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**INDIVIDUAL AND ENVIRONMENTAL FACTORS THAT INFLUENCE LENGTH
OF STAY IN ADULT DAY HEALTH CARE PROGRAMS**

DISSERTATION

**Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University**

By

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*** * * * ***

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ABSTRACT

The social ecological model with an emphasis on contemporary gerontological concepts was used to examine which individual and environmental factors influence the length of stay in adult day services. Literature on service utilization and length of stay in home and community-based care was reviewed. Data were gathered from five adult day programs operating in central Ohio under the administration of one not-for-profit agency. These programs represent combined medical and social models of adult day services. Data were gathered from all new intake files from January 1, 1999 to December 31, 2000. There were 295 clients admitted to the programs during this time period. Of these 295 clients, 280 actually attended the programs after the initial intake. This study was based on those 280 clients.

Cox regression was used to determine which individual and environmental factors influenced length of stay in the five programs. Age, nutritional risk, ethnicity, funding source, marital status and presence of a psychological diagnosis were the significant factors identified. Those older, at higher nutritional risk, non-white, receiving public funding disenrolled at higher rates. Those participants who were married and had a psychological diagnosis disenrolled at lower rates. Using the social ecological model to examine length of stay was supported. Specific policy and program implications are presented.

Dedicated to my grandparents.

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CHAPTER 1

INTRODUCTION

When faced with a debilitating illness, adults overwhelmingly prefer to continue living in the community instead of moving into an institution (McAuley & Blieszner, 1985; Webb, 1989; Keysor, Desai & Mutran, 1999). Until recently, older adults with difficulties managing their daily activities had few long term care options, other than nursing home care. Driven by cost concerns, changes in Medicare and Medicaid during the 1980s have provided more opportunities for reimbursement of home and community-based care leading to significant change and growth in the number of home and community-based services (Estes, Swan & Associates, 1993; Hudson, 1996). These public policy changes coupled with the growing older adult market have brought significant increases in the last decade in the number of home and community-based care providers, including adult day service providers.

The number of adult day programs jumped from fewer than 100 centers before 1975 to 2,100 by 1989. The number of adult day service providers has doubled from 2,000 in 1985 to over 4,000 in the late 1990s (National Adult Day Services Association, 1997). Despite the growth in the number of providers, published research on adult day services is very limited (van Beveren & Hetherington, 1998). In fact, Kirwin & Kaye (1993) describe research on adult day services as “embryonic.” Van Beveren & Hetherington (1998) found that between 1980 and 1993 studies on adult day programs

comprised less than one percent of articles in 16 well established journals in social gerontology. An adult day service program is a community-based care option that provides planned activities to support the social and health needs of older adults in a protective setting during daytime hours. The level of service provided at adult day programs varies tremendously from program to program. Typically, day services are divided into three models: the medical model, the social model and the combined model (van Beveren & Hetherington, 1998; Kirwin, 1991; Kirwin & Kay, 1993). Centers operating under the medical model include skilled assessment, treatment and rehabilitation goals. The social model center focuses on socialization and preventive services (van Beveren & Hetherington, 1998). A combined model has elements of both a social and medical model depending on individual client needs. A common goal of adult day services is to help participants maintain independence and to live in the community (Webb, 1989). Who is best served by which model has not been empirically determined, and clear outcome measures of adult day services have not been established.

Many adult day services participants have institutional level of care needs (Weissert et al., 1990; Conrad, Hanrahan & Hughes, 1990; Wallace et al., 1992; Cefalu, Ettinger & Espeland, 1996). By serving participants with high levels of disability, adult day services provide an avenue to delay institutionalization (Bradsher, Estes & Stuart, 1995; Conrad, Hanrahan & Hughes, 1990). Discharges from adult day programs are frequently due to placement in a long-term care facility (Mace, 1984). This delay in institutionalization of adult day participants occurs at variable rates (Wallace, 1987; Cefalu, Ettinger & Espeland, 1996; Rathermich et al., 1999). By exploring ways to

maximize the length of stay in adult day programs, some older adults can delay or avoid institutionalization.

Social work has long been committed to supporting autonomy and the independence of all vulnerable individuals. Investigating what factors contribute to the length of stay in adult day programs is the first step in determining what types of interventions will maximize the delay in institutionalization of adult day participants as well as who is best served by adult day services.

Using a quasi-experimental non-equivalent group design, Zarit et al. (1998) found that using adult day services for three months or more significantly reduced the stress of caregivers providing care for individuals with Alzheimer's disease when compared to those not using adult day services. Without proper supports like adult day services, stressed caregivers face more mental and physical illness, and lost productivity on the job (Tully & Sehm, 1994; George 1989; Gottlieb & Green, 1984). About 29% of those in Zarit et al.'s study used adult day services for less than three months and disenrolled from the program not due to death. Zarit et al. (1998) argue that given the role adult day services can play in reducing caregiver stress, an important unanswered question is why some participants disenroll from adult day programs earlier than others for reasons other than death.

Having an understanding of the individual and environmental factors that impact the length of stay in an adult day program will assist social workers in adult day programs to meet the new national accreditation standards. The accreditation standards require staff at intake to outline plans for when the client will leave the program (Commission on Accreditation of Rehabilitation Facilities, 1999). The identification of key factors at

intake that impact the length of stay will enable social workers to better target discharge planning and clarify points for interventions. Social workers involved with adult day programs directly will benefit from understanding why some people are more successful in delaying institutionalization than others.

Knowledge of the individual and environmental variables involved in the length of stay in adult day programs will give social work administrators and public policy-makers information that will be helpful in examining public reimbursement schemes as well as private sources of reimbursement. For example, home and community-based Medicaid waiver programs seek to reduce costs for long term care through caring for people in the community instead of in costly institutions. Just over half of the revenue that flows into adult day programs is from government sources, with Medicaid being the largest single payer (Zelman, Elston & Weissert 1991). Maximizing the length of stay in adult day programs for Medicaid recipients is one way to reduce costs. Understanding how or what factors impact the length of stay in adult day programs will also provide helpful information for future policy planning to include adult day services in Medicare's diagnostic related groups-based payment system.

Increasingly, local communities are supporting tax levies to fund home and community-based services for older adults. Information gained from examining the length of stay in adult day programs can assist local funders and the gatekeepers to these programs in determining who is best served by this model of care. More informed assessments could be made to ensure a good match between an individual and adult day services.

Using the contemporary social ecological model, this study examines which individual and programmatic factors influence the length of stay in adult day services. Data were collected from client records from five adult day programs in central Ohio operated by a single not for profit agency and a survey completed by the Director of Social Services. Records were from all new intakes from January 1, 1999 to December 31, 2000. The programs represent combined medical and social models of adult day services. Univariate statistics were used to describe the study population. The multivariate technique of survival analysis using Cox regression was utilized to identify which factors predict length of stay in adult day services.

CHAPTER 2

LITERATURE REVIEW

Theoretical Framework

Andersen and Newman's Model of Medical Care Utilization

Though criticized for having limited predictive capabilities (Wolinsky & Arnold, 1988), Andersen and Newman's model of the determinants of medical care utilization (Andersen & Newman, 1973) is the main theoretical framework used to examine health services utilization in the United States. The majority of the studies completed using this model examine acute care services such as physician visits and hospital stays, but increasingly this model has been used to examine utilization of nursing home or home and community-based care. Studies by Douglass & Visconti (1998), Conrad, Hughes & Wang (1992) and Weissert et al. (1990) examine the utilization of adult day services drawing from Andersen and Newman's work.

Andersen and Newman's model examines the utilization of health services as a function of societal determinants that impact the health services system. Both societal determinants and the health services system then impact individual determinants, ultimately resulting in the use of health services. Health utilization includes type or location of service such as hospital, physician, or nursing home. Anderson & Newman characterize purposes of use as primary care, secondary care, tertiary care or custodial

care. Finally, the units of analysis include initial contact or selection, intensity of care and number of episodes of care (1973).

Societal Determinants

Societal determinants include technology and norms in health care. Technology encompasses many areas including public health efforts, pharmaceutical research as well as life sustaining equipment. Norms in health care are often reflected in formal legislation (Andersen & Newman, 1973). For example, societal emphasis on getting better as a result of treatment is apparent in the acute-care bias in Medicare. Another example is the expectation that older relatives are expected to depend on family members and friends to supplement formal supports.

Health Services System

A health services system as conceptualized by Andersen & Newman (1972) is comprised of two elements: resources and organization. Resources reflect volume and distribution issues. Resources of the system are the labor and capital dedicated to health care. Geographic distribution of these resources impacts the provision of health care services. According to Andersen & Newman (1972), organization includes access and structure. Access involves the means by which a person enters the medical care system and continues treatment.

Accessibility is assumed to increase as the proportion of medical care expenditures paid for by the government, voluntary health insurance, or other third-party payers increases; as waiting time for medical care decreases; and as the range of conditions accepted for treatment increases (Anderson & Newman, 1972, p. 102).

Structure is the internal organizational experience of the person within the health services system including the characteristics of care, personnel roles, referrals, etc.

Individual Determinants

Predisposing. The predisposing needs within individual determinants include demographic, social structural and attitudinal-belief variables. Andersen & Newman (1973) include age, sex, marital status and past illness as key demographic variables. Social structure includes education, race, occupation, family size, ethnicity, religion, and residential mobility. Finally, beliefs include values concerning health and illness, attitudes toward health services and knowledge about disease.

Enabling. Enabling needs provide individuals with the ability to secure services. It allows a family to satisfy a health service need due to income, health insurance and other accessibility issues. Community characteristics such as ratios of health care personnel and facilities to population, price of services, region of country and urban-rural character are important components of enabling needs (Andersen & Newman, 1973).

Need Level. Assuming the presence of the other two components, illness or need level includes both an objective and subjective account of need, including disability, symptoms, diagnoses and general state (Andersen & Newman, 1973).

Criticisms of the Andersen & Newman Model

Andersen & Newman's model of medical care utilization does not recognize diversity within cohorts of older adults and how this heterogeneity impacts the use of health services. Wolinsky & Arnold (1988) refer to this as the "age homogeneity assumption." People increasingly become more different from one another as they age (Neugarten, 1968). Increasingly gerontologists are addressing the importance of intra-cohort analysis. Variations among older adults are seen as the results of accumulative

social interaction and allocations within social structures (Dannefer & Uhlenberg, 1999). The Andersen & Newman model does not recognize this social stratification.

Though access to services within the organization of health services system is included in the model, an emphasis is placed on the "front door," the choice to use a particular health service. The model does not examine the factors that keep people continuing to use a particular health service. The areas intended for analysis include the initial selection of a service, how much service is used and how frequently. Andersen & Newman do not include differential treatment of individuals within the service arena. As reflected by the age homogeneity assumption, Andersen & Newman neglect the role culture may have on the continual use of health services.

The Andersen & Newman model does not have a life course perspective, which implies that the factors that impact the use of medical services are stagnant. There is no recognition of adaptation or change over time. In addition, the factors included in the model appear to have a one way impact on the use of health services. This does not recognize the dynamic interaction and the relationships among factors. For example, a predisposing determinant like race may interact with enabling factors like community characteristics. These factors may impact the use of health services, and an individual's experience with a health services system may impact community characteristics and future use.

Contemporary Social Ecological Perspective

By examining people in environments, the fundamental conception of the contemporary ecological approach is that any significant social behavior is a function of individual strengths and limitations plus social supports and stresses plus

physical/environmental resources and pressures (Bloom, 1996). Social services such as adult day services contribute to helping participants meet their needs within this context. The social ecological approach assumes the unit of analysis is the person:environment. This interaction involves adaptation as people face stressors. According to the social ecological perspective, adaptation takes place to reach a “goodness of fit” between person and environment. Multiple factors facilitate or impede this adaptation. To understand a life event and the adaptation, the social ecological approach suggests that all relevant systems and subsystems of the person must be examined, including biological, affective, cognitive, behavioral status, primary and secondary groups, cultures, society and physical environment.

Richardson (in-press) proposes an ABCDEF practice guide for gerontological social workers that assists in defining variables of importance when examining factors that contribute to the length of stay in adult day programs from a social ecological approach. These person:environment factors include actions, biological aspects, cognitions, demographics, environment and feelings. Specifically, actions include behavioral characteristics of an older adult. Biological aspects include current biological status and physiological change. Cognitions include both cognitive functioning as defined by measures such as the mini mental-status exam, as well as coping patterns. Demographics include indicators such as age, gender and income. Environmental influences include the quality and quantity of social supports, and feelings focuses on psychological issues and self expression. It is recommended that social workers assess and determine the point of intervention based on clients' personal resources and environmental resources using the ABCDEF practice guide.

