the individual and how does it influence how the older individual perceives, remembers, and responds to environmental cues? (4) How do physical factors affect the way the older individual performs? (5)
How do these change over time (p. 61)?

Assessment guidelines or questionnaires have not been designed or implemented that bridge the gap between the functioning capabilities of the elderly individual and the inadequacies of the elderly individual's home. There is an obvious need for the utilization of a computerized assessment that can produce a systematic and comprehensive listing of recommendations an elderly individual may need.

The question remains, "How can formal assessment assist in achieving an optimum degree of individual-environment congruity among older people (Lawton, 1970, p. 38)"? Currently there is no method which encompasses the man-environment relationship exists.

Lawton stated that "...the need to access both environments and people is implicit in the call for optimizing the match between the two (p. 40)." A full assessment should have a broad enough scope to represent all important levels of behavior, major ranges of complexity within each level, and the major range of normative competence levels.

One can borrow concepts and methods from these assessments to structure a comprehensive evaluation of both health and the environment. Lavton's (1972) Activities of Daily Living will be utilized as well as following the perspective of Altman (1975) in viewing the environment ecologically. By following these methods and
perspectives the ERHAP research project may be able to
provide a comprehensive view of the elderly individual's
environment.
2.2. Knowledge Based Computer Systems

The following discussion will be concerned with expert systems. The discussion will include four issues: an explanation of what an expert system is, how an expert system is constructed, the application of expert systems, and expert systems that are in use.

2.2.1. Expert Systems

Expert systems are an outgrowth of Artificial Intelligence. Artificial Intelligent computer systems are systems which emulate the way people use their minds to tackle problems beyond the reach of "ordinary" computers. Whereas ordinary computers refer to conventional computer systems which manipulate data, expert systems manipulate knowledge. Expert computer systems are knowledge-representation tools of Artificial Intelligence which can produce practical results (Nau, 1983). Because expert systems have the capability to emulate the problem solving process of human experts in a specialized problem domain, they are popular in academic disciplines and industries (Harmon and King, 1985; Weiss, and Kulkowski, 1984; The Waite Group, 1986).

Weiss and Kulkowski (1984) defined an expert system as one which can handle real world problems which often, because of their complexity, require expert interpretation. The expert system has the capabilities
to solve complex problems by using an explicit computer model of human reasoning, reaching identical conclusions that a human expert would reach if faced with a comparable problem. Expert systems are most appropriate when experts are in great demand but in short supply. Expert systems can help develop new pools of knowledge through the formalization and clarification of expert reasoning. The human expert is forced to make reasoning explicit rather than leaving it implicit. The expert will record his expertise in such a way that it can be replicated by persons beyond the immediate field of expertise (Weiss and Kulikowski, 1984).

Another advantage of building an expert system is the possibility of combining different fields of expertise to create a synthesized knowledge base (Weiss and Kulikowski, 1984).

2.2.1.1. Four Essential Characteristics of Expert Systems

An expert system must have four basic characteristics: expertise, symbolic reasoning, depth, and self knowledge. These four characteristics separate expert systems from conventional programs. A conventional program will not exhibit these four characteristics.

2.2.1.1.1. Expertise

Amarel (1981) defined expertise as the following:

Expertise in a given domain is commonly characterized by skillful, high
performance, problem solving activity in the domain. A human expert solves problems in his area of expertise more rapidly, more accurately, and with less conscious deliberation about his plan of attack than a novice does (p. 1).

The expert system often can provide solutions which can not be found in textbooks or literature. The knowledge of an expert system relies upon the expertise of the individual who programmed the system. The success or failure of an expert system then, relies upon the expertise of the individual who created the system (Weiss and Kulikowski, 1984).

Waterman (1986) agreed with Amarel in stating that an expert system should be skillful, but he went a step further in stating that he felt an expert system must have robustness as well as being skillful. An expert system is skillful if the knowledge can be applied efficiently and effectively and has the capabilities to emulate human experts in taking shortcuts to eliminate wasteful and unnecessary calculations. The robustness of an expert system is dependent on both its breadth and depth. The system should be capable of reasoning from basic principles when dealing with insufficient or incorrect data (Waterman, 1986).

Rychener (1985) felt there were four levels of knowledge acquisition that expert systems have demonstrated their expertise. These four levels, concepts, rules, models, and strategies, are considered to be a hierarchy. Each level is a stepping stone for the next
level. The lowest level of knowledge acquisition is described as concepts, followed by rules, models, and strategies. Knowledge is the compilation of years of experience. Expertise does not result over a short period of time; rather, it evolves over many years and many different approaches. Concepts are basic terms of a problem domain and are a declarative representation of knowledge. Usually this knowledge can be obtained from textbooks. Rules are empirical and heuristic forms of knowledge. This knowledge is obtained from an expert, or one who relies upon experience. Rules are not always accepted by all experts in a field. Models are a collection of knowledge; they rely upon interrelated rules. The context in which rules take place is often used in organizing models. Strategies are knowledge levels determined by rules and procedures. Strategy knowledge may be applicable in several situations (Rychener, 1985).

2.2.1.1.2. Symbolic Reasoning

Knowledge representation and formation is done through the use of symbols. Expert systems use symbols to represent objects, concepts, relationships, or qualities. The expert system manipulates these symbols rather than performs mathematical computations (Waterman, 1986).

2.2.1.1.3. Depth

An expert system must have depth to handle
difficult problem domains and be able to utilize complex rules, models, and strategies. The depth of an expert system relies upon the breadth of knowledge available in a region of knowledge (knowledge domain) such as medicine. This breadth of knowledge may rely upon learning from education and books, also from mentors and experiences. The depth of an expert system can often be seen in its complexity of rules or the quantity of rules which exist (Waterman, 1986; Hayes-Roth, 1983).

2.2.1.1.4. Self-Knowledge

The characteristic which separates expert systems from other computer programs is the system's ability to use self-knowledge. The expert system uses self-knowledge to reason about its inference process. Most expert systems available today have the capability to examine and explain their own reasoning. This is called an explanation facility (Waterman, 1986). If an expert system has self-knowledge, the user of the system will usually have more faith in the program, and the development of the system is much faster because mistakes can be easily found in the program. Self-knowledge makes the system explicit rather than implicit therefore making the system much easier to change or adapt (Waterman, 1986).
2.2.1.2. The Arrangement of Expert Systems

All expert systems have similar approaches to organizing knowledge. Most expert systems organize their knowledge on three levels i.e., data, knowledge base and control (Nau, 1983).

2.2.1.2.1. Data Level

The data level is the declarative knowledge about a particular problem being solved and the current strategy methods used to solve that problem. At the data level there are three ways to represent declarative knowledge, i.e., first predicate logic, frames, and semantic networks.

Predicate logic is the most common way to represent declarative knowledge. Simple declarative facts are represented as instantiated predicates (i.e. Mary gave Bob a car = Gave [Mary, Bob, car]) (Nau, 1983).

Frames are another method in which declarative knowledge can be represented. Nau (1983) defined frames as

data structures in which all knowledge about a particular object or event is stored together. Such a representation cannot represent any more concepts than first order predicate logic can, but the organization of knowledge can be useful for modularity and accessibility of the knowledge. In addition, frame systems often allow ways to specify default values for pieces of information about an object when the information is not explicitly given (p. 64).

The final approach for representing declarative knowledge is semantic networks. "They are like frames in
the sense that knowledge is organized around objects being described, but here the objects are represented by nodes in a graph and the relations among them are represented by labeled arcs or links (Nau, 1984, p. 64)."

Nodes represent objects and descriptors. Objects may be physical objects or they may be conceptual, i.e., acts, events. The descriptors of nodes provide additional information about the objects. Links show the relationships between the object and descriptors. Links will be in Is-a or has-a formation. Is-A links involve relationships of a node (Mr. Smith is-a man). Has-A links will identify nodes that are properties of other nodes (Mr. Smith has-a tattoo) (Harmon and King, 1985).

Frames and semantic networks are advantageous over predicate logic because all the relevant information is collected together for each object, event, or concept (Nau, 1983).

2.2.1.2.2. Knowledge Base Level

A knowledge base is the current compiled information or knowledge of a particular (specific) problem that the system is designed to solve (Nau, 1983). This knowledge level contains the data for the problem and contains the means to manipulate the data to provide a solution.
2.2.1.2.3. Control

Control is the strategy by which different computer programs are manipulated. The control strategy will regulate the order in which inferences are drawn. Control strategies include data driven search, goal driven search, and back tracking (Nau, 1983). Inferences are driven by events rather than goals when the control strategy is a data driven search (forward chaining). Inferences are driven by goals rather than by data when goal driven searches (backward chaining) are the control strategy utilized. Back tracking explores a single path to see if it provides a solution, if the system can find no solution the system backtracks to its original position and chooses a new path.

The control of an expert system is the inference engine. The inference engine includes knowledge acquisition, explanation, and user interface subsystems (Harmon and King, 1985). The interface subsystem serves as a link between the computer and the outside world.

When an expert system is complete all three levels of knowledge organization will be completed as well. An expert system is incomplete when any one of the three parts, data, the knowledge base or control, is missing.

2.2.2. The Construction of Expert System

Several resources are available which provide
viable and systematic approaches to the designing of an
expert system (Harmon and King, 1985; Hayes-Roth,
Waterman, and Lenat, 1983).

An individual's first step in designing an expert
system is to select a specific tool (expert system)
which will fulfill the needs of the problem situation
(Harmon and King, 1985).

The second step is to identify the problem and the characteristics of the problem.

Next, one must define concepts and relationships which will describe the problem-solving process of the chosen problem (domain). This is the process of conceptualization.

Then one must organize the problem-solving process. I.e., the concepts and relationships are organized into a structured format. This is the process of formalization (Hayes-Roth, Waterman, and Lenat, 1983).

Implementation is the final process. During this procedure rules are created that represent all the available knowledge of a specific problem. At the conclusion of this process, the system is ready for testing.

Testing is the evaluation of the system by experts. Usually the evaluation is conducted by the individual who selected the initial problem as well as by other experts in the same field (Hayes-Roth, Waterman, Lenat, 1983). After a system is evaluated, a series of
revisions should be conducted until it is ready to be run and maintained consistently (Harmon and King, 1985).

2.2.3. Application of Expert Systems

Application of expert systems takes on a variety of forms, including the following categories: interpretation, prediction, diagnosis, design, planning, monitoring, debugging, repair, instruction, and control (Hayes-Roth, Waterman, Lenat, 1983). For example, interpretation systems infer situation descriptions from sensor data. Prediction systems infer likely consequences of a given situation. Diagnosis systems infer system malfunctions from observables. Design systems develop situation solutions that will satisfy design constraints. Planning systems design actions for objects which perform functions. Monitoring systems analyze observations of a system's behavior and its relation to a successful or favorable outcome. Debugging systems provide remedies for malfunctions. Repair systems plan and implement remedies for malfunctions. Instruction systems are tutorial systems which diagnose, debug, and provide remedial support. A control system oversees the overall behavior of a system (Hayes-Roth, Waterman, Lenat, 1983).

2.2.4. Working Expert Systems

From the previously discussed applications, there are several working systems which are in use today.
Among the more well-known working systems are: MYCIN, PROSPECTOR, POMME, and EXSYS. Each was developed for a specific application and draws its information from diverse academic fields.

2.2.4.1. MYCIN

MYCIN is a medically based expert system. MYCIN was developed at Stanford University in the mid-1970's. Since 1979, in the Stanford Medical Center, MYCIN has provided medical diagnostic recommendations for physicians. For example:

MYCIN provides consultation advice about bacteremia (infections that involve bacteria in the blood) and meningitis (infections that involve inflammation of membranes that envelope the brain and spinal cord)...The diagnosis and treatment of these diseases are complex enough that an attending physician will often require an expert (Harmon and King, 1985, p.15).

MYCIN is a comprehensive expert system with capabilities which outperforms conventional software. It "... contains the expertise of the formost experts in the field of infectious blood diseases. It uses this expertise to guide its operators to the most reasonable conclusions and then recommends the best alternative treatments for the problems in diagnosis (The Waite Group, 1986, p. 9)."

MYCIN like most expert systems communicates in English. The users of the system are physicians. The system has an explanation facility and self-knowledge. MYCIN can explain how it arrived at its final
recommendations. In life threatening situations such characteristics are mandatory so that MYCIN recommendations can be checked against a physician's recommendations (Harmon and King, 1985; The Waite Group, 1986). For further, more detailed information on MYCIN, see *Expert Systems* (Harmon and King, 1985).

2.2.4.2. PROSPECTOR

PROSPECTOR is a geological-based expert system. PROSPECTOR was developed at Stanford Research Institute in the late 1970's.

PROSPECTOR is designed to provide consultation to geologist in the early stages of investigating a site for ore-grade deposits. Data are primarily surface geological observations and are assumed to be uncertain and incomplete. The program alerts users to possible interpretations and identifies additional observations that would be valuable to reach a more definite conclusion (Harmon and King, 1985, p. 145).

PROSPECTOR uses a semantic network for its representation of declarative knowledge. The knowledge in this system is the expertise of mineral experts. PROSPECTOR has the ability to be interrupted during the user interface. The user of the system can volunteer and add new information at any point during the running of the system and the system will insert the volunteered information and process it with the original input (Harmon and King, 1985).
2.2.4.3. POMME

POMME is an agricultural-based expert system used for advising farmers on the management of apple orchards. This management includes pest management, drought control, pesticide selection, and treatment for winter injuries. The POMME system uses an If-Then format and the English language. POMME is used exclusively at the Virginia Polytechnic Institute (Roach, Virkar, Weaver, and Drake, 1985).

In 1985 POMME was ready for its initial field testing, the system had more than 550 rules. The system contains the expertise of plant pathologist, entomologists, and others. Information is included about fungicides, insecticides, herbicides, and other non-chemical care treatments of freezing, frost, and drought. POMME is divided into subsystems. These include soil management, pest control, pruning, weather damage recovery, and fruit tree planting. The current system implemented only two subsystems: pest control and weather damage recovery (Roach, Virkar, Weaver, and Drake, 1985).

2.2.4.4. EXSYS (a developmental package)

EXSYS, the remaining expert system, is an expert system development package. EXSYS is a system shell which can be developed for domain-specific problems.
Huntington (1985) describes his system as follows:

Expert systems can be developed with EXSYS for any problem that involves a selection from among a definable group of choices where the decision is based on logical rules. The rules can involve relative probabilities of a choice being correct. Any area where there is a person or group of persons that have special expertise needed by others EXSYS can be used to develop an expert system. Anything from indentification of biological specimens, to automating complex regulations, to aiding customers in selecting from among a group of products, to automated user assistance is possible (Huntington, 1983,84,85, p.5).

EXSYS, being a knowledge-based expert system, is composed of a knowledge base and an inference engine. The knowledge base for EXSYS is developed by the individual to fit a problem-specific domain. The inference engine organizes the relationships among the information which is put into the knowledge base (Brent, 1986). The EXSYS system has an If-Then format and disregards the inclusion of the data level for organizing knowledge. EXSYS is similar to PROSPECTOR in that it can be rerun with new or additional information. EXSYS also has an explanation facility which will provide explanations as to why the system is asking certain questions and why the system is providing certain recommendations.

EXSYS has been used to develop the Elderly Resident Home Assessment Program (ERHAP), a personalized home assessment. To form the knowledge base for ERHAP information was gathered from experts in the fields of environmental design, gerontology, and the social
sciences. There are well over 300 rules in the current system. The rules are based on individual elderly needs and are prioritized by safety, function, and comfort. The computerized home assessment program has been developed for advocates of the elderly, as well as the elderly individual. ERHAP performs personalized home assessments.

ERHAP has been designed, to provide elderly individuals with recommendations for their dwellings. More detailed information about the ERHAP system can be found in "ERHAP: A Computerized Home Assessment For the Elderly (Brent, et. al, 1986)."

Expert systems can provide opportunities for the expansion of knowledge previously attained only through the access of several experts.

Expert systems demonstrate signs of becoming a widely used tool for the dispersal of knowledge while providing access to knowledge on a twenty-four hour basis. Expert systems formalize the expertise of many individuals, providing a consistent and systematic approach to knowledge.
Chapter III

Research Design

3.1. Source of Data

A sample of the elderly population was obtained through nonprobability sampling methods. Fifty persons, 65 years old and older, were selected to participate in this study. Names of elderly heads of household were obtained through local agencies associated with the elderly population and through referrals from ERHAP participants.

Only one elderly member per household was interviewed. When more than one elderly person lived in the household, the elderly member receiving the lowest level of independence (F) on the ADL (Katz, 1970) was interviewed. The Activities of Daily Living Scale was used to measure the functional capacities of the individual. When elderly members of a household could not verbally respond to the ERHAP questionnaire, another member of the household was interviewed (ie. friend, child or adult grandchild [age 18 and above]).

Interview participants were asked a short mental status questionnaire (Mangen & Peterson, 1984). When the individual demonstrated qualities that the interviewer felt denoted mental instability (anxiousness, inattentiveness, did not
speak coherently), the mental status questionnaire was implemented prior to the housing assessment portion of the questionnaire. This determined an individual's ability to understand the questionnaire. If an individual received a score of five or more errors on the mental status questionnaire, the interview was to be terminated prior to the implementation of the housing assessment portion of the questionnaire. None of the respondents failed this portion of the interview.

When the interviewer was confident from simple observation (respondent was attentive and answered coherently when spoken to) that the respondent was mentally capable of responding to the housing assessment portion of the questionnaire, the mental status questionnaire was implemented at the conclusion of the housing assessment portion of the questionnaire.

