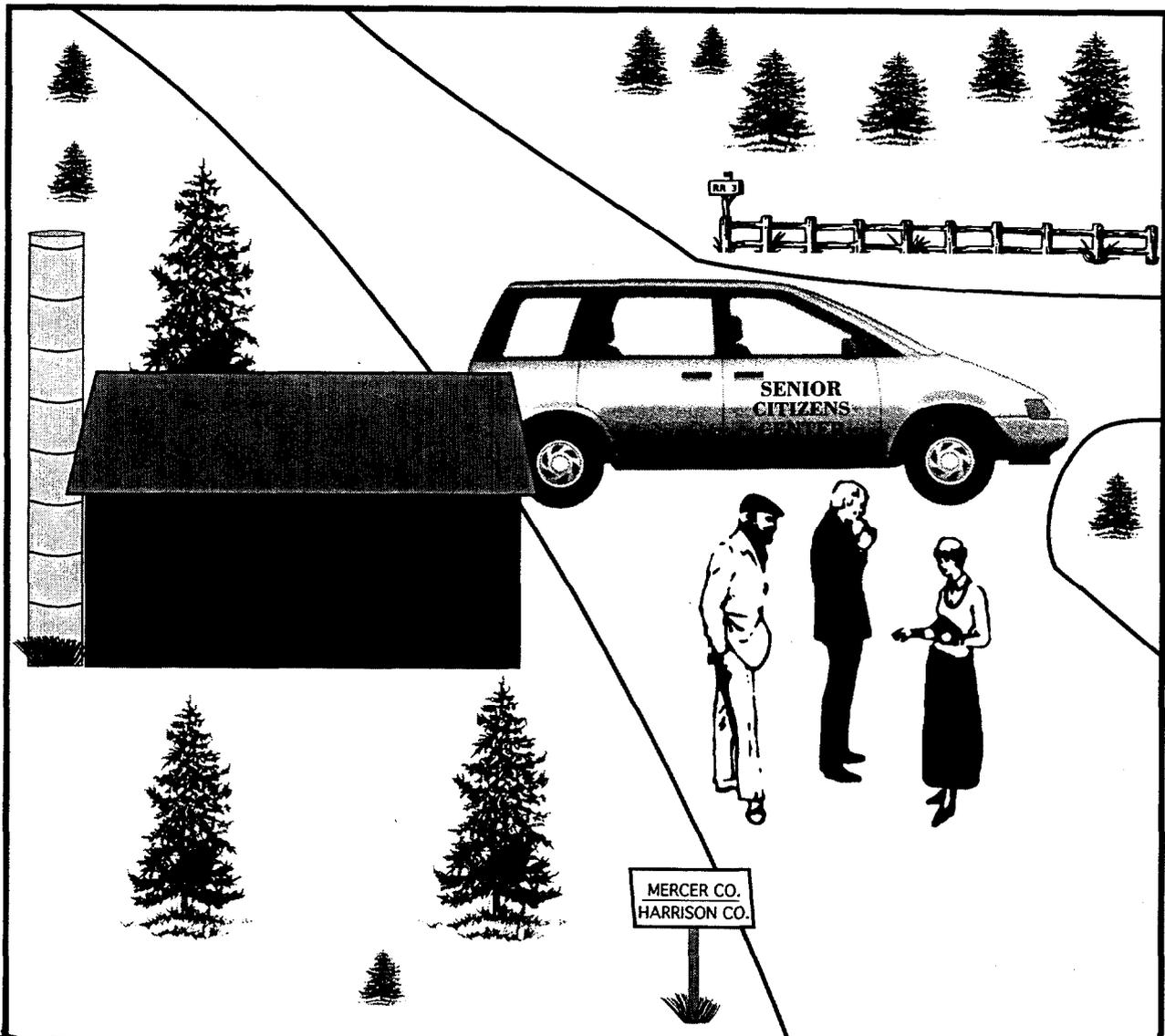




Transportation Services, Utilization and Needs of the Elderly in Non-Urban Areas

Patterns in Two Kentucky Communities

December 1994



FEDERAL TRANSIT ADMINISTRATION

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Transportation Services, Utilization and Needs of the Elderly in Non-Urban Areas

Patterns in Two Kentucky Communities

**Final Report
December 1994**

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PREFACE

This research could not have been accomplished without the generous assistance and cooperation of a variety of individuals and offices in central Kentucky. We have received strong support from the mayors of each of the study communities--Charles Carr in Harrodsburg and Melvin Hampton in Cynthiana--as well as the offices of the County Judge Executives in both Mercer and Harrison counties. Most critical has been the enthusiastic reception and assistance provided by the directors of the Senior Citizens Centers--Ruby Dunn in Harrodsburg and Cindy Vance in Cynthiana. We also wish to express our gratitude to the numerous clergy within several communities of Mercer and Harrison counties for their efforts in assisting with our sampling design. We, of course, are especially grateful to our many elderly participants who gave generously of their time and opinions.

At the University of Kentucky we wish acknowledge the generous support and cooperation of the Kentucky Transportation Center as well as numerous individuals in the Kentucky Transportation Cabinet. Several representatives of the formal transportation providers in our study areas assisted us greatly. Mrs. Sue Jeffers of Bluegrass Ultra Transit was especially helpful. Finally, the investigators were aided by the very capable and diligent efforts of two research assistants, Katherine Jones and Christopher Hayward.

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METRIC / ENGLISH CONVERSION FACTORS

ENGLISH TO METRIC

LENGTH (APPROXIMATE)

1 inch (in) = 2.5 centimeters (cm)
 1 foot (ft) = 30 centimeters (cm)
 1 yard (yd) = 0.9 meter (m)
 1 mile (mi) = 1.6 kilometers (km)

AREA (APPROXIMATE)

1 square inch (sq in, in²) = 6.5 square centimeters (cm²)
 1 square foot (sq ft, ft²) = 0.09 square meter (m²)
 1 square yard (sq yd, yd²) = 0.8 square meter (m²)
 1 square mile (sq mi, mi²) = 2.6 square kilometers (km²)
 1 acre = 0.4 hectares (he) = 4,000 square meters (m²)

MASS - WEIGHT (APPROXIMATE)

1 ounce (oz) = 28 grams (gr)
 1 pound (lb) = .45 kilogram (kg)
 1 short ton = 2,000 pounds (lb) = 0.9 tonne (t)

VOLUME (APPROXIMATE)

1 teaspoon (tsp) = 5 milliliters (ml)
 1 tablespoon (tbsp) = 15 milliliters (ml)
 1 fluid ounce (fl oz) = 30 milliliters (ml)
 1 cup (c) = 0.24 liter (l)
 1 pint (pt) = 0.47 liter (l)
 1 quart (qt) = 0.96 liter (l)
 1 gallon (gal) = 3.8 liters (l)
 1 cubic foot (cu ft, ft³) = 0.03 cubic meter (m³)
 1 cubic yard (cu yd, yd³) = 0.76 cubic meter (m³)

TEMPERATURE (EXACT)

$$[(x - 32)(5/9)]^{\circ}\text{F} = y^{\circ}\text{C}$$

METRIC TO ENGLISH

LENGTH (APPROXIMATE)

1 millimeter (mm) = 0.04 inch (in)
 1 centimeter (cm) = 0.4 inch (in)
 1 meter (m) = 3.3 feet (ft)
 1 meter (m) = 1.1 yards (yd)
 1 kilometer (km) = 0.6 mile (mi)

AREA (APPROXIMATE)

1 square centimeter (cm²) = 0.16 square inch (sq in, in²)
 1 square meter (m²) = 1.2 square yards (sq yd, yd²)
 1 square kilometer (km²) = 0.4 square mile (sq mi, mi²)
 1 hectare (he) = 10,000 square meters (m²) = 2.5 acres

MASS - WEIGHT (APPROXIMATE)

1 gram (gr) = 0.036 ounce (oz)
 1 kilogram (kg) = 2.2 pounds (lb)
 1 tonne (t) = 1,000 kilograms (kg) = 1.1 short tons

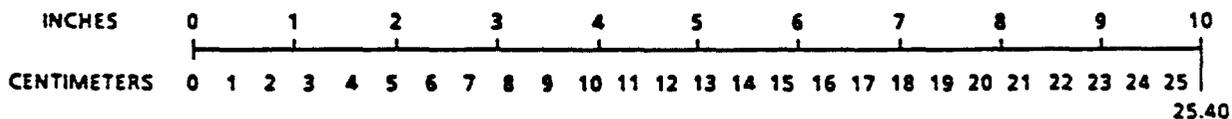
VOLUME (APPROXIMATE)

1 milliliter (ml) = 0.03 fluid ounce (fl oz)
 1 liter (l) = 2.1 pints (pt)
 1 liter (l) = 1.06 quarts (qt)
 1 liter (l) = 0.26 gallon (gal)
 1 cubic meter (m³) = 36 cubic feet (cu ft, ft³)
 1 cubic meter (m³) = 1.3 cubic yards (cu yd, yd³)

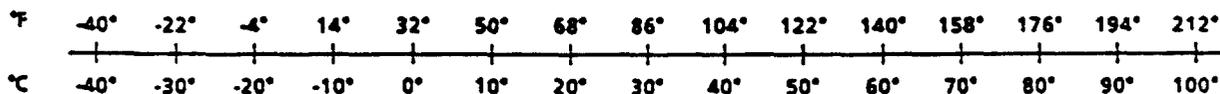
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CHAPTER 1. INTRODUCTION

It is now axiomatic that America's population is growing older. Primary indicators of this aging are the number of individuals age 65 years and over (which increased from about 26 million in 1980 to over 33 million by 1990) and the elderly percentage of the total population (which increased from just above 11 percent in 1980 to 13 percent in 1990). It is likewise widely acknowledged that the link between transportation and needs of the elderly continues to be absolutely critical. In fact, access requirements are among the select group of issues which highlight the agenda for elderly research in the next decade (Rosenbloom, 1988). In this perspective the availability of transport for critical or life threatening needs, e.g. medical care, is of paramount concern, as is access to such routine life maintenance needs as grocery or clothing shopping. Yet too often we fail to realize that the opportunity for the elderly to travel, for social and recreational purposes, on a regular basis as opposed to incidental participation, is closely related to the enhancement of the quality of life, and physical as well as emotional well being. This social aspect of the derived, as opposed to the intrinsic, utility of transportation must receive increased attention as an access goal and policy objective. The salient point here is that, for whatever purpose, it is important that mobility be assured for our elderly population since it is critically related to their enhanced quality of life and indeed their life expectancy.

The elderly population, like the population in general, has traditionally lived in urbanized areas. Consequently, research on the transport needs of this group has focussed largely on urban travel patterns and access delivery solutions within urban areas. Despite existent and continuing research, misconceptions and lack of knowledge persist in regards to the transport means and forms available to the elderly as well as to their travel needs and behavior, especially in the face of a variety of constraints. This is particularly true when we focus on the transportation situations of the non-urban elderly, a population that has very different characteristics and demands in comparison to their urban counterparts. Little attention has been paid to the non-urban elderly and the difficulties in providing access when formal transport services are either not available or few in number. Scarce resources and the inability to efficiently serve a low density market are major reasons for the frequently limited public transport services in non-urban areas. An absence of alternative transport forms often forces non-urban elderly to rely on their personal automobile or that of a relative or neighbor. Unfortunately, relatives, neighbors and friends often are not aware of, or cannot respond to, the daily or even weekly needs of the elderly. In these situations, despite deteriorating health associated with physical aging, individuals may be forced to push the bounds of safety and common sense by driving themselves. Obviously where there is a lack of response or knowledge regarding needs, or at the point where personal ability to drive is lost, the result is extreme isolation through homeboundness.

Our research seeks to provide a deeper understanding of mobility problems among the elderly in non-urban areas by exploring the real needs of the elderly and the actual response of communities and their populations to these needs. Within this specific context we aim at answering a series of general questions. First, why do the elderly travel? Second, where do the

elderly travel? Third, how do the elderly travel, and finally what is the nature and impact of existing transport alternatives?

The report on our research begins in Chapter 2 with a brief but concise review of the state of our knowledge with respect to transport and the elderly, particularly as it relates to the problems of non-urban areas. This background is put in context within subsequent chapters. Chapter 3 offers profile information of the study areas and discusses representative community agencies and organizations that serve a senior population. Chapter 4 extends the community resource theme with an examination of the nature and details surrounding both the formal and informal transport providers or services in the study areas.

The core of our analytical work is covered in the next four chapters. Presentation of the instruments and methodologies employed in deriving our data, and an elaboration of our participant sample and its general demographic and socioeconomic characteristics, is covered in Chapter 5. With the bases of the research defined we then provide results of specific analyses. The initial focus of the work is upon elderly access to and use of personal vehicles. Chapter 6, therefore, includes an analysis of the reasons why elderly travel. Special emphasis is placed upon the travel behavior of the non-urban elderly who do not drive or do not have access to an automobile. This is particularly important when compared to the extent of awareness of public or formal transport services and the use of these services, as well as the degree to which they use informal means of transportation provided by family, friends, or volunteers in the communities. One objective with regard to travel behavior is to determine the knowledge and incidence of trip chaining.

A second major thrust of our research is the manner in which the aging process affects the use of personal automobiles and travel behavior in general. In Chapter 7 we disaggregate our sample by age cohorts in order to derive conclusions about the life cycle impacts upon travel. Within the age cohort analyses we also examine gender, residential location, and income as controlling variables in an effort to better understand mobility behavior as aging progresses.

Clearly a significant factor too in issues surrounding the accessibility and mobility of both the urban and non-urban elderly is the size, and especially the composition of the household. Chapter 8 examines driving behavior and the reasons for travel as a function of household structure. Important here, of course, is the matter of widows or widowers living alone, and how travel behavior and needs differ from those elderly living in households comprised of additional family members such as a spouse, sibling, or children. A special emphasis of our analysis is upon those elderly who are living alone, not only because there is an immediate lack of transportation support within the household, but also because such elderly are most often older, more frail, and consequently most strongly affected by the inability to fulfill their needs without assistance.

Finally our research topic begs an analysis of policy issues, which are discussed in Chapter 9. In this sense we feel that our findings are especially important with respect to the nature and incidence of volunteerism within non-urban communities. Not only is the level of volunteerism significant, it is also crucial to assess the degree to which elderly residents take advantage of it for certain purposes. In addition, and in a complementary perspective, the analysis of the awareness

and use of formal or public provided transport is especially salient given both the importance of such transport to the carless and isolated, as well as the difficulties in addressing access needs in non-urban areas.

CHAPTER 2. TRANSPORTATION AND THE ELDERLY: A SELECT REVIEW

Conceptual Background

It is well recognized that transportation services and facilities are critical to the quality of life of the elderly. The literature surrounding the elderly and transportation is extensive, and no effort will be made here to provide an exhaustive survey. However, it is useful, we feel, to note particularly salient works, many of them quite recent, and to provide some synthesis of existing knowledge. In this respect, a recent monograph published by the Committee for the Study on Improving the Mobility and Safety for Older Persons, Transportation Research Board (1988) is most conspicuous in our perusal of the literature.

One major theme which stands out is the significance of mobility for well being of the elderly. Utilizing data from the Nationwide Personal Transportation Study and the national Health Interview Survey, as well as data from the U.S. Census Bureau, there is an attempt to summarize vital aspects of the broad topic of transportation and the elderly (Rosenbloom, 1988). These data point up the impact of increasing suburbanization and increasing income in the travel patterns of the elderly. It is noted that the elderly have come to rely even more on the car than in the past. While reliance on the private automobile has declined between 1977 and 1983 for those under 60, this is not so for the elderly. In addition elderly in rural areas, both those who drive and those who do not, make more of their trips in cars than those elderly in urban areas and more than younger people in rural areas. Moreover these same data show that the elderly make shorter, but more frequent trips than younger travelers. Elderly nondrivers make far fewer trips with any mode than do drivers.

Critically important in light of these findings is the fact that the elderly face a variety of barriers to initial or continued automobile travel. These include individual or personal physical problems, the financial problems of maintaining a car, and a broad class of environmental problems. Among these latter problems are the ways in which road systems and land uses are organized, as well as the kind, quality, and cost of activities offered to the elderly in a community. But, and of great significance, physical problems seem to create few of the barriers that keep the elderly from leading a more active life; rather environmental problems may pose the greatest barriers (Eisenhandler, 1990).

Review of the data further suggests that socially provided transportation, while being in fact more flexible than conventional transit, is perceived by the elderly to be inadequate to meet their needs. Just as with the automobile, personal and environmental barriers exist and have complicated effects which often reduce the elderly's *desire* to travel before--or while--they reduce the *ability* to do so. Even by removing barriers we may not overcome the resistance of elderly people to utilizing community services that are available. Limitations in both services and choices, as well as the spread out nature of non-urban communities, are several of the most significant barriers to improved mobility for the elderly (Rosenbloom, 1988).

Addressing the mobility problems of the elderly requires both short term and long term responses in three areas: transportation, land use planning, and human service delivery models. In a policy context, a variety of solutions appropriate to the clients and community must be devised. Among these are to offer a host of transport options geared to specific needs and desires and which are financially feasible. Another important strategy direction is to consider whether and how current options can be improved. It is, in addition, critical that we investigate socially derived solutions which must by necessity rely on private and family options. Finally, as our own study will show, we must continue to recognize the importance of the automobile to the elderly and the advantages it offers when social solutions to problems of meeting the needs of the elderly are devised.

Recent work emphasizing the connection between the well being of the elderly and their mobility have been placed within a conceptual model based upon general adaptation theory. This suggests that individual well being depends upon success in meeting life maintenance and higher order needs. Satisfaction of any need depends on congruence between the need and resources for meeting it. Mobility is a key factor because community facilities and services are irrelevant if they are inaccessible. Characteristics of mobility that affect its contribution to well being are feasibility, safety, and personal control. These in turn are influenced by the socio-economic status of the individual and characteristics of the broader environment. The importance of this 'model' is that it integrates two previously separate lines of investigation: social and emotional well being and mobility (Carp, 1988).