Basic Assumptions

According to Germain & Bloom (1999), the social ecological perspective has five fundamental assumptions : person:environment unit of analysis; general tendency toward adaptation; factors that facilitate or impede adaptation; flow of life events; and the transacting configuration. The assumed unit of analysis is the person:environment configuration. The presentation of a colon between the two concepts implies a transactional relationship between the entities. The person can impact the environment and the environment can impact the person. Social reality can be explained only through a dynamic interaction of person and environment (Germain & Bloom, 1999). The social ecological perspective also assumes that human beings are continuing to adapt to increase their goodness of fit between person and environment to ensure survival within a continuously changing society. There is an assumed interdependence between the person and the environment (Robbins, Chatterjee & Canda, 1998). Individual, societal and institutional stressors not only create the need for adaptation, they also act as factors facilitating or impeding adaptation. There is an assumption of the general flow of life events that are either harmful or helpful based on past and present experiences (Germain & Bloom, 1999). Finally, the social ecological approach assumes that multiple systems of the person and environment impact mutual adaptation. Individual subsystems include biological, affective, cognitive and behavioral; the environmental subsystems include groups, culture, society and physical environment (Germain & Bloom, 1999).

Structural Concepts

Person. The structural concepts from the individual side of the person:environment interaction include goodness of fit; adaptation and adaptedness;

maladaptation; and diverse social and cultural contexts (Germain & Bloom, 1999). The person:environment fit is the “favorable or unfavorable fit between the needs, capacities, behavioral styles, and goals of people, and the characteristics of the environment” (Germain & Gitterman, 1996, p. 9). The environment includes both physical and sociocultural environments. The concepts of habitat and niche can be helpful in examining the environment. Habitats are “dwelling places” and niches are the positions or status of the person in the social structure of the community. Groups, such as older adults, may be marginalized and part of destructive niches in communities (Germain & Gitterman, 1997).

Goodness of fit can be favorable, minimally adequate, or unfavorable. Favorable fit promotes growth and development of all involved persons while sustaining or enhancing the environment (Germain & Bloom, 1999). When fit is favorable, then it is assumed that there is positive adaptedness. The concept of adaptation is active within the context of personality, resources, experience, and the nature of the social environment and culture. Adaptedness occurs “when the environment provides resources and experiences at the appropriate time and in the appropriate form to assure people’s optimum biological, cognitive, sensory, perceptual, emotional and social development and functioning” (Germain & Gitterman, 1996, p. 8). Adaptation occurs within diverse social and cultural contexts (Germain & Bloom, 1999). Maladaptation is on the opposite side of the continuum from adaptation.

Environment. The environment consists of physical, social and cultural constructs. The physical environment includes both the natural and built world.

These kinds of physical environments in general provide the space within which human behavior and development occur, the boundaries beyond which they may

not (easily) go, and the physical things that represent obstacles or facilitators with which much human activities has to be concerned (Germain & Bloom, 1999, p. 32).

The social environment includes social relationships and settings, formal organizations, communities, political and economic structures, and social space and time. These environments are viewed as embedded in one another with complex interactions. It is within the social environment that issues of access continue to be prominent (Germain & Bloom, 1999).

The concepts of coercive power and exploitative power are components of the social ecological approach that reflect inequities within the social environment. Coercive power is withholding power from vulnerable groups because of personal or cultural factors. Exploitative power is the abuse of power by dominant groups (Germain & Gitterman, 1997). Culture includes values, norms and social roles that suggest an integrated pattern of communication among a group of people with a common history, language, lifestyle and expectation (Germain & Bloom, 1999).

Positive personal development and environmental change. Favorable person:environment fit includes adaptation toward structural attachments and social affiliations. Personal development and growth occur while sustaining or enhancing environmental components such as social relationships and formal service settings. The environment provides appropriate resources at the appropriate time to allow for positive adaptation (Germain and Bloom, 1999).

Developmental Concepts

Person. The social ecological approach views bio-psycho-sociocultural growth (maturation) and development as an occurrence over the life course. It is a pathway that

replaces the fixed staged development through which all people pass through sequentially and uniformly (Richardson, in-press). Growth or maturation is distinguished from development as a biological process not impacted by the social and cultural context. Development is a function of both biological growth and environmental experiences (Germain & Bloom, 1999).

Environment. Developmental behaviors are reflective of biological, psychological, social and cultural time. Biological time refers to our “biological clock.” Psychological time includes the differences within which people experience the passage of time depending on psychological variables (Germain & Bloom, 1999). Social time is defined as the expected and unexpected life events that occur as the result of individual collective processes involving families, communities and organizations (Germain & Gitterman, 1996). Cultural time reflects the attitudes of a particular culture towards time (Germain & Bloom, 1999).

Positive personal development and environmental change. Developmentally the concept of self-direction reflects the management of a person’s life while respecting the rights and needs of others. Self-direction is mediated by the location of the person in the socially stratified structure of society (Germain & Bloom, 1999).

Functioning Concepts

Person. Functioning concepts as they relate to the person include life events and life stressors and challenges as part of a “stress-coping paradigm” (Germain & Bloom, 1999; Germain & Gitterman, 1996). By life events, the social ecological theorists mean “all stimuli that impinge on people and environments” (Germain & Bloom, 1999, p. 24). Life stressors include life events that cause or are perceived to cause problems for

persons or environments. Life challenges are events that increase the goodness of fit between the person and environment.

As the result of stressors, people respond psychologically and physiologically with stress. Coping with the life event will or will not be effective depending on the person and environment. Certain risk factors and protective/promotive factors will impact the ability to resolve the life event that caused the stress. Personal and/or environmental changes occur within the context of constant feedback loops reflecting the transaction between the event and person:environment unit (Germain & Bloom, 1999; Germain & Gitterman, 1996).

Environment. Social functioning under stress or challenge within the context of the environment includes the concepts of territoriality, spatial behavior, interpersonal spacing, and crowding and isolation (Germain & Bloom, 1999). Territoriality includes possessiveness toward space and objects and is a type of social dominance. Spatial behavior includes how people behave socially in physical environments. Interpersonal spacing reflects the “zones of social space” (Germain & Bloom, 1999). Finally, crowding and isolation reflect the amount of social interaction as being too much (crowding) or as too little (isolation).

Positive personal development and environmental change. Competence and self-esteem function as concepts within positive personal development and environmental change. Competence is the desire to have an effect on one’s environment, which is mediated by opportunities within the environment itself (Germain & Gitterman, 1997). Effectively influencing one’s environment fosters a sense of competence. Self-esteem is the result of positive feelings about oneself through experiences of relatedness,

competence and self-direction (Germain & Bloom, 1999). It is the “extent to which one feels competent, respected and worthy” (Germain & Gitterman, 1997, p. 818).

Application of the Social Ecological Model to Gerontological Research

Published literature on the application of social ecological theory as it relates to older persons is very limited. Though not extensively, social ecological theory has been applied to practice issues, case studies and research papers on older persons. The application of the theory to practice issues as part of general social work publications has occurred primarily through Caryl Germain’s work (Germain & Bloom, 1999; Germain & Gitterman, 1996). Further conceptualization of the theory as it applies to health care, an area of interest to gerontological social workers, has also occurred (Germain, 1984; Coulton, 1981). The first extensive application of the theory to practice with older adults appears to be Richardson’s Social Work Practice with Older Persons, which is in press.

Case studies have been published in social work journals that apply the social ecological theory to older adults and issues of home care, homelessness, service delivery, loss, and disability. (Cox, 1992; Lee, 1989; Beckett & Coley, 1987; Freeman, 1984; Kirschner, 1979). There has been very limited application of social ecological theory to empirical gerontological research. Scheidt and Windley (1983) expanded a general ecological model and developed their own model attempting to explain the mental health status of small-town rural elderly residents in Kansas using environmental, well-being and demographic dimensions. Scheidt and Windley (1983) were able to explain 27% of the variation through their model.

Estes & Swan (1994) applied the social ecological model to examine access to home health care on the organizational level. Through the examination of tax status,

organizational integration, environmental competitiveness, substitute care, demand, and state. In five states, Estes & Swan (1994) found that tax status, organizational complexity and competition, concentration and demand are factors that impact access to home health services. Paulino (1998) used the social ecological approach to help in understanding and organizing information collected through focus groups with older Dominican immigrants about social services needs and use. Finally, Thompson & Krause (1998) used a social ecological perspective to develop a model to predict expected social support in late life based on neighborhood quality, fear of crime and emotional support. Mediated by whether a person is living alone or with others, Thompson & Krause (1998) found that neighborhood deterioration promotes fear of crime and fear of crime decreases the amount of emotional support elderly people receive. The more emotional support that people receive, the more they anticipate support in the future. Though none of the mentioned empirical studies connect their theoretical framework directly to the work of Germain, the theoretical framework referred to by the authors was the ecological approach, and the constructs examined appear to reflect the application of social ecological theory.

Critique of the Social Ecological Perspective

Gerontologists assert that contemporary models of aging must include multidisciplinary, bio-psycho-social, and holistic conceptualizations of aging; heterogeneity and diversity within cohorts; and power and inequality issues (Richardson, in-press). Does contemporary social ecological theory adequately address these issues?

Multidisciplinary, bio-psycho-social, and holistic conceptualizations of aging.

Though social work is the predominate discipline using contemporary social ecological

theory as conceptualized by Germain, the concepts included in the theory have applicability to multiple disciplines. A congruence model of environmental characteristics and individual needs has been developed by Kahana (1982). Kahana's model focuses on the impact of environmental settings on the well-being and adjustment of older people. Emphasis is placed on matching psychological needs, like tolerance of ambiguity, delay in gratification, affect and stimuli receptivity, with the environment. Roots of this model can be tied to theoretical development in environmental psychology of aging done by Lawton (1970; 1975; 1982).

Incorporation of bio-psycho-social elements is fundamental to the perspective. For example, the concepts of adaptation, growth and development, and relatedness provide a psychological and biological perspective. Concepts of social and cultural environment provide an anthropological and sociological perspective. Goodness of fit reflects a holistic examination of bio-psycho-social interactions. It is a nonlinear theory that emphasizes the interaction between individuals, groups and systems (Greif, 1986).

The use of multidisciplinary, bio-psycho-social, and holistic conceptualizations of aging does present challenges in terms of operationalizing variables for research. The comprehensiveness of the approach may encourage a "fishing expedition" where researchers put every possible variable that may be involved with the person:environment interaction into their equation, and then hope to discover some relationship. The theory lacks information about how these concepts interact and why. The direction of the relationships among constructs is unclear. This approach may be effective with exploratory research, but less helpful with explanatory research. The theory provides little guidance in predicting outcomes. Instead, the emphasis is on constructs that have a

role in or impact on the social behavior, not on *how* these constructs impact the behavior. It also may be challenging to build knowledge through replication under such a broad perspective. Constructs are not clearly defined in the theory and may be defined differently from one study to the next according to the research situation. The current state of the contemporary social ecological theory provides an opportunity for further development.

The theory has high utility in terms of practice applications for gerontological social workers. Interventions with person and the environment are fundamental to social work practice. Gerontological social workers often work on multidisciplinary teams, and issues that older adults face are inherently influenced by bio-psycho-social factors. As Richardson (in-press) points out, to be effective, social workers working with older persons need to assess individual issues of biological functioning, health, behavior, cognitive status, and affect and also environment issues of social supports, cultural and ethnic influences, economic issues and community resources. The social ecological theory supports the consideration of all of these factors.

Heterogeneity and diversity within cohorts. The inclusion of social and cultural components within the context of life course development suggests the recognition of diversity among people. Germain & Bloom (1999) point out that development is not a linear process in which everyone proceeds as stage models suggest. Instead they argue that there is wide variation and a lack of predictability in human development because it is a function of both biological and environmental factors. Kahana (1982) suggests that gerontologists not only ask whether an environmental characteristic is good for older

adults, but good for *which* older adults. The contemporary social ecological model does provide a framework to ask this question.

Though there is a recognition of the role of cultural and social factors in the person:environment interaction, Germain & Bloom (1999) do not offer much depth in their discussion of how these concepts have an impact and how culture and society leads to heterogeneity and diversity among groups. The theory provides a framework of concepts that describe the person:environment interaction, but does not explain or predict the interaction. Most of their discussion focuses on child development and does not discuss the impact of accumulative effects of life events on the person:environment interaction. Gerontological research using this theoretical model must include issues associated with heterogeneity within cohorts.