3.2. Methodology and Research Tools

3.2.1. Questionnaire

An elderly household member was verbally interviewed by the researcher using the ERHAP questionnaire [appendix A].

The ERHAP questionnaire is divided into four parts: 1) demographic questions i.e., age, gender, race; 2) health status of the individual, including any disabilities that may influence the functional capabilities of the individual; 3) housing assessment including questions concerned with safety, function, and comfort in the home; and 4) functional and mental status of the individual including the Activities
of Daily Living Scale (Katz, 1970) and the mental status questionnaire (Mangen & Peterson, 1984).

3.2.2. Photographs

During the interview each elderly person's home environment was photographed using a 35mm camera. The interviewer made independent environmental assessments of the interior of the home to determine problem areas. An average of 15 black and white photographs were taken during each interview. Photographs included three to four pictures of each of the common rooms (i.e. sleeping, eating, and living areas) and the remaining photographs were taken of specific areas or objects which the interviewer felt were problem areas in the dwelling, i.e., unsafe stairs, worn floorcoverings, etc.

A systematic approach was followed when photographing the interior of the dwelling. The interviewer took pictures of every wall in each room with a wide-angle lens camera. The photographs were used along with the qualitative notes (comparison of visual analysis with written analysis). When adaptations had been made to the home prior to the interview, pictures were taken of these adaptations.

The elderly person was also asked to sign a release form prior to the photography work so that the pictures could be used in manuscripts submitted for publication.

3.2.3. Qualitative Notes

Qualitative notes for each elderly household included
thumbnail sketches of the dwelling's floorplan drawn by the interviewer. The floorplan sketches were used to determine relationships between rooms and some furniture arrangements. The floorplan sketches were also used to clarify the photographs taken in the individual households. Additional notes accompanied the floor plan only if situations occurred which were not apparent from the floorplan sketches, photographs, or the questionnaire (refer to Appendix).

3.3. Design of Analysis

A descriptive comparative analysis was performed to determine whether or not there were any differences between the ERHAF computer program and the panel of environmental design experts in identifying housing inadequacies and the accuracy of recommendations.

To accomplish this, each elderly respondent was identified through a case file. Each case file contained a completed questionnaire, photographs, and qualitative notes. The case file was analyzed by a panel of two experts, knowledgeable in the field of elderly housing and interior design. The panel had access to the each case file with the exception of the questionnaire; the panel received only the health status portion of the questionnaire. The panel also had access to the interviewer who could provide additional information on individual case files.

The panel of experts conducted a qualitative analysis of each case file comparing photographs, floorplans,
qualitative notes, demographic information, and the health status of the individual (ADL scale and MSQ). Following a format similar to ERHAP, the experts performed a visual analysis of the interior photographs of each household. The format divided the panel's perceived inadequacies of safety, function, and comfort for each household in the following divisions: 1) bathroom, 2) kitchen, 3) livingroom, 4) floorcoverings, 5) stairs, 6) lighting, 7) doors, and 8) communications. At the conclusion of this comparative analysis each panel member presented a list of housing inadequacies. Each member of the panel made independent listings of perceived housing inadequacies followed by a joint discussion, to produce a single listing which identified the perceived inadequacies for a household.

The researcher processed the information provided by the questionnaire through ERHAP in isolation from the panel of experts and was the only person who had access to the questionnaire prior to the completion of recommendations provided by both ERHAP and the listing of housing inadequacies identified by the experts. ERHAP produced a separate list of design recommendations for each case file.

When ERHAP and the panel of experts produced two separate design recommendation lists, the lists were qualitatively and quantitatively analyzed. A qualitative and comparative analysis was performed to determine the similarities and differences in design recommendations of
ERHAP and the perceived housing inadequacies identified by the panel of experts. A quantitative analysis was performed to determine the frequency that specific inadequacies appear on both the ERHAP recommendations and the panel's identified housing inadequacies. The data were organized according to the following: (1) similarities and differences in problems which were identified by ERHAP and the experts, (2) similarities and differences in problems which were identified in the three levels of safety, function, and comfort by ERHAP and the experts, and (3) similarities and differences which were found in each room by ERHAP and the experts.

SAS (statistic analysis system) was utilized to determine the frequencies and percentages for inadequacies identified by ERHAP and the panel of experts.

Each file included a completed questionnaire, photographs, qualitative notes, a listing of housing inadequacies from each panel member, one joint listing of housing inadequacies from the panel, and design recommendations from ERHAP.

A final list of recommendations was presented to each elderly participant.
Chapter IV

4.1 Findings

The following discussion provides an overview of the results which were found through the implementation of ERHAP. The first section covers the housing inadequacies which were identified in the sample. The remaining section covers the application of ERHAP. The inadequacies which were identified by ERHAP will be examined as well as the type of inadequacies which were identified.

4.1.1. Design and Housing Inadequacies in the Sample

The research presented here addresses the incidence of housing inadequacies in the homes of elderly individuals for the purpose of developing information useful in promoting independence, increasing housing options, and enhancing the viability of staying at home as long as possible thus delaying institutionalization.

The individuals interviewed were from middle class (e.g. educators, nurses) to lower middle class (e.g. farmers and blue collar workers) and from SMSA and non-SMSA areas in Missouri. ERHAP was conducted in 50 households, but because the photographs were incomplete in six of the
50 cases, this study is based on 44 cases. Of these cases, 24 of the individuals lived alone while the remaining 20 lived with their spouses or a family member. There were 43 female respondents and 1 male respondent.

There were numerous housing inadequacies in the elderly homes (as listed in Table 4.31). These findings mirror the housing inadequacies found in the homes of elderly as described in the literature. There are problems in safety, function, and comfort. Every home had at least one critical safety problem. There was a mean number of 32 safety inadequacies identified in each home.

Inadequacies were reported for major living spaces (i.e. bathroom, living room) with the kitchen having the highest number of inadequacies (Table 4.1-4.3). The bathroom had the second largest number of inadequacies (Table 4.6-4.8). Each of these spaces will be reviewed later.

4.1.1.1. Kitchen

SAFETY. When comparing the type of safety inadequacies identified by ERHAP and the experts, the experts more frequently identified furniture inadequacies; ERHAP identified problems of fire hazard, electrical shock, and the use of stepstools (see Tables 4.6-4.8).

FUNCTION. Both ERHAP and the experts identified similar types of functional inadequacies in the kitchen,
inadequate counter space, inaccessible storage, unclean and pest ridden areas, and inadequate storage. The experts were more likely to identify functional inadequacies or inappropriate placement of kitchen appliances and kitchen appliances (i.e. portable dishwasher). ERHAP provided specific areas in which task lighting was needed as compared to the experts identifying general lighting inadequacies (see Tables 4.9-4.15).

COMFORT. No comfort inadequacies were identified in the kitchen area.

4.1.1.2. Bathroom

SAFETY. In comparing the types of safety inadequacies which were identified in the bathroom by ERHAP and the experts, both identified inadequacies of grab bars for the toilet and the tub/shower area. ERHAP most frequently identified safety issues concerned with entrance and accessibility of the door, door swing, and the type of locking mechanism on the door. The experts most frequently identified the safety inadequacy of throw rugs being used as a floor covering (see Table 4.1-4.3)

FUNCTION. ERHAP identified only four functional inadequacies in the bathroom; whereas the experts identified thirteen functional inadequacies. Again ERHAP identified inadequacies in the bathroom which commonly occurred (i.e. inadequate grab bars, slippery floor treatment), the experts identified inadequacies which occurred infrequently in the sample (i.e. wooden cabinet in shower area) (see
Tables 4.4-4.5).

COMFORT. The experts more often identified comfort problems in the bathroom than ERHAP (see Table 4.6).

4.1.1.3 Bedroom

SAFETY. ERHAP identified thirteen safety inadequacies in the bedroom whereas the experts identified only five safety inadequacies. ERHAP identified primary safety issues concerning smoke alarms, light sources available (i.e. bedroom illumination so that the elderly individual could easily move from the bedroom to the bathroom and bed height, and construction. The experts focused their attention on light sources within reach of the bed, inadequate telephone access, and inadequate clear space to safely maneuver in the bedroom area (see Tables 4.16-4.17).

FUNCTION. Functional inadequacies identified by ERHAP most frequently included inadequate closet storage, door pulls which were difficult for the elderly individual to manipulate, and furniture which provides inadequate support (i.e. sagging mattress, mattress which is too soft). The experts identified inadequate clearance space around the bed as the most frequent inadequacy in the bedroom. ERHAP and the experts identified the functional inadequacies—interfering door swing and inappropriate bedside storage—at identical frequencies of 15.9% and 6.8% respectively (see Table 4.18-4.20). It should be noted that the experts frequently identified door pulls as an inadequacy, but at a much lower frequency than ERHAP.
COMFORT. Experts did not identify any bedroom comfort inadequacies as compared with ERHAP identifying six separate inadequacies. One frequent inadequacy identified was the lack of having a thermostat control in the bedroom. The remaining issues dealt with lighting, privacy, and noise (see Table 4.21).

4.1.1.4. Living Area

SAFETY. Both ERHAP and the experts identified inadequate clearance space between furnishings as the most frequent safety inadequacy to occur in the living area of a dwelling. The experts, however, identified seven additional inadequacies which dealt with fire hazards (i.e. fireplace without a screen) and the design of existing furniture (i.e. sharp pointed furniture, unstable furniture) (see tables 4.22-4.23).

FUNCTION. Functional inadequacies identified were identified at very low frequencies (i.e. seating by the phone (2.3%)). ERHAP most frequently identified the lack of storage and display area for plants as a functional inadequacy (70.5%) (see Table 4.23).

COMFORT. The experts identified one comfort inadequacy in the living area; whereas, ERHAP identified six inadequacies which dealt with wall finishes and the placement and/or arrangement of the interior of the home which did not provide privacy for its users (see Tables 4.23-4.24).
4.1.1.5. Doors

SAFETY. ERHAP was much better at identifying safety and functional inadequacies of the door and its structural components than the experts. In more than one-half of the sample ERHAP identified sharp leading door edges and unnecessary storm/screen doors as the most frequent safety inadequacy. The experts identified only one safety inadequacy (uneven, hazardous floor surfaces at doorways), and it occurred in less than one-half of the sample population (see Table 4.25).

FUNCTION. Functional inadequacies were identified only by ERHAP and these inadequacies occurred in less than one-fourth of the sample population. The most frequently identified inadequacy was a patio door entrance with the same floor height on the exterior and interior (the exterior floor material did not slope away from the sliding door tracks but instead was level) (see Table 4.26).

COMFORT. No comfort inadequacies were identified concerning doors.

4.1.1.6. Stairs

SAFETY. All inadequacies identified concerning stairs were safety oriented. ERHAP identified a large number of inadequacies, all of which dealt with the structural soundness of the stairs, frequency of use, finish material, and lighting adequacy. The experts identified four safety inadequacies, two of which ERHAP had identified (i.e., finish material and handrails which can be easily grasped...
and held) (see Tables 4.27-4.28).

There were nine additional inadequacies identified that were not categorized in the previous areas. Eight of the inadequacies dealt with safety in various locations in the home. Only one inadequacy - low furniture (20.5%) had a frequency of higher than 20% of the sample population. The ninth inadequacy was comfort oriented - placement of the dining area in close relation to a view outside (see Tables 4.29-4.30).

4.1.2. The Application of ERHAP

Tables 4.1-4.31 illustrate differences between ERHAP and the experts. It is apparent in the tables that ERHAP and the experts' findings differ in the diversity of inadequacies identified and the frequency of occurrence. Findings relating to ERHAP and the experts are described below.

4.1.2.1. Inadequacies Identified by ERHAP and the Experts

While there were inadequacies found in all rooms, the Elderly Resident Housing Assessment Program identified most inadequacies in the kitchen (32) and bathroom (22).

In the bathroom it was found that the experts and ERHAP were more likely to identify problems which dealt with the safety of the elderly user. For example, door locks were found to be the inadequacy which was identified by ERHAP most often as compared to the experts identifying the use of throw rugs as a floor covering. One inadequacy identified
approximately the same number of times by both the experts and ERHAP was the inadequacy of grab bars. Additional inadequacies identified by both ERHAP and the experts include incorrect door swing, unsafe shower and/or tub threshold entrance, slippery tub surface, no ground fault interrupter, and a slippery floor surface.

Inadequacies identified by ERHAP in the bathroom would have a greater influence on the elderly individual's ability to safely function in the space (i.e. door swing, handrails, emergency call button) as compared with the inadequacies infrequently identified by the experts. These inadequacies would have little influence on the elderly individual's capacity to safely function within the space. The experts did identify one inadequacy which does not follow this trend, the electric outlet which is incorrectly wired. ERHAP identified only a small proportion of cases in which the ground fault interrupter had not been used, this can be compared with the high number of cases which the experts found there to be no ground fault interrupters in the bathroom (Table 4.31). This may be attributed to the nature of the interview versus the nature in which the experts assessed the elderly individuals' homes. The experts are visually identifying problems; whereas, ERHAP is a verbal interview of the elderly individual, receiving direct feedback from the person who daily functions within the space. Problems arise in verbally assessing an elderly individual's home. One assumes the elderly individual
understands the terminology the interviewer is using, and
the interviewer is correctly answering questions which the
respondent may ask concerning the interview questions. One
also assumes that ERHAP is asking the correct questions
concerning housing adequacies.

In the kitchen it was found by both the experts and
ERHAP that functional rather than safety inadequacies were
identified. ERHAP identified the lack of having a fire
controlling agent as the most frequent safety inadequacy in
the elderly individuals' homes. The experts most frequently
identified the use of chairs without armrest as a safety
inadequacy. Many of the safety inadequacies
identified by the experts occurred more frequently as
compared with the inadequacies identified by
ERHAP. This displays ERHAP's capacity to frequently
identify inadequacies which can be generalized to a
population group as compared to the expert's identified
inadequacies being applicable only to specific or unique
situations.

In both ERHAP and the expert's identification of
functional inadequacies, these functional inadequacies
would greatly influence the elderly individual's capacity to
efficiently cook, prepare, and eat meals in the kitchen.
Inadequate cabinet pulls, inaccessible cabinets, difficult
faucet handles, inadequate lighting, and an unclean, pest-
ridden kitchen were identified by both ERHAP and the experts
as functional inadequacies in homes.
The number of inadequacies identified by ERHAP and the experts is large. However, the total number of inadequacies which both ERHAP and the experts identically identified is small. Again the experts identified several inadequacies, but the frequency at which the inadequacies occurred was minimal.

Some inadequacies which ERHAP is capable of identifying were not found in this sample. While some of these items are candidates for elimination from ERHAP, some inadequacies concerned with critical safety simply did not occur in this sample. For example, although ERHAP asks the resident if there is a gas leak, the resident may not know if a leak exists and the ERHAP interviewer would have to detect the problem. Obviously, the experts would not be able to detect this problem from the visual photographs.

ERHAP needs improvement to include missing problems that experts have identified. Tables 4.1 to 4.20 identify the many items that experts identified that ERHAP did not.

4.1.2. Issues of Safety, Function, and Comfort

ERHAP and the experts reported most agreement in identifying safety inadequacies (18) followed by functional inadequacies (15). However, while ERHAP had assigned inadequacies relating to safety, function, and comfort, the experts found these divisions to be less useful. Categories of safety, function and comfort were not
found to be mutually exclusive. Functional inadequacies, if left unattended, can become safety problems (i.e. task lighting in the kitchen for preparing and cooking meals). Some comfort problems, if escalated, can become safety problems as well (i.e. temperature control). Rather, the inadequacies are progressive with safety being of fundamental importance influencing function and comfort.

Safety and function housing problems are numerous and take on more importance by both ERHAP and the experts than concerns for comfort. Often, the changes that would be made for safety and function would also benefit resident comfort. For example, an elderly woman has coped with the constraints of a walker by rearranging her home's furnishings to allow for adequate space to maneuver. She has also removed all of her throw rugs thus decreasing the likelihood of tripping and losing balance. Through adapting her home she has succeeded in making it a safer, more functional and comfortable home.
Chapter V
Conclusions

5.1. Aging and the Environment

The findings of this study describe what is known about the housing of elderly in this sample. It becomes necessary, however, to discuss these findings within the larger context of aging and the environment. As the review of literature defines the broad categories of concern (i.e., hierarchy of needs, issues of vulnerability and dependence), it now becomes necessary to draw conclusions from this study that relate to the existing body of knowledge.

5.1.1. Hierarchy of Needs

This study supports the findings of other research in which individual needs are hierarchically defined. (Maslow 1954, Bennett, 1977). Safety is the most basic need; safety inadequacies were most frequently identified by ERHAP. Safety appears to be of prominent importance to the elderly population. Questions concerning safety were often answered more quickly by the respondent than questions concerning function and comfort. Safety inadequacies greatly influence the elderly individuals capacity to function within a dynamic environment.

The second need in the hierarchy is function (see Table 1.1). Functional inadequacies were also frequently
identified by ERHAP at high frequencies. This large identification is a result of the elderly individual's subjective view of the space in which he or she daily functions. The individual is aware of what limitations exist in his or her environment and support his or her daily activities.

The third need in the hierarchy is comfort. Since comfort inadequacies were infrequently identified in all areas of the home, this reinforces the hierarchy of needs. Safety and function needs must be met prior to comfort needs. If safety needs are met, it is likely that function and comfort needs can easily be met. However some comfort needs, if left unexplored, can lead to safety needs (i.e. temperature control). ERHAP and the experts were more likely to identify safety and functional inadequacies rather than comfort inadequacies. In addition, it appears that comfort inadequacies rely heavily upon an individuals' environmental preferences.