Thus ecological and congruence models of aging suggest that transportation availability is crucial to the maintenance of life satisfaction and well being because it allows one to more readily meet all the other life needs (Carp 1988). Well being depends on the satisfaction of not only life maintenance needs (food, shelter, etc.) but also higher order needs, such as socializing and recreation. Without satisfaction of these needs, individuals do not experience a feeling of well being and may become depressed, anxious, or develop low self esteem. According to the congruence model, how well one's needs are met by environmental resources depends upon the degree of congruence between those needs and the available resources. Mobility is a key influence in congruence because, "It largely determines the fit between a person's needs and resources in the community by which it can be met." (Carp 1988 p.6). This framework highlights the integral importance of transportation of the elderly for their social well being, and demonstrates the degree to which these two issues need to be considered in tandem.

While the literature often examines transportation system questions, including geographic accessibility, vehicle design, network coverage and trip frequency, what is essential is that these issues are re-connected so that they begin to question whether existing transport alternatives and proposed solutions actually enable the elderly to reach their destinations (Schmitt 1979). Many factors must be linked, and the problem must be examined in its entirety such that issues of design, environment, frequency, transfers and distance all are solved together. For this to occur, elderly transportation must be considered from a 'people' perspective, where access is highly dependent upon--and a clear function of--personal interaction, and not merely a systemic perspective. One often overlooked issue which may need to be re-thought is that of land use planning. Existing land use planning leads to spatially dispersed landscapes that lead to difficulties

for coordinating shared transportation (Schmitt 1979, Rosenbloom 1987). Difficulties associated with land use planning are especially acute in non-urban areas, which are commonly either lacking in effective planning or devoid of well enforced zoning regulations. Aggregation of services for elderly users might alleviate some of the problems in transport service provision.

The question of distance takes on greater relevance when considering the special problems of elderly in non-urban areas, wherein residences and services are likely to be far more scattered than those of their urban and suburban counterparts (McKelvey 1979). In addition, taxis and most public transportation, even intercity buses, often do not serve areas of such low population density, leaving these elderly highly dependent on personal automobiles for transport. Where formal or informal paratransit does exist, its efficiency and effectiveness become both more important, and more difficult to achieve, because of the greater distance and the expense involved (McKelvey 1979).

Recent Research

In light of some of the above findings, recent research on elderly mobility has emphasized the continued importance of the automobile for the flexible independence which is so important for seniors. A longitudinal study of elderly drivers conducted over a ten year period confirmed that the automobile was the most frequently used mode of transportation for both men and women, although men showed higher rates of automobile usage (Jette, 1992). Results of this study also identified only a slight reduction in the use of the auto over the ten year period, despite advancing age. Such a pattern of reluctance to forgo reliance on the auto leads to implications of ever greater auto use among the elderly. As younger cohorts, who are more accustomed to driving, continue to age, the numbers of elderly drivers will concomitantly increase (Jette 1992). In spite of this reluctance to give up driving, however, research also indicates that visual acuity does decline with increased age, and although older drivers often practice compensatory driving practices, such as driving slower and avoiding bad weather, the types of accidents in which elderly drivers are most frequently involved can be tied to the same declines in visual skills (Kline 1992). Accidents that occur while merging, failing to correctly read signs, and inaccurately judging the speed of vehicles can be attributed to common elderly visual problems (Kline 1992). Many elderly drivers screen their own driving, and reduce or eliminate driving all together when health problems begin to reduce their ability to travel safely (Marottoli, 1993). In a study of driving cessation among the elderly, the factors which best predicted driving cessation were found to be higher age, not working, lower income, presence of neurological disease or cataracts, participation in fewer physical activities, and disability; the factor most often associated with driving cessation was "no longer working" (Marottoli 1993, S257). The factors involved in the decision to drive or to end driving are, therefore, both physical and social. Loss of income may be an important factor in the decision to end driving. By the same token, work related trips may account for a large percentage of overall driving, and retirement would end the need for these trips (Marottoli 1993).

While health and social factors may help predict who decides to stop driving, access to personal auto transport is not available to all. In fact, personal transport access shows important

social and regional patterns; substantial variation exists across age, gender, and rural and urban locations (Cutler 1992). Access to personal transportation decreases with advancing age, especially for women, and for central city residence locations. Elderly women are twice as likely to live in a household without access to an automobile than elderly men. Rural elderly farm households were most likely to have access to an automobile, followed by rural non-farm households, and urban fringe households. Central city households represented the location least likely to have access to an auto, and female central city households less likely still (Cutler 1992). Given this information, it is clear there exists considerable variety in access to automobiles. While some groups in general have greater access, this does not mean there are not members within that group that do not have access. Many rural residents do not have access to personal transport, and thus are uniquely vulnerable given their isolated location (Cutler 1992).

Demand for public transport is also not uniform. Recent research would suggest that certain forms of public transport are more valued by elderly users than are other forms. Using a discrete disaggregate choice model to assess the demand for varying types of public transport, Stern determined that socially provided paratransit services are most highly valued by elderly users, while bus systems are not as highly valued, especially in rural settings and for walking impaired users (Stern 1993). Taxis are useful, but in general are not the most valued form of transport, even when they are subsidized. Most importantly, both the price of transport services and the number of trips taken were found to be relatively inelastic, suggesting that the trips taken by elderly and handicapped travellers are "necessary" (Stern 1993 p.326).

Social service providers for the elderly attempt to fit transportation into models of service provision and barriers to service provision (Yeatts 1992). Three conditions must exist for an elderly client to be able to use a service: 1) knowledge related to the service; 2) access to the service; and 3) intent to use the service (Yeatts 1992 p.25). If these factors are not in place, a client will not use the service. Transportation becomes integral to access, because a client cannot use a service he/she cannot reach. This problem can be addressed at the service end through strategies of service location, delivery, and timing, and also through volunteer programs to provide transport to elderly clients (Yeatts 1992).

Potential Volunteer Solutions

Strategies to address elderly transport needs through volunteer driver programs are not new. One early study describes just such a plan to introduce a free or low cost automobile-based transport service in a small midwestern community (Cottrell, 1971). Interestingly, the goal of this service was two-fold. The primary goal was to provide a low cost, flexible, and accessible form of transport for elderly residents of the community. A secondary intent, however, was to ensure that elderly residents were able to be maintained in place so that more costly alternatives need not be found and, in addition, so that elderly residents would patronize local businesses, hospitals and services, rather than take their business outside the local area. Follow-up surveys of the service indicated that for younger elderly, non-users outnumbered users by two to one, but for the older-old, users exceeded non-users. More women than men used the service, more singles than married individuals, and many in the housing project used it. Much of the demand for the service was not connected to health problems, but many with health problems did use it (Cottrell, 1971).

A more recent study of automobile based elderly transport services examined the feasibility of two such systems for a nine county midwestern area (Kihl 1991). One was a volunteer based system similar to that considered by Cottrell (1971), the other a paid driver service. Prior to determining feasibility through demand and cost modeling, this study conducted a survey of elderly residents in which they were asked to complete trip logs and answer survey questions regarding their travel patterns and their attitudes toward various types of service, and their willingness to pay. Many respondents expressed some concern regarding driving under certain conditions, but many also indicated they would consider driving with a friend or using an organized transportation system as long it was able to take them where they wanted to go. Based on the results, flexibility appears to be a key component for any system designed to serve the needs of the elderly, which suggests that automobile-based systems that are sufficiently small, and therefore flexible, are the most feasible (Kihl 1991).

Demand modeling for the target area indicated that the small number of users and the wide trip variety requires down-sized vehicles for effective transport provision (Kihl 1991). Two different systems were explored, a rural jitney service with a paid driver, and a volunteer driver system, where drivers use their own vehicle with mileage compensation, and a paid coordinator organizes the volunteer staff. Both systems were found to be theoretically workable. In terms of cost effectiveness, the volunteer system had lower operating costs, but longer start up times and potential equal staff costs because of the time intensive nature of the volunteer coordinator position. Elderly volunteer drivers may also add an element of risk, and insurance coverage is an important consideration. The proposed ideal system would probably include elements of both the jitney and the volunteer service. Importantly, the survey found that most elderly travellers would be willing to contribute to the cost of their travel (Kihl 1991).

A more detailed study of the characteristics of volunteer elderly transportation services determined that most of these services shared many similarities, and fell into one of two categories for administration (Del Green 1984). Services were either non-profit organizations governed by a board of directors, usually concerned citizens or individuals involved in the elderly service community in other ways, or they were part of a pre-existing governmental unit. Whichever form the organization took, these transport services tended to be affiliated with one or more service provision agencies. Transportation was most often provided for medical and nutritional services, and many of the services attempted to de-centralize coordination functions so that drivers could specialize in one area, and also reduce costs. The majority of the services relied on private vehicles owned and maintained by the driver, but blanket insurance was often purchased to augment the drivers' policy. Indeed some of the most important issues for volunteer based elderly transport services center on questions of legal liability, cost effectiveness, reimbursement for volunteers, and funding support for the programs (Payne 1983).

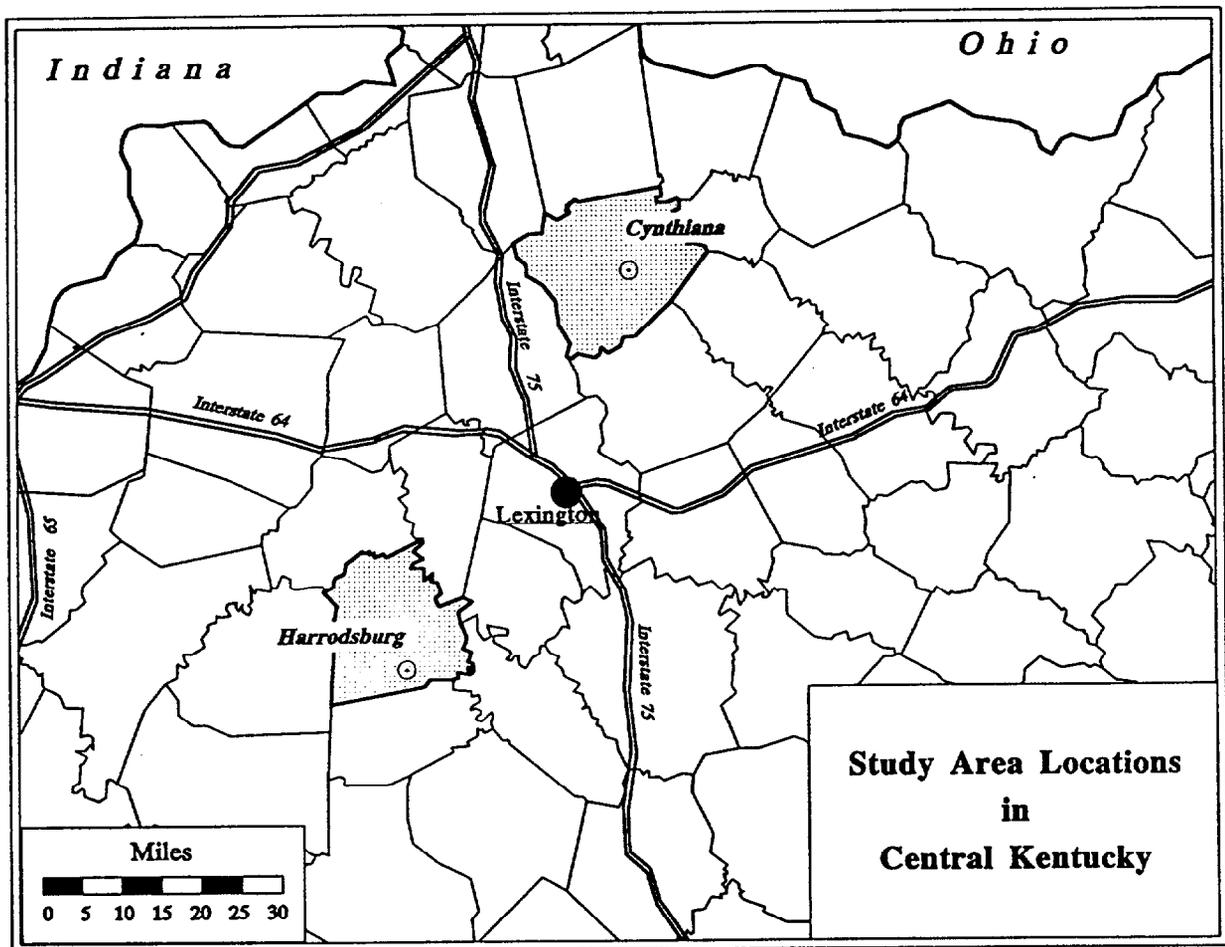
In conclusion, social service and policy research has demonstrated that, while mobility concerns for the elderly are essential for overall well being, these concerns are not merely for transportation systems but involve complex 'people' issues such as land use and personal safety. In addition, current studies confirm the importance of the automobile for elderly travellers, although differences exist between rural and urban households' access to personal transportation.

The maintenance of flexibility appears to be essential for any transport system designed to serve the need of elderly users, and volunteer driver based systems look to be feasible and cost effective ways to provide such services.

CHAPTER 3. STUDY AREAS

The research described in this report was conducted in the two non-urban Kentucky communities of Cynthiana (in Harrison County) and Harrodsburg (in Mercer County). Both communities are located in what generally might be considered central Kentucky, and are 33 to 34 miles distant from Lexington, which is the region's largest city of nearly 200,000 persons.

FIGURE 3.1



Indeed, Lexington serves as a center for commerce, trade, transportation, entertainment, and complete medical care not only for central Kentucky but for virtually the entire eastern half of the state. Paved two-lane roads--both U.S. highways and state routes--connect the study communities with Lexington

In any small town, population change, behavior, attitudes, and expectations are strongly influenced not only by the town's contemporary resource base but by its evolution through history. As a starting point for the report, therefore, this chapter begins with brief historical profiles of each community and the counties in which they are located, which includes patterns of

population growth and decline and the development of local economies. This is followed by a section comparing in more detail their demographic characteristics, with special attention paid to the elderly component. The chapter ends with a survey of the services and agencies of both communities that are associated with an elderly population.

Cynthiana Profile

Historical Context

Cynthiana was established and became the Harrison County seat in 1793. The location of the community was largely influenced by early pioneer settlements and access to the Licking River, which supplied power to local mills and provided limited but important water transportation northward to the Ohio River. By 1810 Cynthiana's population stood at 369, while the county population was recorded at 7,752; these populations would rise by the year 1840 to 800 and 18,720, respectively.

The economy of both Harrison County and Cynthiana through the 1800s was dominantly supported by agriculture, and especially the production of tobacco, hemp, wheat, and corn. Whereas tobacco and hemp provided important national and international trade, the grain crops served as an important foundation for the area's distillery (whiskey) operations. Manufacturing enterprises became established during the middle and late 1800s, and rail linkages (established in 1856) allowed for transport of finished goods away from the area. But agriculture continued to dominate the economy, which allowed Cynthiana to recover quickly after the Civil War; Cynthiana's population in 1900 had increased to over 3,000 and the county population declined to approximately 14,000.

The 1900s were marked by rapid increase in the industrial sector, especially after WWII and with the increase in paved roads within the county. This development lagged behind national trends because state government placed little emphasis on attracting and promoting industry early in the century. By mid-century the county population had grown to 17,000, and as many as 20 companies had set up business in Cynthiana. With rapid growth of larger industries in such market centers as Louisville and Cincinnati, however, population soon stabilized and eventually began to decline because of outmigration of the labor force. The industrial base remains a visible part of the community's economy today, with almost 30 percent of all employment contributing to the production of such items as stainless steel valves, fittings, and tubing, refrigeration coils, iron castings, and clothing. Although agriculture accounts for only 11.5 percent of all employment, grain crops and tobacco continue to dominate, and about 90 percent of all land in the county remains classified as farmland.

County and Community Resources

Employment and the Labor Force - Manufacturing (1,950 positions) accounts for the majority of the 6,705 total jobs held in Harrison County in 1991. Wholesale and retail trade

ranks second (1,141 positions), agriculture third (771 positions), services fourth (752 positions), and state and local government employment fifth (604 positions). Unemployment in 1991 was recorded at 6.7 percent, which was slightly below the state level of 7.4 percent. An anticipated 7,500 persons will be added to the labor force between 1991 and 1994, as the younger cohorts of the population reach the age of 18 years.

Transportation - Major highways serving Cynthiana are U.S. Highways 27 and 62, and Kentucky Route 36. Access to Interstate 75 is 19 miles away to the southwest and 30 miles away to the northwest, and access to Interstate 64 and the state's Mountain Parkway is 31 miles to the south. The nearest scheduled commercial airline service is located at Lexington's Bluegrass Airport, which is 38 miles southwest of Cynthiana. There currently are no commercial bus lines (e.g., Greyhound or Trailways) that serve the community or county.

Climate - The area's annual average temperature is about 54.2°F, with normal low monthly temperatures in the high 30s, and normal high monthly temperatures in the middle 80s. Average annual precipitation is just above 45 inches, with a normal winter snowfall accumulation of about 16 inches.

Medical Resources - Harrison County has 15 resident physicians and 12 commuting specialist physicians. The county's single hospital (Harrison Memorial) is located at the eastern fringe of Cynthiana. The hospital has 99 beds and is staffed by 13 active physicians, 21 consulting physicians, 3 courtesy physicians, 25 contract services, 43 registered nurses, and 19 licensed practical nurses. The University of Kentucky Medical Center is located about 36 miles to the southeast. Harrison County and Cynthiana are also served by the Harrison County Comprehensive Care Center, the WEDCO District/Harrison County Health Center and Home Health Center and Home Health Service, and Brown Ambulance Services, Inc.

Other Services - Cynthiana has four banks, one weekly newspaper, and one radio station.

Harrodsburg Profile

Historical Context

Harrodsburg, the county seat of Mercer County, is considered to be the oldest permanent English settlement west of the Alleghany Mountains, having been established in 1774 at the site of Fort Harrod. Although more distant from river access than Cynthiana, its location relative to both the Dix and Kentucky Rivers (which bound the county to the east and northeast) would play an important role in the transportation of raw and finished goods through history. Early county population growth was rapid, increasing from a level of 9,646 in 1800 to nearly 19,000 by 1840; the Harrodsburg population, although much smaller, also experienced dramatic growth during this period of the 1800s.