Power and inequality issues. Social ecological theory grew from Germain's life model of social work practice. The life model has been criticized by feminists for its emphasis on purpose and stability and its lack of attention to the role of power and conflict in society (Gould, 1987). Germain appeared to try to address this criticism by introducing the concepts of coercive power and exploitative power into the model in the early 1990s. These concepts appear to be "add-ons" to the model and are not fully integrated even in her most recent 1999 publication with Bloom. The impact of power relationships on goodness of fit and adaptation is not fully explored. In fact, Germain & Bloom describe favorable goodness of fit as growth and development of the individual while *sustaining* and *enhancing* the environment. Conflict theorists argue that sustaining and enhancing a social environment that is stratified by gender, race, age, and socioeconomic class cannot further human development for people in marginalized

groups. Germain's perspective closely relates to functionalist theories that do not see the productive role of conflict in development. The lack of integration of the power concepts provides a limited and disconnected picture for social work researchers and practitioners.

Despite its limitations, contemporary social ecological theory does provide an important contribution to gerontological researchers and practitioners. There is a recognition of the bio-psycho-social factors and a conceptual attempt to address the heterogeneity and diversity of within cohorts. A significant amount of development needs to occur before it can adequately address the inequity and power requirements of a comprehensive model of aging. The concepts and relationships among concepts will continue to evolve. Because of Germain's recent death, the evolution will have to be led by Gitterman, Bloom, Richardson and others.

Theoretical Focus

Contemporary social ecological theory provides a framework to explore the factors that contribute to the length of stay of adult day participants. Disenrollment from programs reflects an upset in the goodness of fit between person and the environment. Attempts by social workers on the micro and macro level to increase the length of stay in adult day program will support a favorable goodness of fit. Determining what factors support adaptation and coping with physical and cognitive changes as life events will add to social work's ability to foster positive personal development and environmental change. Receiving adult day services occurs within the context of individual and environmental subsystems.

Application of the social ecological approach emphasizing contemporary gerontological issues may provide add additional depth in the analysis of length of service utilization and program participation than the Anderson and Newman model. Individual and environmental factors are examined as factors that facilitate or impede adaptation within adult day services. The impact of cultural components is recognized. Bio-psycho-social components are folded into the individual and environmental factors. Recognizing multiple systems impact adaptation and "goodness of fit" with the environment, physical and social environmental characteristics, will also be included in the analysis. Analysis and interpretation acknowledge issues of power and inequity through the examination of the distribution of social resources.

Related Research

Previous research completed on the length of stay in home and community-based programs indicate that individual, programmatic and community factors impact length of stay in programs. Freedman (1999) using national data from the 1992 National Home and Hospice Care Survey, found gender, marital status, age, race, admission diagnosis, geographic region and primary payer all had an impact on length of use of home health services. Length of use was defined as the number of days from admission to discharge. Examining national Medicare home health claims between January 1989 and September 1993, Goldberg and Schmitz (1994) found that agency size, type of organization, geographic area, age, gender and diagnosis were associated with length of service. In addition, variables including race, level of formal education, annual income and living arrangements (living alone or with someone else) have been useful in predicting home

care and social service utilization (Johnson & Wolinsky, 1996; Norgard & Rodgers, 1997; Bass, Looman & Ehrlich, 1992; Ozawa and Morrow-Howell, 1992). Using county-wide data, Choi (1999) found that deteriorating health among African Americans and a dissatisfaction with meals and a poor appetite were important determinants of lengths of stay in meals on wheel programs.

Studies on the length of stay in adult day programs are very limited. Using statewide data, Cox (1997) compared caregivers who used respite services on a short term (less than six months), long term (more than six months) and not at all. Adult day services was included in the definition of respite services as well as in-home help and short-term nursing home stay. Those who used less than six months of respite were more likely to be white. Caregivers who used services longer were found to be initially less anxious and depressed, and experience less personal gain from their role as a caregiver. No differences were found between the groups in terms of relationship to care recipient, employment status of the caregiver and the cognitive functioning of the care recipient. Cox (1997) found that more than half of the caregivers who used respite for less than 6 months no longer used respite services because their care recipient was placed in a nursing home.

Specific to adult day services only, Zarit et al. (1999), using data from his caregiver experiment with a caregiver stress theoretical foundation, compared brief users (less than 3 months) to sustained users (more than one year). Those caregivers who used adult day services for a brief period had less formal education and were more likely to be a spouse. The care recipients in the brief group were more likely to be men and have higher ADL impairment and behavior problems. Caregivers with higher levels of role

captivity at baseline were more likely to use services for a brief time. Lower levels of depression and positive affect were associated with brief use.

One atheoretical exploratory study used client information to examine the length of stay in an adult day program. Wallace (1988) reviewed 177 records from one adult day program collecting data on age, sex, attendance schedule, medical problems, psychological problems, reason for referral, support systems, living arrangements, source of funding and reason for termination. Using step-wise regression, Wallace found that external funding, gender, type of support system, number of days scheduled to attend and reasons for referral were statistically significant indicators of length of stay in the program. When combined these variables explained 20 percent of the variation in the length of stay.

Extensive research has been completed on utilization of nursing home care. In Fisher & Liberman's (1999) review of the literature, multiple studies were identified that found demographic characteristics, severity of disease and characteristics of the caregiver to be predictors of nursing home placement for older adults. However, there have been contradictory findings in terms of specific variables and their level of impact. Specific demographic predictors include age, marital status, income, type of residence in the community and education of the caregiver. Functional level, mental deficiencies and health status have consistently been the best predictors of use of acute and long-term health care services (Fisher & Liberman, 1999; Wolinsky & Arnold, 1988). Fisher & Liberman (1999) add family characteristics as another important variable related to the use of nursing homes.

Though not specifically related to the length of stay in an adult day program, a few significant studies on the utilization of adult day services have been completed that provide important information about variables to consider when examining length of stay in adult day programs. Some of the same factors that impact the decision to use adult day services may also impact the decision to continue to use adult day services. The utilization studies reviewed provide findings in three areas: center characteristics, caregivers and clients. Using the Andersen and Newman model, Conrad, Hughes & Wang, (1992) and Weissert et al. (1990) identified utilization issues that related to organizational characteristics through national representative surveys. Using regression analysis and centers as the unit of analysis, Conrad, Hughes & Wang (1992) found higher *demand* for centers which

- are located in urban areas;
- have a high number of linkages in the community with referral agencies;
- are licensed;
- serve higher-functioning clients;
- have transportation and own a high number of vehicles; and
- are publicly funded (as opposed to private or corporate centers).

Demand was defined as the number of clients enrolled at a center plus the number of the waiting list.

The social environment of adult day programs, operationalized by Conrad, Hughes & Wang (1992) as scales measuring independence-promoting behaviors, staff morale problems, communication and director control, was not associated with demand. Also using centers as the unit of analysis, Weissert et al. (1990) found adult day services programs affiliated with general hospitals/social services agencies had larger daily census when compared to those affiliated with nursing homes and rehabilitation centers or special care centers.

Using a stratified random sample of 1913 households in Kentucky and Indiana from telephone interviews and organizational records, Barber, Paton, & Wishnia (1993) found that among caregivers, *use* of adult day services was lower than perceived *need*. Need was defined subjectively and objectively. Objective need was measured as the presence of a person in the household who had difficulty with either walking or dressing, or of someone who spent five or more hours a day caring for another adult in the household. Barber, Paton & Wishnia (1993) used difference of means tests to compare utilization and non-utilization. Factors that contributed to under-utilization included the lack of transportation and a lack of knowledge about adult day services. Those who lacked knowledge about adult day services were individuals who were poor, with low levels of formal education and lived in the urban or rural areas (Barber, Paton & Wishnia, 1993).

Cohen-Mansfield et al. (1994) through a non-representative sample of caregivers from four centers in a county in Maryland, found that women caregivers who did not utilize adult day services denied needing help or felt it was their duty to provide care for their husbands at home. Caregivers who were not spouses or children cited external reasons such as cost, transportation, and inconvenient hours as reasons for not using adult day services. Caregivers who inquired about adult day services because of their own physical and emotional burden were less likely to say cost was the reason they did not use. These caregivers who were looking for respite were more likely to state transportation problems as the reason for not using services (Cohen-Mansfield et al. 1994). If caregivers who inquired about adult day services said they were interested in adult day because they thought it would benefit the care recipient, it was more likely that

the care recipient would refuse to attend. Finally, those who were looking at adult day services for socialization for their care recipient had older care recipients than those looking for other reasons (Cohen-Mansfield et al., 1994).

Douglass & Visconti (1998) using the California Alzheimer's Disease Diagnostic and Treatment Center Program charts found that use of adult day services by a particular client was significantly related to previous use of adult day services.

Wallace et al. (1992) using a probability sample of adult day participants in Missouri found African American elderly use adult day services at twice the rate as whites even though no differences were found in physical and cognitive functioning. African Americans were more likely than whites to depend on children for caregiving and Medicaid for reimbursement of services.

Testing Andersen and Newman's behavioral health model using regression analysis, Douglass & Visconti (1998) found that client characteristics, caregiver characteristics and community characteristics were not significantly related to service use with this population. They used a probability sample of records of veterans enrolled in adult day programs and found that compared to nonparticipants, participants

- were less likely to be hospital inpatients at referral;
- were more likely to have been enrolled in a nursing home at admission;
- were more likely to be receiving in home care;
- had caregivers who were more dependent in IADLs; and
- had more behavioral problems as rated by their caregivers (Hedrick, et al., 1991).

Finally, Weissert et al. (1990) conducted the only study to determine variables associated with full-time versus part-time attendance rates. Using a nationally representative sample of charts and supplemental survey information, Weissert found the variables associated with an increased probability of full-time attendance were

- being 85 or older;
- having a history of nursing home use;
- having a history of mental illness;
- having a history of stroke;
- being dependent in toileting, eating, or both, and being subsidized by Medicaid;
- being a private payer;
- attending a center that was located in a county with older age structure; and
- attending a center facing competition from other day care providers.

Characteristics associated with a reduced probability of full-time attendance included

- having impaired mobility;
- having Alzheimer's disease or a related dementia;
- attending a center located in the Northeastern part of the U.S.;
- attending a center located in a high per capita income county;
- attending a center located in a county with a relatively high number of nursing homes per elderly person; and
- attending a center located in a high-density county, especially if the center is operating at or near capacity.

Ozawa and Tseng (1999) found users of out of home services defined as adult day services, senior centers and congregate meal sites versus those who used in-home services were younger and more educated. Physical limitations and health impairments were not found to impact the use of services. A recent national examination of only adult day service users indicated that when compared to users of home health care services, adult day users were younger, had greater cognitive impairments and needed more supervisory assistance with activities of daily living (Dabelko & Balaswamy, 2000). In addition, Dabelko & Balaswamy found that adult day service users had more social contacts than home health services users suggesting the importance of respite services provided by adult day programs.

This study tested the contemporary social ecological model by examining what factors influence the person and environment fit in adult day services. Length of stay in

the program was the proxy measure for goodness of fit. Specifically, this study addressed the following research questions.

What individual and environmental factors, as defined by the contemporary social ecological model, predict the length of stay in adult day programs?

- a) What factors facilitate or impede the fit between participants and adult day service programs?**
- b) Do the impeding factors involve social and physical environmental factors that can be changed?**
- c) What is the profile of the person who best fits with a medical/social model of adult day services?**

CHAPTER 3

METHOD

Population

This exploratory research study examined the associations between individual and environmental factors and the length of stay in adult day programs. Though national surveys are increasingly asking about the use of adult day services (See the National Longitudinal Study on Aging, Asset and Health Dynamics Among the Oldest Old, Social Security New Beneficiary Data System), inquiries focus only on use or no use, not the length of use. Statewide information on services is available only on the aggregate level. Finally, the mixture of public and private funding for adult day services makes it difficult to access comprehensive data on all clients who receive services. Because of these limitations, data must be gathered from local programs.

The clients from a single non-profit agency operating five older adult day programs in central Ohio were the subjects of this study. The agency was purposefully selected to maximize the variability in the predictor variables. The programs served clients with diverse racial and economic backgrounds and were located in urban and rural settings. All five programs operated as combined medical and social care models. The data were collected from client records and a written survey completed by the Director of Social Services. The subjects included all new intakes from January 1, 1999 to December 31, 2000. There were 295 clients admitted to the programs during this time

period. Of these 295 clients, 280 actually attended the programs after the initial intake. This study was based on those 280 clients.