The hierarchy of ERHAP does not have mutually exclusive categories which exist in Maslow's and Bennett's hierarchies. Instead ERHAP's hierarchy of needs (safety, function, and comfort) rely upon each other as building blocks, each justifying or supporting the level of inadequacy identified.

5.1.2. Issues of Vulnerability and Dependence

As discussed earlier, the elderly individual is considered highly vulnerable to his/her environment.
Research showed elderly individuals to have several environmental inadequacies which threatened their safety. The study supports the "competence and environmental model" (Murray, 1938; Lawton 1972, 1970; Helson 1964). For example, an elderly man suffered from a heart attack and recently had open heart surgery. He forced himself to exercise by arranging his home environment so that his bedroom was on the second floor of his dwelling. After a short period of time the resident thought that this arrangement was helping him regain some strength. In another example, a blind elderly man who was active in his earlier days arranged a physical exercise workout area in his home. This exercise helped both his physical and mental well being. Again this reiterates the common theory that the more vulnerable the elderly individual becomes, he/she becomes more dependent on the environment.

This research also supports the "person environment congruence model" (Kahana 1982) in that the elderly individuals interviewed had adapted to their environments. If the residents were not able to cope with the environmental inadequacies, it appeared that they would ignore that area of their home. In coping with the environment, each elderly individual had unique needs concerning safety, function, and comfort. If the individual had never had certain needs of safety, function, or comfort, it proved unlikely the individual would seek an environment beyond one which could provide support for his or her
personal needs. The approach in which an elderly individual prioritises his needs (safety, function, and comfort) will determine the level of support which is necessary in his environment. If an environment was offered to an elderly individual provided unfamiliar and unwanted support, the results may prove to be detrimental to the physical and psychological well-being of the individual. The elderly individual may not strive for his or her full potential in an environment which is unfamiliar and stressful.

Environments which are unfamiliar and stressful to the elderly individual may cause him or her to feel a loss of control. If the individual is placed in an environment which is not supportive or familiar it is unlikely that he or she will demonstrate or exert any level of control over the environment. Environments which are unfamiliar are not supportive of the individual's needs.

For example, if an elderly woman who had difficulty in mobility but used no special aids in walking was unable to bathe herself in the bathtub, her method of coping was to sponge herself clean without the use of the tub. She used her bathtub for household item and furniture storage.

Another example of how the elderly adapt with their physical health problems and environmental constraints is the situation of an elderly woman who had a stroke and was unable to reach items on the top shelf of her kitchen cabinets. She had assistance in lowering all kitchen items to the first shelf and onto the counter top. Unfortunately
this created other problems in limited workspace and cleaning.

5.1.3. Housing Inadequacies

Housing inadequacies are a result of the dynamic environment in which the elderly population lives. This pilot study demonstrates that the elderly individual's needs are constantly changing and the environment which he or she lives in is constantly developing new and different inadequacies. Some methods individuals may use to adapt to these housing inadequacies may be simply to avoid an area in their environment rather than physically changing it. Housing inadequacies are part of the ecological process. As the elderly individual begins to demonstrate physical aging, the ability of the environment to provide support for the individual determines the adequacy level of the individual's home.

In the ERHAP pilot test, the elderly respondents demonstrated a high degree of independence. They did not rely on support services such as meals-on-wheels but continued to remain in their homes; thus they maintained some degree of environmental control.

In measuring housing inadequacies this study provides a new comprehensive approach in identifying housing inadequacies and recommendations. ERHAP provides both a subjective and objective approach to providing recommendations. When asked objective questions from ERHAP,
the elderly individual gave subjective information concerning his environment. The questionnaire is an objective tool. It examines the elderly individual's environment through professional standards which measure adequacy. Prior housing inadequacy measures do not combine objective and subjective measures (Jacobs, 1985). The use of ERHAP alone provides both an objective and subjective view of the elderly individuals' homes.

5.2 The Application of ERHAP

Of the four evaluation methods which were discussed in chapter 2, only one was used during the testing of this study - Lawton's Activities of Daily Living scale (1972). Lawton's scale measures the functional capabilities of the elderly individual rather than measure functional capabilities in relation to the environment. As a part of the ERHAP questionnaire the ADL provides additional physical information concerning the functional capabilities of the individual. ERHAP provides the combination of the functional status of the elderly individual in relation to his/her environment, rather than in isolation from the environment. The main goal behind this study is to develop an assessment tool which is capable of simultaneously measuring the functional capabilities of the individual and the environmental inadequacies.

ERHAP, as a working system, supports the studies which have been done in artificial intelligence systems. ERHAP can produce practical results and is capable, to a
certain degree, of emulating the human thought process. The specialized problem domain of elderly housing inadequacies forms ERHAP's knowledge base and is capable of producing results which clarify expert reasoning.

When comparing the results produced by ERHAP and the panel of experts it is important to note the type of inadequacies that ERHAP did or did not identify. Overall, the experts were more specific in identifying inadequacies for each room. On the other hand, ERHAP identified a large number of inadequacies applicable to a general, overall view of a room or area. When identifying inadequacies for interior components (i.e. stairs, doors) ERHAP identified numerous specific inadequacies. The inadequacies identified by the experts were often inadequacies which occurred infrequently as compared to the inadequacies identified by ERHAP which occurred more frequently.

The total number of inadequacies identified by ERHAP and the experts was relatively high in comparison to the number of problems simultaneously identified by ERHAP and the experts. Both ERHAP and the experts have identified inadequacies which can and do greatly influence the capacity of the elderly to safely function within their private domain.

There were distinct differences in identical inadequacies identified by ERHAP and the experts as compared with the different inadequacies which were identified by ERHAP and the experts. These differences are a result of
the limitations in which the experts and ERHAP are bound. An example of these differences can be seen in the discussion of inadequacies of the kitchen. Secure storage for valuables was identified as a common inadequacy by ERHAP. Things to consider in explaining this occurrence is that several elderly individuals do not store their valuables at home; secondly, if they did, they may not answer the interviewer truthfully, and, lastly, the elderly individual may assume that if they do not secure their valuables in the kitchen (but do so elsewhere in the home) that the interviewer may not consider their valuables secure.

From this preliminary stage, strategies for improving ERHAP are apparent. ERHAP needs to include some common recurring problems for each room since respondents recall inadequacies by room rather than by type. For example, each room should have specific questions on throw rugs, floorcoverings, door knobs, cabinet pulls, etc.

Perhaps the greatest strength of this study is to emphasize the eventual usefulness of ERHAP for widespread utilization by healthcare providers and others. While the methods used were appropriate as a trial-run in the development of a computer program, the study suggests that an artificial intelligence program is an effective tool in identifying housing problems and advancing knowledge about these environments. The study also suggests that observations are needed even if ERHAP were to be completed
by nondesigners because the trained observer can identify problems that the resident cannot.

5.3. Limitations and Implications for Future Research

This study represents a beginning step in a larger research program. Therefore, the ERHAP program has not reached its full potential. The methodology is not fully refined nor are the findings conclusive. The findings, instead, suggest directions for improving the ERHAP program.

ERHAP does not provide a complete list of possible housing inadequacies. New housing inadequacies continue to be found. The experts are limited by their set of experiences and knowledge. The experts' cumulative recommendations were sometimes better than ERHAP. The validity of the recommendations would have been strengthened if there were no differences between experts. In retrospect, coding (SAS) should have allowed for comparison of recommendations between each of the design experts.

Another limitation of the pilot study include the small sample of 44 completed cases out of the total sample size of 50. Also, the small black and white photographs did not allow optimal review of housing. For example, it was difficult to assess the quality of floorcoverings from the photographs. The experts have no allowances for situations in which a verbal affirmation of yes or no could possibly clarify whether a problem physically exists or whether it is simply a visual discrepancy in the photographs. Finally,
without a portable computer there was a greater chance for coding error.

The low frequency in which inadequacies were identified by ERHAP and the experts offers no real problems. Instead, this demonstrates that several specific problems may occur in specific situations. This is a reminder that the elderly population has a diverse set of needs and values. The elderly individual will often adapt to a specific problem rather than finding a way to adapt or modify the problem to suit his personal satisfaction.

As a consequence of this study, the next phases of this research have become more apparent. ERHAP is a useful tool with which to evaluate the elderly population. The system continues to need refinement. New or missed inadequacies must be included to provide a clearer and more exact picture of the housing inadequacies of the elderly population.

A larger sample is needed to provide a more reliable measure of the elderly population. The next sample size should be larger and stratified by health status and/or social economic status to increase the external validity.

ERHAP, currently, may be successfully utilized in large urban centers as well as small towns and rural areas. This in turn would provide a more systematic method by which to assess housing for the elderly.

It is also apparent that the interviewer conducting ERHAP will need training in both interviewing and
observation techniques. ERHAP presently is unable to function without a trained interviewer visually assessing the elderly individual's home. The current ERHAP program is insufficiently sophisticated to provide a complete environmental assessment without some type of assistance.

5.4. Summary

This research suggests three primary results. These may be highlighted in the following:

* What has been learned about the elderly housing of the sample.
* What has been have learned about the ecological impact of the environment on the elderly.
* What has been learned about the potential application of ERHAP

Each of these will be briefly summarized.

**What has been learned about the elderly housing of our sample.**

Housing inadequacies were most often found in the kitchen and bathroom. The kitchen and bathroom provide the greatest environmental challenge to the elderly individual. These two rooms incorporate the largest number of activities which occur in the home—providing nutrition and performing personal hygiene. If the elderly individual is deterred from independent use of these two spaces there is a loss of self-esteem and self-worth.

**What has been learned about the ecological impact of the environment on the elderly.**

The environment in which the elderly individual lives is dynamic. As a person ages there are numerous physical
and psychological health changes. The environment, for the aging individual, has a much greater influence on the individuals' capabilities to function independently. As inadequacies increase in the homes of elderly individuals, the fit between the individual and the environment decreases. In examining the ecological relationship between the elderly and their environment, safety inadequacies were found to be identified more frequently than function and comfort inadequacies in the elderly individuals' homes. Safety issues also influence the elderly individual's capacity to function in their private domain and contribute to overall comfort. In fact, it was difficult to separate inadequacies in terms of safety, function, and comfort because of the inherent overlap. As the study progressed these distinctions were less important in identifying housing problems.

What has been learned about the potential application of ERHAP.

Overall, the results of this preliminary pilot test demonstrate that an artificial intelligence system can be effectively used to evaluate the homes of elderly individuals. ERHAP proved to be an accurate evaluation system. However, ERHAP requires additional programming to provide an evaluation which is more comprehensive than the existing program.

By identifying inadequacies in the elderly individual's home, it is hoped that the elderly individual will be
inclined to make some effort towards improving or adapting their environment. This in turn will allow the elderly individuals to remain in their homes and live independently for a longer period of time.
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TABLE 4.1

BATHROOM SAFETY

LEGEND
ERHAP

EXPERTS

0 10 20 30 40 50 60 70 80 90
GRAB BARS FOR THE TOILET
HORIZ GRAB BARS/TUB
VERTI GRAB BARS
BATHROOM LOCKS
UNLOCKABLE EMERGENCY CALL BUTTON
DOOR SWING
BUILT-IN/PRTBLE TUBSEAT
<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throw rugs in shower/tub</td>
<td>80%</td>
</tr>
<tr>
<td>Threshold into shower/tub</td>
<td>50%</td>
</tr>
<tr>
<td>Slippery tub/shower surfaces</td>
<td>20%</td>
</tr>
<tr>
<td>High/low toilet seat</td>
<td>30%</td>
</tr>
<tr>
<td>No outlet near lavatory</td>
<td>40%</td>
</tr>
<tr>
<td>Unsafe electrical outlets</td>
<td>10%</td>
</tr>
<tr>
<td>No ground fault interrupter</td>
<td>5%</td>
</tr>
</tbody>
</table>
TABLE 4.4

BATHROOM FUNCTION

FLEXIBLE SHOWER CONTROL
FAN/VENT
DIFFICULT FAUCET HANDLES
NONFUNCTIONAL DRAINAGE
UNNEEDED FURNISHINGS
UNADJ STORAGE SHELVES
INTERFER DR SWINGS
WINDOW IN SHWR

0 10 20 30 40 50 60 70
TABLE 4.5.

BATHROOM FUNCTION

<table>
<thead>
<tr>
<th>Condition</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate Clear Space</td>
<td>9</td>
</tr>
<tr>
<td>Exposed Pipes</td>
<td>9</td>
</tr>
<tr>
<td>Difficult Cabinet Pulls</td>
<td>9</td>
</tr>
<tr>
<td>Unaccessible Toilet Tissue</td>
<td>4</td>
</tr>
<tr>
<td>No Shower Curtain/Dr</td>
<td>2</td>
</tr>
<tr>
<td>Inadequate Ceiling Height</td>
<td>2</td>
</tr>
<tr>
<td>Wooden Cabinet</td>
<td>2</td>
</tr>
<tr>
<td>Condition</td>
<td>Percentage</td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>Inadequate lighting</td>
<td>80</td>
</tr>
<tr>
<td>Incorrect fire control</td>
<td>60</td>
</tr>
<tr>
<td>Mirror placement</td>
<td>50</td>
</tr>
<tr>
<td>Tub placement</td>
<td>40</td>
</tr>
<tr>
<td>Location</td>
<td>30</td>
</tr>
<tr>
<td>Lighting</td>
<td>20</td>
</tr>
<tr>
<td>Safety measures</td>
<td>10</td>
</tr>
</tbody>
</table>

TABLE 4.6

BATHROOM COMFORT / KITCHEN SAFETY

---

78
TABLE 4.8

KITCHEN SAFETY

- Stove top cluttered/flammable
- Extension cords
- Chairs without armrests
- No deadbolt to exterior exit
- Insufficient clear space
- Location of cooktop controls
- Utensils stored directly above cooktop surface
TABLE 4.9

KITCHEN FUNCTION

- Cabinets too high
- Secure storage for valuables
- Drawer pulls difficult to grasp
- Cabinet inaccessible (must use step stool)
- Countertop too deep
- Shelves too deep
- Items not stored in front of shelves
TABLE 4.10.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelves limited adjustment</td>
<td>25</td>
</tr>
<tr>
<td>Shelves inaccessible (not adj/tbl)</td>
<td>20</td>
</tr>
<tr>
<td>Kitchen is unclean</td>
<td>16</td>
</tr>
<tr>
<td>Kitchen has pests</td>
<td>14</td>
</tr>
<tr>
<td>Inaccess. below counter storage</td>
<td>10</td>
</tr>
<tr>
<td>Below counter storage not adj.</td>
<td>8</td>
</tr>
<tr>
<td>Shelves have no raised lip</td>
<td>6</td>
</tr>
</tbody>
</table>
TABLE 4.12

KITCHEN FUNCTION

- Non-Tactile CounterCtrls
- In-Adot Sink Task Lighting
- In-Adot Cabinet Task Lighting
- Swing/Bi-Fold Cabinet Drs
- Manual Defrost Refriger
- Non-Functional Refriger
- Cabinet Drawers Hard to Pull Open/Close
TABLE 4.13

KITCHEN FUNCTION

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinet Inaccess</td>
<td>16</td>
</tr>
<tr>
<td>Cabinets Above Counter</td>
<td>14</td>
</tr>
<tr>
<td>Inadequate Center Space</td>
<td>12</td>
</tr>
<tr>
<td>Inappropriate Refrigerator Swing</td>
<td>10</td>
</tr>
<tr>
<td>Dish Interference W/ Mobility</td>
<td>8</td>
</tr>
<tr>
<td>Insufficient Electrical Outlets</td>
<td>6</td>
</tr>
</tbody>
</table>
TABLE 4.15

KITCHEN FUNCTION

- Portable Dishwasher
- Upper Cabinets to Low
- Inaccessible Stove Below Oven
- Casement Windows
- CRANK HANDLES
- Stools Are for Inadequate Seating
- Step Stool
TABLE 4.16

BEDROOM SAFETY

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke Alarm</td>
<td>60</td>
</tr>
<tr>
<td>Light Source Within Reach of Bed</td>
<td>45</td>
</tr>
<tr>
<td>Continuous Burn Night Light</td>
<td>50</td>
</tr>
<tr>
<td>Portable Light Source (Flashlight)</td>
<td>35</td>
</tr>
<tr>
<td>Bed Height</td>
<td>40</td>
</tr>
<tr>
<td>Unsafe Flammable Sounding</td>
<td>30</td>
</tr>
<tr>
<td>Throw Rugs</td>
<td>20</td>
</tr>
<tr>
<td>Deaf/Fire Alarm</td>
<td>5</td>
</tr>
</tbody>
</table>
TABLE 4.17

BEDROOM SAFETY

<table>
<thead>
<tr>
<th>Item</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headboard Unglued Headboard</td>
<td></td>
</tr>
<tr>
<td>No Lighting</td>
<td></td>
</tr>
<tr>
<td>Deaf/Blind/Fire Alarm</td>
<td></td>
</tr>
<tr>
<td>Light Switches</td>
<td></td>
</tr>
<tr>
<td>Bedside Phone</td>
<td></td>
</tr>
<tr>
<td>Inadequate Phone Jacks</td>
<td></td>
</tr>
<tr>
<td>Inadequate Clear Space</td>
<td></td>
</tr>
<tr>
<td>Plumbing/Appliance</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 4.18