Harrodsburg's economy was dominated by agricultural activities during its early history, with principal crops being tobacco, hemp, and flax (important in both national and international markets) and corn, oats, wheat, and rye (mostly used in local distilleries). Harrodsburg also was supported by a variety of small enterprises, most notably saltmaking for food preservation, and gunpowder, lead molding, and iron smelting, which would be important during the civil war.

By the year 1900, the county population was recorded at 14,426; little change would be experienced in this size through the next 60 years. Agriculture continued to dominate the local economy of Harrodsburg, but since all suitable land in the county was being cultivated, there was little immigration of new settlers. Indeed, the trend was for outmigration of the original residents towards the west, with newcomers serving only to balance the outmigration losses. Manufacturing played a minimal role in the area's economy during much of the first half of the 20th century because of a lack of suitable power and mineral resources. By the 1950s, however, improved roads and electrical power caused a rapid increase in industry, with optical glass and clothing being the top products. These industries still exist today, and serve as primary employment for about 21 percent of the area's labor force. Agriculture remains very important. About 95 percent of the county's land is classified as agricultural, and an estimated 90 percent of farm land is in hay pasturage. Most farms tend to be quite small (120 acres or less), and consequently tobacco dominates in the area because of the high dollar yield per acre. Horse breeding has also risen in importance in the Harrodsburg area, and this industry has thrived because of the proximity to Lexington-- a city of international fame in the horse business.

County and Community Resources

Employment and Labor Force - Manufacturing dominated Mercer County employment in 1990, accounting for 1,983 of the 9,284 total jobs available. Wholesale and retail trade supported 1,150 jobs, there were 911 persons employed in agriculture, service occupations represented 857 jobs, and state and local government contributed 629 jobs. Unemployment was about 5 percent in 1990 (lower than both Cynthiana and the state average). It is estimated that, in the period from 1992 to 1996, 9,826 new members will be added to the labor force as the younger population reaches age 18.

Transportation - Highways serving Harrodsburg include U.S. Highways 68 and 127, and Kentucky Route 152. The Bluegrass Parkway can be accessed 16 miles to the north, Interstate 64 is 29 miles north, and Interstate 75 is 38 miles northeast. Local air service is available at the Danville-Boyle County airport, which is 13 miles southeast of Harrodsburg, and commercial service is available at Bluegrass Airport, 32 miles to the northeast. Although the community was at one time on a Greyhound bus route, service was terminated several years ago and there currently are no commercial carriers serving the area.

Climate - Average annual temperature in Harrodsburg is 57.1°F and, like Cynthiana, winter monthly lows average in the high 30s and summer monthly highs in the middle 80s. Normal annual precipitation measures just over 45.5 inches, and normal seasonal snowfall is 15.9 inches.

Medical Resources - There are 14 resident physicians who serve Harrodsburg and the Mercer County area. The county has one hospital (James B. Haggin Memorial) with 80 beds and supported by a staff of 20 active physicians, 6 courtesy physicians, 29 registered nurses, and 24 licensed practical nurses. The University of Kentucky Medical Center is located 35 miles northeast in Lexington. Other medical services include the Southern Bluegrass Comprehensive Care Center, West Bluegrass District Health Department, and the Mercer County Ambulance Service.

Other Services - Harrodsburg has four banks, one weekly newspaper, and one radio station.

Comparative Demographic Characteristics

With respect to the 1990 census, both Harrison and Mercer counties are demographically similar. Their total populations at that time were 16,248 and 16,348, respectively, both counties had a slightly dominant female population (sex ratios of 93.7 males per 100 females and 94.2 males per 100 females), and they had identical elderly percentages of 15.5 percent age 65 years and over. An examination of the two populations over the course of several decades, however, indicates that these counties are, in fact, quite different (Table 3.1).

The most striking difference between Harrison and Mercer counties is the pattern of total population change during the period 1960 to 1990; while Harrison has experienced fairly steady increases over each decade, Mercer county appears to have progressed through a "boom and bust" phase, with dramatic increases through 1980, and an equally dramatic decline during the 1980s. Also quite different is the pattern of population aging as indicated by the percentage of the total population falling within specific elderly age groups. Both counties have 1990 populations that are "older" than the state of Kentucky as a whole, which has 12.7 percent of its population within the elderly age groups, and the county percentages have been above the state level since the 1950s. Harrison county has experienced only moderate change between 1960 and 1990 (increasing from 13.8 percent to 15.5 percent, with the percentage appearing to stabilize during the last decade), while Mercer has witnessed a rapid increase in elderly percentage only during the 1980s. These differential patterns are even more pronounced when an alternative measure of population aging is used--median age (Figure 3.2).

A key factor causing differences between the two counties' populations is migration. Evidence from the 1980 census provides an example of the variability in migration impacts across age (Figure 3.3). Harrison county reported moderate growth between 1970 and 1980, and also saw a substantial decline in the 5-14 year age group in 1970 as it aged to the 15-24 age group by 1980 (see Table 3.1). The moderate overall growth and the particular age cohort decline noted is immediately traceable to the nearly comparable in- and out-migration over all age groups except at an early age, where outmigration dominates. This outmigration represents those individuals leaving the county either for higher education or in search of a job. In Mercer county, on the other hand, there was rapid overall population growth that was a consequence of high net immigration in selected age categories, and only slight net outmigration in but two age categories.

TABLE 3.1. DECADE CHANGES IN POPULATIONS BY AGE AND GENDER

Age	Sex	Harrison County				Mercer County			
		1960	1970	1980	1990	1960	1970	1980	1990
Under 5	M	669	561	556	528	753	614	684	511
	F	677	531	542	531	664	653	694	538
5-14	M	1,293	1,397	1,238	1,297	1,352	1,520	1,502	1,273
	F	1,225	1,324	1,088	1,208	1,380	1,433	1,529	1,228
15-24	M	832	969	1,249	1,105	885	1,199	1,540	1,082
	F	876	978	1,239	1,096	988	1,230	1,542	1,126
25-34	M	721	743	1,022	1,209	864	921	1,360	1,209
	F	763	846	1,055	1,230	915	972	1,468	1,219
35-44	M	849	717	810	1,122	975	899	1,096	1,322
	F	865	781	872	1,188	935	992	1,131	1,169
45-54	M	846	800	762	851	830	966	972	807
	F	829	843	784	873	880	994	1,027	892
55-64	M	662	758	752	691	689	771	950	648
	F	701	844	825	796	767	865	1,024	794
65-74	M	510	533	627	622	492	539	652	635
	F	606	612	768	705	539	666	845	690
75-84	M	296	299	281	350	247	237	312	367
	F	363	396	449	567	301	342	480	583
85 and above	M	51	87	75	85	50	62	62	75
	F	70	137	172	196	90	85	141	180
Totals by Sex	M	6,729	6,866	7,372	7,858	7,137	7,728	9,130	7,929
	F	6,975	7,292	7,794	8,390	7,459	8,232	9,881	8,419
Total		13,704	14,158	15,166	16,248	14,596	15,960	19,011	16,348
Percent 65+		13.8%	14.6%	15.6%	15.5%	11.8%	11.5%	13.1%	15.5%
Percent 75+		5.7%	6.5%	6.4%	7.4%	4.7%	3.9%	5.2%	7.4%
Percent 85+		0.9%	1.6%	1.6%	1.7%	1.0%	0.9%	1.1%	1.6%

FIGURE 3.2. COMPARATIVE INDICATORS OF POPULATION AGING

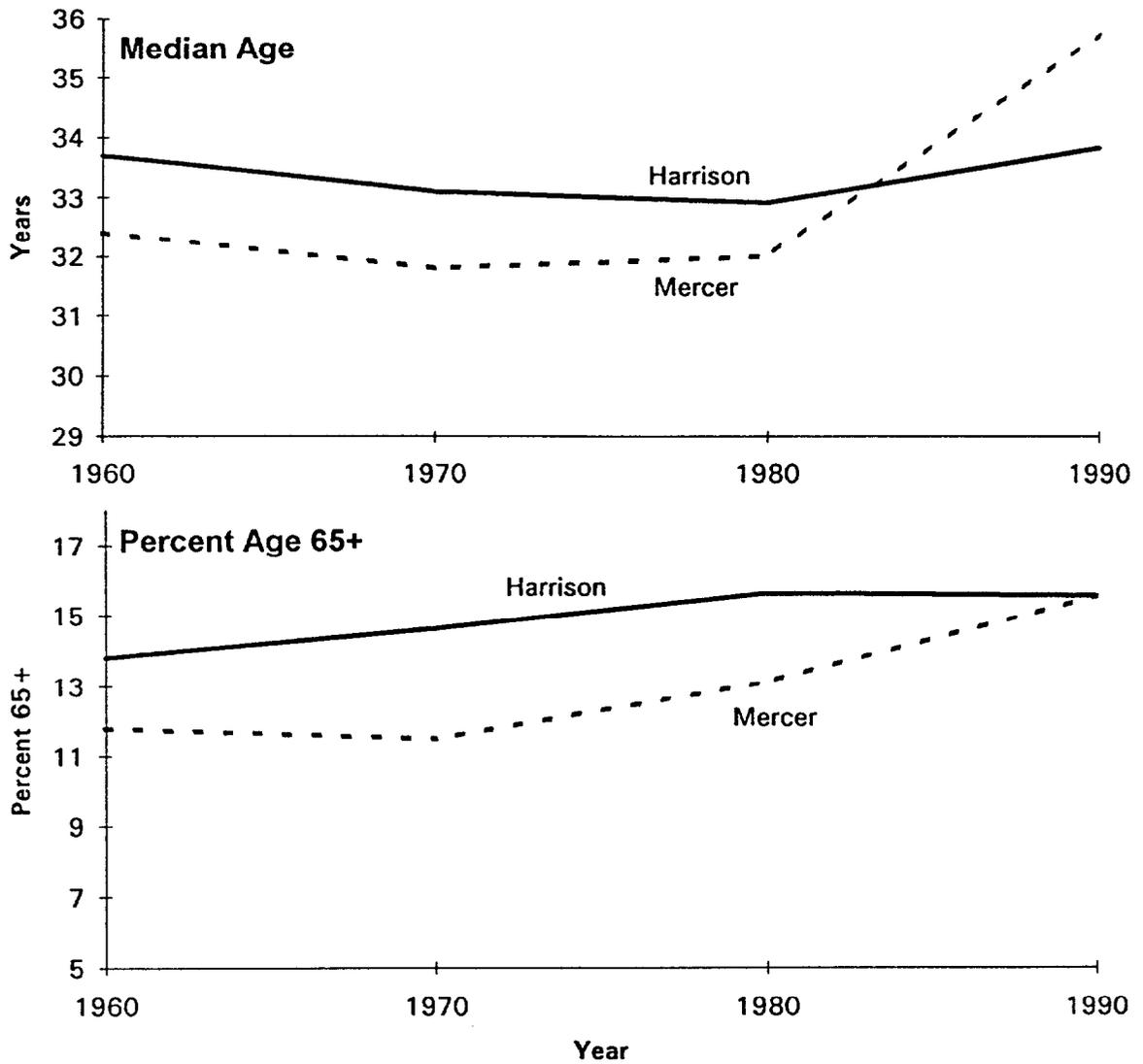
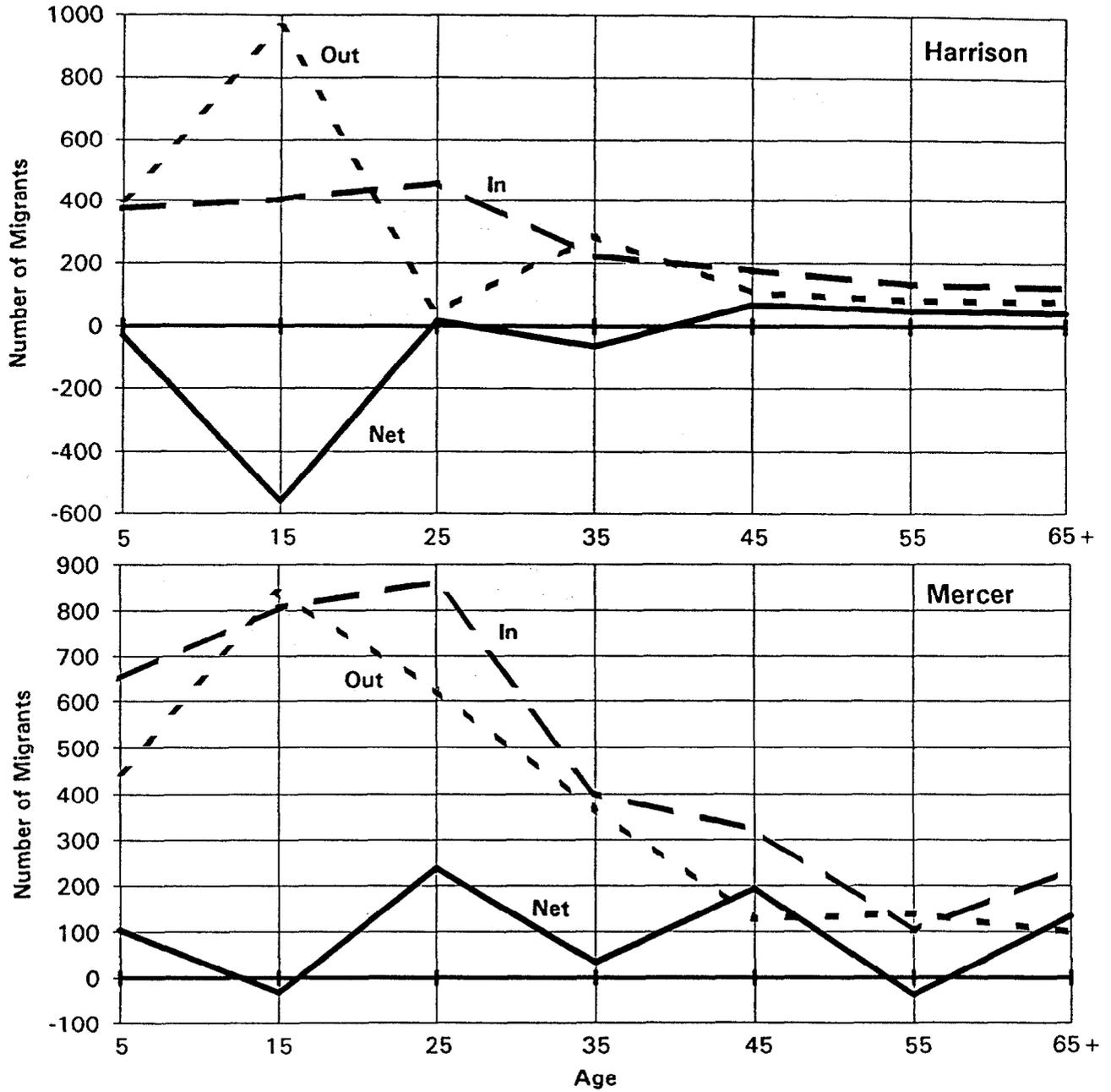
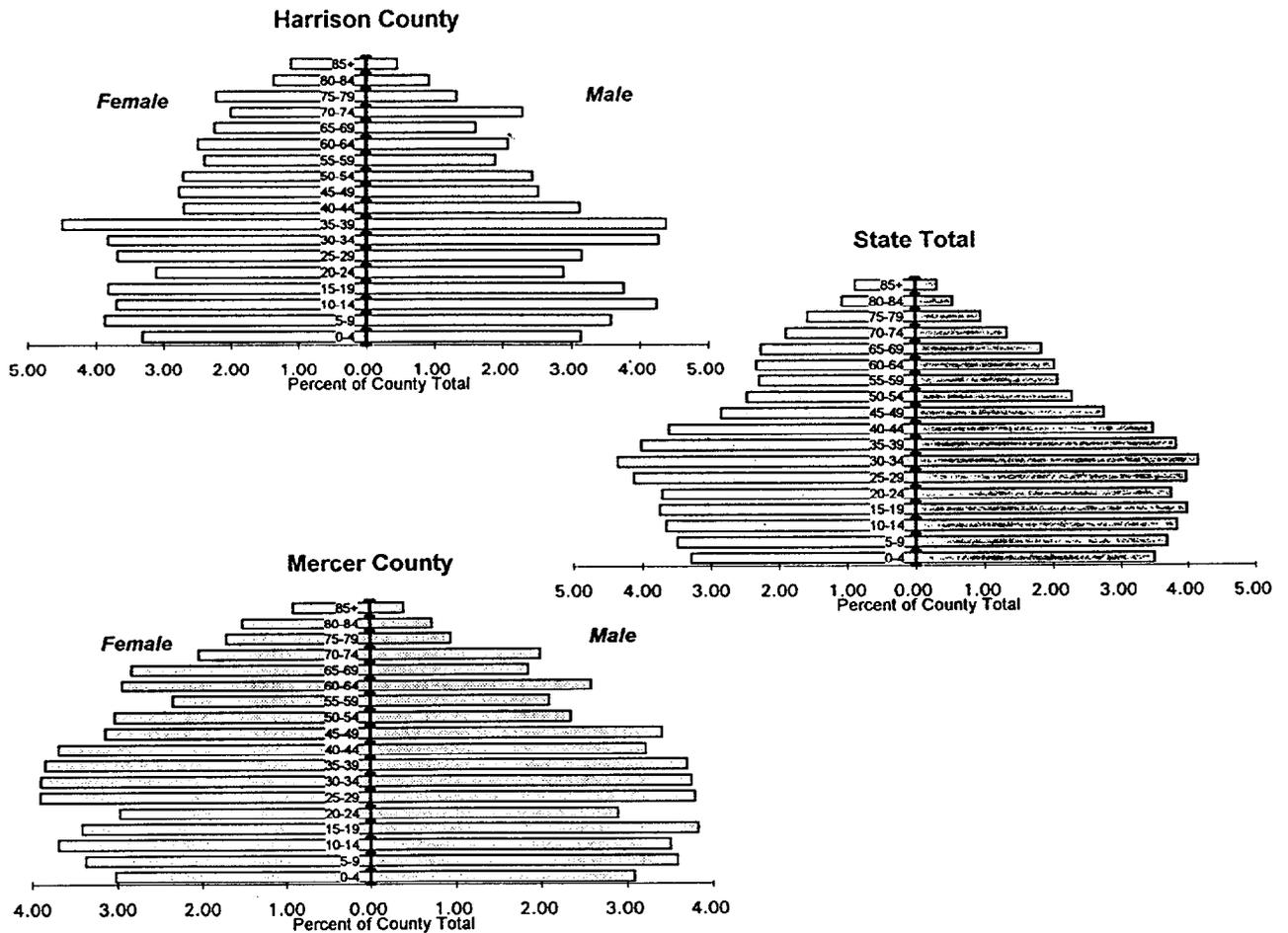


FIGURE 3.3. 1980 MIGRATION PATTERNS BY AGE



Although 1990 census migration data at the county level has yet to be released, the cohort aging patterns shown in Table 3.1 suggests that recent migration patterns have changed considerably from previous decades (compare, for example, the 15-24 age group in 1980 with the 25-34 age group in 1990 for each county). Harrison county appears to have experienced recent net immigration within the middle labor force age groups, with little change across most other age groups; this results in the modest increase in overall population size and the slight decrease in the percentage 65 years and over. Mercer county, however, appears to have lost a considerable number of younger individuals in the 5-24 age group (15-34 age group by 1990) and experienced no substantial net gains across any age groups. Total population fell during the 1980s as a consequence of these migration trends, and the elderly percentage increased as the elderly population, which commonly exhibits much lower rates of migration than are found in labor force age groups, remained in the county. Migration trends over time have in part caused the current population age structures shown in Figure 3.4. These pyramids demonstrate first the large share of early-middle aged adults (those in their 30s) with their children (those in their teens) in Harrison county, and a progressive natural decline in population size with increased age. Mercer county, in comparison, has a more broadly represented labor force age structure, and very rapid declines in percentages at ages above 70 years.