Measures

The variables selected for this study were based on the contemporary social ecological model and existing literature. With only general constructs identified by the social ecological model, existing literature on health care utilization provided further guidance to the operationalization of the constructs. Figure 3.1 is a conceptual framework applying the social ecological model to adult day services length of stay. Increasing the validity of the measures, clusters of variables represented cognitive functioning, health status, cultural factors and financial factors. The constructs included in the categories of individual and environmental factors were defined by the social ecological model. The individual constructs included biological, affective, cognitive and health factors. The environmental constructs included cultural, social and physical factors. The goodness of fit between adult day program and older adults was measured as the length of stay in the program.

Individual Factors

Biological: age, gender

Affective: depression/anxiety

Cognitive Function: diagnosis, behavior

Health: prior hospitalization, prior nursing home stay, ADLs, IADLs, nutritional risk, incontinence, multiple diagnoses

Environmental Factors

Cultural: race/ethnicity, language, religion

Social: ***Financial Resources:***
income, funding, out of pocket costs

Social Resources:
marital status, level of education, number of people in household, relationship of primary caregiver, service intensity, transportation provider

Physical: size of staff, diversity of staff, size of program, capacity, size of program space, program type

Goodness of Fit
Length of Stay

Figure 3.1: Application of the social ecological model to adult day length of stay.

Individual Factors

Biological measures. (age and gender)

Age. Age at intake was measured in the number of years living as reported by the client/caregiver. Age has been found to be a predictor of the length of stay in home health services (Freedman, 1999; Goldberg & Schmitz, 1994; Johnson & Wolinsky, 1996; Norgard & Rogers, 1997; Ozawa & Morrow-Howell, 1992) and adult day services (Wallace, 1988).

Gender. Gender was categorized as male or female as noted by the licensed social worker at intake. Gender was found to be a predictor of length of stay in home health services (Freedman, 1999; Goldberg & Schmitz, 1994; Johnson & Wolinsky, 1996; Norgard & Rogers, 1997; Ozawa & Morrow-Howell, 1992). Zarit et al. (1999) found male participants of adult day services were more likely than females to have short stays in programs (less than 3 months).

Affective measure.

Depression/Anxiety. Depression/anxiety was measured as a dichotomous variable in categories of yes or no if a depression, anxiety or bipolar disorder is diagnosed by a physician as noted on the Physician Admitting Medical Evaluation form, and/or by the licensed social worker at intake. Depression is the major affective disorder among older adults (Schatzberg, Liptzin & Satlin, 1984).

About 15% of persons ages 65 and older had four or more symptoms of depression on the shortened version of the Center of Epidemiology Studies Depression Scale (CES-D). Of the oldest old (85 years or older) 23% had four or more symptoms of depression (Federal Interagency Forum on Aging Related

Statistics, 2000). Frequently anxiety accompanies depressive disorders (Kastenbaum, 1994).

Potentially threatening validity and reliability of this measure, it is not known whether standard assessment tools were used by the physician and/or the licensed social work in making these diagnoses. Lack of knowledge by physicians of diagnostic criteria and treatment as well as factors complicating diagnosis such as situational changes, association with medical illness or drug treatment, and the difficulty in distinguishing depression from dementia, most likely leads to under-diagnosis (Davis & Rapp, 1989; Schatzberg, Liptzin & Satlin, 1984). Under-diagnosis may be a problem in this study as well. There is some evidence to suggest that this variable will covary with health behaviors (Forsell, Jorm, Winbald, 1994).

Cognitive measures. (dementia-related diagnosis and cognitively-impaired behaviors)

Cognitive functioning. Increasingly cognitive functioning is being recognized as an important factor in assessing impairment (Kane, Saslow & Brundage, 1991). Using diagnosis and behavioral assessments, cognitive functioning has consistently been found to be a predictor of acute and long term health care services (Fisher & Liberman, 1999). Cognitive functioning was measured using diagnosis and behavioral measures such as forgetfulness/confusion and wandering. It has been argued that diagnosis of a dementing illness with a behavioral impairment measure is a more valid indicator of cognitive functioning than diagnosis alone (Schaie & Willis, 1999). However,

because no standard assessment tool was used with all clients, cognitive impairment was probably underestimated in this study.

Dementia-related Diagnosis. Dementia-related diagnosis was a categorical measure of yes or no if diagnosis of Alzheimer's disease or other dementing illness by physician was noted on the Physician Admitting Medical Evaluation form, and/or by the licensed social worker at intake. Dabelko & Balaswamy (2000) used a diagnosis of Alzheimer's disease or other dementing illness as a measure of cognitive impairment in a national study of adult day service users.

Cognitively-impaired behaviors. Cognitively-impaired behaviors was a categorical measure of yes or no if client exhibited forgetfulness/confusion and/or wandering behaviors at intake as reported by clients/caregivers or licensed social worker.

Health measures. (prior hospitalization, prior nursing home stay, ADLs, IADLs, nutritional risk, incontinence, multiple diagnoses)

Health. To strengthen construct-related validity, a cluster of seven variables was used to examine health-related behaviors. Health indicators have repeatedly been associated with the utilization of health care services.

Prior hospitalization. Prior hospitalization was measured in the number of times the subject was hospitalized in the last 3 years prior to intake as reported by client/caregiver.

Prior nursing home stay. Prior nursing home stays was measured in categories of yes or no if ever occurred prior to intake as reported by client/caregiver.

Activities of Daily Living (ADLs) limitations. ADL limitations was measured in seven specific areas including: transfer/mobility, bathing, grooming, dressing, toileting, eating/feeding, taking medications as reported by client/caregiver at intake. Per activity, points were given for level of assistance needed: 1 = no help needed, 2 = supervision needed and 3 = hands-on assistance needed. If data were present for four of the seven indicators, then means substitution was used. All 280 cases had data on at least four indicators. This scale was the standard assessment used as part of the National Aging Program Information System Resources (NAPIS) as required by the Administration on Aging. ADLs have been found to be a predictor of the utilization of home care (Benjamin, 1992). Though commonly used in research about older persons, Sinoff & Ore (1997) raised questions about the validity of self-reports for assessing activities of daily living. Sinoff & Ore suggested that a performance-based measure captures physical abilities differently from self-reports.

Instrumental Activities of Daily Living (IADLs) limitations. IADL limitations was measured in eleven specific areas including: medication administration, shopping, meal preparation, using telephone, arranging transportation, ability to take short walks, light housework, laundry, heavy housework, home maintenance, legal/financial as reported by client/caregiver at intake. Per activity, points were given for level of assistance needed: 1 = no help

needed, 2 = supervision needed and 3 = hands-on assistance needed. If data were present for seven of the 11 indicators, then means substitution was used. All 280 cases had data on at least seven indicators. This scale is the standard assessment used as part of the National Aging Program Information System Resources (NAPIS) as required by the Administration on Aging.

Nutrition. Nutritional risk was measured as a score on the nutrition risk assessment scale ranging from 0 to 21 as reported by client/caregiver. Scores from 0 to 2 indicate low risk, 3 to 5 indicate moderate risk and 6 or more high risk. This checklist was developed as part of the Nutrition Screening Initiative, a collaborative effort by the American Academy of Family Physicians, the American Dietetic Association and the National Council on Aging. It is required by the Administration on Aging as a standard assessment included in NAPIS. Nutrition has been identified by the National Center for Health Statistics, Centers for Disease Control and Prevention, as part of their National Health and Nutrition Examination Survey, as one of the key components of physical and functional health status of older adults (Burt & Harris, 1994).

Incontinence. Incontinence included urinary and/or bowel incontinence and was a categorical measurement of yes or no as reported at intake by client/caregiver. Self-reporting of incontinence may have limited validity. Fultz & Herzog (1993) point out the difficulty in gaining accurate reports of incontinence from older adults because of its often gradual onset and embarrassing nature.

Multiple Diagnoses. Multiple diagnoses included a count of up to four physical health diagnoses by a physician as noted on the Physician Admitting Medical Evaluation form, and/or reported to the social worker at intake. The data were recoded to reflect the categories of the physical health disorders classified by the American Geriatrics Society (Reuben et al, 2001). Diagnoses included: cardiovascular diseases, endocrine and renal disorders, gastrointestinal diseases, musculoskeletal disorders, neurological disorders, oncology and hematology, respiratory diseases. The reliability and validity of these diagnoses may be questioned. Errors may have occurred in self reports and physicians may have used different assessment tools. However, it is likely standard protocols for diagnoses were used by the physicians. Goldberg & Schmitz (1994) and Freedman (1999) found physician diagnosis to be a significant predictor of the length of stay in home and community-base care.

Environmental Factors

Cultural measures. (race/ethnicity, language and religion)

Culture has not been included as a construct that impacts the use of home and community-based care. Previous studies have relied exclusively on race or ethnicity only. To strengthen construct-related validity, a cluster of three variables was used to examine cultural factors.

Race/ethnicity. Race/ethnicity was originally defined as categories of African American, American Indian, Asian, Caucasian, Hispanic or other as reported by client/caregiver at intake. Because of the lack of diversity in the population,

race/ethnicity was recoded as white and non-white. Race/ethnicity has been found to be a predictor of length of stay with in-home services (Choi, 1999; Freedman, 1999; Cox, 1997).

Language. Language was defined as the primary language spoken at home as reported by client/caregiver at intake. Because of limited variance, language was coded as English and non-English.

Religion. Religious preference was defined as religious identification reported by client/caregiver at intake. With limited variability, religious preference was coded as preference or no preference for a particular religion.

Social measures. (financial and social resources)

To increase construct-validity, a cluster of variables was used to examine financial and social resources.

Financial Resources. Using assets and income as measures of financial well-being among older persons provides a more accurate picture of their financial resources than income alone (Rendall, 1996). Only income data, which limits the validity of this measure, was available for this study.

Income. Income was measured as the total dollar amount of social security, supplemental security income (SSI), Veteran's Administration (VA), and private pension received in one month as reported by client/caregiver. Income has been found to predict use of home care and social services (Johnson & Wolinsky, 1997; Bass, Looman & Ehrlich, 1992; Ozaawa & Morrow-Howell, 1992).

Funding. Funding was operationalized as the primary payer of care. The original categories included self pay, PASSPORT, Senior Options, Veteran's Administration, private insurance, title III, OHC, Senior Choices, Title XX, Alzheimer's grant. Because of the distribution of the data, funding was recoded as public or private sources of funding. Primary payer has previously been found to be a predictor of home health services and adult day services use (Freedman, 1999; Wallace 1988; Bass & Noelker, 1987).

Out of pocket costs. Out of pocket costs was measured in total dollars clients agreed to pay for care and transportation per month at intake. National figures suggest that out-of-pocket health care expenditures by older persons are significant. In 1998, annual out-of-pocket costs on health care by persons 65 year or older ranged from 9 to 16 percent of their total expenditures. The relative burden is felt more significantly by those in the bottom fifth of the income distribution. These individuals spent 13 percent of their annual expenditures on health care (Federal Interagency Forum on Aging Related Statistics, 2000).

Social Resources. To increase construct-validity, a cluster of six variables was used to examine social support.

Marital status. Marital status was based on client/caregiver's report at intake. The original categories included married, widowed, divorced and single. For ease of analysis, marital status was recoded as single or married. With the single category including those who were widowed, divorced or single. In previous studies, marital status is a predictor of length of use of home health

services and adult day services (Freedman, 1999; Zarit et al., 1999). Married adult day services participants tend to stay in the program for less than three months (Zarit et al, 1999).

Level of education. The level of formal education was measured by the highest grade of school completed as reported by client/caregiver. Completion of a General Education Degree (GED) was considered equivalent to 12 years of education. Level of formal education has been found to be a predictor of home health care use. Individuals with more formal education tend to use home health services more than those with less formal education (Johnson & Wolinsky, 1997; Bass, Looman & Ehrlich, 1992; Ozaawa & Morrow-Howell, 1992). Zarit et al (1999) found caregivers who used adult day services for a brief period of time versus those who used the services for an extended period of time had less formal education.

Individuals living in the household. Individuals living in the household was measured as the total number of people living in the household including the client as reported by the client/caregiver at intake. Those who use adult day services are more likely to live with another person than those who use in-home services (Dabelko & Balaswamy, 2000).

Relationship of primary caregiver to client. Relationship of primary caregiver to client was operationalized as the relationship of the primary emergency contact to the client as reported at intake. Categories included immediate family, extended family and non-family. Immediate family was

defined as child or spouse. Extended family was defined as grandchild, daughter-in-law, or other family. Non-family was defined as friend or paid professional.