BEDROOM FUNCTION

- INADQ CLOSET STAGE
- DR. PULLS DIFFICULT TO MANIPULATE
- SAGGING MATTRESS
- MATTRESS TOO SOFT
- CLOSET LIGHTING
- VISUAL PRIVACY
- SHOE STORAGE
TABLE 4.19

BEDROOM FUNCTION

- Interfering nonessential
- LDRS
- Inaccess clothes rod
- Clothes rod not adjusted
- No designated clothes storage
- Items knocked from bedside
- Inappropriate bedside

<table>
<thead>
<tr>
<th>Issue</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interfering nonessential</td>
<td>16</td>
</tr>
<tr>
<td>LDRS</td>
<td>14</td>
</tr>
<tr>
<td>Inaccess clothes rod</td>
<td>12</td>
</tr>
<tr>
<td>Clothes rod not adjusted</td>
<td>10</td>
</tr>
<tr>
<td>No designated clothes storage</td>
<td>8</td>
</tr>
<tr>
<td>Items knocked from bedside</td>
<td>6</td>
</tr>
<tr>
<td>Inappropriate bedside</td>
<td>4</td>
</tr>
</tbody>
</table>
TABLE 4.20

BEDROOM FUNCTION

<table>
<thead>
<tr>
<th>Function</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interference with public space</td>
<td>5</td>
</tr>
<tr>
<td>Bedside table</td>
<td>10</td>
</tr>
<tr>
<td>Bedside table</td>
<td>15</td>
</tr>
<tr>
<td>Designated dressing area</td>
<td>20</td>
</tr>
<tr>
<td>Clear space at foot/sides</td>
<td>30</td>
</tr>
<tr>
<td>TV placement</td>
<td>5</td>
</tr>
<tr>
<td>Designated clothes storage</td>
<td>15</td>
</tr>
<tr>
<td>Bed is located in a draft</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>
### TABLE 4.21

<table>
<thead>
<tr>
<th>Issue</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No thermostat control</td>
<td>90</td>
</tr>
<tr>
<td>Bedside light inappropriate</td>
<td>30</td>
</tr>
<tr>
<td>Inadequate bedside lighting</td>
<td>20</td>
</tr>
<tr>
<td>No privacy from public areas</td>
<td>10</td>
</tr>
<tr>
<td>Noisy location for bedroom</td>
<td>5</td>
</tr>
<tr>
<td>Glare from outside</td>
<td>2</td>
</tr>
</tbody>
</table>
TABLE 4.22

LIVING AREA-SAFETY

- Inadequate clear space between furn.
- Fireplace w/o safety screen
- Piano bench w/o arm rests
- Sharp pointed furn.
- Furn. not sturdy
- Furn. located too close to heat src.
- Fireplace hearth in traffic path.
# TABLE 4.23

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIVING AREA: SAFETY</td>
<td></td>
</tr>
<tr>
<td>Air conditioner</td>
<td></td>
</tr>
<tr>
<td>Inadequate storage</td>
<td></td>
</tr>
<tr>
<td>Storage/Space</td>
<td></td>
</tr>
<tr>
<td>Seating</td>
<td></td>
</tr>
<tr>
<td>Ceiling</td>
<td></td>
</tr>
<tr>
<td>Window</td>
<td></td>
</tr>
<tr>
<td>Thermos</td>
<td></td>
</tr>
<tr>
<td>Crackeds</td>
<td></td>
</tr>
<tr>
<td>Thermostat</td>
<td></td>
</tr>
<tr>
<td>Coils</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td></td>
</tr>
<tr>
<td>Near</td>
<td></td>
</tr>
<tr>
<td>Reflecting</td>
<td></td>
</tr>
<tr>
<td>Nt</td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td></td>
</tr>
<tr>
<td>(Loose Location)</td>
<td></td>
</tr>
<tr>
<td>Exposed</td>
<td></td>
</tr>
<tr>
<td>For telephone</td>
<td></td>
</tr>
<tr>
<td>Exposed to a plant</td>
<td></td>
</tr>
<tr>
<td>Manipulation to read heat</td>
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TABLE 4.27

STAIRS: SAFETY

<table>
<thead>
<tr>
<th>Condition</th>
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<tr>
<td>Floor Covering</td>
<td>90</td>
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<tr>
<td>Traverse Short Distance</td>
<td>40</td>
</tr>
<tr>
<td>Frequent Path of Travel</td>
<td>30</td>
</tr>
<tr>
<td>Visual Difficulty</td>
<td>20</td>
</tr>
<tr>
<td>Grasp Hold Handrails</td>
<td>10</td>
</tr>
<tr>
<td>No Handrails</td>
<td>5</td>
</tr>
<tr>
<td>Railing Entire Length Of Stairs</td>
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Legend: 
- Grey: High Risk
- Black: Low Risk
<table>
<thead>
<tr>
<th>Issue</th>
<th>Value</th>
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<tbody>
<tr>
<td>Handrails to secure surface</td>
<td>7</td>
</tr>
<tr>
<td>Nonuniform height</td>
<td>2</td>
</tr>
<tr>
<td>Blind/uses stairs</td>
<td>2</td>
</tr>
<tr>
<td>Inadequate lighting</td>
<td>2</td>
</tr>
<tr>
<td>Exposed bulb in stairwell</td>
<td>4</td>
</tr>
<tr>
<td>Stairway landing cluttered</td>
<td>6</td>
</tr>
<tr>
<td>Stairs to enter dwelling</td>
<td>2</td>
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### TABLE 4.29