FIGURE 3.4. COMPARATIVE 1990 PYRAMIDS: COUNTY AND STATE



Summary Notes on Community Characteristics

Of particular relevance in this study are the elderly populations in Harrison and Mercer counties and their respective communities of Cynthiana and Harrodsburg. Compared to more urbanized areas, both counties have a higher proportion of their populations in the elderly age groups. This fact is largely a result of a greater propensity of younger individuals to leave, either for higher education or for more favorable job opportunities. There is not a significant level of elderly net migration in either county, although Mercer tends to have a noticeably higher level of both in and outmigration. It therefore appears clear that aging-in-place of younger residents through their senior years is the dominating demographic process in each location, and especially in Harrison county and Cynthiana.

The turnover in populations because of in- and outmigration, no matter how slight, cannot be neglected in small non-urban communities. A sense of community among individuals emerges only after an extended period of residence in a community; familiarity with the layout and resources of the community is enhanced with time as is the development of social networks both within and across age cohorts. Retirees entering a community as immigrants, for example, would not have the informal social ties that long term elderly residents of the community would have. Similarly, high turnover of residents (i.e., high in- and outmigration) in the labor force ages could either interrupt existing social bonds with older cohorts or could result in either weak or nonexistent bonds across cohorts. This has salient implications for support mechanisms within a community, which most likely would include the provision of transportation.

Finally, a national trend, and one that is also evident in both study areas, is the rapid growth of the old-old population (defined as those 75 years and over) that is now beginning and is expected to continue for several decades. As will be discussed later in the report, this trend has important implications in terms of transportation because of the declining prevalence in personal driving associated with the onset and progressive severity of chronic disabilities at advanced age.

Aging-Related Support Organizations

Non-urban areas clearly are at a disadvantage compared to their urban counterparts with respect to both the amount and diversity of services available to the elderly. Small communities removed from metropolitan areas commonly do not have an adequate market size to support a comprehensive array of services, including not only formal transportation systems (primarily buses) but adequate adult day care or senior activity organizations. Despite the relatively low market size, however, there is growing realization in state and local government that nonurban counties have significantly larger shares of their populations at advanced ages than do urban areas. Although the numbers may be small, the concentrations of elderly are sufficiently large enough to warrant financial support of elderly-related programs and services, however limited the support may be.

The study communities of Cynthiana and Harrodsburg have a surprising number of agencies, organizations, and groups that offer assistance and service to the elderly. The following is a list of representative resources.

Common to Both Communities:

1. *Bluegrass Area Development District Homecare Services.* This Homecare program, which involves 17 counties (including Harrison and Mercer) serves clients who are frail, elderly persons 60 years of age or older who are at risk of being placed in a nursing home. Potential participants are generally identified through referral, and final acceptance is based on the results of initial phone screening and follow-up assessment by a case manager in the potential clients home. Services, which are provided according to need and available funding, include homemaking and home management, personal care, escort, respite care, chores, minor home repairs, and home delivered meals.

2. *Senior Citizen's Center.* The Senior Citizen's Center in each community is the agency responsible for carrying out many of the services supported by the ADD Homecare Services mentioned above. In addition, however, financial support is allocated to these centers to provide "Title III" services of advocacy, chores, congregate meals, home-delivered meals, education, escort, friendly visiting, health related services, homemaker and home repair, information and referral, outreach, personal care, recreation, telephone reassurance, and transportation. The mission statements of these Centers provide an indication of the spirit in which they operate: "The Harrison County Senior Citizen's Center strives to offer support, services and activities that will encourage the involvement of the senior citizens in this community, support their independence and enhance their dignity;" and "The mission of the Mercer County Senior Citizens, Inc. is to provide an array of essential services to qualified persons... with the greatest social and economic needs, with particular emphasis directed to low-income minority, rural elderly persons and persons in danger of unnecessary or premature institutionalization." In the case of the Center in Harrodsburg (Mercer county), a significant amount of support funding is provided by the United Way.

3. *Churches.* Churches tend to be a much more visible part of small communities than they are in cities. Both Harrison and Mercer counties have several dozen churches, with congregation sizes ranging from about 25 to about 200 members. Depending on the resources available, churches may offer transportation to their parishoners, organize special interest clubs exclusively for their elderly members (e.g., the Harrodsburg Christian Church "Quilters Group"), and even provide community-wide service and social opportunities (e.g., the "Thursday Club" and "Minus-1 Club" supported by the Cynthiana Presbyterian Church, and "Eldercare" supported by the First Church of God in Cynthiana). As will be demonstrated later in the report, the elderly in our study communities view religious worship and related church activities as being among the top priorities in their travel needs.

Special Services in Each Community:

1. *Harrodsburg*. Perhaps the most evident service in Harrodsburg besides Senior Citizens, Inc. is the "Senior Companion Program," which is federally funded and is administered by the Bluegrass Community Action Agency. The program, which is also available in nine surrounding counties, focuses on the homebound elderly. Volunteers, who themselves are elderly, provide person-to-person care in such areas as meal preparation, routine housekeeping and repairs, ensuring that medications are taken and bills paid, and transportation to locations in the community for church, medical visits, or basic errands. An important part of the Companions program is the social and personal support that the volunteers provide.

2. *Cynthiana*. Two additional organizations in this community warrant mention; they are the "Community action Council" and "Harrison County Elder Care." The former offers transportation, clothing/housing/ heating assistance, and elderly gardening opportunities. The Elder Care program offers supervision of senior adults, help with personal needs, activities that address physical, mental, social and spiritual needs, hot lunches and snacks, and relief for younger family members experiencing stress from caring for frail parents.

CHAPTER 4. PUBLIC TRANSPORTATION SERVICES

Introduction

The two principal providers of transportation services in the Harrodsburg (Mercer County) and Cynthiana (Harrison County) communities are the Bluegrass Ultra-transit Service (BUS) and Community Action Transit Service (CATS), respectively. Each is a rural public transportation system that is operated similar to city bus systems, except that collection and delivery points are precisely where the traveler requires, not at the nearest bus stop. In exchange for this facility, neither BUS or CATS is able to offer on-demand service with timetable schedules. Rather, they offer a demand-response service, with a minimum 24 hours notice required for most trips. In addition, contracts have been arranged between each carrier and particular senior centers, which entail scheduling a regular daily pattern of travel for seniors in accordance with the center's needs.

BUS and CATS each provide public transportation under contract to particular Community Action Program agencies, known as the lead agency: BUS contracts with the Bluegrass Community Action Agency, which covers their entire territory; CATS contracts with the Community Action Council, headquartered in Lexington, for their operations in Bourbon, Harrison and Nicholas Counties, and with a variety of agencies covering different needs in the remaining five counties, Bath, Menifee, Morgan, Montgomery, and Rowan. Further detail is given in the organization section of this report for each transport provider.

Both BUS and CATS operate over large geographic areas (Figure 4.1), and as a result keep vehicles throughout their regions to facilitate a prompt response. Dispatching and staff functions are accomplished at headquarters, which are in Frankfort, Kentucky (BUS), and Carlisle, Kentucky (CATS).

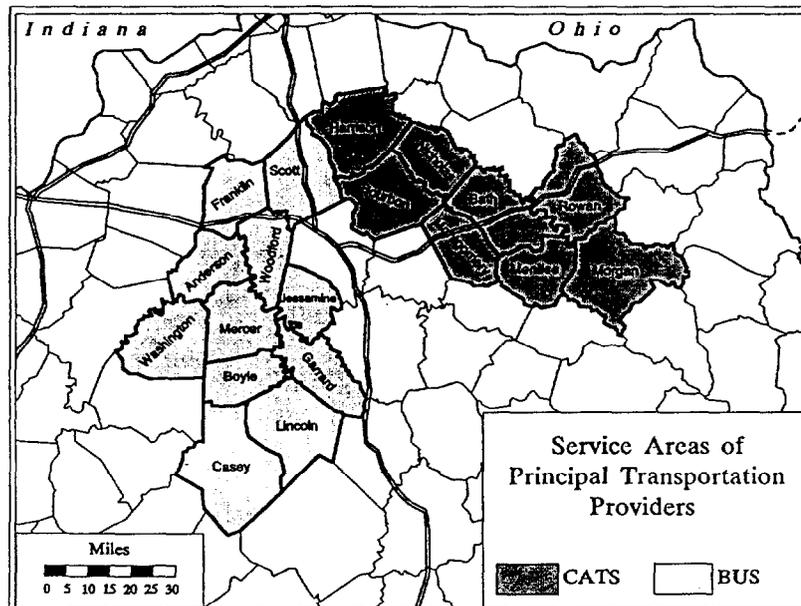


FIGURE 4.1

Apart from BUS and CATS, public transport for the elderly is limited in the two communities being investigated. A taxi service is still available in Cynthiana, while in Harrodsburg, there has been no taxi service for the past 12 months or so. A limited amount of 'formal' and greater amount of 'informal' volunteerism exists in both communities.

Following is a more detailed survey of the organization and operating procedures at each company, and an examination of their abilities to service the transportation needs of senior citizens in the communities of Harrodsburg and Cynthiana and their respective counties.

Community Action Transit System (CATS)

Geographic Area

CATS has been serving the transportation needs of citizens in a number of central Kentucky counties since 1986. Initially, three counties were served: Bourbon, Harrison, and Nicholas, to which an extra five counties were added in May, 1992, namely Bath, Menifee, Montgomery, Morgan, and Rowan (see Figure 4.1). The eight counties together amount to a network extending over 2,137 square miles.

An additional five counties (east to the West Virginia state border) are currently being considered for inclusion in the network. A decision on this eastern extension, which includes the counties of Boyd, Carter, Elliot, Greenup, and Lawrence, is expected in the near future and, if approved, start-up is slated for January 1, 1994. These five counties amount to 1,568 square miles, which would increase CATS commitment to an area covering just over 3,700 square miles. The addition of five more counties (north to the Ohio River) will be the subject of discussion at a later date.

Organization

CATS operates under Sections 16 and 18 of the Federal Transit Act, as amended, which authorizes federal assistance for systems which provide transportation services for senior citizens, and especially those living on lower incomes (Sec. 16), and for the general public who live in largely rural areas (Sec. 18). The lead agency to whom CATS are contracted to provide Sec. 16 and Sec. 18 transport services in their three original counties (Bourbon, Harrison, and Nicholas) is the Community Action Council (CAC) based in Lexington. In addition, transport services are provided through two specialist agencies, Accutran and Bluegrass Regional MHMR, who offer comprehensive care to disabled citizens, including the mentally handicapped and mentally retarded (MHMR).

CATS operations in the remaining five counties (the so-called 'Gateway Counties') include Sec. 18 service for the general public, but not Sec. 16 service for the elderly and those on lower incomes. In addition, CATS contracts to satisfy the transport needs associated with the specialist lead agency, Pathways, which administers Community Support Programs (CSPs) offering comprehensive care for the disabled, and Sheltered Workshops (SWs) for the MHMR. Section

16 service in the Gateway Counties is provided by a small agency, Eastern Kentucky Service Organization (EKSO).

Should the five additional counties to the east come within CATS scope, the lead agency will again be Pathways, which administers CSPs and SWs in these counties as well. All other transportation in these counties is currently undertaken by Rural Transport System, whose lead agency is Five Counties (FIVCO).

Of the CATS current budget, which amounts to \$1.203 million, federal assistance under this FT act currently totals about 8 percent (it used to be a 50/50 split). A large proportion of the balance (approximately 95 percent) is accounted for through receipts from the Medicaid program. Contributions from the state are limited to a proportion of capital requirements, such as new vehicles.

The CATS organization consists of 11 support staff in Carlisle, Kentucky, including the director, two radio dispatchers, accounting, clerical, and public relations staff, and a total of 70 highly-trained drivers who reside throughout the region. This large number of drivers reflects CATS concern both to service their entire area with adequate cover in the event of unexpected demand, or driver sickness, vacation, etc., and to enable them to expand seamlessly into additional counties as discussed above. Arrangements for travel services for the elderly and others in each county are either made by individuals themselves, by Senior Centers, or by Site Directors in each county who work with the specialist agencies, such as Accutran and Pathways.

The Vehicle Fleet

The CATS fleet consists of a variety of comfortable, climate-controlled vans and mini-buses, totaling 24 vehicles. Included among these are two vans leased to CATS by individual senior centers, nine leased through a leasing company (eight from Pathways, one from Bluegrass Regional MHMR), and the remaining 13 purchased and titled to Community Action Council. At present, this number is considered adequate to meet all their obligations in the eight counties, provided that new vehicles can continue to be acquired as the existing stock needs replacing. Currently, it is considered that the optimum mileage per vehicle is 200,000, which is attained after approximately 3 to 4 years' use.

The Senior Center vehicles from Bourbon and Nicholas County Senior Centers are leased to CATS for a consideration of \$1 per year, in exchange for which CATS provides insurance, driver, and maintenance, and contracts to provide the center with all their transportation needs. The rationale for this lies in vehicle usage. CATS considers that they can utilize their vehicles for about 8.5 to 9.5 hours a day, whereas it has been estimated that Senior Centers may only use their vehicles for about 3 to 4 hours a day on average. This assumes about an hour each for delivery of seniors to and from the center, meals-on-wheels, and any other specific daily transportation needs.

Future plans include the purchase of one wheelchair-equipped Sec. 16 vehicle, which is expected to be delivered in the near future and will be the sixth lift-equipped vehicle in their fleet. Furthermore, requests are out for an additional eight vehicles, one or two of which will be used to

replace older Sec. 16 models, and the remainder of which will gradually replace the various leased vehicles, which are a costly burden on monthly budgets.

In the event that CATS expands east, the lease on an additional 14 vehicles will be transferred from that area's lead agency (Pathways) to CATS, together with a corresponding number of drivers.

Operation

CATS is a delayed-response operation, offering travel with a minimum 24 hours notice required for most trips. These may include local trips, such as to the grocery store, drug store, doctor, or just visiting friends, as well as longer trips outside the county (for example to Lexington, Louisville, or Cincinnati for medical or recreational activities). For these longer trips, additional notice is required so that a vehicle can be filled. Within this general operational framework, but only where transportation is provided to a senior center, will CATS arrange a daily on-demand travel service as detailed above.

As the principal and, in most cases only public transport operator, CATS can provide this service to anyone living in the eight counties. It is available to people of all ages and incomes, and can be used for any transport service throughout the state of Kentucky. To this end, in 1992, CATS traveled a total of 479,733 miles, representing 143,757 individual one-way trips.

The fare structure is simple: 50 cents per passenger-mile for the general public, and a senior citizens contract which amounts to 75 cents per loaded-mile (or vehicle-mile). For example, a member of the general public wishing to travel from their home to the post office and grocery store, covering a total roundtrip distance of 7.2 miles, would pay a total of \$5.40; on the other hand, a sole senior citizen making the same trip would pay \$3.60, whereas if there were two or three seniors making the trip at the same time, the total fare would drop to \$1.80 or \$1.20 per person, respectively.

Ridership

Table 4.1 shows the number of one-way trips taken by CATS riders during the fiscal year ending in June, 1993. The final column, which exhibits the ratio of total ridership to elderly population, provides an opportunity to compare each county's ridership levels. The number of one-way trips undertaken by senior citizens (including meal deliveries) in Bourbon County amounted to approximately 23,652 in fiscal 1992-3 (or 47 percent of the total ridership). In Nicholas County, this proportion has been estimated at 6,312 (or 51 percent of the total). At the other end of the scale, the number of seniors traveling in Harrison and Rowan Counties amounts to less than two percent of the respective totals.

Table IV.1 shows that Bourbon County has the greatest ridership by a considerable margin, followed by Rowan, Nicholas, Bath, and Morgan counties; Menifee, Harrison, and Montgomery trail well behind. Thus, two of the three highest ratios of elderly riders are to be found in those counties whose Senior Centers have contracted with CATS to provide all their

transportation services. Naturally, this would result in both an increased total ridership as well as a higher proportion of elderly riders to the total number.