Service intensity. Service intensity was defined as the number of days scheduled to attend the center per week as defined at intake. Wallace (1988) found a client's service schedule to be a predictor of the length of stay in an adult day program.

Transportation. Transportation provider was defined as the primary provider of transportation to and from the center. Transportation provider was either the center (formal support) or the family (informal support) as decided at intake. The center was coded as the provider when the center was scheduled to transport the client more often per week than the family.

Physical measures. (size of staff, diversity of staff, size of program, capacity, size of program space and program type)

Organizational environment as it relates to staff issues has been found to be associated with service utilization (Hennessy, 1993; Capitman, MacAdam & Abrahams, 1991).

Size of staff. The size of staff was measured as the average client to staff ratio in 1999 and 2000. This measure excluded drivers.

Diversity of staff. The diversity of staff was operationalized as the racial congruency between the individual client and the majority of staff employed in 1999 and 2000.

Size of program. The size of the program was measured as the average number of clients served in each program between 1999 and 2000. Godberg &

Schmitz (1994) found size of program to be a significant predictor in the length of stay in home and community-based care programs.

Capacity. Capacity was defined as the ratio of the average number of clients served at the center of attendance to the average potential number of client served in 1999 and 2000.

Size of program space. Operationalized as a ratio of the total number of square feet per person served.

Program Type. Type of program was defined as type of client primarily served. Categories of program type include functionally impaired only and both cognitively and functionally impaired clients. Lacking validity and reliability, program definitions have been determined by program administrators.

"Goodness of Fit" measure.

Length of Stay. "Goodness of fit" was operationalized as the length of stay in the program. The length of stay was measured in the number of weeks enrolled in the program beginning with the date of program admission and ending with the disenrollment date. The clients who had not disenrolled or died by the end of the study were assigned a disenrollment date of March 30, 2001, the date on which the data collection was completed.

CHAPTER 4

ANALYSIS AND FINDINGS

Analysis

Descriptive statistics including frequencies, measures of central tendency and standard deviations were used to describe the study population. The multivariate statistical analysis used to investigate the factors that influenced the length of stay in adult day services was the Cox proportional hazard regression model. Cox regression uses a hazard function as a rate estimate of the potential for disenrollment at a particular time (Steinberg, 1997; Hosmer & Lemeshow, 1999). This model determined to what extent individual and environmental factors can be used to predict the risk of disenrollment from adult day programs, and which factors were associated with longer stays versus shorter stays. The time variable was the length of stay in the programs. Enrollment was used as the status variable, and individual and environmental variables were used as the covariates.

Cox regression is an event history multiple regression which handles "censored cases." Censored cases are those in which the amount of time until the terminal event is not known because it has not yet occurred (Hosmer & Lemeshow, 1999). This is an important difference between Cox regression and linear and logistic regression. In linear and logistic regression, complete observations of the outcome variable occur. With Cox regression, the outcome variable is only partially observed (Hosmer & Lemeshow, 1999).

By the end of the study period some of the adult day services participants will not have disenrolled. Therefore, their end date is the end date of the study, not the date of disenrollment. Linear and logistic regression cannot handle cases that have not disenrolled during the study period. Using Cox regression with this truncated data will result in a plausible and interpretable estimate of length of stay.

Cox regression can handle categorical and continuous independent variables (Steinberg, 1997; Hosmer & Lemeshow, 1999). The Cox regression model determines the influence of the predictor variables on the dependent variable expressed in terms of a hazard function. The hazard function is an estimated risk of disenrollment. It is a rate that estimates the potential for disenrollment at a particular point in time given the individual is still enrolled at that time (SPSS, 1999).

Cox regression assumes that the relationships between the predictor variables and the dependent variables are independent and that all relevant variables have been included in the analysis. It assumes that the predictor variables are normally distributed. In addition, Cox regression assumes the hazard ratio is constant across time (Hosmer & Lemeshow, 1999). Using a .05 alpha level, the analysis first determines how well the regression model fits the data. Dummy coding was used for categorical variables and means substitutions were used to handle missing data. Then a presentation and discussion of the importance of the predictor variables in explaining the variance in the dependent variable is included.

For data reduction purposes, common factor analysis was used to create latent variables that represent the concepts measured with clusters of variables. Data reduction was necessary because of the large number of variables studied compared to the sample

size. A latent variable represents an underlying characteristic that is not measured directly (Vogt, 1999). These latent variables were used in the Cox regression analysis. Appropriateness of an exploratory common factor analysis is determined by examining the correlation matrix, Bartlett's test of sphericity, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and the initial estimates of communality (Norusis, 1990). In order to find the factor solution which best fits the observed correlations among variables in the observed data set, maximum likelihood method of extraction was used (Norusis, 1990). The criteria used to determine how many factors to interpret was the Kaiser criterion, scree plot, percent of total variance extracted and the interpretation of the factors (Gorsuch, 1983). To determine whether the oblique rotation or the orthogonal rotation was the most appropriate to interpret, simple structure, correlation of variables and conceptual interpretation were considered (Stevens, 1996). Of these criteria, conceptual interpretation resulted in the final conclusion.

Exploratory Common Factor Analysis

Appropriateness of common factor analysis. Common factor analysis was used as a data reduction technique to examine clusters of variables in the model. Based on conceptual associations, health, culture, social and physical variables were considered for the appropriateness of factor analysis. Correlation matrices for these clusters were considered. The health variables were the only variables that had a large number of significantly strong correlations. Therefore, the following health factors were considered as potential variables for data reduction: number of prior hospitalizations, Activities of Daily Living (ADL) index score, Instrumental Activities of Daily Living (IADL) index

score, nutritional risk score, number of diagnoses, incontinence (dichotomous) and prior nursing home stay (dichotomous).

Next, Bartlett's test of sphericity, Kaiser-Meyer-Olkin measure of sampling adequacy and initial estimates of communalities were examined to further determine the appropriateness of conducting a factor analysis. Bartlett's test of sphericity was used to test the hypothesis that the correlation matrix is an identity matrix. An identity matrix is one with the diagonal terms equal to one and the off-diagonal values equal to zero. This test assumes the data reflects a normal population distribution (Norusis, 1990). The chi-square of 192.87 was significant at a .000 level, indicating that a factor analysis is appropriate.

The KMO measure of sampling adequacy is an index for comparing the size of the observed correlation coefficients to the size of the partial correlation coefficients (Norusis, 1990). The values of the KMO measure range from 0 to 1. If the value is closer to 1, the sum of the squared partial correlation coefficients is small compared to the sum of the squared correlation coefficients indicating that a factor analysis is appropriate (Norusis, 1990). Hair, Anderson, Tatham & Black (1998) suggest values above .50 are acceptable. This analysis reveals a KMO statistic of .61 also indicating a factor analysis may be appropriate.

Finally the communalities of the variables were examined to determine appropriateness of a factor analysis. The communality is an indication of the strength of the association among the variables. The initial communality is the proportion of variance each variable shares with all other variables (Norusis, 1990). The results from this indicator are not as definitive as the previous two. Only the ADL index (.45) and the

IADL index (.38) meet the criteria of .3 or higher, suggesting that the other variables may not have high loadings on the resulting factors. However, because of the suggestive results from the previous tests, a factor analysis does appear appropriate with these data.

Initial determination of factors. There are multiple methods available for the extraction of the common factors with little agreement as to the superiority of one over the other in studies with cases of 30 or more (Gorsuch, 1983). For exploratory factor analysis, the goal is to determine the maximum number of common factors that produce satisfactory correlations among the observed variables. Using SPSS 10.1 the maximum likelihood method was used to extract common factors in this analysis. This method produces parameter estimates that are most likely to have produced the observed correlation matrix if the sample is from a normal distribution (Norusis, 1990).

In order to determine how many factors to interpret, four criteria were used: the Kaiser criterion (eigenvalues), the scree test, the percent of total variance extracted and conceptual interpretation based on previous literature. The Kaiser criterion retains all factors with eigenvalues greater than 1.0. In the initial analysis, two factors were retained based on this criteria. Factor one had an eigenvalue of 2.08 and factor two had an eigenvalue of 1.27. Because the Kaiser criterion can often underestimate or overestimate the number of factors (Gorsuch, 1983), in addition to conceptual examination, additional empirical criteria was used. The scree plot provides a visual examination of the eigenvalues by the number of factors. The scree plot shows a sharp descent after 2 factors also suggesting that 2 factors be maintained. Finally the percentage of variance explained by the factors was used to determine the number of factors to retain. The percent of common variance extracted by 2 factors in this initial analysis was 33% using

all of the health factors. Because factors 3 and 4 had eigenvalues near 1.0, .98 and .912 respectively, as well as the low percentage of common variance explained by the two factors, additional analyses were run with 3 and 4 factors. Though adding the third factor led to the explanation of more of the common variance, only one variable, incontinence, loaded on the third factor. Including four factors did not yield interpretable loadings.

Tabachnick & Fidell (1996) suggest a critical value of .32 or above to identify variables that load on each factor. Stevens (1996) suggests that at a minimum, loadings used to interpret a factor should be statistically significant. Using this criteria, a critical value of .32 is appropriate for samples with about 250 cases. Using .32 as the salient value, the nutritional risk assessment variable does not load on either factor using oblique or orthogonal rotation. Though nutrition has been identified as a key component of physical and functional health status (Burt & Harris, 1994), Sahyoun et al. (1997) argue the checklist may be more appropriate for awareness or educational purposes, rather than a screening tool. This finding may support that argument. It also may suggest that nutritional status should be treated as an independent concept from other functional health status measures. For the purposes of this study, nutritional risk was treated as an independent covariate in additional analysis.

Final determination of appropriateness of factor analysis. The final common factor analysis was rerun excluding the nutritional risk assessment variable. The following variables remained: number of prior hospitalizations, Activities of Daily Living index score, Instrumental Activities of Daily Living index score, number of diagnoses, incontinence (dichotomous), and prior nursing home stay (dichotomous).

Again, Bartlett's test of sphericity, Kaiser-Meyer-Olkin measure of sampling adequacy and initial estimates of communalities were examined to determine the appropriateness of conducting a factor analysis with this variable set. Bartlett's test of sphericity was used to test the hypothesis that the correlation matrix was an identity matrix. The chi-square of 217.29 was significant at a .000 level, indicating that a factor analysis is befitting. The KMO measure of sampling adequacy revealed a KMO statistic of .58 also suggesting support for conducting a factor analysis. Finally the communalities of the variables were examined. Similar to the previous analysis, only the ADL index (.49) and the IADL index (.41) met the criteria of .3 or higher, suggesting that the other variables may not have high loadings on the factors. However, because of the results from the previous tests, a factor analysis was appropriate with this data.

Final factor determination. The maximum likelihood method was used to extract common factors in this analysis. Again, in order to determine how many factors to interpret, four criteria were used: the Kaiser criterion (eigenvalues), the scree test, the percent of total variance extracted and the conceptual interpretation based on previous literature. The Kaiser criterion retains all factors with eigenvalues greater than 1.0. In this final analysis, two factors were retained based on this criteria. This final analysis had similar eigenvalues to the seven variable model. Factor one had an eigenvalue of 2.01 and factor two had an eigenvalue of 1.27. The scree plot provided a visual examination of the eigenvalues by the number of factors. The screen plot showed a sharp descent after two factors also suggesting that two factors be maintained.

Figure 4.1: Scree plot

Finally the percentage of variance explained by the factors was used to determine the number of factors to retain. The percent of common variance extracted by two factors in the analysis was almost 40% (38.65) using all of the health factors. Because factor three had an eigenvalue of .93 and the common variance explained by the two factors was low, another analysis was run imposing the three factors. Again, similar results to the initial analysis revealed the addition of the third factor led to the explanation of more of the common variance; only one variable, incontinence, loaded on the third factor.

Factor rotation. The rotation of factors creates a simple factor structure enabling variables to have non-zero loadings on only one factor (Gorsuch, 1983). This allows for simpler interpretation. As recommended by Stevens (1996), factors were rotated both

orthogonally and obliquely. Oblique rotation was selected for the final analysis because the factors are conceptually related and are correlated at .3.

Using .32 as the cutoff value, a simple two factor structure emerged. Factor one including ADL index, IADL index and continence, reflects a measure of functional health status. Factor two represents predictors of institutional use including previous nursing home placements, number of previous hospital stay and number of diagnosis.