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>Takes medication/difficulty read</td>
<td>4.5</td>
</tr>
<tr>
<td>Dwelling has no airconditioning</td>
<td>4.0</td>
</tr>
<tr>
<td>Dining area no view to outside</td>
<td>4.0</td>
</tr>
<tr>
<td>WTR HTR located in LA</td>
<td>2.5</td>
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<tr>
<td>Porch chair w/o armrests</td>
<td>2.0</td>
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<tr>
<td></td>
<td>EXHAP</td>
</tr>
<tr>
<td>---</td>
<td>-------</td>
</tr>
<tr>
<td>2</td>
<td>bathroom:safety</td>
</tr>
<tr>
<td>3</td>
<td>GRAB BARS FOR THE TOILET</td>
</tr>
<tr>
<td>4</td>
<td>HORIZ GRAB BARS/TUB</td>
</tr>
<tr>
<td>5</td>
<td>VERTI GRAB BARS</td>
</tr>
<tr>
<td>6</td>
<td>BATHROOM DOOR LOCKS</td>
</tr>
<tr>
<td>7</td>
<td>UNLOCKABLE DR LOCKS</td>
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<tr>
<td>8</td>
<td>EMERGENCY CALL BUTTON</td>
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<td>9</td>
<td>DOOR SWING</td>
</tr>
<tr>
<td>10</td>
<td>BUILT-IN/PATBLE TUBSEAT</td>
</tr>
<tr>
<td>11</td>
<td>THROW RUGS</td>
</tr>
<tr>
<td>12</td>
<td>THRESHOLD INTO SHOWER/TUB</td>
</tr>
<tr>
<td>13</td>
<td>SLIPPERY TUB/SHWR. SURFACE</td>
</tr>
<tr>
<td>14</td>
<td>HIGH/LOW TOILET SEAT</td>
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<tr>
<td>15</td>
<td>NO ELECTRIC OUTLET NEAR LAUNDRY</td>
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<td>16</td>
<td>UNSAFE ELECTRICAL OUTLETS</td>
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<td>17</td>
<td>NO GROUND FAULT INTERRUPTER</td>
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<td>18</td>
<td>DANGEROUS SHOWER DOOR</td>
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<td>19</td>
<td>GRAB RAIL HEIGHT</td>
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<td>20</td>
<td>SLIPPERY FLOOR SURFACE</td>
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<td>21</td>
<td>UNSAFE APPLIANCES</td>
</tr>
<tr>
<td>22</td>
<td>WATER HEATER W/O A DRAIN</td>
</tr>
<tr>
<td>23</td>
<td>NO TOWEL BARS</td>
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<tr>
<td>24</td>
<td>bathroom:function</td>
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<tr>
<td>25</td>
<td>FLEXIBLE SHOWER CONTROL</td>
</tr>
<tr>
<td>26</td>
<td>FAN/VENT</td>
</tr>
<tr>
<td>27</td>
<td>DIFFICULT FAUCET HANDLES</td>
</tr>
<tr>
<td>28</td>
<td>NONFUNCTIONAL DRAINAGE</td>
</tr>
<tr>
<td>29</td>
<td>UNNEEDED FURNISHINGS</td>
</tr>
<tr>
<td>30</td>
<td>UNADJ STORAGE SHELVES</td>
</tr>
<tr>
<td>31</td>
<td>INTERFER OR SWINGS</td>
</tr>
<tr>
<td>32</td>
<td>WINDOW IN SHWR</td>
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<tr>
<td>33</td>
<td>INADQ CLEAR SPACE</td>
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<tr>
<td>34</td>
<td>EXPOSED PIPES</td>
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<td>35</td>
<td>DIFFICULT CABINET PULLS</td>
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<td>36</td>
<td>UNACISBLE TOILET TISSUE</td>
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<td>37</td>
<td>NO SHWR CURTAIN/DR</td>
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<td>38</td>
<td>INADQ CEILING Hght</td>
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<td>39</td>
<td>WOODEN CABINET</td>
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<td>---</td>
<td>--------------------------------</td>
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<tr>
<td>40</td>
<td>bathroom: comfort</td>
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<tr>
<td>41</td>
<td>INADQ TUB LIGHTING</td>
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<td>42</td>
<td>INADEQUATE LIGHTING</td>
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<td>43</td>
<td>GLARE DUE TO LIGHTING</td>
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<td>44</td>
<td>INCORRECT MIRROR PLMNT</td>
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<td>45</td>
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<td>46</td>
<td>FIRE CONTROL AGENT</td>
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<tr>
<td>48</td>
<td>UNACCESS WATER TEMP CNTRL</td>
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<tr>
<td>49</td>
<td>OPEN FLAME GAS STOVE</td>
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<tr>
<td>50</td>
<td>STOVE TOP CLUTTERED/FLAMMABLE</td>
</tr>
<tr>
<td>51</td>
<td>EXTENSION CORDS</td>
</tr>
<tr>
<td>52</td>
<td>CHAIRS WITHOUT ARMRESTS</td>
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<td>53</td>
<td>NO DEADBOLT TO EXTERIOR EXIT</td>
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<tr>
<td>54</td>
<td>INSUFFICIENT CLEAR SPACE</td>
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<td>55</td>
<td>LOCATION OF COOKTOP CONTROLS</td>
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<td>56</td>
<td>UTENSILS STRD DIRECTLY ABVE CKTOP SURF</td>
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<td>57</td>
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<tr>
<td>58</td>
<td>CABINETS TOO HIGH</td>
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<td>SECURE STORAGE FOR VALUABLES</td>
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<td>DRAWER PULLS DIFFICULT TO GRASP</td>
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<td>61</td>
<td>CABNT INACCESS (MUST USE STPSTOOL)</td>
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<td>CBNT OVER COOKTOP</td>
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<td>63</td>
<td>SHELVES TOO DEEP</td>
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<td>64</td>
<td>ITEMS NOT STRD IN FANT OF SHELVES</td>
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<td>65</td>
<td>SHELVES LIMITED ADJUSTMENT</td>
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<tr>
<td>66</td>
<td>SHELVES INACCESSIBLE (NOT ADJTB)</td>
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<td>67</td>
<td>KITCHEN IS UNELEAN</td>
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<td>KITCHEN HAS PESTS</td>
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<td>69</td>
<td>INACCESS. BELOW COUNTER STAGE.</td>
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<td>BELOW COUNTER STAGE. NOT ADJ.</td>
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<td>SHELVES HAVE NO RAISED LIP</td>
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<td>DIFFICULT FAUCET HANDLES</td>
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<td>74</td>
<td>SHELVES ARE NON-TRANSPARENT</td>
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<td>NO DRAWER SAFETY STOPS</td>
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<td>Inadq Cntr Cabinet Lighting</td>
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<td>82</td>
<td>Swing/Bi-Fold Cabinet Drs</td>
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<td>84</td>
<td>Non-Functional Refrig</td>
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<td>85</td>
<td>Cabnt Daws Hard To Pull Open/Close</td>
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<td>87</td>
<td>Cabinet Inaccess</td>
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<td>Cabinets Above CkTop</td>
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<td>89</td>
<td>Inadq Cnter Space</td>
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<td>94</td>
<td>Inaccess Cnter Space</td>
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<td>Plcment Of Thermostat</td>
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<td>Patble Light Source (Flashlight)</td>
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<td>110</td>
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<td>112</td>
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<td>113</td>
<td>Deaf/Fire Alarm</td>
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<td>114</td>
<td>Headboard Height</td>
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<td>Uncushioned Headboard</td>
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<td>Deaf-Blind/Fire Alarm</td>
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<tr>
<td><strong>118</strong> LIGHT SWITCHES DO NOT GLOW</td>
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<tr>
<td><strong>119</strong> BEDSIDE PHONE</td>
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<tr>
<td><strong>120</strong> INADQ PHONE JACKS</td>
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<td><strong>121</strong> INADQ CLEAR SPACE</td>
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</tr>
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<td><strong>122</strong> PLCMNT OF ELECTRICAL APPLIANCES</td>
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<td><strong>123</strong> bedroom:function</td>
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<tr>
<td><strong>124</strong> INADQ CLOSET STAGE</td>
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</tr>
<tr>
<td><strong>125</strong> OR PULLS DIFFICULT TO MANIPULATE</td>
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<td><strong>127</strong> MATTRESS TOO SOFT</td>
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<td><strong>128</strong> CLOSET LIGHTING</td>
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<td><strong>129</strong> VISUAL PRIVACY</td>
<td>18.2</td>
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<tr>
<td><strong>130</strong> SHOE STORAGE</td>
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<tr>
<td><strong>131</strong> INTERFERING OR SWING</td>
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<tr>
<td><strong>132</strong> NONESSENTIAL DAS</td>
<td>15.9</td>
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<td><strong>133</strong> INACCESS CLOTHES ROD</td>
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<td><strong>134</strong> CLOTHES ROD NOT ADJ</td>
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<tr>
<td><strong>135</strong> NO DESIGNATED CLOTHES STORAGE</td>
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<tr>
<td><strong>136</strong> ITEMS KNOCKED FROM BEDSIDE STAG</td>
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<tr>
<td><strong>137</strong> INAPPROPRIATE BEDSIDE STAG</td>
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<tr>
<td><strong>138</strong> INTERFERENCE WITH PUBLIC SPACE</td>
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</tr>
<tr>
<td><strong>139</strong> BEDSIDE TABLE TOO HIGH/LOW</td>
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</tr>
<tr>
<td><strong>140</strong> BEDSIDE TABLE INSUFFICIENT</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>141</strong> DESIGN TO DRESSING AREA W/SEATING</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>142</strong> CLEAR SPACE AT FOOT/SIDES OF BED</td>
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</tr>
<tr>
<td><strong>143</strong> TV PLCMNT</td>
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<tr>
<td><strong>144</strong> DESIGN CLOTHES STAGE</td>
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</tr>
<tr>
<td><strong>145</strong> BED IS LOCATED IN A DRAFT</td>
<td>31.8</td>
</tr>
<tr>
<td><strong>146</strong> bedroom comfort</td>
<td></td>
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<tr>
<td><strong>147</strong> NO THERMOSTATE CNTRL</td>
<td>88.6</td>
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<tr>
<td><strong>148</strong> BEDSIDE LIGHT INAPPRO</td>
<td>29.5</td>
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<tr>
<td><strong>149</strong> INADQ BEDSIDE LIGHTING</td>
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</tr>
<tr>
<td><strong>150</strong> NO PRIVACY FROM PUBLIC AREAS</td>
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<tr>
<td><strong>151</strong> NOISY LOCATION FOR BDR.</td>
<td>9.1</td>
</tr>
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<td><strong>152</strong> RECEIVES GLARE FROM OUTSIDE</td>
<td>9.1</td>
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<tr>
<td><strong>153</strong> living area</td>
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<tr>
<td><strong>154</strong> INADQ CLEAR SPACE BETWN FURN.</td>
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<tr>
<td><strong>155</strong> FIREPLACE W/O SAFETY SCREEN</td>
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</tr>
<tr>
<td><strong>156</strong> PIANOBENCH W/O ARM RESTS</td>
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</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>157</td>
<td>SHARP POINTED FURN</td>
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<tr>
<td>158</td>
<td>FURN NOT STURDY</td>
</tr>
<tr>
<td>159</td>
<td>FURN LOCATED TO CLOSE TO HEAT SR.</td>
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<tr>
<td>160</td>
<td>FIREPLACE HEARTH IN TRAFFIC PTH.</td>
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<td>161</td>
<td>AIRCONDITIONER COILS EXPOSED TO LA</td>
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<tr>
<td>162</td>
<td>INADQ. STORAGE/DISPLAY FOR PLANTS</td>
</tr>
<tr>
<td>163</td>
<td>STORAGE SPACE NEAR TELEPHONE</td>
</tr>
<tr>
<td>164</td>
<td>SEATING BY PHONE</td>
</tr>
<tr>
<td>165</td>
<td>CEILING IS NON-REFLECTING</td>
</tr>
<tr>
<td>166</td>
<td>WINDOW TREATMENT MANIPULATION</td>
</tr>
<tr>
<td>167</td>
<td>THERMOSTATE DIFFICULT TO READ</td>
</tr>
<tr>
<td>168</td>
<td>CRACKED WINDOW (LOSE HEAT)</td>
</tr>
<tr>
<td>169</td>
<td>THERMOSTATE LOCATION</td>
</tr>
<tr>
<td>170</td>
<td>living area: comfort</td>
</tr>
<tr>
<td>171</td>
<td>FURNACES DRESSING AREA</td>
</tr>
<tr>
<td>172</td>
<td>NO SLEEPING AREAS FOR GUESTS</td>
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<tr>
<td>173</td>
<td>FURN FACE PRIMARY ENTRANCE</td>
</tr>
<tr>
<td>174</td>
<td>EXTERIOR ENTRANCE NO PRIVACY</td>
</tr>
<tr>
<td>175</td>
<td>WALLS DARK AND NON/REFLECTANT</td>
</tr>
<tr>
<td>176</td>
<td>WALL CAUSE GLARE</td>
</tr>
<tr>
<td>177</td>
<td>INACCESSIBLE STEREO</td>
</tr>
<tr>
<td>178</td>
<td>doors: safety</td>
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<tr>
<td>179</td>
<td>LEADING DOOR EDGES ARE SHARP</td>
</tr>
<tr>
<td>180</td>
<td>UNNECESSARY STORM/SCREEN DOORS</td>
</tr>
<tr>
<td>181</td>
<td>MOVEABLE DOORSTOPS</td>
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<tr>
<td>182</td>
<td>EXTERIOR DOOR-ONE PEEPHOLE</td>
</tr>
<tr>
<td>183</td>
<td>PEEPHOLE TOO HIGH/LOW</td>
</tr>
<tr>
<td>184</td>
<td>FLOR SURFACE IS NOT FLAT</td>
</tr>
<tr>
<td>185</td>
<td>RAISED THRESHOLD</td>
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<tr>
<td>186</td>
<td>PROTRUDING STRIKER PLATES</td>
</tr>
<tr>
<td>187</td>
<td>doors: function</td>
</tr>
<tr>
<td>188</td>
<td>OUTSIDE FLR DOES NOT SLOPE</td>
</tr>
<tr>
<td>189</td>
<td>DOORS ARE INCORRECTLY ATTACHED</td>
</tr>
<tr>
<td>190</td>
<td>TABLE/SHELF EXTERIOR ENTRANCE</td>
</tr>
<tr>
<td>191</td>
<td>DOOR KICKPLATES</td>
</tr>
<tr>
<td>192</td>
<td>VISUALLY IMPAIRED/IN/OUT FLOOR LEVE</td>
</tr>
<tr>
<td>193</td>
<td>MAIL SLOT LOCATION</td>
</tr>
<tr>
<td>194</td>
<td>SOLID ENTRANCE DOOR</td>
</tr>
<tr>
<td>195</td>
<td>stairs:safety</td>
</tr>
<tr>
<td></td>
<td>Frequency Table</td>
</tr>
<tr>
<td>---</td>
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<tr>
<td>196</td>
<td>FLOOR COVERING</td>
</tr>
<tr>
<td>197</td>
<td>TRAVERSE SHORT DISTANCE</td>
</tr>
<tr>
<td>198</td>
<td>FREQUENT PATH OF TRAVEL</td>
</tr>
<tr>
<td>199</td>
<td>VISUAL DIFFICULTY</td>
</tr>
<tr>
<td>200</td>
<td>GRASP/HOLD HANDRAILS</td>
</tr>
<tr>
<td>201</td>
<td>NO HANDRAILS</td>
</tr>
<tr>
<td>202</td>
<td>RAILING ENTIRE LENGTH OF STAIRS</td>
</tr>
<tr>
<td>203</td>
<td>HANDRAILS TO SECURE SURFACE</td>
</tr>
<tr>
<td>204</td>
<td>NONUNIFORM HIGHT</td>
</tr>
<tr>
<td>205</td>
<td>BLIND/USES STAIRS</td>
</tr>
<tr>
<td>206</td>
<td>INADQ LIGHTING</td>
</tr>
<tr>
<td>207</td>
<td>EXPOSED BULB IN STAIRWELL</td>
</tr>
<tr>
<td>208</td>
<td>STAIRWAY LANDING CLUTTERED</td>
</tr>
<tr>
<td>209</td>
<td>STAIRS TO ENTER DWELLING</td>
</tr>
<tr>
<td>210</td>
<td>additional:remarks</td>
</tr>
<tr>
<td>211</td>
<td>TAKES MEDICATION/DIFFICULTY READ</td>
</tr>
<tr>
<td>212</td>
<td>DWELLING HAS NO AIRCONDITIONING</td>
</tr>
<tr>
<td>213</td>
<td>DINING AREA NO VIEW TO OUTSIDE</td>
</tr>
<tr>
<td>214</td>
<td>WTR HTR LOCATED IN LA</td>
</tr>
<tr>
<td>215</td>
<td>PORCH CHAIR W/O ARMRESTS</td>
</tr>
<tr>
<td>216</td>
<td>LOW FURNITURE</td>
</tr>
<tr>
<td>217</td>
<td>INAPPROPRIATE THERMOSTATE</td>
</tr>
<tr>
<td>218</td>
<td>UNECESSARY FURNITURE</td>
</tr>
<tr>
<td>219</td>
<td>FURNITURE OBSTRUCTS DR. SWING</td>
</tr>
<tr>
<td>label</td>
<td>value label</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>race</td>
<td>00</td>
</tr>
<tr>
<td>RACE</td>
<td>1=cauc 2=black</td>
</tr>
<tr>
<td>sex</td>
<td>1=female 2=male</td>
</tr>
<tr>
<td>SEX</td>
<td></td>
</tr>
<tr>
<td>marital status</td>
<td>1=married 2=seperated 3=divorced 4=widowed 5=single 8=other</td>
</tr>
<tr>
<td>MSTATUS</td>
<td></td>
</tr>
<tr>
<td>living alone</td>
<td>1=yes 2=no</td>
</tr>
<tr>
<td>LSTATUS</td>
<td></td>
</tr>
<tr>
<td>education</td>
<td>01-08 elemen. 09-12 high sch. 13-16 college 17-21 profess. 88 other</td>
</tr>
<tr>
<td>EDUCATE</td>
<td></td>
</tr>
<tr>
<td>occupation</td>
<td>01=farmer 02=professional 03=administrator/manager 04=foreman or supervisor 05=skilled craftsman 06=laborer 07=clerical worker 08=service worker 09=homemaker 10=no occupation 88=other</td>
</tr>
<tr>
<td>JSTATUS</td>
<td></td>
</tr>
<tr>
<td>length of residence</td>
<td>00</td>
</tr>
<tr>
<td>RESIDE</td>
<td></td>
</tr>
<tr>
<td>physically handicapped</td>
<td>1=yes 2=no</td>
</tr>
<tr>
<td>PHYHAND</td>
<td></td>
</tr>
<tr>
<td>home ownership</td>
<td>1=own 2=rent 3=rent free</td>
</tr>
<tr>
<td>OWNER</td>
<td></td>
</tr>
<tr>
<td>bldg. type</td>
<td>1=apartment in house 2=apartment building (1-3 floors) 3=apartment building (more than three floors) 4=town house 5=duplex 6=mobile home (sw) 7=mobile home (dw) 8=mobile home with attached structure 9=single family detached home (1 story) 10=single family detached home (2 story) 11=single family detached home (3 story) 88=other</td>
</tr>
<tr>
<td>Community Size</td>
<td>COMSIZE</td>
</tr>
<tr>
<td>----------------</td>
<td>---------</td>
</tr>
<tr>
<td>1</td>
<td>on a farm or in the open country</td>
</tr>
<tr>
<td>2</td>
<td>in a very small town, less than 1,000</td>
</tr>
<tr>
<td>3</td>
<td>in a small town or city, 1,000 to 10,000</td>
</tr>
<tr>
<td>4</td>
<td>in a medium sized town, 10,000 to 50,000</td>
</tr>
<tr>
<td>5</td>
<td>in a large city, 50,000 to 100,000</td>
</tr>
<tr>
<td>6</td>
<td>in a very large city, 100,000 and above</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health Rate</th>
<th>HEALTH</th>
<th>1</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>very poor to excellent</td>
<td>1-7</td>
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<table>
<thead>
<tr>
<th>Sensitive to Temperature</th>
<th>SENTEMP</th>
<th>1</th>
<th>20</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>sensitive to minor</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>sensitive to major</td>
<td>2-8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>insensitive to minor</td>
<td>3-8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>insensitive to major</td>
<td>4-8</td>
<td></td>
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<table>
<thead>
<tr>
<th>Weakness in Lower Extremities</th>
<th>WEAKNES</th>
<th>1</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>yes</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>no</td>
<td>2-8</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physically Handicapped</th>
<th>PHYSICAL</th>
<th>1</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>yes</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>no</td>
<td>2-8</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Supportive Aid</th>
<th>SUPRAID</th>
<th>1</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>yes</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>no</td>
<td>2-8</td>
<td></td>
</tr>
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<table>
<thead>
<tr>
<th>Use Wheelchair</th>
<th>USEWHCR</th>
<th>1</th>
<th>24</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>yes</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>no</td>
<td>2-8</td>
<td></td>
</tr>
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<table>
<thead>
<tr>
<th>Use Walking Aid</th>
<th>USEWALK</th>
<th>1</th>
<th>25</th>
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<tbody>
<tr>
<td>1</td>
<td>cane</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>walker</td>
<td>2-8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>no aids are used</td>
<td>3-8</td>
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<table>
<thead>
<tr>
<th>Hearing</th>
<th>HEARING</th>
<th>1</th>
<th>26</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>not deaf</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>partially deaf</td>
<td>2-8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>deaf</td>
<td>3-8</td>
<td></td>
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<table>
<thead>
<tr>
<th>Vision</th>
<th>VISION</th>
<th>1</th>
<th>27</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>excellent</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>good</td>
<td>2-8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>fair</td>
<td>3-8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>poor</td>
<td>4-8</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>totally blind</td>
<td>5-8</td>
<td></td>
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<table>
<thead>
<tr>
<th>Bending Difficulty</th>
<th>DIFBEND</th>
<th>1</th>
<th>28</th>
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<tbody>
<tr>
<td>1</td>
<td>yes</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>no</td>
<td>2-8</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Coordination</th>
<th>COORDIN</th>
<th>1</th>
<th>29</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>lack of physical coordination</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>lack of strength in upper extremities</td>
<td>2-8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>no problem with phys/streng.</td>
<td>3-8</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory</th>
<th>MEMORY</th>
<th>1</th>
<th>30</th>
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<tbody>
<tr>
<td>1</td>
<td>not forgetful</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>forgetful</td>
<td>2-8</td>
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<th>Take Prescribed Medication</th>
<th>MEDICIN</th>
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<tbody>
<tr>
<td>1</td>
<td>yes</td>
<td>1-8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>no</td>
<td>2-8</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Code</td>
<td>Value</td>
<td>Number</td>
</tr>
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<td>-------------------------</td>
<td>-------</td>
<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td>Mobility problems</td>
<td>1</td>
<td>yes</td>
<td>32</td>
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<tr>
<td></td>
<td>2</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>1</td>
<td>easily</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>quickly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>rarely</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>frequently</td>
<td></td>
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<tr>
<td>Dizzy when bending</td>
<td>1</td>
<td>yes</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Depth perception problems</td>
<td>1</td>
<td>yes</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>00</td>
<td></td>
<td>68, 69, c12</td>
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<tr>
<td>Race</td>
<td>1</td>
<td>caucasian</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>black</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>other</td>
<td></td>
</tr>
<tr>
<td>C#</td>
<td>P#</td>
<td>V#</td>
<td>RECOMMENDATION</td>
</tr>
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<td>----</td>
<td>----</td>
<td>----</td>
<td>----------------</td>
</tr>
<tr>
<td>c1</td>
<td>36</td>
<td>01</td>
<td>no changes now or in the future</td>
</tr>
<tr>
<td></td>
<td>37</td>
<td>02</td>
<td>no changes now but changes neccessary in future</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>03</td>
<td>minor changes should be made</td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>04</td>
<td>major changes, may need to move</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>05</td>
<td>replace bed with a sturdier bed</td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>06</td>
<td>increased bed storage</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>07</td>
<td>create a dressing area</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>08</td>
<td>window treatment that eliminates glare</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>09</td>
<td>small continuous-burning night light</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>10</td>
<td>install bedside lamp within reach, flash light</td>
</tr>
<tr>
<td></td>
<td>46</td>
<td>11</td>
<td>install central air in entire house</td>
</tr>
<tr>
<td></td>
<td>47</td>
<td>12</td>
<td>install a separate room-controlled thermostat</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>13</td>
<td>move location of bedroom</td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>14</td>
<td>create private space, install a pull-curtain rod</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>15</td>
<td>install bright, flashing alarm</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>16</td>
<td>vibrator alarm in bed</td>
</tr>
<tr>
<td></td>
<td>52</td>
<td>17</td>
<td>floor covering should be non-slip, throw rugs eliminated</td>
</tr>
<tr>
<td></td>
<td>53</td>
<td>18</td>
<td>bedspread should be tailored</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>19</td>
<td>bed height should be adjusted to wheelchair height</td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>20</td>
<td>furniture rearranged for access from BR to Bath</td>
</tr>
<tr>
<td></td>
<td>56</td>
<td>21</td>
<td>furniture arranged for 36&quot; unobstructed space</td>
</tr>
<tr>
<td></td>
<td>57</td>
<td>22</td>
<td>bed rearranged from draft</td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>23</td>
<td>install paddle handles</td>
</tr>
<tr>
<td></td>
<td>59</td>
<td>24</td>
<td>install extended lever for faucet handles</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>25</td>
<td>install push-pull handles for cupboard pulls</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td>26</td>
<td>lights should be installed in closets</td>
</tr>
<tr>
<td></td>
<td>62</td>
<td>27</td>
<td>closet, shelf, and drawer interiors should be light colored</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>28</td>
<td>increase lighting level on stairways</td>
</tr>
<tr>
<td></td>
<td>64</td>
<td>29</td>
<td>walls/ceilings near stairs light colored to reflect light</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>30</td>
<td>avoid sources of glare around stairs</td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>31</td>
<td>handrails on right/left side of stairs or steps</td>
</tr>
<tr>
<td></td>
<td>67</td>
<td>32</td>
<td>handrail easily grasped/slip resistant</td>
</tr>
<tr>
<td></td>
<td>68</td>
<td>33</td>
<td>lighting should directed out from mirror to avoid glare</td>
</tr>
<tr>
<td></td>
<td>69</td>
<td>34</td>
<td>lighting levels increased to min. 100w incandescent</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>35</td>
<td>incandecent/warm white deluxe fluor should be used</td>
</tr>
<tr>
<td></td>
<td>71</td>
<td>36</td>
<td>walls should be painted/papered in light colors</td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>37</td>
<td>lamp shades to prevent glare</td>
</tr>
<tr>
<td>c2</td>
<td>05</td>
<td>38</td>
<td>lampshades large enough to direct light flow</td>
</tr>
<tr>
<td></td>
<td>06</td>
<td>39</td>
<td>lampshades large enough to direct light flow</td>
</tr>
<tr>
<td></td>
<td>07</td>
<td>40</td>
<td>cover light fixture with a shade</td>
</tr>
<tr>
<td></td>
<td>08</td>
<td>41</td>
<td>cover light fixture with larger or opaque shade</td>
</tr>
<tr>
<td></td>
<td>09</td>
<td>42</td>
<td>ceiling should be light colored with a matte finish</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>43</td>
<td>portable shades should shade eyes when seated</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>44</td>
<td>portable shades should be tall enough</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>45</td>
<td>light switches should be 36&quot; from the floor</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>46</td>
<td>light switches should be located near room entrances</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>47</td>
<td>highly visible color should be applied to stair nosing</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>48</td>
<td>stairs should be adequately lighted</td>
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24 57 additional heat source
25 58 temperature control for water heater
26 59 pull-out counter boards
27 60 pull-out counter boards
28 61 cooktop controls with cooktop controls on front
29 62 minimum 25.6” kneespace
30 63 countertop should be installed which is 33.5” tall
31 64 doors should have kickplates installed
32 65 noessential doors should be removed
33 66 furnishings moved to allow 60x60 space inside door
34 67 platform bed
35 68 60x60 clear space for dressing in bedroom
36 69 nonessential doors should be removed
37 70 stairs should be replaced with a ramp
38 71 stairs should be avoided
39 72 stairway landing should be a 4x4 unobstructed space
40 73
41 74 continuous stair rail on both sides of stairs
42 75 stair rail should be non-slip
43 76 bench close to entrance
44 77 furnishings rearranged clear space from eating to living
45 78 furniture should be arranged for 42” wide clear space
46 79 stair rail should be on entire run of stairs
47 80 ramp installed over existing stairs
48 81 adapt present bed
49 82 replace existing bedside storage
50 83 remove unnecessary clutter from bedside table
51 84 replace existing bedside storage
52 85 adjustable toilet seat
53 86 toilet seat height should be 17” from the floor
54 87 adjustable toilet seat
55 88 toilet seat height should be 19” for wheelchair bound
56 89 extra furnishings around toilet area should be removed
57 90 60X60 clear space around the toilet area
58 91 12” clearance on each side of toilet (12-24” diagonal apr)
59 92 36” unobstructed space around toilet
60 93 handrails/grab bars installed behind/aside toilet
61 94 grab bars installed 32-37” from the floor
62 95 grab bar behind toilet (32-36” long, 4” above tank)
63 96 grab bars on side wall
64 97 all grab bars should be 11/2” from wall, 11/4”-1/1/2” dia.
65 98 color of grab bars should contrast with wall surface
66 99 toilet paper holder should be recessed
67 100 tissue holder located 19” from floor, slightly in front of toilet
68 101 sink should be raised/lowered to 32” from the floor to rim
69 102 sink should be raised to comfortable level
70 103 sink installed 36” from rim to floor
71 104 sink needs to have apron height of 27” from floor
72 105 area under sink should have minimum opening width 30”
73 106
74 107 lavatory should 17” depth under lavatory
75 108 lavatory faucet controls should be 16” from front edge
76 109 sink needs to be replaced
77 110
78 111 cabinets should not be used to store frequent items
79 112 cabinets should be used for seasonal items
80 113 cabinets over the cooktop area, removed by someone
81 114
82 115 cabinets used, retrieved by someone else
83 116 cabinets higher than 55”, used for rarely used items
16 117 lighting levels in kitchen area should be increased 617 65 INCLITE
17 118 task lighting over sink 618 66 LITESNK
18 119 task lighting over the cabinets 619 67 LITECAB
19 120 sufficient lighting over stove/cocktop 620 68 LITESTV
20 121 sliding doors should replace bifold or swing doors 621 69 CABBORS
21 122 adjustable shelving 15" and 63" 622 70 ADJRESH
22 123 appliances installed 43.3" unobstructed maneuvering 623 71 APPSPAC
23 124 large appliances, facing each other 48" maneuvering 624 72 FACAPP
24 125 stove top surface clean, free of fire hazard 625 05 c9 STOFEFR
25 126 larger cooking surface should be installed 626 06 LGRSTOV
26 127 safe to use matches around gas stove 627 07 GASSTOV
27 128 fire extinguisher near stove 628 08 FIREEXT
28 129 baking soda close to stove 629 09 BAKSODA
29 130 water heater installed to provide adq. hot water 630 10 WHTRADJ
30 131 counter top height should be no greater 33.5" 631 11 CTRHGHT
31 132 present space are to be no smaller than 30X18 632 12 CABCRSP
32 133 kitchen should be adapted to minimum of 48" between 633 13 MINKITC
33 134 existing kitchen should be minimum 60" between fixt. 634 14 MINFIXT
34 135 clearance of at least 40" between cabinets 635 15 CABCRLRS
35 136 existing cabinets removed to allow for easy access 636 16 CABESAC
36 137 drainage pipes checked for waste/mineral buildup 637 17 DRAINPS
37 138 drainage pipes replaced because of wear/wrong size 638 18 DRAINWS
38 139 contact reliable plumber to check drainage system 639 19 PLUMBR
39 140 stepstool should be sturdy 640 20 STPSTLS
40 141 stepstool should provide broad base of support 641 21 STPSTLB
41 142 stepstool should have handle bar/grab bar built-in 642 22 STPSTGB
42 143 existing refrigerator replaced with electric defrost refrig. 643 23 REFRIGD
43 144 existing refrigerator replaced with functional refrigerator 644 24 REFRIGF
44 145 existing washer/dryer replaced with front loading mach. 645 25 WDFRONT
45 146 carpets should be avoided (except low, level loop) 646 26 CARPETA
46 147 f/c handles replaced with extended lever/push-pull handles647 27 FCPULLS
47 148 knobs should be replaced by levers 648 28 LEVERSK
48 149 curled lever "D" handles installed for easy grasping 649 29 DLEVERS
49 150 self-closing door hinges 650 30 DRHINGE
50 151 medications should be properly labeled 651 31 MEDICIN
51 152 food stored in logical order/clearly labeled 652 32 FOODORD
52 153 food stored on shelves that are easy to reach 653 33 FODRECH
53 154 food stored on shelves that are easy to reach 654 34 RECHFOD
54 155 use electric stove 655 35 ELECSTV
55 156 resident should check for possible gas leak 656 36 GASLEAK
56 157 shelves or ledges placed at window sill 657 37 SHELEDG
57 158 plant stands at window areas 658 38 PLANST
58 159 window selected in living area for dining area 659 39 WINDIN
59 160 furnishings arranged for visually private entry 660 40 PRTENTR
60 161 screen/drapes to separate entry from living areas 661 41 PRTSCRN
61 162 existing mattress with firm mattress that doesn't sag 662 42 FIRMMAT
62 163 bed height allows for accessibility with causing pain 663 43 BGDHGHT
63 164 bed should be firm for person with back pain 664 44 FRIMBED
64 165 resident should move bedroom to another locating 665 45 BDROLCT
65 166 bedroom visually private rearrange furn./screens 666 46 BDRPRIV
66 167 headboard tall enough to support back 667 47 TLHEADB
67 168 headboard with a padded surface 668 48 PDHEADB
68 169 space in living area for mats or cots 669 49 MATCOTS
69 170 purchase sleeper sofa 670 50 SLEEPER
70 171 purchase double bed 671 51 DOUBLEB
71 172 seating provided by bed 672 52 SEATBED
72 173 table placed near the phone for storage 673 53 TABPHON
73 174 lighted phone/ enlarged dial 674 54 LITPHON
74 175 light source close to the phone 675 55 LITESRC
75 176 telephone jacks in various locations 676 56 PHNJACS
furnishing arrange in LA so won't face dressing area
seating source so resident can view over rail
replace existing railing material
select residence with recessed balconies
remove trash and garbage
reliable pest control agency evaluate
double swinging doors removed
doors hinged so that they do not interfere
5x5 landing space
sand leading edges of doors
striker plates filed
spring loaded doorstop
hinge pin door stops
doors correctly attached to door framing
doors hinged properly maintained and adjusted
closet door swing should be hinged to go out
locks installed that can be opened with screwdriver
glass doors should be clearly marked with stripes/decals
not use moveable door stops
contrasting color between inside/outside sliding doors
outside floor should slope away from doors
a catch installed for delayed action closure, sliding doors
resident should install peephole 42" from floor
install two peepholes
floor should be covered w/ non-skid surface, even wet
resident should remove all throw rugs
carpet should be firmly attached to floor
type of carpet utilized (low pile, looped, tightly woven)
hallway should be enlarged to a minimum of 42"
traffic lanes should be a min. of 36" wide
60x60 space for wheelchair to turn 180 degree turn
doors should be enlarged (32")
furnishing rearranged for 24" space on latch side of door
furnishing rearranged for 24" space on latch side of door
furnishing rearranged for 24" space on latch side of door
furnishing rearranged for 24" space on latch side of door
furnishing rearranged for 24" space on latch side of door
small shelf installed 36"-39" high on latch side of door
mail slot should be 36-42" from floor, with basket
exterior wall mounted box place 36"-42" by front door
"D" handle/lever installed on hinged side of door
eliminate storm and screen doors
"D" handle installed 36" from the floor
shelves should be shallow
items stored in the front of shelves
adjustable pullout shelves installed, drawers if possible
safety stops should be installed
shelf and drawer extension should be decreased
small trays installed
small trays should not be overloaded
peg board should be installed
storage of goods should allow for sideways approach
good moved to most accesible storage areas
lower shelves, edges should be rounded and raised
install lock in one drawer or cabinet
storage shelves adaptable 10" to 69.9"
install transparent shelves
move heavy items to storage area below shoulder height
heavy bulky items stored 20"-42.8" from floor
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<td>remove existing door and replace with curtain-pleated dr</td>
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<td>11</td>
<td>316</td>
<td>install shelves or cabinets</td>
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<td>12</td>
<td>317</td>
<td>medicine cabinet at eyerlevel of elder</td>
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<td>13</td>
<td>318</td>
<td>grab bar close to lavatory</td>
<td>818</td>
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<td>14</td>
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<td>install surface material that is slip resistant</td>
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<td>15</td>
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<td>electric outlets removed when near tub</td>
<td>820</td>
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<td>paint or wallcovering should not be glossy</td>
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<td>elder should remove extension cords</td>
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<td>replace existing light switches with pressure/roller swth.</td>
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<td>disabled electric outlets near tub</td>
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<td>install night light visible from bed</td>
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<td>install night light of low wattage</td>
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<td>night light that can be plugged directly in wall outlet</td>
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<td>floor surface materials bridge to form flat surface</td>
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<td>handrails installed to a secure material</td>
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<td>ceiling light should be covered or diffused</td>
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<td>electric outlet installed 38&quot; from floor located near lavtr.</td>
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<td>change inward swing of a door</td>
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<td>electric appliances under sink</td>
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<td>inadequate towel bars</td>
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<td>need shower curtain</td>
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<td>water heater located in Bath with no drain</td>
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<td>ceiling too low over toilet</td>
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<td>mirror placement too high when seated at vanity</td>
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<td>exposed pipes</td>
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<td>wooden cabinet located in shower</td>
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<td>window in shower</td>
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<td>peeling paint</td>
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<td>broken floor tile-worn flooring</td>
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<td>chairs without armrest</td>
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<td>pointed, sharp furniture</td>
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<td>furniture place in front of heat register</td>
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<td>low chilids chair, low furniture</td>
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<td>TV placement inappropriate for viewing</td>
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<td>no dead bolt</td>
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<td>inadequate counter space (storing appliances)</td>
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<td>cabinet clearance too low (between countertop)</td>
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<td>storage under oven unaccessible</td>
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51 356  casement window cranks                  856  33  CRANKSW
52 357  thermostat control in kitchen          857  34  THERMOC
53 358  inadequate electrical outlets          858  35  INAQOT
54 359  no storage space for stepstool          859  36  STORSTL
55 360  no seating available when preparing meals 860  37  SEATMLS
56 361  refrigerator door swing incorrect       861  38  REFIRGS
57 362  inadequate ventilation for stove        862  39  VENTILA
58 363  no kickplates for the cabinets          863  40  CABKIKP
59 364  light fixture is not centered of applied area 864  41  CENTLIT
60 365  inaccessible counter surface            865  42  COUTSRF
61 366  utensils stored directly over range     866  43  UTENSIL
62 367  cap sprayer hole in sink                867  44  CAPSRY
63 368  portable dishwasher had to manuever      868  45  PORTDWS
64 369  furniture obstructs the swing of a door  869  46  OBSTRUC
65 370  stereo equipment located on floor not elevated 870  47  STERIOE
66 371  no armrest on piano bench               871  48  PIANOBC
67 372  furniture to close to stove/fireplace    872  49  FURNCL
68 373  thermostat hard to read                 873  50  THERMOS
69 374  location of thermostat                 874  51  THERMOL
70 375  fireplace hearth (potential circulation problem) 875  52  HEARTHC
71 376  air conditioner coils exposed           876  53  COILAIR
72 377  electric heat pad in chair              877  54  ELECPAD