TABLE 4.1. CATS RIDERSHIP PER COUNTY. Number of one-way trips, Fiscal Year July, 1992 to June, 1993

County	County Seat	Ridership (one-way trips)			County Pop. > 65	Ratio Ridership to Pop. >65
		July-Dec	Jan-June	Total		
Bath	Owingsville	8,003	6,384	14,387	1,473	9.77
Bourbon	Paris	27,191	22,690	49,881	2,635	18.93
Harrison	Cynthiana	7,044	7,635	14,679	2,518	5.83
Menifee	Frenchburg	2,628	1,879	4,507	621	7.26
Montgomery	Mt. Sterling	4,906	4,033	8,939	2,542	3.52
Morgan	West Liberty	6,470	6,567	13,037	1,444	9.03
Nicholas	Carlisle	6,508	5,824	12,332	1,076	11.46
Rowan	Morehead	11,931	14,064	25,995	2,035	12.77
Total		74,681	69,076	143,757	14,344	10.02

*Sources: Ridership data: CATS, Carlisle, Kentucky
Population data: 1990 Census of Population*

It also should be mentioned that Bourbon and Nicholas are two of the three original counties in the CATS network, and thus have had the benefit of CATS presence for a full seven years. The third county, Harrison, has the third highest total ridership, reflecting CATS early start-up, but not a large number of elderly since the Harrison County Senior Center in Cynthiana has chosen thus far not to enter into a similar contract with CATS.

Ridership other than through Senior Centers is comprised as follows: Comprehensive Care Sites (CCSs), at which outpatient (counseling), adult day care, and night group activities are coordinated, exist in Bourbon (with the addition of a pre-school program), Harrison, and Nicholas Counties (in a more limited way); Sheltered Workshops (SWs) for the mentally handicapped and mentally retarded (MHMR) in Bath, Bourbon, Harrison, Morgan, Nicholas, and Rowan Counties; and Community Support Programs (CSPs), similar to CCSs but for the mentally handicapped, in each of the Gateway Counties. In addition, CATS provides transportation for the general public (under Sec. 18) in all eight counties.

If CATS is successful in its negotiations with Pathways in the additional five eastern Kentucky counties, ridership will come from CSPs and WSs. As mentioned above, Sec. 18 and Sec. 16 ridership in these counties is contracted to Rural Transport Systems (RTS) by FIVCO, and will not be available for CATS, unless RTS sub-contracts in the future.

Summary

It is evident from Table IV.1 that CATS ridership is beneficially affected from the contractual arrangements made with Bourbon and Nicholas County senior centers. This lends credence to CATS claim that they can obtain greater utilization of their vehicles than senior centers can, by being able to use what would otherwise be down-time for the center's vehicle. In this way, more people can be served more of the time.

As far as Harrison County is concerned, more than 14,600 citizens made one-way trips during the year to June 1993. Many of these would have been within or to/from the city of Cynthiana. For senior citizens in the county as well as those who attend the Harrison County Senior Center, it remains to be seen whether a contract between the center and CATS would provide improved service for a greater number of seniors and others in the Cynthiana catchment area. Evidence from Bourbon and Nicholas Counties suggests that this might indeed be the case. Meanwhile, the Harrison County Senior Center continues to express their desire to hold on to the flexibility and self-containment afforded through possession of their own vehicle, which is now six years and approximately 55-60,000 miles old.

Overall, CATS is operating at or near capacity, and they are on the verge of expanding into five new counties. Clearly, it will be a testing time for their organization, not least in terms of the added demand for serviceable vehicles. However, they appear to be an excellent team and can be applauded for their enterprise.

Bluegrass Ultra-transit Service (BUS)

Geographic Area

BUS has been serving the transportation needs of citizens in eleven counties in central Kentucky since 1983. These eleven consist of Anderson, Boyle, Casey, Franklin, Garrard, Jessamine, Lincoln, Mercer, Scott, Washington, and Woodford Counties, an area which extends from Frankfort in the north to Casey which is just north of the Cumberland Lake area in southern Kentucky. Altogether, this amounts to a network comprising 2,803 square miles. Detail of this network and how it relates to the eight counties served by CATS can be observed in Figure 4.1 (see beginning of chapter).

Organization

BUS is the transportation arm of the Bluegrass Community Action Agency (BCAA), which among other things oversees operation of senior centers in nine of the eleven counties, the exceptions being Casey and Washington counties. In each of the nine counties, BCAA employs a full-time community developer whose duties are in part to harness all the resources of their particular area so as to help citizens who, for one reason or another, do not fall into any of the categories for which there is already adequate assistance. For BUS, the community developer is able to publicize and promote the transit service itself, thus bringing BUS to the attention of many

who might otherwise not be aware of this service. As a result, nearly 50 percent of BUS ridership regularly is comprised of citizens who are transportation-disabled, such as the hearing- or vision-impaired and the mentally disabled, of whom around 20 percent are also elderly.

In its current (1993/4) budget of around \$1 million, BUS receives direct federal assistance for operations amounting to \$200,000, of which \$105,000 has been mandated for intercity service. The balance of \$95,000 represents the subsidy BUS can offer its ridership. In the words of Transportation Director Sue Jeffers, "this leaves little room for innovation". No operating funds are available from the state, nor the counties. For capital requirements, such as vehicles, the state puts up 10 percent, the federal government 80 percent, and the balance of 10 percent coming from local funds (self financing). A large proportion of the balance of the operational budget (about 85 percent) is accounted for through receipts from the Medicaid program.

The BUS organization consists of 31 employees, 27 of whom are drivers, and four of whom are office staff, including a dispatcher, a maintenance coordinator, an operations manager, and a director. The drivers currently work an average of 35-40 hours/week, although they are hired as--and when--needed on a daily basis.

The supply of gas and oil, as well as regular and major maintenance needs, are put out to bid every other year. Currently, maintenance providers are located in Danville (to cover Mercer County and the southern half of the region) and in Frankfort (for the northern counties). Additional contracts for the provision of fuel and minor maintenance have been negotiated in Lincoln and Casey Counties.

The Vehicle Fleet

The BUS fleet consists of 35 vehicles, including eight that are lift-equipped. Of the 35 vehicles, eight regular and two lift-equipped vehicles are considered back-ups. Vehicles, which travel about 50,000 miles in the region each year, have a life-cycle of about four years, and BUS has just purchased seven replacement vehicles. Included among this batch were two lift-equipped vans, designed and manufactured according to Americans with Disabilities Act of 1990 (ADA) specifications, that replace two wheelchair-equipped vehicles which were built prior to 1990.

BUS operates no central garage facility; instead, vans go home with the drivers who call the office daily for their instructions for the following day. Each driver is responsible for her/his vehicle's outside and inside cleanliness, and follow a weekly check list which covers routine maintenance items.

Future plans include the purchase of another ADA-approved, lift-equipped van, which is due early in 1994 and represents an additional vehicle, not a replacement. This reflects the growing demand from the elderly and disabled population for community-based transportation alternatives.

Operation

Like CATS, BUS operates on the basis of a minimum 24 hours notice for most trips. These would normally include both local travel requirements, such as to the doctor, grocery or drug store, visiting friends/relatives, and longer distance travel outside the county, such as for medical treatment in Lexington or recreational trips to Louisville or Cincinnati.

Following the new budgetary line item (as introduced above in the organization section) covering intercity travel, BUS vehicles have started making twice weekly trips from each county to Lexington, and there are plans to raise this service to five days per week from October/November, 1993. One result of this regular intercity component to date is that BUS is starting to get travel requests to Bluegrass Airport. It is essential, however, that BUS offers this service at a price which the elderly, particularly those who have no support system of their own, can afford.

BUS has a single fare of 50 cents per passenger-mile for the general public, and 50 cents per loaded-mile (or vehicle-mile) for contract service. Consideration is being given to raising this contract rate to 75 cents/vehicle-mile, which would bring BUS in line with CATS, for example. No decision on this is thought likely, however, in the immediate future. The reason for this is entirely budget derived; it is estimated that trip costs amount to \$1.05 per mile, so that the subsidy is 55 cents/mile on nearly all trips. As federal operating funds are squeezed, it becomes harder to account for such a large subsidy. On the aforementioned intercity trips, BUS is likely to offer inclusive prices per trip from each county to and from Lexington rather than calculate fares at 50 cents/passenger-mile, which is the normal rate for this type of trip. It is hoped this will make the intercity service rates both easier to understand and more economical.

Ridership

Table 4.2 shows the number of one-way trips undertaken by BUS riders during the year to June 1993. Comparing total ridership to elderly population in each county, it can be seen that Garrard County has the highest proportion of elderly ridership, followed by Scott, Woodford, Anderson, and Boyle. However, this does not give an accurate profile of BUS ridership, because each month the largest group of riders comes under the category of disabled/medical, of which only about 20 percent are elderly; the majority are non-elderly who are hearing- or vision-impaired, or mentally disabled. In the six months from July to December, this group accounted for 49 percent of the total ridership, and 45 percent during the second six month period. By contrast, specifically elderly ridership accounted for 29 and 27 percent, respectively. This elderly component reflects the contract arrangements BUS has with Senior Centers in nine of the eleven counties covered. The exceptions are Casey and Washington Counties, the latter giving little opportunity for developing ridership at the present time.

TABLE 4.2. BUS RIDERSHIP PER COUNTY. Number of one-way trips, fiscal year July 1992-June 1993

County	County Seat	Ridership (one-way trips)			County Pop. > 65	Ratio Ridership to Pop. > 65
		July-Dec	Jan-June	Total		
Anderson	Lawrenceburg	8,932	7,452	16,384	1,812	9.04
Boyle	Danville	14,821	15,546	30,367	3,715	8.17
Casey	Liberty	7,404	8,926	16,330	2,138	7.64
Franklin	Frankfort	13,309	15,837	29,146	5,306	5.41
Garrard	Lancaster	11,130	7,431	18,561	1,790	10.37
Jessamine	Nicholasville	9,411	8,336	17,747	2,661	6.67
Lincoln	Stanford	7,390	6,563	13,961	2,843	4.91
Mercer	Harrodsburg	11,131	10,964	22,095	2,880	7.67
Scott	Georgetown	12,218	12,495	24,713	2,595	9.52
Washington	Springfield	0	16	16	1,625	0.01
Woodford	Versailles	9,891	9,726	19,617	2,118	9.26
Total		105,645	103,292	208,937	29,483	9.80

Sources: Ridership data: BUS, Frankfort, Kentucky
Population data: 1990 Census of Population

In Harrodsburg, BUS has a unique contract whereby a van is provided three days a week for the use of the Mercer County Senior Center. While there, the van provides such services as collecting and delivering the elderly to the center, returning them to their homes later in the day, delivering pharmaceuticals, and delivering meals-on-wheels. Most trips are nutrition based, and the vehicle is not normally used for medical trips. In all other counties, BUS responds to the requests of individuals or the Senior Centers a minimum 24 hours ahead.

Summary

In providing almost 209,000 one-way trips to the citizens of 11 central Kentucky counties during the year ending June 31, 1993, BUS has played an invaluable role in helping to cement the social fabric within many non-urban communities. They operate at or near full capacity, are run by extremely competent staff, and are on the verge of introducing a different kind of service in the fixed-schedule daily run to Lexington from each county in their extensive region.

Taxis

In Harrodsburg, a taxi service was available up to approximately a year ago; it is no longer in existence. It appears that the demise of the service is a result of improper pricing, lack of management skills and unstable demand. A taxi service does exist in Danville, Johnson's Cab Co., that will collect a passenger in Harrodsburg and, for example, drive to Lexington and back for

about \$75. In view of the cost, it is unlikely to be of much use to the elderly in Harrodsburg or in the surrounding rural parts of Mercer County.

In Cynthiana, on the other hand, a taxi service survives--Cynthiana Taxi Co. It contracts outside the county and with CATS when requested, and occasionally drives to Lexington (\$70 roundtrip). Within the city, they operate with two rates: from the courthouse to the hospital, for example, they charge the general public \$3.00 and seniors \$2.75. They also deliver drugs to those who cannot get out for \$5.00, and have a senior citizen card that provides one free ride after four paid ones. Their busiest period every month is from the first to the fifteenth, when checks and stamps are delivered, and from month to month when the weather is inclement. They possess two vehicles, a 'baby' Chevrolet Sprint, which is apparently good in snow, and a large Chevrolet Impala.

Interestingly, both CATS and BUS contract with taxi companies in certain counties. CATS coordinates with taxi companies in Bourbon, Harrison, Montgomery, and Rowan Counties, mainly as emergency back-up owing to vehicle break-down, schedule conflict or after-hours service. BUS utilizes the taxi service in Jessamine County, which includes a lift-equipped vehicle among its fleet, for similar reasons.

Mercer County Emergency Medical Service (MCEMS)

The MCEMS, a private company under contract to Mercer County, has been in existence for 16 years and has been owned by Paul Parkes for the past two years. They currently have three ambulances, and operate on the same basis as CATS and BUS, requiring a minimum of 24 hours notice, though an immediate service can be arranged in response to 911 calls. While all trips are for medical purposes, about 45 percent are classified as emergency, and 55 percent as non-emergency; the great majority of trips are for travel within Mercer and neighboring Boyle Counties, with approximately 10 percent destined for Lexington. Emergency patients are taken to Haggin Memorial Hospital in Harrodsburg, while non-emergency patients may, for example, be consigned to physicians in Harrodsburg or Danville.

Volunteerism

Volunteerism can be defined in one of two ways according to the nature of the service: institutions that organize volunteer driver programs, such as churches, hospitals and hospices, can be thought of as formal volunteerism; the transportation assistance offered by networks of family and friends is wholly informal.

Harrodsburg

The amount of formal volunteerism in Harrodsburg is considerable. Many of the churches have their own van or bus (the Harrodsburg Baptist Church, for example, has one of each), which

chiefly are used to assist those who have no other way of getting to church services or functions, as well as to facilitate church outings on special days. The Mercer County branch unit of the American Cancer Society (ACS) has been running a local 'Road to Recovery' program for the past eight years, and they currently have 40 volunteer drivers who undertake both short and long distance travel for anyone suffering from cancer. Many trips are made to Lexington's medical care institutions for radiation treatment. Calls to the ACS come from a variety of sources, such as Haggin Hospital, the patients' family or their doctor. Insurance for all volunteer drivers is covered by the ACS.

The Heritage Hospice in Danville, some 9 miles south of Harrodsburg, also has an extensive program of volunteers, 42 of whom are drivers, spread throughout the four counties covered by Heritage: Mercer, Boyle, Garrard, and Lincoln. Volunteer Coordinator, Jonelle Lane, advised that patients suffering from cancer will usually be referred to volunteers working through the 'Road to Recovery' program. All others, and there are 105 patients in total, are helped by Hospice volunteers, some of whom prefer to travel just within their own county, with others who are able to travel further afield. Each patient has a Primary Care Giver (PCG), usually a family member or close friend, who lives at home with the individual and often takes care of basic transportation needs. However, when the PCG is unable to assist, a volunteer will step in. As with the ACS program, all volunteer drivers are covered for insurance under a policy taken out by the Heritage Hospice.

Finally, the Mercer County Senior Citizens' Center has the assistance of one volunteer, who helps the senior center out with unusual requests. The difficulty encountered here is the insurance coverage. According to Lyla Thurman at the Center, premiums increase dramatically as soon as an application to transport elderly or disabled people is put through, since the Center does not have the ability to affect coverage under their own policy. Indeed, the senior center lost one volunteer driver quite recently as a direct result of increased insurance.

Informal volunteerism is more difficult to quantify. However, according to a number of people in Harrodsburg, including David Hartman of the Harrodsburg Baptist Church, Dr. Earl J. Motzer (Ph.D., FACHE, and hospital CEO) of the James B. Haggin Memorial Hospital in Harrodsburg, and BCAA Community Developer Jim Murray, a considerable amount of short-distance informal volunteerism occurs. Typically, the volunteers are friends or family of the individual, or members of the same church congregation. On the other hand time and, in some cases, financial constraints work against the ability of volunteers to assist with longer-distance trips, including those to Lexington for medical purposes. It will be seen that very similar conditions exist in Cynthiana.

Cynthiana

Formal volunteerism in Cynthiana is most evident at the Harrison County branch office of The Hospice of the Bluegrass, which was founded in 1978. Here, 15 active out of a total 31 trained people, both certified and honorary, act as transport volunteers. Also, four individuals who are with the American Cancer Society can be used as back-up.

Each patient, and there are currently 65 who come under the Cynthiana regional office, has to have a PCG, who is usually a member of the family or a close personal friend. For a variety of reasons, the PCG may be unable to transport the patient on a particular day, and this is when a volunteer is called in to help. Usually, there are five to ten transport requests per month. Since the region covered includes the counties of Bourbon, Harrison, Nicholas, and Scott, and many of the trips are to Lexington for medical purposes, the mileage involved can be quite extensive. Insurance for all volunteer drivers is covered under a Hospice of the Bluegrass group policy, which circumvents the type of insurance problem volunteers have encountered at, for example, the Mercer County Senior Center.

Coordinator of Volunteer Services for the Hospice, Cindi A. Eaton, also commented on the level of church and individual volunteerism in Cynthiana. She believes that a considerable amount of volunteerism exists, either in direct association with a church or at the informal level for local trips, which usually involves members of the same congregation, friends or family. She mentions, however, that it is much harder to obtain a volunteer driver for a longer trip, say to Lexington. This may be because of time constraints since many of the volunteers are professional and working full-time, or are home-makers who may have children.

Cindy Vance, director of the Mercer County Senior Center, believes that there is a need for more formal and informal volunteers, particularly for longer trips and for serving those who do not have their own support system. The main area of need is with lengthy medical trips; the center's own vehicle makes an all-day trip to Lexington each Thursday. Still, it is recognized that it may not always be possible to arrange a trip to see a doctor or specialist on a fixed day of the week, and the nature of an all-day trip may not be to everyone's taste.