Item	Functional Health Status	Health History
Nursing Home Stay	.13	<u>.36</u>
# of Hospitalizations	-.15	<u>.72</u>
Diagnosis Count	.003	<u>.32</u>
ADLs	<u>.99</u>	-.004
IADLs	<u>.64</u>	-.001
Continence	<u>.39</u>	.003
Eigenvalue	2.01	1.27
Percent total variance	27.01	11.58
Percent trace	27.07	38.65

Table 4.1: Factor loadings with oblique rotation and maximum likelihood extraction (N = 280)

Factor scores were calculated by SPSS 10.1 for these two factors using the estimation of factor score coefficients. This regression method of calculating factor scores results in scores that have a mean of zero and a variance equal to the squared

multiple correlation between the estimated factor scores and the true factor scores. These scores were used in the development of the subsequent regression model.

Survival Analysis

Survival analysis enables the investigation of the length of time to an event of interest regardless of whether or not the event has occurred by the end of the study time. Unlike multiple regression modeling, survival analysis is considered robust when the critical event has not occurred for all cases (Hosmer & Lemeshow, 1999). Because of the skewed nature of the outcome variable, length of stay, the Kaplan-Meier estimator is the appropriate statistic to use to describe this variable (Hosmer & Lemeshow, 1999). Using both uncensored and censored observations, the Kaplan-Meier estimator is a survivorship function that determines the probability of observing a survival time greater than or equal to a particular point in time. As it relates to this analysis, it is an estimate of the probability of enrollment at time t , given that disenrollment has not yet taken place.

Table 4.2 depicts the Kaplan-Meier estimator as the estimated probability of enrollment by week. The following information is reported.

Time t : a point in time within the range of enrollment time.

Cumulative survival: the probability of enrollment through time t .

Cumulative events (disenrollment): the number of clients who have disenrolled by time t .

Number remaining: the number of clients still enrolled at time t , which will eventually disenroll (SPSS, 1999).

Time (weeks)	Cumulative Survival Beyond <i>t</i>	Cumulative Disenrolled by <i>t</i>	Number Remaining**
1	.88	35	245
2	.79	59	218
3	.73	74	192
4	.65	96	155
5	.60	106	129
6	.59	113	110
7	.51	124	91
8	.47	130	71
9	.45	133	61
10	.42	138	47
11	.40	140	32
12	.40	140	21
13	.35	142	12
14	.31	143	12
15	.31	143	0
Percentile	Weeks		S.E.
25 th *	-		-
50 th	7.17		.92
75 th	2.75		.41

* Twenty-fifth percentile is not reported because there is no change from the 50th and the 25th percentiles.

** Number of non-censored cases only.

Table 4.2: Survivorship function (N = 280)

Figure 4.2: Cumulative Survival Function

Graphing the cumulative survival functions indicated a steady and sharp disenrollment risk until about eight weeks in the programs. The risk of disenrollment after eight weeks levels off more gradually until reaching the minimum value of .3119. Because the last case was censored, the point estimator was biased downwards (Hosmer & Lemeshow, 1999).

Cox Regression

Cox regression uses a hazard function to estimate the relative risk of “failure” or disenrollment in this study. As directed by Hosmer & Lemeshow, (1999), multiple steps

were required to build the Cox regression model. First covariates were selected. Second the linearity of the continuous covariates were examined. Third, the examination of the interaction effects was completed. Fourth, the estimated model was tested for adherence to key assumptions. Finally, a summary measure of goodness-of-fit was calculated.

Selection of covariates. Due to the exploratory nature of this research, both conceptual and empirical methods were used to ensure the inclusion of all significant covariates. All of the covariates included as part of the social ecological model were considered with the exception of language and religion, which lacked variation. As suggested by Hosmer and Lemeshow (1999), all covariates with a .20 p-value from the Wald tests of individual coefficients were considered for the model. The Wald tests whether the estimated beta coefficient is different from 0 in the population. It is a chi-square distribution (SPSS, 1999). In addition, two additional variables were selected based on their significance using stepwise entry. Stepwise entry uses computer generated statistical calculations to find the best combination of variables for the regression equation. Entry is based on the significance of the score statistic and removed based on the probability of the likelihood-ratio statistic depending on the conditional parameter estimates (SPSS, 1999).

	Covariate	Wald	Significance
<u>Individual Factors</u>			
<i>Biological:</i>	age	2.50	.11
<i>Affective:</i>	psychological diagnosis	9.91	.01
<i>Cognitive Function:</i>	dementia diagnosis	1.63	.20
<i>Health Status:</i>	nutritional risk status	2.81	.09
<u>Environmental Factors</u>			
<i>Culture:</i>	ethnicity	.15	.70*
<i>Social:</i>	<i>Financial Resources:</i>		
	primary funding source	7.64	.01
	<i>Social Resources:</i>		
	marital status	1.27	.26*
	service intensity	2.38	.12
<i>Physical:</i>	ethnic congruency	1.72	.19
	number of clients served	1.94	.16
	capacity	3.05	.08

*Considered for the model because of significance using stepwise entry.

Table 4.3: Covariates considered for the Cox regression model

From this initial model, each covariate was removed one at a time and the p-value of the partial likelihood ratio test was used to confirm that the deleted variable was not significant. The partial likelihood is the product of the risk of disenrollment at all points in time (SPSS, 1999). As recommended by Hosmer and Lemeshow (1999), after each removal, the coefficients were examined to determine if the removal resulted in a 20%

change in the remaining coefficients. If this was the case, the variable was added back into the model. Finally, all variables that were removed were added back into the model one at a time to confirm the variable was not statistically significant or an important confounding variable. This process resulted in a preliminary main effect model including seven covariates: age ($B = .04$, $SE = .01$, $p < .001$), psychological diagnosis ($B = .68$, $SE = .21$, $p < .001$), nutritional risk status ($B = .10$, $SE = .03$, $p < .005$), ethnicity ($B = .38$, $SE = .19$, $p < .05$), funding source ($B = .64$, $SE = .20$, $p < .001$), marital status ($B = -.37$, $SE = .19$, $p < .048$), and capacity ($B = 4.20$, $SE = 2.30$, $p < .039$).

Linearity of the continuous covariates. The preliminary main effect model includes three variables that are continuous: age, nutritional risk score and capacity. Hosmer & Lemeshow (1999) recommend examining the scale of the continuous covariates to determine whether the data supports the hypothesis that the covariate is linear in the log relative hazard. The log relative hazard is the natural log of the hazard ratio (the measure of the increase or decrease risk of disenrollment based on the covariates) (SPSS, 1999). The method of fractional polynomials is one approach to examining the linearity of continuous covariates (Hosmer & Lemeshow, 1999). STATA 7.0 was used for this portion of the analysis because SPSS to date has not implemented this method into their software. The fractional polynomial uses a finite set of powers [-2, -1, -.5, 0, .5, 1, 2, 3] to determine the best power for a covariate in the log hazard function. The best power is the one with the largest log partial likelihood. The partial likelihood is the product of the risk of disenrollment at all points in time (SPSS, 1999). The two best models developed are then compared with the linear model. Partial likelihood ratio tests are used to choose which of the three forms of the covariates is the most significant

(Hosmer & Lemeshow, 1999). The linear model is significant for all three variables indicating they are linear.

Age	Gain	Sig	Powers
Linear	.000	.004	1
Model 1	.014	.904	.5
Model 2	.017	.999	-2, 2
Nutrition	Gain	Sig	Powers
Linear	.000	.005	1
Model 1	1.965	.161	-.5
Model 2	2.749	.676	-2, 3
Capacity	Gain	Sig	Powers
Linear	.000	.102	1
Model 1	.228	.633	-2
Model 2	.495	.875	-2, -2

Table 4.4: Fractional polynomial model comparisons

Interaction terms. Hosmer & Lemeshow (1999) suggest the final step in the variable selection process is to determine if interactions need to be included in the model. Interactions are the joint effect of two or more covariates on the time variable (length of stay). *Interaction effects occur when covariates act in combination on the time variable.* The first step in the selection process is to form a set of clinically plausible interaction terms from the main effect terms in the model (Hosmer & Lemeshow, 1999). The significance of the partial likelihood ratio test for each interaction should be examined by adding each to the main model separately. Those interactions that are significant at .05 should be added to the model (Hosmer & Lemeshow, 1999). Two interaction effects

were conceptually determined to be plausible: 1) ethnicity and funding source 2) marital status and funding source. Neither proved to be significant when added to the model: ethnicity by funding (.334) and marital status by funding (.23).

Adherence to key assumptions.

Proportional hazards assumption. Residuals are used to test the model's adherence to key assumptions (Hosmer & Lemeshow, 1999). The standard definition of a residual in linear regression is the observed value minus the predicted value. This definition cannot be used in Cox regression because the model provides an estimate of the dependent variable in censored cases because the true value of the outcome is not known (Hosmer & Lemeshow, 1999). Therefore, several different residuals have been developed for Cox regression modeling including the Schoenfeld residuals, the Martingale residual and the Cox-Snell residual. The residuals provide information in assessing the proportional hazards assumption. The proportional hazards assumption presumes the effect of the covariates are the same regardless of the point in time (Hosmer & Lemeshow, 1999). In other words, it assumes the hazard function for the model is proportionally related to the baseline hazard over time (SPSS, 1999).

There have been a number of a "tests of proportionality" proposed. Hosmer & Lemeshow (1999) argue that using one test is more than adequate and one test is not superior over another. To test the hazards assumption for the covariates in the model, the scaled Schoenfeld residuals (partial residuals) were plotted against time in figures 4.3 through 4.9. If the proportional hazards assumption is not violated, a visual assessment should illustrate a parallel relationship for categorical variables and no relationship for continuous variables. The covariate capacity or the ratio of those served by those able to

serve appears to violate the proportional hazards assumption (see figure 4.3). This means the values of this variable are being influenced by factors that are dependent on time. This finding suggests that this covariate may need to be removed from the model. Before this determination is made, Hosmer and Lemeshow (1999) suggest examining the subject specific diagnostics that are described in the following section.

Figure 4.3: Partial residual for capacity by length of stay

Figure 4.4: Partial residual for age by length of stay

Figure 4.5: Partial residual for nutritional risk by length of stay

Figure 4.6: Partial residual for race by length of stay

Figure 4.7: Partial residual for funding source by length of stay

Figure 4.8: Partial residual for marital status by length of stay

Figure 4.9: Partial residual for psychological diagnosis by length of stay

Subject specific diagnostics. As recommended by Hosmer & Lemeshow (1999), DfBeta values were examined to determine if a coefficient in the preliminary main effects model is overly dependent on a particular subject. DfBetas measure the difference between each regression coefficient when a particular observation is included and excluded in the model. The difference is scaled by the estimated standard error of the coefficient (STATA reference Manual, 1999). It is suggested by Belsley, Kuh and Welsch (1980), as cited by the STATA Reference Manual, that values with the absolute

values greater than 2 divided by the square root of n should be further examined. Using this criteria, the critical value of .11 was used to determine potential problems in the data. All of the DfBeta values for the covariates, age, psychological diagnosis, nutritional risk, ethnicity, primary funding source and marital status were less than .11. Again, the covariate capacity, had numerous cases that suggest violations of this assumption.

The examination of the residuals, the proportional hazards assumption, and the subject specific diagnostic statistics support the exclusion of the covariate capacity and the inclusion of the covariates age, psychological diagnosis, nutritional status, ethnicity, funding source and marital status in the final model.

Findings

Population Description

The majority of the study population was female (71%), widowed (52%), Christian (86%) and spoke English as a primary language (96%). Race was mixed with about half Caucasian (52%) and half African American or other (48%). The average age was 77 years (SD = 9.07) and the average of number of years of formal education was 11 years (SD = 3.53).

	Percent			N
Gender				280
Female			71	
Race				277
Caucasian			52	
African American			46	
Other			2	
Primary Language				280
English			96	
Religious Preference				277
Christian			86	
Other			5	
None			9	
Marital Status				275
Married			27	
Widowed			52	
Divorced			15	
Single			6	
	M	SD	Range	N
Age	77.29	9.07	50-95	280
Education	11	3.53	0-20	246

Table 4.5: Demographics

Mental and Physical Health Status

About 20% of the population had a psychological diagnosis of anxiety, depression or bipolar made by a physician or a licensed social worker. Measures of cognitive functioning indicated that only 11% of the population had a dementia diagnosis by a

physician, but according to reports by individuals or caregivers, 68% engaged in behaviors associated with cognitive impairment including wandering and/or forgetfulness. About a quarter had been in nursing homes in the past and about half had urinary and/or bowel incontinence. The ADL and IADL indexes indicated a high level of limitation with IADLs and a moderate level with ADLs. The population averaged about two diagnoses and one hospital stay in the last three years. Nutritionally, the average risk score was 4.27 (SD = 2.58) indicating moderate risk.