05 378  heat loss through window because of attena 878  55  HATTENA
06 379  newspaper in front of range             879  56  NEWSPPR
07 380  stairs into apartment building          880  57  APARTMT
08 381  task lighting in work areas             881  58  WORKTSK
09 382  inappropriate pull chain                882  59  PULLCHN
10 383  lighting impedes circulating            883  60  IMPLITE
11 384  laundry room circulation                884  61  LAUNDRY
12 385  furniture is not sturdy                 885  62  STURDYF
13 386  water heater in the living area         886  63  WHRLARE
14 387  porch chair without armrests            887  64  PRCHARM
15 388  inappropriate thermostat                888  65  THERMIN
16 389  inappropriate placement of electrical appliances 889  66  PLACELE
17 390  fireplace without glass doors            890  67  FIREPLA1
Hello, my name is [your name]. I am conducting a house inspection/assessment. This house assessment/inspection is being conducted to learn about your housing and your housing needs. The information that I will collect about your house will be processed through the use of a programmed computer. In turn, you will receive a list of recommendations of changes you could make to your house to make it safer, more functional, and comfortable.

I'd like to interview you now. Let me assure you that any information you provide will be kept strictly confidential.

STARTING TIME
__ : __ AM/PM

First I would like to ask you some questions concerning you, your house, and your community (check or fill in the appropriate answers).

1. How old were you on your last birthday? ___ years
2. Gender ___ Male ___ Female
3. Race  __Caucasian  __Black  __Asian  __Am. Indian
   __Other (please specify) ________________

4. What is your marital status?
   __married, living with spouse
   __separated, living alone
   __divorced, living alone
   __widowed
   __single, living alone
   __other (specify) ________________

5. Are you currently living alone?  __Yes  __No
   If NO, what is your relationship with this person?
   __spouse
   __relative
   __friend
   __other (specify) ________________

6. What is the highest grade of school that you completed (circle the appropriate answer)?
   None
   Elementary  00 01 02 03 04 05 06 07 08
   High School  09 10 11 12
   College (Technical Training)  13 14 15 16
   Professional or Graduate Work  17 18 19 20 21
   __Other (specify) ________________

7. Are you currently employed?  __Yes  __No
   If YES, do you work:
   __full time
   __part time
   __other (specify) ________________
   If NO, are you retired?  __Yes  __No

8. What is/was the principle occupation of the male head of this household?
   __00 no male head
   __01 farmer
   __02 professional
   __03 administrator or manager
   __04 foreman or supervisor
   __05 skilled craftsman
   __06 laborer
   __07 clerical worker
   __08 service worker
   __09 homemaker
   __10 no occupation
   __88 other (specify) ________________

9. What is/was the principle occupation of the female head of this household?
   __00 no female head
   __01 farmer
   __02 professional
   __03 administrator or manager
   __04 foreman or supervisor
   __05 skilled craftsman
   __06 laborer
   __07 clerical worker
   __08 service worker
   __09 homemaker
   __10 no occupation
   __88 other (specify) ________________

10. How long have you lived in this house?  __years  __months

11. Within the last five years, did you make major changes affecting the interior appearance of this house?
   __Yes  __No
   If YES, what did you do?
   __01 remodeled the kitchen
   __02 remodeled the bathroom
   __03 remodeled some other room
   __04 other (specify) ________________

12. Is any member of your household physically handicapped or disabled?  __Yes  __No
   GO TO #13

13. Because of this handicap or disability have you made any alterations or additions to your house?
   __Yes  __No
   If YES, what alterations were made to your dwelling?
   (specify) ________________

14. Are there alterations or additions that you think need to be done because of this handicap or disability?
   __Yes  __No

15. Do you have plans to make your house more accessible for those with physical disabilities?
   __no plans to __have thought about it __want to
16. Has the existence of a disability or handicap caused you to move to another house?
   ___ Yes  ___ No
17. How would you rate your overall housing situation on a scale from very worst to very best?

   □ very worst  □ very best
   1  2  3  4  5  6  7
18. Do you own or rent this home?
   ___ own
   ___ rent
   ___ live here rent free
19. Which of the following best describes this building?
   ___ apartment in a house
   ___ apartment building (1-3 floors)
   ___ apartment building (more than three floors)
   ___ town house
   ___ duplex
   ___ mobile home (single wide)
   ___ mobile home (double wide)
   ___ mobile home with attached structure
   ___ single family detached home-1 story
   ___ single family detached home-2 story
   ___ single family detached home-3 story
   ___ other (specify)
20. How I would like to know how many different types of rooms you have in your house.

<table>
<thead>
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<tbody>
<tr>
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<td>A. bedrooms</td>
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<tr>
<td></td>
<td>B. living dining combination</td>
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<td></td>
<td>C. living room</td>
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<td>D. separate dining rm</td>
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<td></td>
<td>E. kitchen with no eating area</td>
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<td></td>
<td>F. kitchen dining combination</td>
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21. How satisfied are you with how well your bathroom works?

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<td>1  2  3  4  5  6</td>
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22. How satisfied are you with how well your kitchen works?

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<th>Extremely</th>
<th>Extremely</th>
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<td>satisfied</td>
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<td>1  2  3  4  5  6</td>
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</table>
23. How able are you to make changes or alterations to your house?

   ___ very unable
   ___ unable
   ___ somewhat unable
   ___ able
   ___ somewhat able
   ___ very able
24. If alterations were needed, who would help you?

   ___ relatives
   ___ neighbors/friends
   ___ church
   ___ social service group
   ___ other (specify)
25. Do you have definite plans to move within the next year?