The Harrison County Memorial Hospital Auxiliary group has an informal network of drivers, who are committed to taking cancer patients to Lexington for treatment. Debbie Spicer advised that currently there are five drivers, all retired, who offer this service on an 'as needed' basis. There appears to be no formal organization to this group of drivers, and referrals are frequently made by doctors directly with the appropriate driver.

Conclusion

In sum, it appears that the biggest problem surrounding public transportation is the temporal nature of scheduling. In both communities, it seems as if a need exists for some form of on-demand service, particularly for the longer trips such as those to Lexington, which involve delays at the destination of several hours (i.e., many medical-oriented trips). This need has been exacerbated by several factors: the relatively few long trips undertaken by Senior Center vehicles; the delayed-response requirement of CATS and BUS; the problems associated with volunteers making lengthy trips that also involve long delays at point of destination; and particularly concerns regarding difficulties over insurance premiums. Indeed, insurance appears to be a significant issue for volunteers who are not associated with an organization or institution capable of offering umbrella coverage for its members.

The plans being developed by BUS for a daily service to Lexington from each of the counties in their extensive region would seem to be a direct response to this need. Provided the fares are reasonable, and that access to the service, particularly in rural areas, is feasible, there seems little to suggest that this intercity element will be anything other than a complete success. CATS, on the other hand, according to their General Manager Phil Pack, has not thus far received any budgetary instructions concerning intercity service. This complicates the situation somewhat.

Both CATS and BUS appear to have excellent organizations, and they are both operating at or near full capacity. The main differences in the two are their respective sizes (in terms of office personnel) and the way in which they handle their promotional activities. One reason for the greater number of office staff at CATS (11) compared to BUS (4), could be that BUS is located in the same building as their lead agency, BCAA, whereas CATS is located at some distance from either of their two main lead agencies, CAC and Pathways. Thus, BUS can enjoy the on-site presence of top agency management and additional support staff, while CATS has neither option in Carlisle and, consequently, needs to hire more support staff.

CHAPTER 5. METHODOLOGIES AND PARTICIPANT CHARACTERISTICS

Because of the topical and conceptual focus of this research, it was determined that personal interviews would be best suited for data collection. Personal contact with participants ensures not only that all elements of the required data are obtained, but that quality of data are uniform across all participants. Mail surveys, by comparison, would not necessarily provide such consistency, and phone surveys would be virtually impossible because of the complexity of certain data elements.

This chapter covers the field methodology used in this research, with a brief discussion of the development and testing of survey instruments prior to formal field work, and procedures followed during formal data gathering in Cynthiana and Harrodsburg. A second part of this chapter provides a general overview of selected demographic and socio-economic characteristics of the research participants.

Data Acquisition

The research problem and study objectives were investigated through the use of two separate information gathering mechanisms. First, a basic survey questionnaire was developed to obtain information on essential personal characteristics (including age, gender, household size, income, and place of residence) as well as information related to the individual's license status, automobile ownership and use, and access to a personal automobile. The survey instrument further allowed us to gather information on the reasons for travel, frequency of travel, knowledge of transport services, utilization of trip chaining and other aspects of travel behavior. Questions in the survey were primarily structured to promote basic yes/no responses, rankings of certain data elements, and general demographic, socioeconomic, and residential characteristics. An open-ended approach to questioning was eschewed because of its time-intensive nature and its inability to allow for a comprehensive assessment of the results in the context of the communities at large. The instrument is attached to this report as an appendix.

In addition we utilized a trip diary mechanism to obtain information on the actual daily travel behavior in terms of the overall frequency of travel, the timing of trips both during a typical day and across a typical week, the relative distances travelled during trips, the reasons for travel, and the mode of travel. This means of data collection was particularly valuable as a cross-reference for data elements gathered during the survey interview. The trip diaries were addressed at the conclusion of the survey interview, with an explanation provided of the reasons and importance of keeping a trip diary, and instructions on how to accurately log personal travel in the diary. In most cases, participants filled out trip diaries on their own during the course of a week to 10 days. In a number of instances, however, it was considered necessary for interviewers to work with participants in recording their travels. This instrument is also attached as an appendix.

An initial draft of our survey instrument and the trip diary were pilot tested in the Lexington area before our actual field work began. The pilot testing was done using several dozen participants selected from the University of Kentucky Sanders-Brown Center on Aging pool of voluntary research subjects. Based upon responses to these interviews, adjustments were made to the survey instrument and diary both to improve their clarity and effectiveness. We also used the pilot results to either delete certain elements that were found to be unimportant, or to include additional questions to further examine salient topics identified by the pilot participants.

Both the trip diaries and the survey instrument were completed with the assistance of experienced interviewers. These interviewers were selected from a pool of graduate student applicants from such fields as education, counselling psychology, engineering, geography, and sociology. Candidates were screened by the investigators, and preference was given to individuals having a background in general research methods, personal interviewing, and gerontological studies. After the selection of interviewers, several training sessions were held to familiarize the field personnel with the study and the survey instruments. Finally, each interviewer underwent at least one "simulated" interview session, and commonly two additional supervised interviews in the field before being allowed to contact and meet with elderly study participants. We felt that the rigor of field personnel training was important to ensure uniformity across all interviews and, consequently, within the final data set.

Field research began with the development of an enumeration and listing of the elderly population in each community and surrounding areas. In the absence of detailed census records from state or community sources (which are protected by confidentiality laws) we proceeded to develop our population of potential participants in several ways. First we assembled contact lists through several programs carried out in or by the Senior Citizens Centers. By examining records and making inquiries from employees and volunteers at the Centers we gradually developed an initial listing of potential participants. Among the programs utilized (and mentioned above) were the Meals on Wheels, Home Care and several other programs. Thus elderly participants in these formal programs became one source of respondents. Similar agencies from which participation was sought included community volunteer organizations such as Hospice, hospitals, and hospital women's auxiliaries.

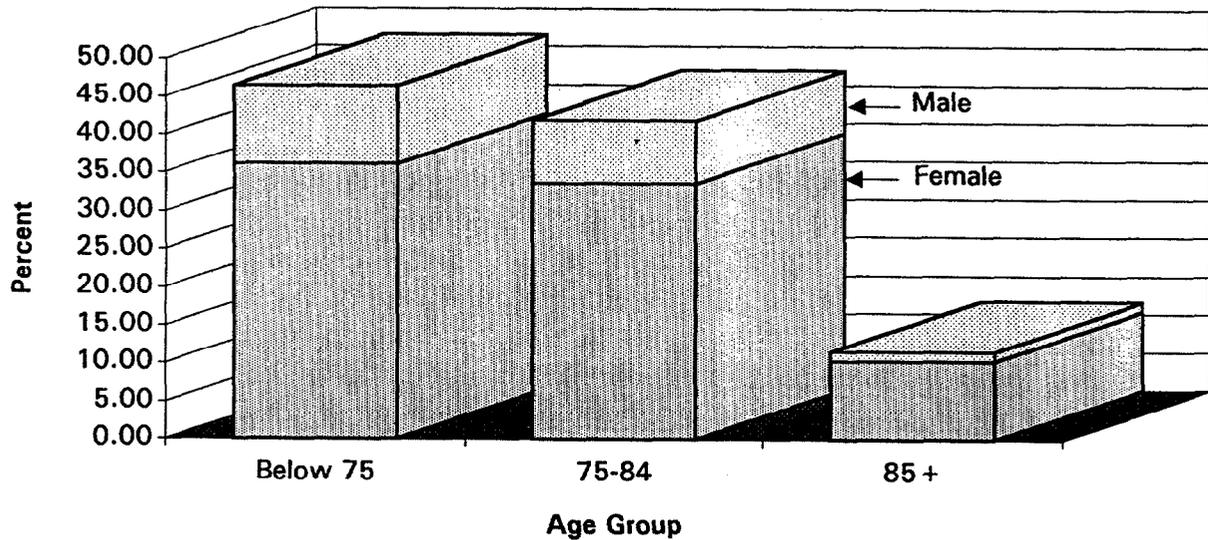
In addition to the agencies which delivered formal services to, or provided volunteer opportunities for the elderly, we approached local clergy in the main and surrounding communities and asked these individuals to solicit volunteers from their respective congregations. The names of these volunteers derived from church organizations or simply regular church attenders formed still another listing of potential respondents.

A third effort to obtain potential respondents involved publicizing our research project and its aims on local radio stations, in local newspapers and at special gatherings (e.g. luncheon clubs) of the elderly in the two communities. In numerous cases, formal presentations were made before large audiences of the elderly to provide background on the study and to solicit participation. Finally, at the end of each interview, participants were asked to provide referrals of other individuals who could be contacted.

General Characteristics of the Respondent Sample

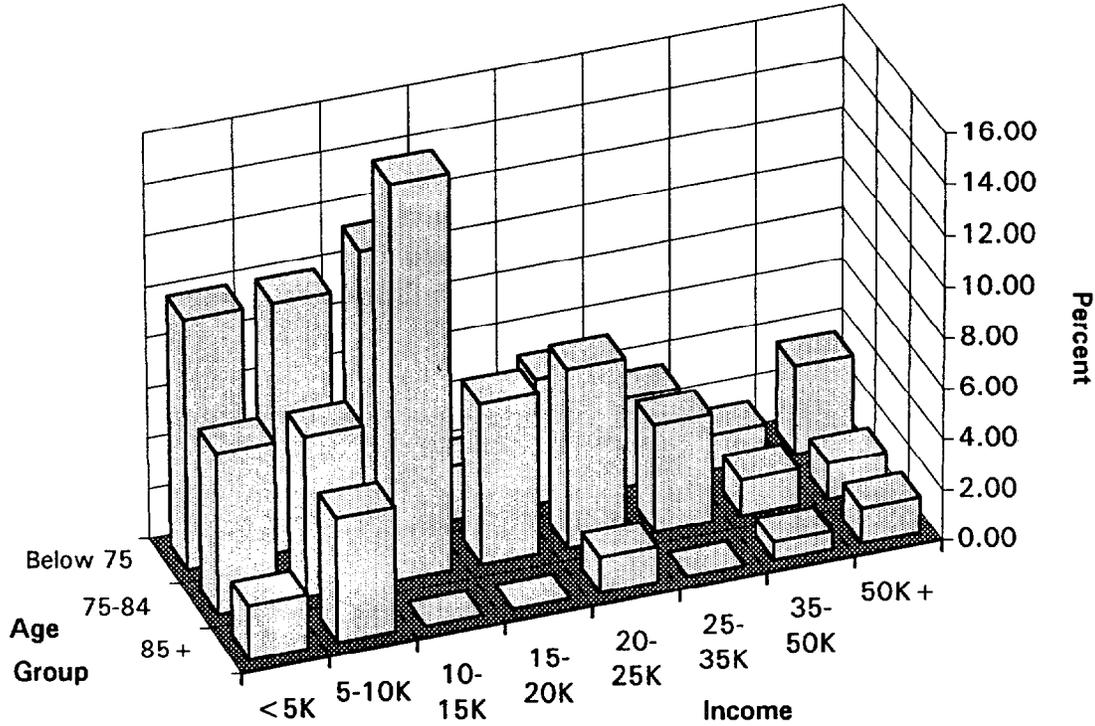
Sampling and screening procedures ultimately provided a set of 155 respondents who agreed to participate in our survey. These respondents were derived from a list of nearly 500 contacts, yielding a response rate of approximately 30 percent. The 155 respondents consist of 124 females and 31 males, with a median age of 75 years (Figure 5.1). For the purpose of further analyses the age distribution was partitioned into the three age cohorts most commonly identified in the gerontological literature: below 75 years (the young-old); 75 to 84 years (the old-old); and age 85 and over (the oldest-old). With respect to these three age groups, the distribution was 47 percent young-old, 42 percent old-old, and 11 percent oldest-old. Compared to the total elderly population of the communities, our sample exhibited a slight bias away from the young-old category in favor of the old-old category, and the oldest-old category was proportionately quite similar. (Representative percentages among the total community elderly populations were 52 percent, 38 percent, and 10 percent, respectively.) In terms of gender comparisons, our sample exhibited clear underrepresentation of males (20 percent in the sample compared to just above 40 percent in the full elderly population.)

FIGURE 5.1. AGE DISTRIBUTION BY GENDER



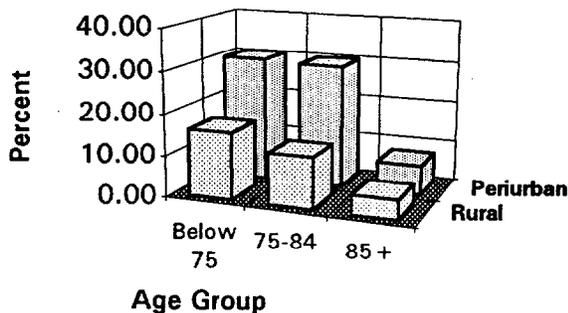
As anticipated the income distribution among respondents exhibits high diversity, with several elderly reporting incomes in excess of \$50,000. However, the median income category was \$10-15,000 and in fact the modal category was \$5-10,000. Individuals in the two younger age categories, and particularly those below the age of 75 years, reported a tendency towards low incomes, as shown in Figure 5.2.

FIGURE 5.2. AGE DISTRIBUTION BY INCOME



In selecting our final set of respondents we wanted to insure that a broad cross section of ages and income patterns as well as locations were represented. With respect to location we felt that it was critical to examine the travel behavior and needs of individuals who were located in more densely settled non-urban areas (periurban--usually in town or on the fringe of a town) as well as distinctly rural and on occasion quite isolated settings.

FIGURE 5.3. AGE BY RESIDENCE

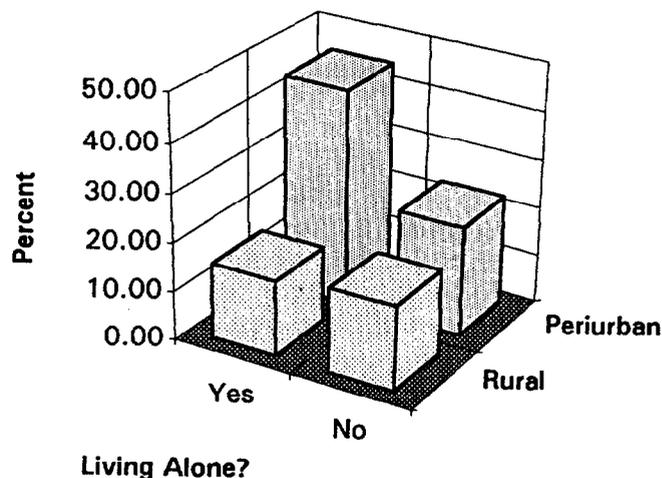


Thus our respondent sample is also dichotomized as periurban and rural in order to allow us to capture this distinction (Figure 5.3). Obviously our primary intent in developing this further categorization is to allow us to examine travel behavior, knowledge and needs with location as a control variable.

A basic premise in our research is that travel behavior, knowledge and needs are a function not only of basic demographic, economic, and residential location characteristics but of the family structure as well. Therefore we use family size and composition as still an additional variable by which to explain variations in travel associated measures. Especially critical in this

sense is whether an elderly respondent was living alone. Within our sample, 60 percent of respondents lived without spouse or relatives (Figure 5.4). Another 35 percent of our respondents were living with spouses in a two member family. These percentages are approximately opposite of those characterizing the entire elderly population. This result is in part due to our over-sampling of the old-old age category and also a consequence of a sampling procedure that used community service providers to establish contacts.

FIGURE 5.4 LIVING ALONE BY RESIDENCE



Summary

Our field work and sampling efforts were influenced by several factors that warrant summary discussion. First, the total number of respondents was lower than originally anticipated. This is largely a consequence of three factors. First, the personal interviews alone ranged in duration from 45 minutes to 90 minutes. Many potential respondents declined to be interviewed simply because of this time commitment. Contrary to popular belief, retirees are as a group very active people; we found them to have set schedules for their daily activities and to be quite inflexible in terms of these schedules. Second, the elderly population has increasingly become victims of crime over the past several decades. This crime not only encompasses the real estate scams that have proliferated in such popular retirement states as Florida, but also includes local home maintenance and repair operations that over-charge and under-serve, and marketing agencies that have taken advantage of the elderly's increased disposable incomes primarily through home and telephone sales strategies. It is fortunate for the elderly that local and national agencies (including the American Association of Retired People) have promoted education of these crimes by increasing awareness of such activities and suggesting preventative behavior. It is unfortunate, however, for research that relies on making personal contacts with the elderly because there is immediate suspicion of any strangers. Our efforts in meeting with town administrators and law enforcement agencies was an attempt to overcome this barrier.

Lastly, it is difficult in many small periurban communities and rural areas for residents to open up to outsiders. Social networks are often strong in these areas, and outsiders are not easily accepted. Cynthiana, for example, was found to be much more "closed" to outsiders than Harrodsburg, which may be a consequence of historic migration patterns. As shown in Chapter 3, Harrodsburg has traditionally had a higher level of migration activity than Cynthiana, which acts to break up and redefine the social networks of communities. Harrodsburg also has a viable tourism component, and local residents are relatively accustomed to the presence of nonresidents. Indeed, we were much more able to solicit participation in Harrodsburg than in Cynthiana.

The age and gender biases evident in our sample are not considered to be a detriment to the study. Our intention is not so much to determine an overall level of transportation needs in a community as it is to identify specific needs, the ways in which the elderly's travel behavior is structured around these needs, and the types of resources available that allow needs to be fulfilled. As such, it becomes a benefit to have a sample that emphasizes those populations who will gain most from our research, namely older females.

CHAPTER 6. ELDERLY ACCESS TO AND USE OF VEHICLES

Drivership

Possession of a driver's license may be considered a factor that greatly affects and changes the activities of an individual. Securing a driver's license at a relatively young age is considered an indicator of independence and a "passport" to adult life-styles. But, maintaining the driver's license as one ages is also an indicator of independence and mobility status. Research has shown that maintaining a license as one achieves elderly status is as important as earning a license while a teenager.