	Percent	N		
Mental Health				
Affective State		280		
Anxiety, Depression or Bipolar Diagnosis	20			
Cognitive Functioning		280		
Dementia Diagnosis	11			
Behavioral Limitation	68			
Physical Health				
Past Nursing Home Stay		278		
Yes	28			
Incontinent		252		
Yes	46			
	M	SD	Range	N
ADL Index (7 items)	12.34	4.11	7-21	280
IADL Index (11 items)	28.41	4.40	11-33	280
Number of Diagnoses	1.91	1.15	0-4	280
Hospital Stays in 3 Years	.84	.71	0-5	280
Nutritional Risk	4.27	2.58	0-12	280

Table 4.6: Mental and physical health status

Financial and Social Resources

About 75% of the population relied on public dollars as the primary payer for services. Those who did pay for services averaged \$5.60 a day (SD = 14.38) and had annual incomes averaging \$13,209 with ranges from \$1,366 to \$60,001. In terms of

social resources, the relationship of the primary caregiver was most frequently a daughter or daughter-in-law (50%) or spouse (21%). The number living in the client's household including the client ranged from 1 to 10 with the average of three. The center provided transportation for clients in the majority of cases (78%) and the average number of days per week scheduled was about three (SD = 1.3).

	Percent			N
Primary Funding Source				280
Private		23		
Medicaid-waiver		41		
Veteran's Administration		8		
County Levy		25		
Other Public		3		
	M	SD	Range	N
Annual Income	\$13,209	\$8,681	\$1,366-\$60,001	271
Client Cost per Day	\$5.60	\$14.38	\$0-\$57.60	215

Table 4.7: Financial Resources

	Percent			N
Relationship of Primary Caregiver				280
Spouse			21	
Daughter/Daughter-in-law			50	
Son			10	
Granddaughter			3	
Grandson			.4	
Other Family			10	
Friend or Professional			12	
Primary Transportation Provider				273
Center			78	
	M	SD	Range	N
Number in Household	2.71	1.33	1-10	278
Days Scheduled per Week	2.97	1.30	1-6	279

Table 4.8: Social resources

Individual in the Program Environment

In about half of the cases (46%), the race of the client matched the predominant race of the staff. The average client to staff ratio was 4:1 and programs could serve an average of 27 clients and were on average 77% full during the study period. Physical programming space averaged about 137 square feet per person with a standard deviation of 30 feet (includes bathrooms and kitchen areas). The majority of the clients were in programs with mixed cognitively and functionally impaired participants.

	Percent	N		
<hr/>				
Staff/Client Race Congruency		276		
Same	46			
Different	54			
Clients Primarily Served		279		
Cognitively and Functionally Impaired	80			
Functionally Impaired Only	20			
<hr/>				
	M	SD	Range	N
Client to Staff Ratio	3.89	.2576	3.4-4.27	278
Number Served	27.42	6.27	17-35	279
Capacity	.77	4.40	.70-.85	279
(Those Served/Ability to Serve)				
Space	137.07	30.27	96-170.69	279
(Square Feet per Person)				
<hr/>				

Table 4.9: Individual in the program environment

Program Stay

About half of the clients were still enrolled in the programs at the end of the study period. The most frequent reason for disenrollment was long-term care placement (36%) followed by the services not matching need (19%). Disenrollment due to death was 15% and disenrollment due to moving was 10%. The median length of stay in the program was almost five weeks (SD = 3.9).

	Percent	N		
<hr/>				
Enrollment Status		280		
Enrolled	49			
Disenrolled	51			
<hr/>				
Reason for Disenrollment		143		
Long-term Care Placement	36			
Services Did Not Match Need	23			
Death	15			
Moved	10			
No Longer Needed Services	4			
Dissatisfied with Services	3			
<hr/>				
	Median*	SD	Range	N
Length of Stay (weeks)	4.60	3.92	.1-15.5	280

*Median is used as the measure of central tendency because it is preferred to the mean in cases where the variable is truncated.

Table 4.10: Client stay in program

Cox Regression Model

The final Cox regression model provides insights into the following study questions.

What individual and environmental factors, as defined by the contemporary social ecological model, predict the length of stay in adult day programs?

- d) What factors facilitate or impede the fit between participants and adult day service programs?

- e) Do the impeding factors involve social and physical environmental factors that can be changed?
- f) What is the profile of the person who best fits with a medical/social model of adult day services?

The application of the social ecological model to the covariates of interest suggest that biological, affective, health, culture, financial and social factors influence the length of stay in adult day programs. Absent are cognitive functioning measures and physical environmental issues associated with program characteristics.

Figure 4.10: Application of social ecological model to covariates

The final main effect model is reported in the following table. The following information is included in the table.

B: is the estimated coefficient or the predicted change in the log hazard for a one unit increase in the predictor variable controlling for the other covariates.

SE: is the standard error of B.

Wald: is the test statistic that determines whether B is different from 0 in the population. It is distributed as chi-square.

Sig: is the significance level for the Wald.

Exp(B): is the hazard ratio. For dichotomous variables it is the relative risk, the ratio of the risk with X at 0 compared to the risk with X at 1. Greater than 1 means an increase risk. For continuous variables, Exp(B) estimates the percentage change in risk with each unit change in the covariate.

95%CIE: is the 95% confidence interval for the hazard ratio (SPSS, 1999).

Log Likelihood: is the chi-square distribution used to look at the difference between a baseline model where all the covariates have a value of 0 and the developed model.

Variable	B	SE	Wald	Sig	Exp(B)	95%CIE
Age	.03	.01	9.62	.002	1.03	1.01, 1.06
Nutrition	.09	.03	7.14	.008	1.09	1.02, 1.17
Ethnicity	.50	.18	7.44	.006	1.64	1.15, 2.35
Funding	.59	.20	8.87	.003	1.81	1.23, 2.68
Marital	-.38	.19	4.09	.043	.69	.48, .99
Psych	-.62	.21	8.94	.003	.54	.36, .81

-2 log likelihood = 1325.235

Table 4.11: Final model

The final model suggests that each year older in age at intake increases the risk of disenrollment by 3%. In other words, clients who are one year older disenroll at a rate that is 3% higher than younger clients. Clients who score one point more on the nutritional risk assessment at intake disenroll at a rate that is 10% higher than those with lower scores. Dichotomous variables suggest relative risk. Non-white clients are disenrolling at a rate that is 64% higher than whites. Clients who rely on public funding as a primary payer for services disenroll at a rate that is 81% higher than those who pay privately. Clients who are married disenroll at a rate that is 69% lower than those not married. Those clients with a psychological diagnosis disenroll at a rate that is 54% lower than clients without a psychological diagnosis. The -2 log likelihood for the final model is 1325.24 compared with 1365.45 with the baseline model in which all beta values are set to 0. This chi-square difference of 40.21 is significant at .000.

Nutritional risk status and primary funding source for care are factors that can be addressed through social interventions. The best fit for a medical/social model of adult day service is a younger, white, married person at low nutritional risk with a psychological diagnosis who pays privately for care.

Overall goodness-of-fit

Hosmer & Lemeshow (1999) indicate that one should use caution when interpreting model performance of a proportional hazards regression model using existing statistical calculations. They suggest that more work needs to be done in this area. A perfectly adequate model may have what appears to be a very low R-squared equivalent value due to the high percent of censored data (Hosmer & Lemeshow, 1999). Hosmer &

Lemeshow (1999) do suggest the following formula “if one must compute such a measure.”

$$R_p^2 = 1 - \{\exp[2/n (L_0 - L_p)]\}$$

L_p = the log partial likelihood for the fitted model with the covariates.

L_0 = the log partial likelihood for the fitted model without the covariates.

Excel software was used to calculate the value of .13 from the log partial likelihood values in the model. An R-square for this proportional hazards model of .13 suggests that age, nutritional risk, ethnicity, funding sources, marital status and psychological diagnosis together explained 13% of the variance in the length of stay in adult day service programs.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

Summary

This study used the contemporary social ecological model to examine which factors influenced length of stay in adult day programs. Literature was reviewed on service utilization and length of stay in home and community-based care. Individual and environmental data were collected from 1999 and 2000 new client files and an administrative survey in five adult day programs in central Ohio administered under a single non-profit agency (N=280). Using Cox regression, age, nutritional risk, ethnicity, funding source, marital status and psychological diagnosis were found to be the significant predictors of length of stay. Those participants who had the longest stays were younger, had low nutritional risk, were white, paid privately for care, were married and had a psychological diagnosis of anxiety, depression or bipolar disorder. Implications on the utility of the model and policy and programming implications are presented below. A discussion of limitations and future research recommendations ends this chapter.

Discussion

The findings in this study support the use of the contemporary social ecological model as a framework to examine individual and environmental factors that influence the length of stay in adult day programs. Adaptation to reach a “goodness of fit” (a long stay) was facilitated by having a psychological diagnosis and being married. Length of

stay was impeded by older age, higher nutritional risk, being non-white and receiving public funds for care. Physical programmatic factors, however, were not found to be significant predictors of fit. This finding suggests that the program environment does not influence length of stay in adult day programs. Programmatic factors such as the number of clients served, size of program space, staff characteristics, etc. may have an impact on a client or caregiver choosing to enroll in the program, but does not appear to influence staying with the program. It should be noted that the broad conceptualization of the constructs in the contemporary social ecological theory might have resulted in missing key measures of the physical environment such as lighting or amount of visual stimulus. The decision to make a distinction between theoretical frameworks used to examine service use (Andersen and Newman's Model of Medical Care Utilization) versus length of use appears to be supported.

Though the social ecological perspective seems to suggest that individual and environmental factors equally influence “goodness of fit”, the findings in this study suggest that the cultural and social environmental factors (race, primary funding source and marital status) have more influence than individual biological, affective and health factors (age, psychological diagnosis, nutritional risk) on length of stay in adult day programs. The importance of the cultural and social environment factors provides support for the need to fully integrate power and inequity issues into the contemporary social ecological perspective. As previously noted, the social ecological theory has been criticized for not addressing the role of power and conflict in social behavior. Considering the significant influence of race, primary funding source and marital status on length of stay in adult day programs, a critical gerontological perspective should be

integrated into the contemporary social ecological model when applied to older adult issues.

The profile of an adult day services client who has longer program stays is a young white married individual with low nutritional risk and a psychological diagnosis who pays privately for care. Within the context of the social ecological perspective, an individual with this profile has a favorable “goodness of fit” promoting growth and development. This positive adaptiveness to the flow of life events suggests that the adult day services model plays an important role on the continuum of long term care for these individuals. Because the process of continual enrollment in an adult day program is a dynamic one, adult day programs acts as a protective factor when particular clients face life stressors.

Policy Implications

Adult day services is a less expensive option to institutional care that supports older adults' wishes to remain living in the community as long as possible. About 50-75% of adult day participants nationally (Zelman, Elston & Weissert, 1991; Bradsher et al, 1995) and about 75% in this study receive public dollars to pay for their care. With nearly 40% disenrolling into institutional long-term care, policy efforts to support the use of adult day services is both fiscally responsible and supports individual autonomy. (According to the Ohio Association of Area Agencies on Aging, in January 2002, the annual nursing home cost in the state of Ohio was \$52,000 versus an average annual cost of a person in the home and community-based care Medicaid waiver program at \$11,200.)

The significantly higher disenrollment rates for those who use public dollars versus private pay, and the lack of predictive power of functional health status, suggests screening mechanisms for eligibility for public programs should be examined. The current screening tools using ADLs and IADLs may be good predictors of health care use, such as hospitals and nursing homes (Fisher & Liberman, 1999; Wolinsky & Arnold, 1988), but appear not to be good indicators of length of use in adult day programs. Though a composite measure of health status was used in this study, previous studies using individual measures of health status were found not to predict length of stay in home and community-based services. Ozawa and Tseng (1999) found physical limitations and health impairments do not predict the use of community-based services (senior centers, congregate meal sites and adult day health). Specific to adult day length of stay, Wallace (1988) also found medical problems not to be a predictor of length of stay. Finally, national home care studies of length of stay also suggest that functional health status is not a good predictor of length of stay (Freedman, 1999; Goldberg & Schmitz, 1994). The institutional level of care requirements of Medicaid-waiver programs may bring public payers to adult day at sicker levels preventing them from longer stays in the program and experiencing the full benefits of the program. Premature nursing home placement may be avoided if clients are able to enter programs at various levels of functioning. Though there is an association between race and funding source ($r=.15$, $p<.02$), this small association does not provide enough descriptive power to use cultural issues as the only explanation for the higher rates of disenrollment. The Medicaid-waiver program is a capped benefit program perhaps prohibiting access to all needed services.