   ___ Yes  ___ No
26. Do you expect to move within the next year?  
   Yes—-----go to question #29—-----  
   No  

27. Do you want to move within the next year?  
   Yes—-----go to question #29—-----  
   No  

28. Have you ever thought about moving from this house?  
   Yes  
   No—-----go to question H5—-----  

29. Are you thinking of moving to  
   1 a different house in this neighborhood  
   2 a different neighborhood in this community  
   3 a different community in this state  
   4 a different state in the US  
   5 outside the US  

30. What is the size of your community?  
   1 on a farm or in the open country  
   2 in a very small town, less than 1,000  
   3 in a small town or city, 1,000 to 10,000  
   4 in a medium sized town, 10,000 to 50,000  
   5 in a large city, 50,000 to 100,000  
   6 in a very large city, 100,000 and above  

HEALTH STATUS

H5 How would you rate your physical health on a scale from very  
poor to excellent?  
   very poor 1 2 3 4 5 6 7  

H51 Are you  
   A. sensitive to minor variations in temperature  
   B. sensitive to major variations in temperature  
   C. insensitive to minor variations in temperature  
   D. insensitive to major variations in temperature  

H52 Do you have  
   A. weakness in the lower extremities  
   B. no weakness in the lower extremities  

H53 Are you  
   A. physically handicapped  
   B. not handicapped  

H54 Do you  
   A. need some type of supportive aid to get around the house (cane,  
   walker, wheelchair)  
   B. not need some type of supportive aid to get around the house  

H55 Are you  
   A. wheelchair bound  
   B. ambulatory  
   C. not wheelchair bound or ambulatory  

H56 Do you use  
   A. a cane  
   B. a walker  
   C. no walking aid devices  

H57 Are you  
   A. deaf  
   B. not deaf  
   C. partially deaf  

H58 How would you rate your eyesight  
   A. excellent (no impairment)  
   B. good (minor impairment)  
   C. fair (partially impaired)  
   D. poor (partially sighted)  
   E. totally blind  

H59 Do you have  
   A. difficulty bending  
   B. no difficulty bending  

H510 Do you have  
   A. lack of physical coordination  
   B. lack of strength in upper extremities  
   C. no problem with upper extremities or coordination  

H511 Are you  
   A. forgetful  
   B. not forgetful  

H512 Do you  
   A. take prescribed medication  
   B. not take prescribed medication  

H513 Do you have  
   A. mobility problems  
   B. back pain  
   C. no mobility problems  
   D. no back pain
HS14 Do you tire
   ___ A. easily
   ___ B. quickly
   ___ C. rarely
   ___ D. frequently

HS15 Are you
   ___ A. dizzy when bending over
   ___ B. not dizzy when bending over

HS16 Do you have
   ___ A. visual depth problems
   ___ B. no visual depth problems

GENERAL QUESTIONS

G1 Does your house have
   ___ A. no smoke alarm system
   ___ B. a smoke alarm system

G2 Is summer heat
   ___ A. a problem
   ___ B. not a problem

G3 Can you
   ___ A. adequately control the temperature
       of his dwelling during the summer months
   ___ B. not adequately control the
       temperature of his dwelling during the summer months

G4 Do you live
   ___ A. in a climate where summer heat
       may be life threatening
   ___ B. in a climate where summer heat
       is not life threatening

G5 Do you have
   ___ A. air conditioning (window
       air condition unit)
   ___ B. no air conditioning
   ___ C. air conditioning (central
       air conditioning)

G6 Can you
   ___ A. control or manipulate the
       room temperature for heating
       in the winter months
   ___ B. not control or manipulate

   the room temperature for heating
   in the winter months

G7 If you take naps during the day is
   ___ A. not conducive in the living
       areas of the dwelling because
       these areas receive glare from
       natural light
   ___ B. possible in the living areas of
       dwelling because the areas do not
       receive glare from natural light

G8 Are your window sills
   ___ A. wide enough to place flower pots
       as well as window boxes
   ___ B. too small to place flower pots
       or window boxes

G9 Does the dwelling have
   ___ A. an exterior balcony
   ___ B. no exterior balcony———go to Question G13———

G10 Does the exterior balcony area have
   ___ A. a railing that permits ease of
       viewing while sitting down
   ___ B. a railing that does not allow
       the resident the ease of viewing while
       sitting down

G11 Is the exterior balcony
   ___ A. recessed
   ___ B. projected from the building facade

G12 Do you feel
   ___ A. secure on the balcony
   ___ B. does not feel secure on the balcony

G13 Do you have
   ___ A. problems with pests or rodents
   ___ B. no problems with pests or rodents

G14 Is carpeting
   ___ A. used for a floorcovering
   ___ B. not used for a floorcovering———GO TO G16———

G15 Is the carpeting
   ___ A. loose from the floor surface
   ___ B. firmly attached to the floor

G16 Are the floors
   ___ A. made of different surface
       treatments and as a result
       floor heights may vary slightly
   ___ B. not made of different surface
       treatments and as a result the floor
BR1 Is your bed
____ A. located directly in line of a
draft from a window
____ B. not located directly in line
of a draft from a window

BR2 Does your bedroom
____ A. have a separate room
controlled thermostat
____ B. does not have a separate room
controlled thermostat

BR3 Do you have
____ A. have air conditioning in the bedroom
____ B. not have air conditioning
in the bedroom

* * *

---GO TO BR4 only if the resident is wheelchair bound
or uses a walker, if the resident is not wheelchair bound
or uses a walker---GO TO BR5---

WHEELCHAIR BOUND OR USES A WALKER

BR4a Does the bedroom furniture
____ A. need to be rearranged to allow
36" space at the foot and the side of the
bed
____ B. need not be rearranged

BR4b Is there
____ A. not a minimum 36" of unobstructed
space at the foot and side of the bed
____ B. at least 36" of unobstructed space at
the foot and side of the bed

BR4c Is the sleeping area
____ A. not the platform type and allows
for no toe room
____ B. of a platform type providing plenty
of toe room beneath the recessed base
____ C. of a platform type but has no toe room

BR4d Does the bedroom area have
____ A. no unobstructed space for maneuvering
and dressing
____ B. 60"x60" unobstructed space for
maneuvering and dressing

BR4e Is the top of the mattress
____ A. about the same height as the
wheelchair seat (19")
____ B. more than 2" different than
the wheelchair seat height

BR5 Is there
____ A. not a direct line of access to
the bathroom from the bed
____ B. a direct line of access to the
bathroom from the bed

BR6 Does the furniture need to
____ A. be rearranged to allow for a direct
line of access to the bathroom
____ B. not be rearranged

BR7 Is your bed
____ A. covered with a bedspread that
touches the floor
____ B. covered with a bedspread that
does not touch the floor

BR8 Are any of the floors
____ A. slick, highly polished
____ B. treated with a non-slip surface

BR9 Are throw rugs
____ A. present
____ B. not used

BR10 on the bedroom floor is/are there
____ A. throw rugs
____ B. a slippery floor treatment
____ C. an unwaxed floor surface
____ D. wall-to-wall carpet

BR11 Is the floor
____ A. a nonskid surface
____ B. a slick surface
____ C. throw rugs
____ D. a carpet

BR12 In case of fire, is there
____ A. a dependable mechanism to alert resident
____ B. no dependable mechanism to alert resident

BR13 Do you have
____ A. a smoke alarm in the bedroom area
____ B. no smoke alarm in the bedroom area

BR14 Is your bedroom
____ A. visually private
____ B. not visually private

BR15 Is your bedroom
A. acoustically private
B. not acoustically private

**BB16** Is noise
A. bothersome
B. no problem

**BB17** Is the bedroom
A. away from mainstream activities of the dwelling
B. located in the mainstream activities of the dwelling

**BB18** Is your bedroom
A. private
B. not private

**BB19** Is the dressing area
A. visible from the living areas of the dwelling
B. not visible from the living areas of the dwelling

**BB20** Do you have
A. night light
B. no bedroom light that is visible from the bed
C. no bedroom light

**BB21** Do you need
A. a light frequently when in bed
B. no light when in bed

**BB22** Is there
A. a light source within easy reach while resident is in bed
B. a light source within easy reach while resident is in bed

**BB23** Do you have
A. a shared bedroom
B. an unshared room

**BB24** Is there
A. no directional bed light available
B. a directional light available

**BB25** Is there a direct light source for
A. the bed
B. the bedroom

**BB26** Do you have
A. no plug-in night light in the bedroom area
B. plug-in night light in the bedroom area

**BR27** Do you have
A. problems finding light switches in the dark
B. no problems finding light switches in the dark

**BR28** Is day time napping in the bedroom
A. conducive because bedroom is glare free
B. not conducive because bedroom has glare from natural light

**BR29** Is your dressing area
A. spread out in the bedroom requiring trips between closets and dresser drawers without a place to be seated
B. in close proximity and with a place to be seated

**BR30** Is your bedside surface storage
A. adequate to place a telephone, alarm, lamp, and remote control console (if necessary)
B. too small to place a telephone, alarm, lamp, and remote control console (if necessary)
C. too cluttered with unnecessary items

**BR31** Is your bed
A. unsteady
B. difficult to grip at the headboard
C. difficult to grip at the footboard
D. sturdy
E. easy to grip at the headboard
F. easy to grip at the footboard

**BR32** Is the headboard on your bed
A. too low to provide adequate back support
B. at a height to provide adequate back support
C. too high to provide adequate back support

**BR33** Is there
A. a storage area in the headboard area of the bed
B. no storage in the headboard area of the bed—GO TO 23

**BR34** Is this headboard storage area
A. inaccessible
B. easily accessible

**BR35** Do you have to
A. leave ironing board, iron, and ironing supplies out because there is no designated storage area
__B. store all ironing supplies

BR36 Is the storage in the bedroom
___A. composed of drawers which are above the eye level of the resident
___B. composed of drawers which are generally below the eye level of the resident
___C. open shelves

BR37 Are the drawers or storage doors
___A. self-closing
___B. spring closing
___C. opened and closed manually

BR38 Do you have
___A. problems getting into and out of bed
___B. no problems getting into or out of bed

BR39 Do you have
___A. a single bed
___B. a double bed
___C. a twin bed
___D. a queen-size bed
___E. a king-size bed

BR40 Are you
___A. uncomfortable with present bed size
___B. comfortable with present bed size

BR41 Does your bed have
___A. a mattress that does not sag
___B. a mattress that sags

BR42 Do you have
___A. a separate guest room
___B. no separate guest room
___C. no need for a separate guest room

BR43 Do you have
___A. problems reaching items on the bedside table without losing balance, falling out of bed or without a great deal of strain
___B. no problem reaching items on the bedside table

BR44 While in bed do you have
___A. a problem dropping items over the edge of the bedside table when reaching
___B. no problems in dropping items when reaching to the night table

BR45 Do you have
___A. adequate storage for footwear in the bedroom closet
___B. inadequate storage for footwear in the bedroom closet

BATHROOM

B1 Is your bathroom heat
___A. kept at a temperature below 70 degrees
___B. kept at 70 degrees
___C. kept at a temperature above 70 degrees

B2 Can the temperature in the bathroom
___A. be raised to 75 degrees
___B. not be raised to 75 degrees

B3 Is the water in the house
___A. too hot
___B. has no temperature problem

B4 Can you
___A. control the temperature of your water
___B. not control the temperature of your water

B5 Can you
___A. keep the temperature of your water at a maximum of 115 to 120 degrees
___B. not keep the temperature of your water at a maximum of 115 to 120 degrees

B6 Is your toilet seat
___A. higher or lower than 17" from the floor
___B. is 17" from the floor

B7 Are there
___A. handrails/grab bars behind the toilet and on each or near side of toilet
___B. no handrails/grab bars behind the toilet nor on each or near side of the toilet

B8 Is the tissue holder
___A. flush mounted to the wall surface
___B. recessed into the wall surface
B9 Is the toilet paper dispenser
   A. hard to reach
   B. easy to reach

B10 Is the bathroom sink
   A. too tall for you to comfortably use
   B. too low for you to comfortably use
   C. at a comfortable height for you to use

----GO TO B11----
only if the respondent is wheelchair bound, if the respondent is not wheelchair bound----GO TO B12----

B11 Is the sink
   A. hard to approach from the front
   B. not hard to approach from the front

B11b Is the apron of the sink
   A. too low for you to place your wheelchair under the sink
   B. high enough to allow you to place your wheelchair under the sink

B11c Is the width under the sink
   A. sufficient to allow for a wheelchair
   B. insufficient to allow for a wheelchair

B11d Is the depth under the lavatory
   A. sufficient to allow for a wheelchair
   B. insufficient to allow for a wheelchair

B11e Do you have
   A. problems bumping into the pipes under the lavatory
   B. no problems bumping into the pipes under the lavatory

B11f Are the hot water and drain pipes
   A. not exposed
   B. exposed

B11g Are the hot water pipes
   A. insulated
   B. not insulated

B11h Is your toilet seat
   A. 19" from the floor
   B. not 19" from the floor

B11i Is there an unobstructed area around the toilet
   A. a 60" X 60" square
   B. less than 60" X 60"

B11j Around the toilet is there
   A. clearance around and in front of the toilet
   B. no clearance in front or around the toilet

B11k Is there an unobstructed space around the toilet
   A. 36"
   B. less than 36"

B12 Are the bathroom lavatory faucets
   A. hard to reach
   B. easy to reach

B13 Do you have
   A. problems maneuvering in the bathroom area
   B. no problems maneuvering in the bathroom area

B14 Is there
   A. adequate clear space allowed in the bath area
   B. inadequate clear space in the bath area

B15 Are you
   A. uncomfortable with bathroom area lighting
   B. comfortable with bathroom area lighting

B16 Do you have an
   A. adequate lighting over tub or shower
   B. inadequate light source directly over tub or shower

B17 Do you have an
   A. an emergency call button in the bathroom
   B. no emergency call button in the bathroom

B18 Is there
   A. an electric outlet located near the lavatory without a ground fault circuit breaker
   B. an electric outlet located near the lavatory with a ground fault circuit breaker
C. no electric outlet near the lavatory—GO TO B20—

B19 Do you have
___ A. problems reaching the lavatory
___ B. no problems reaching the lavatory

B20 Do you have electric outlets
___ A. located near the tub
___ B. not located near the tub

B21 In your bathroom do you have
___ A. a ceiling fan or vent in the bathroom
___ B. no ceiling fan or vent in the bathroom
___ C. an easily operated window

B22 Does the bathroom door
___ A. swing into the bathroom
___ B. swing out of the bathroom

B23 Can the fixtures in the bathroom
___ A. support less than 250 lbs.
___ B. support 250 lbs.

B24 Do you have
___ A. problems using the existing
bathroom medicine cabinet
___ B. no problems with existing
bathroom medicine cabinet

B25 Do you have
___ A. a seat in the tub and in the shower
___ B. no built-in seat in the tub nor a seat in the shower

B26 Does the bathtub area or shower area have
___ A. adequate grab bars
___ B. inadequate grab bars

B27 Do you have
___ A. a shower with a threshold
___ B. a shower with no threshold
___ C. a shower with a door
___ D. no shower

B28 Do you have
___ A. adequate storage in the bathroom
___ B. inadequate storage in the bathroom

B29 Do you have
___ A. adequate grab bars or towel bars
___ B. inadequate grab bars or towel bars located near the lavatory

B30 Does your bathtub have
___ A. a slick bottom
___ B. a non-slip bottom

KITCHEN AND BATH
KB1 Are faucet handles and cupboard pulls
___ A. hard to use
___ B. adapted for ease of handling

KB2 Do you have
___ A. difficulty with faucet handles
___ B. limited fine motor coordination
___ C. no problems with any faucets

KB3 Do you have
___ A. difficulty with faucet handles
___ B. a lack of strength
___ C. no difficulty with faucet handles

KB4 Do you have
___ A. difficulty with cupboard pulls
___ B. no difficulty with cupboard pulls

KITCHEN
K1 Do you prepare
___ A. meals with help
___ B. meals without help

K2 You cook
___ A. the cooktop controls are located
to the back of the cooktop
___ B. the cooktop controls are located
on the front of the cooktop
___ C. the cooktop has an open flame
___ D. the cooktop has electric burners
or a corningware top
___ E. cooktop controls are not
distinguishable by touch
___ F. cooktop controls are distinguishable
by touch

K3 Does the kitchen have
___ A. adequate cooking facilities
___ B. inadequate cooking facilities

K4 Is food
___ A. not easily found in the kitchen
B. easily found in the kitchen

K5 Is there
___A. a direct unobstructed pathway
    from the kitchen to the eating
    and living areas of the house
___B. no direct unobstructed pathway
    from the kitchen to the eating
    and living areas of the house

K6 Is there
___A. a clear unobstructed pathway
    from the cooking center to the
    table/eating area
___B. unobstructed pathway from the cooking
    center to the table/eating area

K7 Do you have
___A. a dining room
___B. no dining room

K8 Does the dining room have
___A. no natural light or a view
    of the out doors
___B. natural light and a view
    to the out doors

K9 Can you
___A. easily move from one work
    area to another
___B. not easily move from one
    work area to another

K10 Does the kitchen
___A. have pullout counter boards
___B. not have pullout counter boards

K11 Do you use
___A. a gas stove
___B. an electric stove
___C. no stove

K12 Do you cook with an electric/gas cooktop with
___A. cooktop controls on the back
    surface of the cooktop
___B. cooktop controls on the front
    surface of the cooktop
___C. has no electric cooktop

K13 Do you have
___A. a gas stove with a pilot light
___B. a gas stove with no pilot light
___C. an electric stove

K14 Is your stove or cooktop

A. free from grease and flammable objects
___B. covered with grease or flammable objects

K15 Do you
___A. have a small fire extinguisher
    near to the stove
___B. not have a small fire extinguisher
    near the stove
___C. not keep baking soda near
    to the stove
___D. keep baking soda near to the stove

K16 Does the kitchen have
___A. large appliances which face each other
___B. no appliances which face each other

K17 Does the kitchen have
___A. an access space of less than 30" X 18"
___B. no access space problems

K18 Does the kitchen have
___A. less than 48" between opposing
    large kitchen fixtures
___B. 48" between opposing
    large kitchen fixtures

K19 Is the kitchen
___A. U-shaped
___B. corridor
___C. L-shaped

___GO TO K20-----only if the respondent is wheelchair bound
or uses a walker, if the respondent does not use a wheelchair or
a walker-----GO TO K21

K20a Is the space between kitchen cabinets
___A. inadequate to allow for easily
    access from one area to another
___B. adequate, it allows for easy
    access from one area to another

K20b Does the kitchen
___A. have a minimum of 25 1/2" of knee space
    under the sink for a wheelchair
___B. not have knee space under the sink
    for a wheelchair

K20c Is the countertop height in the kitchen
___A. too tall for use by a person
    seated in a wheelchair
___B. adequate for a person seated
    in a wheelchair (33 1/2")

K20d Can you
A. not approach the storage cabinets at a sideways approach
B. approach the storage cabinets at a sideways approach

K21 Are the kitchen cabinets
A. located directly over the cooktop
B. not located directly over the cooktop
C. located over a full size refrigerator
D. not located over a full size refrigerator