The importance of this phenomenon was also prominent among the participants in this study. Among the 155 participants who completed the interview and the questionnaire, 107 (69 percent) currently had a valid driver's license. When the same individuals were asked if they currently drive, 95 (60.6 percent) indicated that they drive. A cross-tabulation of licensed drivers with the driving status indicated that only a small percentage of licensed individuals does not drive (11 percent), while 80 percent of those who do not currently drive did not maintain a driver's license. These results generally support other findings on elderly mobility (e.g., Rosenbloom, 1988).

The years behind the wheel of an automobile (years of driving experience) these individuals had was also of concern in this study. More than one-fourth of the participants (27.1 percent) had not driven in their entire life and approximately one-third of them had twenty or fewer years of driving experience. Three-fourths of the participants who do not have a valid driver's license are also those individuals with no driving experience. A similar portion of participants indicated that they do not currently drive and have no driving experience. A small percentage of the participants indicated that they currently have a license and no driving experience (Table 6.1). This phenomenon may be attributed to death or inability of a spouse to drive and the need to drive by the other spouse in order to fulfill their mobility needs.

TABLE 6.1. DRIVING EXPERIENCE AND DRIVERSHIP

Years Driving	Licensed Drivers		Currently Drive	
	Yes	No	Yes	No
0	3	39	0	42
1-20	3	4	2	5
21-30	4	2	4	2
31-40	11	3	10	4
41-50	28	0	27	1
51-60	31	0	16	5
61+	27	0	25	2

Those participants without a driver's license and no driving experience are largely accounted for by gender distinctions. The significant portion of elderly with no driving experience is mainly attributed to individuals that never had the need to acquire a license due to attitudes and conventions during the period when current generations of elderly matured. Obtaining a driver's license at a young age was not a very common phenomenon in the past, and current generations of elderly may not have had the opportunity to gain driving experience. However, these trends will certainly disappear in the future as current younger cohorts graduate into retirement and younger individuals today will have driven for longer periods.

Barriers to Use of Personal Vehicles

The level of travel among the elderly is much less when compared to the general population. Work-related trips comprise the highest percentage of trips for younger individuals who are members of the labor force. However, for older persons who have retired, these trips are no longer a significant part of their trip behavior. Thus, elderly travel is reduced significantly, when compared to that of younger persons. In addition, poorer eyesight and slower reaction times associated with aging may, first, cause the elderly to reduce their driving and travel. Eventually the lack of alternative means to complete travel may force such individuals to terminate their traveling. Moreover, reduced sensory abilities and poor health are not the only reasons that will confine seniors to their homes. When our participants were asked to identify reasons for not traveling, a number of other factors were mentioned in addition to reduced visual abilities and health levels.

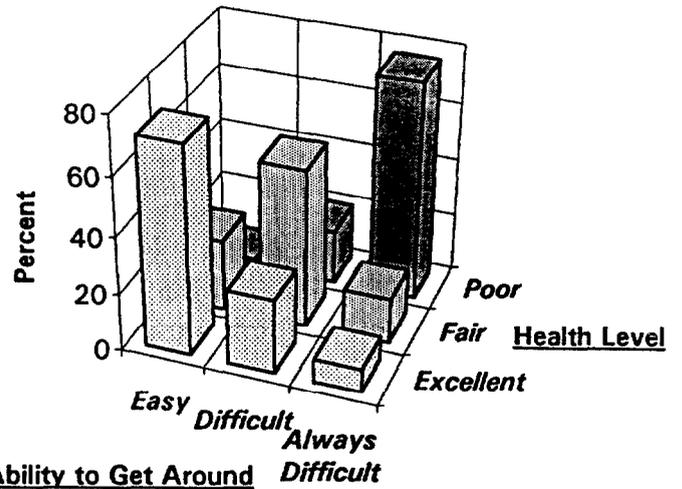
Table 6.2 presents these responses and indicates that health was mentioned as a prohibitive factor in leaving home only 5.5 percent of the time. Health related problems were ranked as the first prohibitive factor only by 7.9 percent of the respondents. The most prohibitive factor is adverse weather conditions. The length of the trip (distance to destination) and time of the trip are a distant second and third, respectively. However, most of the factors listed in Table 6.2 are clearly tied to health in some way. Reduced visual and cognitive abilities may deter seniors from driving at darkness, when traffic is heavy, or the weather conditions are bad. On the other hand, long trips and/or rough roads can be physically taxing on the older individual.

TABLE 6.2. FACTORS AFFECTING DECISION TO TRAVEL

Factors	Ranked 1st		Overall	
	Number	Percent	Number	Percent
Weather (ice, snow, rain)	37	41.6	151	39.3
Distance	22	24.7	62	16.2
Time of day	15	16.9	54	14.1
Heavy traffic	2	2.2	40	10.4
Road type and quality	1	1.1	30	7.8
Health	7	7.9	21	5.5
Other	5	5.6	26	6.8
TOTAL	89	100.0	384	100.0

About 60 percent of the participants assessed their ability to go out as "easy." On the other hand, approximately 15 percent of them indicated that it is always difficult or sometimes impossible to fulfill their mobility needs. In addition to these findings, a strong relationship was found between mobility achievement and the self assessment of health. Individuals that classify their health as excellent or good indicate that there are no problems in their ability to complete trips and fulfill their mobility needs. Moreover, those who assessed their health as poor or very poor expressed difficulties in completing their trips and fulfilling their mobility needs (Figure 6.1). These findings are in agreement with the observations elsewhere regarding the reasons for not driving and are indicative of the correlation between satisfaction of mobility needs and health levels for elderly.

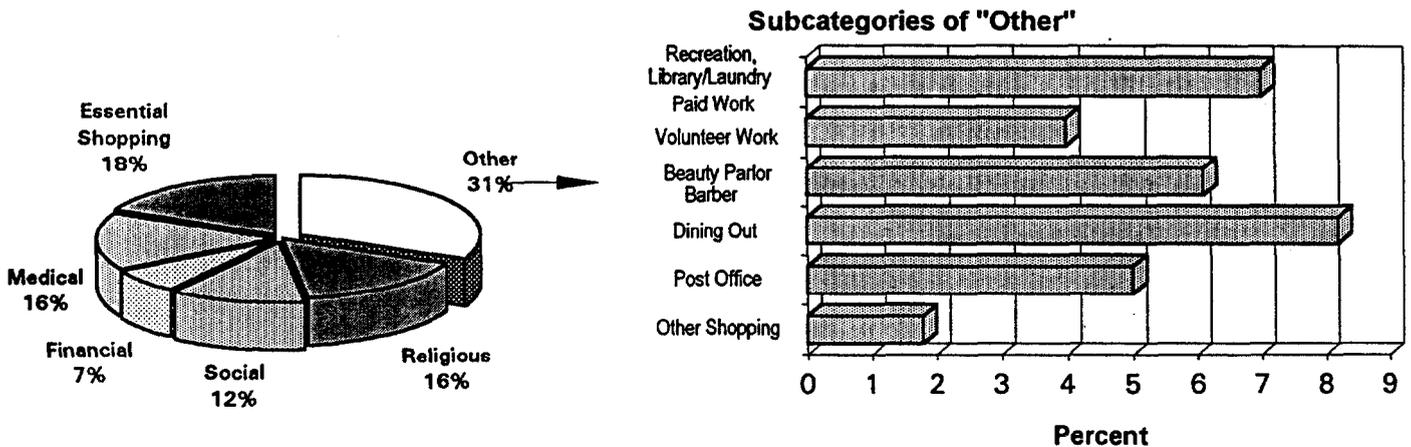
FIGURE 6.1. MOBILITY ABILITY AND HEALTH



Reasons and Modes for Travel

We have noted that work related travel by the elderly gradually declines, and often disappears after retirement. However, the elderly continue to travel away from their homes for a wide variety of reasons. Older persons, as persons in all other age groups, have to fulfill certain needs. The well-being of the elderly is clearly a function of the success in meeting these needs. The transportation research literature dealing with the elderly indicates that trips can be grouped in two major categories: "life-maintenance" and "higher-order" trips (Carp, 1988). The first category includes trips essential for life support and includes travel for food, clothing, medical care and medications, and financial considerations. On the other hand, "higher-order" trips include needs associated with social interaction, recreation, and religion. The trip purposes collected from this study were grouped in a similar way, and their percent share among the respondents is shown in Figure 6.2. The data in this Figure represent all the reasons that elderly

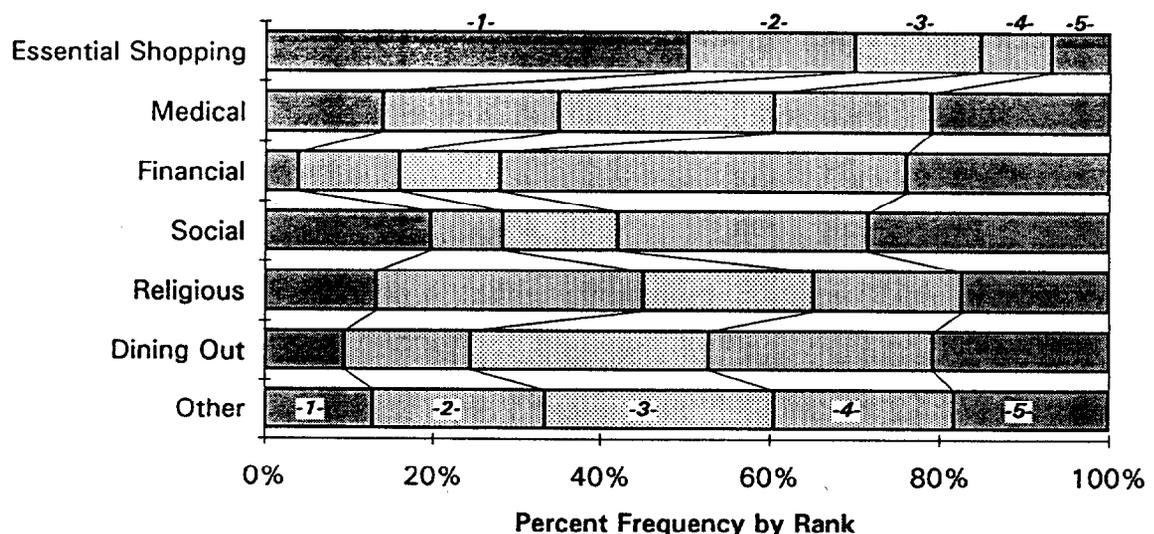
FIGURE 6.2. REPORTED FREQUENCY OF TRIP PURPOSES



leave their homes, regardless of ranking among the trips. Trips to satisfy the "life-maintenance", which include essential shopping, medical, and financial, encompass nearly 40 percent of all reasons for leaving home. Patterns shown in this figure indicate that, overall, fulfilling "higher-order" needs is much more significant than "life-maintenance" needs for our elderly respondents. It is apparent that "higher-order" needs are essential for promoting the well-being of older individuals and have as high priority as those needs for immediate survival. Fulfillment of religious needs is the highest "high-order" need accounting for 15.9 percent of the trips, while social interactions (visiting friends and family and participating in clubs) were next in importance. If "dining out" is considered primarily a social function rather than one necessary for immediate physical survival, then social reasons account for one-fifth of all reasons for leaving home. These data indicate that, for the elderly to maintain an acceptable quality life, needs other than those required for sustaining life are essential. Fulfillment of these needs is crucial for the well-being of the elderly. It is important to note also that for those individuals who have retired there is no opportunity to fulfill their social needs in the work place.

When our respondents were asked to *rank* their trip purposes in importance, a different distribution among the various travel purposes emerges. Here, trips with a "life-maintenance" purpose are most important among the elderly (Figure 6.3). Our respondents assigned the highest rank to these trips 62.3 percent of the time. Among the "life-maintenance" trips, essential shopping was ranked highest 51.3 percent of the time. The degree of significance changes for the other rankings. "Life-maintenance" trips encompass slightly more than one-third of trips with medical purposes accounting for most of these. Among those trips ranked as second, those for fulfilling religious needs was the highest single trip purpose accounting for 31.1 percent of the trips. In the subsequent rankings, social trips increase in significance indicating the need of older persons for social interaction and acceptance.

FIGURE 6.3. TRENDS FOR RANKING TRIP PURPOSE



Fulfillment of both "life-maintenance" and "higher-order" needs greatly depends upon the available means to travel to centers that satisfy them. Transportation becomes a vital element in ensuring congruence between the community resources and the needs of elderly for preserving life and maintaining social interaction and acceptance. A large variation exists among elderly regarding the mode chosen to fulfill these needs (Table 6.3). Being the driver is the most frequent mode of transportation used by elderly and it accounts for 48.2 percent of their trips. Being driven by a relative not living at home (13 percent), a household member (11.4 percent) or a non-relative (10.6 percent) account for the next highest percentages of mode selected. Walking (10.7 percent) and using a public transportation mode (6.1 percent) account for smaller portions of trips completed.

TABLE 6.3. TRANSPORTATION MODE CHOSEN BY TRIP PURPOSE

Trip Purpose	Mode						
	Walk (%)	Drive (%)	Household member Drives (%)	Non-Relative Drives (%)	Relative Drives (%)	Public Transport (%)	Total (%)
Essential Shopping	8.4	50.8	9.2	9.5	16.0	6.1	100
Medical	6.1	38.9	13.0	10.9	19.8	11.3	100
Financial	11.0	51.0	10.0	4.0	15.0	9.0	100
Life-maintenance	7.9	46.0	10.8	9.2	17.4	8.7	100
Social	17.8	48.5	8.4	8.9	12.9	3.5	100
Religious	8.3	47.4	11.5	17.4	9.5	5.9	100
Dining out	4.1	45.9	18.5	17.1	12.3	2.1	100
Other	15.7	53.0	11.1	6.6	8.8	4.8	100
High-order	12.5	49.6	11.8	11.4	10.3	4.4	100
TOTAL	10.7	48.2	11.4	10.6	13.0	6.1	100

Even though the predominant mode of transportation is the personal automobile and most of the elderly drive themselves, different levels of significance are noted for the other forms of transportation in connection with both trip purpose categories -- "life-maintenance" and "high-order." For "life-maintenance" trips, "personal driving" accounts for 46.0 percent of their trips. "Driven by others" accounts for 30.3 percent and public transportation for 8.7 percent of their trips. These percentages are different for "high-order" trips. In this category, "personal driving" accounts for 49.6 percent of their trips, public transport is reduced almost by one-half, and "driven by others" increases (33.6 percent). The increase in "personal driving" is indicative of the desire to maintain their independence for these type of trips and activities, since this increase is equivalent to the reduction of trips where they are driven by other relatives.

Differences are also noted among the modes used to complete trips for the various distinct trip purposes. For example, more than 85 percent of essential shopping is completed by personal automobile. More than 50 percent of the time elderly chose "personal driving" for fulfilling these trips and they accept rides from friends and relatives approximately one-third of the time. Even though the total proportion of medical trips completed by personal automobile is almost the same (83 percent) the relative distribution between "personal driving" and "driven by others" is

reversed. Only for 39 percent of these trips elderly chose "personal driving" and allow for 44 percent of the time to be driven by someone else. Similarly, while almost an equal number of elderly chose between "personal driving" and "driven by others" for dining out less than one-third of them accept rides from friends and relatives when they complete trips with social purposes.

The length of trips traveled by the elderly was another aspect of mobility that was examined in this study (Table 6.4). Elderly complete almost 69 percent of their trips within a 5 mile radius of their homes. The differences between the distances for completing "life-maintenance" and "high-order" trips are not significant with the exception of trips completed within 2 blocks from the residence, where twice as many "high-order" trips are completed. This may be indicative of the proximity of friends and relatives to the residence of the respondents. Another explanation for this may be the structure and lay-out of non-urban areas, where distances between destinations are relatively small. Approximately 41 percent of medical trips are completed at distances longer than 5 miles. This outcome was expected, since more medical facilities are available in Lexington, an urban center within a 30 mile radius. Moreover, the small portion of essential shopping (27 percent) completed beyond the 5 mile radius, is indicative of the presence of adequate shopping to satisfy the essential needs of food and clothing in Harrodsburg and Cynthiana. On the other hand, approximately 43 percent of dining out trips and 41 percent of social activities trips are completed at longer than 5 miles distances. The desire to travel longer distances to eat out and visit friends and relatives is indicative of the need for social interaction and the fact that older persons are willing to travel longer distances to achieve and maintain their social activities.

TABLE 6.4. TRIP DISTANCE BY TRIP PURPOSE (PERCENTAGES)

Trip Purpose	Distance						Total
	2 Blocks	< 1 mi	1-5 mi	5-10 mi	10-20 mi	20+ mi	
Essential Shopping	8.2	29.6	34.6	9.7	9.0	8.9	100
Medical	7.5	19.7	31.6	11.8	9.7	19.7	100
Financial	7.1	47.6	29.8	8.3	4.8	2.4	100
Life-maintenance	7.7	28.3	32.7	10.4	8.6	12.3	100
Social	16.5	17.4	25.0	8.9	5.8	26.4	100
Religious	16.4	32.9	29.1	11.3	6.6	3.7	100
Dining out	5.7	25.5	25.5	13.4	11.4	18.5	100
Other	13.8	31.3	30.4	9.8	6.4	8.3	100
High-order	13.7	27.3	27.9	10.5	7.2	13.4	100
TOTAL	11.4	27.7	29.7	10.5	7.7	13.0	100

Trip Chaining

Our study also focused upon the nature of travel behavior. A large portion of the respondents (77 percent) indicated that they practice some type of trip chaining, that is they combine trip purposes in a single journey. Approximately 39 percent of them complete multiple

purpose trips on a regular basis. The largest portion of the multiple purpose trips accommodate two destinations (44.2 percent), while 21 percent of these trips satisfy three purposes, 18 percent have four stops, and the remaining 17 percent accommodates four or more trip purposes. Most of these trip chains (70 percent) link essential shopping with social activities, medical activities, and other shopping. These choices may be considered as an attempt by older persons to facilitate at the same time both "life-maintenance" and "high-order" trip purposes when opportunities to travel and means of transportation may be limited. When our respondents were asked to identify reasons for trip chaining, most of them indicated that they do it because of time savings (22.5 percent), destination proximity (15.7 percent), fuel savings (13.8 percent), cost savings (7.8 percent), and reduced stress for travel (8.6 percent). Excluding financial reasons for trip chaining, most of the reasons mentioned by the elderly respondents are associated with their desire to travel less. These findings strengthen the observations made earlier and which are based on the data presented in Table 6.2.