The higher rates of disenrollment among non-whites may reflect the years of inequities non-whites have faced in the health care arena. With lower life expectancies, less access to medical care and institutional forms of racism, non-whites face challenges in all areas of health services (Watson, 1990). Some argue the addition of Medicare and Medicaid in the 1960s has increased access to health care for non-whites (Miller, Campbell & Furner, 1997; Height, 1996). Despite this increase in access, inequities remain. A recent study of Medicare beneficiaries enrolled in managed care plans found blacks received poorer quality of care than whites (Schneider, Zaslavsky & Epstein, 2002). Schneider, Zaslavsky & Epstein (2002) suggest disparities may be the result of racial bias among doctors and cultural differences reflected in a tendency for blacks to not seek preventative care. The higher rates of disenrollment for non-white adult day participants may reflect an individual's history of poor health care, inequities in quality of current care and limited financial resources.

Unlike nursing home use, Wallace et al. (1992) found African Americans were more likely than older whites to use adult day services and use it more frequently. This statewide study suggests the nature of the caregiver relationship is an important factor in adult day use. African American participants were less likely to be married and more likely to rely on nonspousal family for informal support. African American caregivers were more likely to be working. With the expected growth in the number of non-white older adults, public policies that address the unique life experiences and needs of these individuals are needed. Expansion of employment policies that support extended family caregiver activities such as the Family Medical Leave Act may offer minorities more options for balancing formal and informal caregiving. Balancing formal and informal

caregiving is crucial to adult day service use and perhaps ultimately preventing premature institutionalization.

Participants are staying in adult day programs for short term and long term stays demonstrating that adult day services may provide multiple roles in the continuum of care for older adults. In this study, about half of the participants stayed less than eight weeks in the program and half longer than eight weeks. In addition, the rate of disenrollment appears to be more rapid in the first eight 8 weeks and then level around eight weeks. There is little consensus about the principal goals and services of adult day programs and how these services connect with the long-term care continuum. Bradsher et al, (1995) and Benjamin (1993) argue that this lack of consensus limits policy development and access to adult day services. Adult day services is in the position to dually define its role in providing brief and sustained service to help participants maintain independence. The short-term stays may reflect rehabilitative purposes or subacute services. The longer term stays support individuals with mental health issues, cognitive impairment and long term respite for caregivers.

Social support appears to be important in maximizing the length of stay in adult day programs. Using a national data set, Dabelko & Balaswamy (2000) found adult day participants when compared to home health care users had more social contacts. Participants who are married stay in the program for longer periods of time than those who are single. Spouses are most frequently identified as the primary caregiver and provide the most extensive care for their loved one regardless of formal service utilization (Tennstedt, 1999). The adult day service model capitalizes on the informal and formal care networks to maximize independent living in a cost-effective manner.

Support for services for family caregivers has recently received more attention with the 2000 amendments to the Older Americans Act that established the National Family Caregiver Support Program. Through \$125 million in fiscal year 2001, state units on aging and area agencies on aging are providing information to caregivers about available services; assistance in gaining access to supportive services; individual counseling and support groups; caregiver training; respite care (such as adult day services); and supplemental services on a limited bases to complement the care provided by caregivers (Administration on Aging, 2001). The dollars for the National Family Caregiver Support program increased to \$141 million in FY2002 (Administration on Aging, 2002). With the important influence social support plays in length of use of adult day services, this service model is well positioned to take advantage of these new funds.

Additional policy development should be explored to address cases where a spouse or an adult family member is not available to provide caregiving. Creative caregiving options such as consumer directed home care may enable an older adult without family or friends to be an informal caregiver to hire a friend to assist in the needed balance between formal and informal care. Gaugher et al. (2000) found caregivers were less likely to institutionalize their relatives if other family members provided overnight help and assisted with activities of daily living. Formalized relationships with home care agencies may not provide the flexibility needed to support caregiver and client needs. Additional supports should be examined to develop informal care networks. Findings from Gaugher et al. (2000) suggest the type of additional social support for caregivers versus the amount of support is an important predictor of institutionalization.

Supporting adult day services as an important provider for older adults with mental health issues has not fully been recognized in the public policy arena. Adult day services may be a politically palatable solution for supporters of de-institutionalization of mental health services while providing the needed structural support for older adults with mental illness. The deinstitutionalization efforts that began in the mid-1960s have resulted in limited public dollars for mental health services and a lack of community supports and alternatives for care. Unfortunately, many individuals face institutionalization in hospitals and nursing homes instead of community-based care options. Adult day services can play an important role in stabilization through medication administration and monitoring and socialization. Funding for these services can also support raising public awareness about geriatric mental health issues. Though approximately 20% of older adults experience mental health disorders, older adults underutilize mental health services (Administration on Aging, 1999). Barusch, Roger & Soleman (1999) suggest this number could be as high as one in three among physically frail elders. Barriers to service use include fragmented and inadequate funding, lack of collaboration and coordination by physical health, mental health and aging service providers and inadequate training by professionals in geriatric mental health issues (Administration on Aging, 1999). Adult day services can provide an important avenue to address these barriers.

The limitations of this study prevented the examination of the change in nutritional status during the stay in adult day programs. However, with lunch and snacks provided to all adult day participants in attendance, conceptually it follows that the nutritional status of participants most likely improved while in the program. Despite this

likely improvement, nutritional risk at intake remained a significant predictor of length of stay. Since the 1972 amendments of the Older American's Act, there has been a continual recognition of the importance of nutritional status in health and wellness (Burt & Harris, 1994). This recognition has been supported by increased public dollars for nutritional programs.

Program Implications

Clients disenroll at higher rates during their first eight weeks of stay in the adult day program, than after eight weeks. The first eight weeks appear to be crucial in determining if the client will be staying for a short stay or longer stay. Additional support and contacts should be made to clients and caregivers in their first eight weeks of stay in the program to ensure longer stays. This is especially true for non-white, publicly funded, single individuals at high nutritional risk. Social work and nursing contact schedules should reflect how long a participant has been enrolled in the program.

Opportunity exists to continue the development of a relationship with local mental health agencies. Since individuals with an anxiety, depression or bipolar diagnosis are staying longer in programs, adult day services appears to be a viable option for services for individuals with mental illness. Adult day services may provide therapeutic socialization and support medication compliance giving clients stabilization. Because of older adults' hesitancy to use designated mental health services (Administration on Aging, 2002), adult day services might provide a more palatable mechanism for treatment. As individuals with mental illness are staying in programs at a higher rate than those without mental health diagnosis, it is important that social workers and staff are

provided on-going training in mental health issues and innovative programming support. Standardized mental health tools should be completed at different points in a client's stay in the program to demonstrate improvement or changes.

Social workers in adult day programs need to continue to acknowledge the importance of social support in maintaining a client in the program. Reduction in caregiver stress as the result of adult day services has been documented by Zarit et al (1998). Despite the limited acknowledgment of caregivers in the recent national accreditation standards (Commission on Accreditation of Rehabilitation Facilities, 1999), caregivers are an important consumer of adult day services. Adult day services relies on formal and informal support structures to keep a participant living in the community. In cases where participants do not have an informal support network, social workers must attempt to identify and provide assistance to potential informal caregivers.

The higher rate of disenrollment by non-white participants should be explored. As previously noted, there is a small association between payer source and race ($r = .15$, $p < .02$). This association does not appear large enough to explain the much higher disenrollment rates of non-whites. Social workers should explore what cultural issues or programmatic issues lead to non-white clients disenrolling. Caregiving issues previously mentioned that are unique to non-white clients should also be explored. Access to additional health services outside the adult day program should supported. From this study, it does not appear that staff and client racial congruency is an issue. Social workers need to explore how best they can support non-white individuals and their families while in adult day programs by talking with older adults and their caregivers. As suggested by Watson (1990) patterns of kinship care among African Americans, respect

for elders and the role of the church are important influences on how African Americans interact with health care providers.

With private payers staying longer in programs, adult day administrators and staff may want to consider more aggressively marketing to higher income clientele. Those with the ability to pay privately for care have more care alternatives than nursing home care such as assisted living. Despite this availability of options, private pay individuals are choosing to remain in the community with the support of adult day services. With the majority of adult day clients receiving public funding, there appears to be an untapped market for higher income individuals.

Because of the limitations of this study, change in nutritional status once clients were enrolled in programs was not measured. However, with nutritional status at intake being a predictor of length of stay, the importance of meal programs in adult day services should not be overlooked. Nutritional risk has been found to be a predictor of mortality (Sahyoun et al., 1997). Examination of nutritional habits and continuation of nutritional supports through programming should be enhanced. Measures of nutritional status should be implemented at various points in a participant's stay in the program to monitor change.

Limitations

This ex post facto exploratory study has a number of limitations that merit attention. As data were gathered from existing client charts, the information may be what the client reports, what the caregiver reports and/or what the social worker assessed. The

data may be inaccurate or missing. There were up to six different licensed social workers completing the intake forms which threatens the reliability of this measure.

Measures of depression and cognitive functioning were based on professional judgement only. With no standard assessment tools known to be used, these data may lack validity and reliability. Medical diagnosis was taken from the Physician Admitting Medical Evaluation form. This form was completed by a number of Physicians and the reliability and validity of the diagnosis was based on their professional assessment. Because of the difficulty of including multiple categories of diagnoses in the regression model, number of diagnoses was substituted. This measure limits the understanding of the nature of the diseases. The intensity of service was based on scheduled days of attendance, not actual days attended. Due to the limited variability in language and religion, race was the only measure used when examining cultural influence. The nutritional risk checklist was found by Poster et al. (1993) to be valid with noninstitutionalized older persons. However, Sahyoun et al. (1997) argued the checklist may be more appropriate for awareness or educational purposes, rather than a screening tool. Though Sahyoun et al. found the overall score significantly predicted mortality, the relative risk calculated was somewhat a weak predictor.

The process of moving from levels of care is a complex and dynamic one. Though an extensive literature review was completed as well as theoretical guidance was used, there still may be other factors that contribute to the length of stay in adult day programs that have not been included in the analysis. For example, other variables of interest may include a measure of the nature of familial relationships or the level of religiosity, etc. In addition, the data collected reflects only one point in time (at intake)

and does not reflect the changing nature of the process. Incorporating time-varying measurements could provide more information about changes that occur while an adult day participant is enrolled in a program.

The results can be generalized only to the programs from which the data were collected. Because there are multiple models of adult day care, these programs reflect only the combined medical and social model.

Future Research

Because of the nature of this exploratory research, there are a number of issues that need further exploration. Additional empirical research using the contemporary social ecological model emphasizing critical gerontological concepts could provide additional clarity in the operationalization of concepts as they relate to older adult issues. Additional research could contribute to the development of the contemporary social ecological model that is appropriate for older adult issues.

Comparison of different adult day service models such as medical versus social might provide additional insights into the programmatic factors that influence length of stay in adult day programs. Other key programmatic factors such as profit or not-for-profit program comparisons might offer additional understanding. As in the case of the adult day programs examined in this study, frequently one administrative agency oversees multiple programs. Random assignment to different programs within one agency could provide some causal explanations in terms of environmental factors that influence length of stay.

Because data were collected from intake records, the nature of the client's experience within the adult day setting was not captured. Examining changes that occur while enrolled in adult day programs might provide an understanding of how the nature of the care contributes to the length of stay in the program. Changes in individual factors could also provide insights.

Additional research is needed to understand what factors contribute to non-white disenrolling at higher rates. Further examination of issues like the nature of caregiving relationships, access to quality health care, etc. should be examined. Additional programmatic factors such as the nature of program activities and client interactions could be considered. Because of the lack of variability in primary language spoken at home and religious preference, cultural measures were limited to race/ethnicity. Data collected from participants with more diversity in language and religion could provide additional cultural information. Exploring other ways to operationalize the concept of culture might prove beneficial.

Because existing client records were used to gather data, a number of the measurements used were inadequate. Future research that includes standardized measure of cognitive functioning, depression and anxiety, etc. is warranted. Additional depth of particular measures could be beneficial. For example, examining the nature of the caregiving relationship or the level of religiosity would provide a more in-depth look at these issues.

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