K22 Are your cabinets
A. too deep for the elderly to reach items in the back
B. shallow enough to allow for easy access

K23 Are the shelves
A. fixed
B. pullout
C. adjustable

K24 In the kitchen is there
A. space allowed for you beyond where the drawer and pullout shelf extends
B. no space allowed for you beyond where the drawer and pullout shelf extends

K25 Do you have a
A. limited amount of storage space in the kitchen
B. adequate amount of storage space in the kitchen

K26 Do the cabinet shelves have
A. sharp and blunt edges
B. raised, rounded edges

K27 Do you have
A. no drawers or cabinets with locks
B. drawers and cabinets with locks

K28 Are storage shelves
A. very limited in their ability to adjust to a wide range of uses
B. adjustable

K29 Are shelves which are
A. at eye level made of solid materials rather than transparent materials
B. at eye level made of see-through materials

K30 Do you have
A. problems selecting items from storage shelves which are at eye level
B. no problems selecting items from storage shelves which are at eye level

K31 Do you have
A. problems with dropping items when moving them from storage
B. no problems with dropping items when moving them from storage

K32 Do your drawers have
A. no drawer stops
B. drawer stops

K33 Is the top shelf of the kitchen cabinets
A. higher than you can reach when standing on the floor
B. low enough for you to reach when standing on the floor

K34 Are the kitchen cabinets
A. too tall
B. easily accessible
C. too low

K35 Are the kitchen lighting conditions
A. sufficient
B. insufficient in providing general illumination

K36 task lighting over
A. the sink is not present
B. the sink is present
C. countertops is not present
D. countertops is present
E. the cooktop or stove is not present
F. the cooktop or stove is present

K37 Do the cabinets have
A. bifold or swing doors
B. sliding doors
C. adjustable shelves
D. fixed shelves
E. no doors

K38 Do you have
A. inadequate cold and hot water for cooking, cleaning and bathing
B. adequate cold and hot water for cooking, cleaning and bathing

K39 Do you have
A. problems in bending or stretching
  to use the kitchen countertop surface
B. no problems using present kitchen
  countertop surface

K40 Does the kitchen sink have
A. problems draining
B. no problems draining

K41 Do you use
A. a stepstool
B. no stepstool

K42 Do you have
A. a standard refrigerator
B. a defective refrigerator

K43 Do you have to
A. defrost the refrigerator by hand
B. do not defrost by hand or manually

K44 Is the refrigerator
A. not functional
B. functional

K45 Are the washer and dryer
A. top loading machines
B. front loading machines

K46 Are the cabinet doors
A. hard to pull open due to
  the pressure in the hinges
  or sticking latches
B. easy to pull open

K47 Do you have
A. large drawers which are
  difficult to pull open and close
B. large drawers which are
  suspended on nylon slide glides

CIRCULATION (DOORS/TRAFFIC PATHS)
---GO TO D1--- if the respondent is wheelchair bound or uses
a walker, if the respondent is not wheelchair bound or does not
use a walker---GO TO D2---

D1a Is your traveling path
A. through doors without kickplates
   for protection
B. through doors with kickplates
   for protection

Dib Is your pathway
A. through nonessential doorways
B. through essential doorways

Dic Is there
A. no clear space immediately
   inside a doorway
B. a 60"X60" clear space immediately
   inside the doorway

Did Is the hallway
A. narrow and does not allow
   for adequate traffic
B. adequate

Dle Are the traffic lanes
A. unobstructed
B. obstructed

Dlf Do you have
A. problems moving from room
to room or within the rooms
B. no problems moving from room
to room or within the rooms

Dlg Do traffic lanes go
A. through hallways
B. from room to room

Dlh Do the open living spaces
A. not allow the resident to move
   freely or easily, spaces do not
   allow for unobstructed maneuvering
   areas for a wheelchair
B. allow the resident to move freely
   and easily, spaces are adequate to
   allow for wheelchair maneuvering

Dli Are you
A. unable to move through the house
   because the doors are too small
B. able to move through the house
   because the door sizes are adequate

Dlj Can you
A. not use your entrance/exit door
   because it is an inswinging door
   and no space is available for the wheelchair
B. use all of the houses exterior doors

Dlk Is the hallway
A. too narrow
B. adequate
D11 Does a hinged door swing
   A. into the hallway
   B. into the room off the hallway

D12 Does your house have
   A. swinging doors
   B. double swinging doors
   C. doors that interfere with the
      swing of another door
   D. a door which swings into a stairway
   E. no problems with the doors

D13 Are there interior doors which have
   A. rounded leading edges
   B. angled edges

D14 Is the outside floor by the glass doors
   A. sloped slightly away from the the doors
   B. not sloped

D15 Are the striker plates on the door frames
   A. filed at the corners and are
      bent back for safety
   B. protruding from the corners
      and project outward from the doorframe

D16 Do you have
   A. moveable doorstops (bricks,
      plastic door stops, etc.)
   B. hinges pin or spring protection
   C. no door stops

D17 Do you have
   A. doors that stick
   B. doors that do not stick

D18 Does the walk-in closet have
   A. a door which opens into the closet
   B. a door which opens out from the closet

D19 Do you have
   A. interior doors with locks
   B. interior doors without locks

D20 Can the locks
   A. be opened with a screwdriver
   B. not be opened with a screwdriver

D21 Does your house have
   A. glass doors
   B. no glass doors
   C. screen doors
   D. no screen doors

D22 Do you have
   A. a difficult time telling whether
      a glass door is opened or closed
   B. no difficulty telling whether a
      glass door is opened or closed

D23 Are the floors outside/inside the glass doors
   A. on the same level
   B. are different levels

D24 Are the exterior doors
   A. adequate for wheelchair entrance
   B. inadequate for wheelchair entrance

D25 Does the exterior entrance have
   A. a beveled threshold which you
      cannot negotiate
   B. a beveled threshold which you
      can negotiate

D26 Do the interior doors have
   A. no protection at the bottom
      of the push side of the door
   B. a kickplate at the bottom
      of the push side of the door

D27 Does the entrance closet have
   A. a door which does not allow
      for a wheelchair to approach
      the closet from the side
   B. no door
   C. sliding door

27

28
D15 Do the sliding glass doors or screen doors close
   - A. with a delayed action
   - B. with no delayed action

D16 Is your entry
   - A. not visually private
   - B. visually private

D17 Does the front door have
   - A. no peephole
   - B. a peephole
   - C. no need for a peephole (glass door)
   - GO TO D19

D18 Is there a peephole only
   - A. at one height
   - B. at two heights

D19 Does your house have
   - A. no convenient place, other than the floor, to put parcels down at the exterior entrances
   - B. a convenient place to put parcels, other than the floor, at the exterior entrances

D20 Does the exterior door have
   - A. a mail slot located near the bottom of the door frame
   - B. no mail slot
   - C. a mail slot located somewhere on the exterior door surface

D21 Do you frequently travel
   - A. through doors
   - B. through open doorways

D22 Do the doors have
   - A. a standard knob or handle on the hinged side of the door
   - B. a "d" handle mounted 8" from the hinged side of the door

D23 Do you have
   - A. storm or screen doors
   - B. no storm or screen doors

D24 Do you need to
   - A. keep all storm and screen doors
   - B. remove all storm and screen doors

D25 Is your house entrance
   - A. not acoustically private
   - B. acoustically private

D26 Do you have
   - A. no interior seating close to the dwelling entrance
   - B. interior seating close to the dwelling entrance

D27 Does your house have
   - A. a closet or storage area near the entrance area
   - B. no closet or storage area near the entrance

D28 Can you
   - A. not reach the clothes rod
   - B. reach the clothes rod

D29 Do you travel through
   - A. nonessential doors
   - B. essential doors

STAIRS

   - GO TO S1 if the respondent is totally blind, if the respondent is not blind

S1 Do you use stairs as a frequent path of travel
   - A. that have no tactile warning signs
   - B. that have tactile warning signs

S2 Do you have
   - A. stairs in your house
   - B. no stairs in your house
   - GO TO S13

S3 Do you use
   - A. stairs as a frequent path of travel
   - B. stairs infrequently

S4 Are the stairs
   - A. poorly lighted
   - B. adequately lighted
   - C. not lit

S5 Do you use stairs frequently
   - A. that are not visible
   - B. that are clearly visible
   - C. have no contrast in the materials used for the upper and lower stair treads
   - D. that have contrasting materials used for upper and lower stair treads

S6 Do you use stairs frequently
   - A. that have no caution strips which indicate the finish of a run of stairs or the start of a run of stairs
   - B. that have caution strips which indicate
S7 Are handrails on stairs
   __ A. not present
   __ B. present

S8 Are the handrails on the stair
   __ A. not easily grasped
   __ B. easily grasped

S9 Are the risers on the steps
   __ A. designed in such a way that the
      you frequently trip on the
      nosing of the stairs
   __ B. designed in such a way that you
      infrequently trip on the
      nosing of the stairs

S10 Is the stair riser
   __ A. designed in such a way that the
      tread nosing extends beyond the
      edge of the riser
   __ B. designed in such a way that the
      tread nosing is flush with the
      edge of the riser

S11 Are the risers
   __ A. not uniform in height
   __ B. uniform in height

S12 Do you have
   __ A. difficulty negotiating the stairs
      because the treads are worn and
      covered with a slick finish
   __ B. no problem negotiating the stairs

S13 Do you have
   __ A. doorways with high or uneven thresholds
      which cause the elder to trip and fall
   __ B. no doorways with thresholds

S14 Is there
   __ A. a slight change in a floor height
      where two or three steps are used to
      traverse this height
   __ B. no change in floor height

S15 Are your stairs landings
   __ A. crowded or cluttered with furniture
      and objects
   __ B. clear of clutter from furniture
      and objects

TELEPHONE/COMMUNICATIONS

T1 Do you use
   __ A. a telephone
   __ B. no telephone------------------GO TO R1------------------

T2 By the telephone is there
   __ A. no chair or seating available
   __ B. seating available
   __ C. no table for writing and for
      storing telephone books
   __ D. a table available for writing
      and for storing telephone books

T3 Does the telephone have
   __ A. a lighted or an enlarged dial
   __ B. so special features

T4 Does your house have
   __ A. an insufficient number of phone jacks
   __ B. a sufficient number of phone jacks

STORAGE

R1 Do you have        ------------------GO TO T1
   __ A. problems lifting and moving
      items in storage
   __ B. no problems lifting and
      moving items in storage

R2 Do you have
   __ A. several large items stored above
      shoulder height or below hip height
   __ B. several large items stored below
      shoulder height or above hip height

R3 Do you have
   __ A. problems hanging their clothes
      on clothes rod
   __ B. no problems hanging their
      clothes on clothes rod

R4 Can you
   __ A. reach and use the shelf above
      the clothes rod in the bedroom
   __ B. not reach and use the shelf above
      the clothes rod in the bedroom

R5 Does the swing of the closet door
   __ A. obstruct access to closet storage
   __ B. does not obstruct access to the storage area

R6 Do you have
   __ A. problems with knobs or door handles
   __ B. no problems with knobs or door handles
R7 Does the storage area have
   A. a door with a regular knob or handle
   B. a door with a "D" handle

R8 Do you have
   A. problems opening storage drawers
      because of the type of knob or handle
   B. no problems opening storage drawers
      because a "D" knob is utilized

R9 Do you
   A. strain to reach books which are placed on the upper shelves of a bookcase
   B. easily reach books which are placed on the upper shelves of a bookcase

R10 Do you have
   A. bookcases which have open ends
   B. bookcases which are closed in
   C. no bookcases

R11 Do you use
   A. the bookcase for physical support
   B. no bookcases for physical support

R12 Do you have
   A. gardening as a hobby
   B. no hobby
   C. a hobby

R13 Do you have
   A. no storage space for gardening tools or plant tending materials
   B. storage for gardening tools and plant tending materials

R14 Do you have
   A. no solid supports to grasp when moving from area to area
   B. solid supports to grasp when moving from area to area

---GO TO R15---if the respondent is wheelchair bound, if the respondent is not wheelchair bound---GO TO L1---

R15a Is there
   A. no storage space available for a fold up wheelchair
   B. storage space allotted for a fold up wheelchair

R15b Can you
   A. not approach storage pieces from the front
   B. approach storage pieces from the front

LIGHTING

L1 Are light switches
   A. located directly inside the room entrance
   B. not located at the room entrance

L2 Are the light switches
   A. installed beyond a height in which you are unable to easily reach
   B. be installed 36" from the floor

L3 Do the closets and storage areas
   A. have lights
   B. don't have lights

L4 Are the closet, shelf, and drawer interiors
   A. are light-colored
   B. are not light-colored

L5 Is light
   A. reflected off of the mirror in the bathroom vanity area
   B. pointed directly towards the mirror in the bathroom vanity area

L6 Is lighting in the vanity/laundry area
   A. inadequate, shadows often appear on the users facial features
   B. adequate, facial features are evenly illuminated

L7 Is the bathroom
   A. cool in appearance because of the lighting
   B. warm in appearance because of the lighting

L8 Are the living area walls
   A. dark and do not reflect substantial amounts of light
   B. light colored and reflect light

L9 Do lamp lights
   A. glare directly into the resident's eyes
   B. are adequately shaded
L10 Do the portable lamp shades
   ___ A. direct the light flow to your eye level
   ___ B. direct the light flow to your shoulder and lower

L11 Does the light from a ceiling fixture
   ___ A. shines directly into your eyes
   ___ B. does not shine directly into your eyes

L12 Does the ceiling
   ___ A. reflect a large amount of light
   ___ B. does not reflect a substantial amount of light

L13 Does portable lamp
   ___ A. shades do not allow direct light to illuminate a book while you are seated by the lamp
   ___ B. shades permits direct light to illuminate a book while you are by a lamp

L14 Are the light switches
   ___ A. above or below your average reach
   ___ B. aprox. 36" from the floor

L15 Do you have
   ___ A. extension cords across traffic paths
   ___ B. no extension cords across traffic paths

L16 Do you have
   ___ A. problems using the standard type of light switch (toggle)
   ___ B. no problems using the standard type of light switch

ACTIVITIES OF DAILY LIVING

For each area of functioning listed below, check the description that applies. (The word “assistance” means supervision, or under direction of personal assistance.)

1. BATHING—either sponge bath, tub bath, or shower
   ___ receives no assistance (gets in and out of tub by self if tub is usual means of bathing)
   ___ receives assistance in bathing only one part of the body (such as back or leg)
   ___ receives assistance in bathing more than one part of the body (or not bathed)

2. DRESSING—gets clothes from closets and drawers, including underclothes, outer garments and using fasteners (including braces, if worn)
   ___ gets clothes and gets completely dressed without assistance
   ___ gets clothes and gets dressed without assistance, except for assistance in tying shoes
   ___ receives assistance in getting clothes or in getting dressed, or stays partly or completely undressed

3. TOILETING—going to the “toilet room” for bowel and urine elimination; cleaning self after elimination, and arranging clothes
   ___ goes to toilet room, cleans self and arranges clothes (may use object for support such as cane, walker or wheelchair, and may manage night bedpan or commode, emptying same in morning)
   ___ receives assistance in going to toilet room or in cleaning self or in arranging clothes after elimination or in use of bedpan (night) or commode
   ___ doesn’t go to room termed toilet for the elimination process

4. TRANSFER
   ___ moves in and out of bed as well as in and out of chair without assistance (may be using object for support such as a cane or walker)
   ___ moves in or out of bed or chair with assistance
   ___ doesn’t get out of bed

5. CONTINENCE
   ___ controls urination and bowel movement completely by self
   ___ has occasional “accidents”
   ___ supervision helps keep urine or bowel control; catheter is used or is incontinent

6. FEEDING
- Feeds self without assistance
- Feeds self except for getting assistance in cutting meat or buttering bread
- Receives assistance in feeding or is fed partly completely by using tubes or intravenous fluids

**SHORT PORTABLE MENTAL STATUS QUESTIONNAIRE**

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<tr>
<th>Right</th>
<th>Wrong</th>
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<td>What is the date today (month/day/year)?</td>
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<td>What day of the week is it?</td>
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<td></td>
<td>What is the name of this town?</td>
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<td></td>
<td></td>
<td>What is your telephone number? (If no telephone, what is your street address?)</td>
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<tr>
<td></td>
<td></td>
<td>How old are you?</td>
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<td></td>
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<td>When were you born (month/day/year)?</td>
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<td></td>
<td>Who is the current president of the United States?</td>
</tr>
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<td></td>
<td></td>
<td>Who was the president just before him?</td>
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<td>Subtract 3 from 20 and keep subtracting each new number you get, all the way down.</td>
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Number of errors __________

0-2 errors = intact
3-4 errors = mild intellectual impairment
5-7 errors = moderate intellectual impairment
8-9 errors = severe intellectual impairment

ENDING TIME __________

AM/PM
HAS CYPRIOT IN BEDROOM

SITTING RM

TELEPHONES

4
I consent to have photographs taken of the interior of my home. I understand that these pictures will be used only in correspondence with ERHAP. My name and address will not be used to identify these pictures.
REFERENCES
References


Barnekov, T.K. (1980). An assessment of the social service needs of the elderly in group subsidized housing (Administration on Aging, grant 90-A-1833(01)). Newark, Delaware: University of Delaware, College of Urban Affairs and Public Policy.


University of Minnesota.


United States Senate 93rd Congress (second session) (1-18-


NOTE

For information concerning the ERHAP program please write to THE IDEA WORKS, INC., Ruth Brent, 100 West Briarwood Lane, Columbia, Missouri, 65211.
Local identifier | Ray1987

Source information

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