To further examine the extent to which elderly engaged in trip chaining activities when they were younger, respondents were asked to compare the regularity of their trip chaining between their past and current travel patterns. Those who currently engage in trip chaining indicated that they complete at least the same number or more multiple purpose trips compared to their younger ages. Less than one-third (30 percent) of our respondents indicated that they perform fewer trips that combine several purposes currently than when they were younger. The increase in trip chaining frequency over the life course may reflect their physical changes, their increased limitations due to aging, and the lack of alternative modes of transportation.

Summary

The results from our survey questionnaire indicate that a significant portion of the non-urban elderly does not currently drive (40 percent) and a large portion of the participants does not hold a valid driver's license (31 percent). Most of our participants who do not have a valid driver's license (80 percent) have never acquired one nor they have ever driven. Moreover, among those individuals who have a valid license only a small portion (11 percent) does not drive. These data indicate that there is a strong relationship between the driving experience of the individual, the maintenance of the driver's license, and the continuation of driving. It is likely that elderly have a stronger feeling of maintaining their driving privileges and use their driver's license as an indicator of maintaining their independence, as it has been shown in other research. Surrendering this privilege may be significant to the well-being of these individuals. These data were supported from our respondents indicating that the majority of them continue to both drive and hold a license.

Even though poor health or degraded physical abilities are not enough to restrict seniors in their homes, most of the factors mentioned which affect their trip making decisions, such as inclement weather, heavy traffic, and darkness, are somehow health related. Most of the same reasons necessitate surrendering or limiting their driving privileges, which may be the single most valuable privilege for seniors. Existing studies suggest that losing one's drivers license or losing the ability to drive can be a major transition in life and can be considered similar to the

significance of obtaining a license for the first time. Earning and surrendering a license may be considered equally important for an individual, since the earning of the license signifies acceptance in the adult society while the surrendering of the license is considered as an indicator of the passage to the sunset of life.

Research findings elsewhere show that the automobile is the universally preferred mode of transportation (TRB SR 212). This study indicates that this holds also for the non-urban elderly in our study. Non-urban elderly complete almost 85 percent of their trips with an automobile - either as drivers or as passengers. This underscores the importance of the automobile in today's society and also points out the dependency upon this means of transportation. "Personally driving" accounts for the largest portion of trips completed by these individuals and may reflect their desire to maintain independence and mobility freedom.

Trips are completed to fulfill certain needs that can be divided into "life-maintenance" (required to sustain life) and "higher-order" (required to maintain quality of life) trips. This study finds that the non-urban elderly place a high significance on trips that are vital for maintaining a high quality of life, since these trips account for more than 60 percent of all their trips. It is apparent that satisfying the mobility needs of the non-urban elderly in connection with "higher-order" trips is a very important consideration for policy makers. Among not only the "higher-order" trips, but among *all* trips is social interaction an important element; it explicitly accounts for more than one-fifth of all trips, and is often indirectly associated with "life-maintenance" trips through trip chaining. Social activities and fulfillment of these activities certainly play a significant role in the well-being of our respondents.

While the personal automobile is chosen as the preferred mode of transportation, the choice between being the driver or the passenger in an automobile depends upon the specific trip purposes. In general, the elderly accept less frequently rides from friends and relatives and prefer to be the driver most of the time. For certain trip purposes, such as "dining-out", these trends are more profound and signify the importance of mobility freedom. Maintaining the freedom to move about for fulfilling trips associated both with quality and maintenance of life is of great significance not only to the non-urban but, probably, to all elderly.

Existing literature indicates that older persons make shorter trips than younger persons. The findings of this survey are in agreement with such research. Slightly more than two-thirds of the trips non-urban elderly make are completed within a 5 mile distance from their homes. The results also indicate that trips associated with life support activities are in general the same length as trips dealing with quality of life. However, our analysis of trips with a social purpose show that the elderly are willing to travel longer distances to eat out and visit friends and relatives. This behavior signifies their need for social interaction and desire to maintain their social activities regardless of the hardship of travel.

A large share of the non-urban elderly combine multiple purpose trips on a regular basis, indicating a desire by these individuals to make fewer trips to fulfill their mobility needs. Those who view mobility achievement with no problems are more likely to engage in trip chaining in a regular fashion. Moreover, our respondents indicated that they engage more frequently now in

trip chaining compared to their younger ages. The increase in their frequency of trip chaining over their life course may reflect their physical limitations due to aging and, possibly, lack of alternative modes of transportation.

CHAPTER 7. DEMOGRAPHIC DISTINCTIONS AND INFLUENCES UPON TRAVEL BEHAVIOR

Drivership

Data analyzed in the previous section demonstrated an interaction effect present among the variables: years of driving experience, licensing, and continuation of driving. We also examined the access of the non-urban elderly to personal automobile, and the reasons for travel and modes used to complete trips. Past research has indicated clear differences among various age cohorts and the genders of elderly regarding their mobility needs and travel behavior.

The next step in our study, therefore, involves examinations of the associations between demographic characteristics and the travel behavior of our respondents. Existent research indicates that the personal automobile is the preferred mode of transportation for the elderly. Data from our study, presented in the previous chapter, validates this finding and also shows that a large portion of our elderly respondents (61 percent) currently drive. To determine the differences among the various age cohorts of elderly, these data are further analyzed with respect to the age of our respondents. The analysis of the relationship across age groups and continuation of driving (Table 7.1.a) shows that slightly more than one-half of those who drive are young-old (below 75 years), 42.6 percent are old-old (75 to 84 years), and 6.4 percent are oldest-old (85 years and over). This age distribution is completely different for those participants who do not drive; there are twice as many oldest-old and one-half as many young-old who do not currently drive compared to those who drive. The analysis of the same data but *within* the age groups shows that an equal portion of young-old and old-old does not currently drive (Table 7.1.b). On the other hand, the portion of oldest-old who does not drive is twice as large as the portion of those who currently drive.

TABLE 7.1. DRIVERSHIP AND AGE (PERCENTAGES)

a. Across age groups

Age	Currently Drive	
	No	Yes
Below 75	39.3	51.0
75-84	41.0	42.6
85+	19.7	6.4
Total	100.0	100.0

b. Within age groups

Age	Currently Drive		
	No	Yes	Total
Below 75	33.3	66.7	100.0
75-84	38.5	62.5	100.0
85+	66.7	33.3	100.0

In addition to the age groups of the elderly, another area of interest is the gender distinctions and influences upon the travel behavior of elderly. Significant differences are noted across genders regarding the continuation or termination of driving (Table 7.2.a). Almost all of our participants who do not currently drive are females. The examination of drivership within genders shows that one-fifth of the male respondents do not currently drive, while a significantly

larger percentage of females (44 percent) has given up driving (Table 7.2.b). The gender differences noted from the within-gender analysis are indicative of the dependence of females on their family members and friends to provide them with rides to fulfill their mobility needs.

TABLE 7.2. DRIVERSHIP AND GENDER (PERCENTAGES)

a. Across gender groups

Gender	Currently Drive	
	No	Yes
Male	9.8	26.6
Female	90.2	73.4
Total	100.0	100.0

b. Within gender groups

Gender	Currently Drive		
	No	Yes	Total
Male	19.4	80.6	100.0
Female	44.4	55.6	100.0

Some additional demographic characteristics that we initially felt could distinguish those who currently drive and those who do not are the location of residence and income of our participants. The location of residence provides little valuable information; it essentially illustrates that the same percentages of periurban and rural residents currently drive. With respect to income, most of our participants who have given up driving (70 percent) could be classified as poor, having annual incomes of less than \$5,000. On the other hand, more than four-fifths of those who could be characterized as more affluent, with annual incomes of more than \$15,000, still continue to drive. Those individuals having incomes in the \$5,000-\$15,000 category showed almost equal portions between those who currently drive and those who have stopped driving. These data indicate that continuation of driving may not be influenced solely by age but by the economic status of the elderly individual. Apparently, there are higher needs to be fulfilled than maintaining an automobile when one is a poor older individual, while this does not seem to be a problem for wealthier individuals. It is recognized at the national level that incomes are lower among the elderly at advanced age. Indeed, census statistics indicate a marked increase in poverty beginning at age 75. Consequently, the resources necessary to purchase and maintain an automobile are limited. Our survey results, however, as shown in Chapter 5, did not mirror this national trend. Yet, there do appear to be interactions between self-assessed level of health, income, and drivership. Our data indicate that income and self-assessed level of health are related; as the income of participants increases, the quality of health also improves. Therefore, it could be hypothesized that more affluent individuals are more likely to have better health care and thus be able to continue driving unhindered by health related problems that would limit or curb their driving. These individuals, then, are more likely to have and maintain a personal automobile and continue to drive.

Licensure

We also wished to examine the distinctions of the same demographic characteristics upon the licensure of our participants. The first characteristic that we examined was the age of the participants. The across-age groups analysis indicated that almost an equal percentage of young-old and old-old do not have a license, and slightly more than one-fifth of those who do not have a

license are oldest-old (Table 7.3.a). Among those who have a driver's license, only a small percentage (7.5 percent) represents the oldest-old. The analysis of the same data *within* each age group provided additional information regarding the current license status of the individuals (Table 7.3.b). As the age of our participants increased, a larger portion of them did not have a valid driver's license; more than one-half of the oldest-old did not maintain a valid driver's license (55.6 percent), while only one-fourth of the young-old did not have a driver's license. These findings are similar to those observed in the analysis of driving continuation, and probably are indicative of the health limitations of the elderly.

TABLE 7.3. LICENSURE AND AGE (PERCENTAGES)

a. Across age groups

Age	Have License?	
	No	Yes
Below 75	37.5	50.4
75-84	41.7	42.1
85+	20.8	7.5
Total	100.0	100.0

b. Within age groups

Age	Have License?		
	No	Yes	Total
Below 75	25.0	75.0	100.0
75-84	30.8	69.2	100.0
85+	55.6	44.4	100.0

The effect of gender on the maintenance and holding of a license was also analyzed. The across the gender analysis indicated that virtually all of our participants that are not licensed are females (Table 7.4.a). A within-gender analysis showed that all but two men are licensed, while more than one-third of females (37 percent) do not currently hold a driver's license (Table 7.4.b). These data indicate that when males advance in age they do not readily surrender their driving privileges, which is in contrast to the behavior of elderly females where a larger portion do not have a driver's license. The gender differences noted here are largely a consequence of today's older females being more likely to have never acquired a driver's license. The provision of all mobility needs by the husband and the lack of the need to drive may have caused elderly females to have never obtained a license and thus, not to hold one presently. However, it is certain that this trend will disappear in the future, since more females within labor force age groups today obtain a driver's license at the same age as their male cohorts.

TABLE 7.4. LICENSURE AND GENDER (PERCENTAGES)

a. Across gender groups

Gender	Have License?	
	No	Yes
Male	9.8	26.6
Female	90.2	73.4
Total	100.0	100.0

b. Within gender groups

Gender	Have License?		
	No	Yes	Total
Male	19.4	80.6	100.0
Female	44.4	55.6	100.0

The income of participants and the location of their residence were also of interest in examining impacts on the licensure of the non-urban elderly. The location of the residence did not indicate any differences in the licensure levels between the periurban and rural residents. Trends, similar to the ones noted in the previous section, were observed for the relationship between the income of the participants and their having driver's licenses. Almost all of our participants (94 percent) who did not have a valid driver's license had an annual income of less than \$15,000. A large portion (62 percent) of the non-urban elderly with an income of less than \$5,000 did not have a driver's license. However, as the income of the participants increased a larger portion of those maintained a driver's license. Among the middle class of elderly (with incomes between \$15,000 and \$25,000) all but one respondent had a license. Moreover, approximately an equal share between those earning less than \$15,000 and more than \$15,000 annual income were licensed. Thus, our data show that maintaining a driver's license is more a characteristic of individuals above the poverty level (annual income less than \$5,000). A small number of poor non-urban elderly have a license and an even smaller number of those individuals currently drive. Thus the bulk of poorer elderly are the most dependent upon friends and relatives to fulfill their mobility needs. These same individuals are also likely to need public transport.

Another factor that was of interest to our research team is the access to personal automobiles and especially the relationships among the variables: automobile access, income, drivership, and licensure of non-urban elderly. All participants who do not currently drive indicated that they did not have access to an automobile. Similarly, almost all (92 percent) of our participants who do not have a valid driver's license indicated that they do not have access to a car. Average annual income for four-fifths of the individuals who did not have access to an automobile was less than \$15,000. Thus, our data suggest that the accessibility of an automobile is a limiting factor in the decision of an elderly individual to maintain a driver's license and continue his/her driving habits. Our survey does not, however, allow us to fully examine the causal relationship between licensure and car ownership. The broader literature indicates that it is more likely for an older individual to maintain their license for various psychological reasons, including the promotion of well being and the maintenance of independence, although they do not have access to a car. Moreover, having a restricted income is a common condition among those individuals who do not drive, do not have a license, and, most of all, do not have access to an automobile.

Our data indicate distinct relationships between continuation of driving, maintenance of license, automobile accessibility, and income. These relationships may consequently have strong impacts on the reasons and patterns of travel among the non-urban elderly, including those who do not currently drive. Limited access to an automobile, either their own or one belonging to a family member, and no driver's license are significant reasons that prohibit individuals from driving. Moreover, reduced income contributes to the reduced use of automobiles and increases the dependence of elderly on other individuals and forms of transport to fulfill their mobility needs. These two factors combined with health limitations are the most important reasons for the elderly to give up driving.

Driving Experience

The data in the previous chapter determined the presence of a relationship between licensed participants and years of driving experience, and attributed it to gender differences. Therefore, our study also sought to examine the ways in which driving experience is related to gender and age. The data show that almost one-third of elderly female respondents never drove (Table 7.5). Approximately 47 percent of the female respondents had more than 40 years of driving experience, while almost all men (87 percent) had 40 or more years of driving experience. These gender differences reflect a time period in which females were not encouraged to drive or did not have the opportunity to learn to drive. An analysis of the gender, licensure, and years of driving experience indicate that almost all individuals (except one) who do not currently have a driver's license and have never driven are female. Thus, our data suggest that current generations of elderly females depend on relatives and friends to fulfill their mobility needs. However, these trends may disappear in the future as current younger cohorts (e.g., the Baby Boom and younger) move into retirement, since younger females today reflect driving experience which is nearly identical to males in the same cohorts.

TABLE 7.5. DRIVING EXPERIENCE AND GENDER (PERCENTAGES)

Gender	Years Driving					Total
	0	1-20	21-30	31-40	40+	
Male	6.5	0.0	0.0	6.5	87.0	100.0
Female	32.3	5.7	4.8	9.6	47.6	100.0

To examine the effect of age on the years of driving experience a similar analysis was undertaken. A large portion (45 percent) of the young-old never drove. The young-old with no driving experience comprise more than one-fourth (26.4 percent) of the participants in this age group (Table 7.6). A similar pattern was also noted for the old-old, where slightly less than one-fourth of the participants had never driven. Moreover, 45 percent of the oldest-old, all of whom were female, indicated that they did not have any driving experience. Even though a large number of the respondents with no driving experience are young-old, their dependency on a spouse to fulfill their mobility needs and the lack of "personal driving" were obvious. Thus, our data indicate that the relationships between the years of driving experience and licensure are attributed mainly to gender differences. These differences, while more profound for the oldest-old, were also found for the younger elderly. However, these trends will certainly be eliminated in the future as drivership levels of both males and females converge.

TABLE 7.6. DRIVING EXPERIENCE AND AGE (PERCENTAGES)

Age	Years Driving					Total
	0	1-20	21-30	31-40	40+	
Below 75	26.4	2.8	4.2	11.1	55.5	100.0
75-84	23.1	4.6	3.1	9.2	60.0	100.0
85+	44.4	11.1	5.6	0.0	38.9	100.0

Reasons for Travel

An important aspect of our research focused upon the analysis of reasons for travel. The trip behavior of the elderly was examined using two major categories ("life-maintenance" and "higher-order") as in the previous chapter in order to explore the effect of gender, age, and location of residence.

The analysis of the reason for travel focused first on gender differences. The data show that trips to satisfy "life-maintenance" purposes account for 43.5 percent of all reasons for leaving home for females and 38.7 percent for males (Table 7.7). The analysis of distinct trip purposes within genders show that for all purposes males and females had the same trip behavior. The largest difference between male and female elderly travel was noted for essential shopping trips. Here, females had a larger share compared to males. It is apparent that, overall, both genders complete a large portion of social trips. Indeed, social trips combined with dining out trips account for more than one-fifth of all the trips each gender takes. These data also indicate that "higher-order" trips occupy the largest share of trips completed by both genders. Thus, our data show that there essentially are no differences between the two genders of elderly regarding their trip behavior.

When our respondents were asked to *rank* their trip purposes in importance, a new order of significance was observed that differs from the one observed for all trips. Regardless of gender, trips classified as "life-maintenance" in nature were ranked as the most important ones. However, the relative importance of these trips between genders is different; males gave their highest ranking for these trips 55 percent of the time, while females ranked them as their most important trips almost two-thirds of the time. While the single most important trip purpose for both genders is essential shopping, there is a significant difference between males and females with respect to priorities. More than one-half of females (54.1 percent) indicated this as their most important reason for going out, while a smaller share of males rated this reason as their highest priority (44.8 percent). For males, social reasons for travel were much more important than they were for females. If dining out is regarded as a social activity, more than one-fourth of

TABLE 7.7. REASONS FOR TRAVEL BY GENDER (PERCENTAGES)

Trip Purpose	Overall		Ranked 1st	
	Male	Female	Male	Female
Essential Shopping	19.0	23.4	44.8	54.1
Medical	14.1	17.1	10.4	10.7
Financial	5.6	3.1	0.0	0.8
Life-maintenance	38.7	43.5	55.2	65.6
Social	13.4	11.1	17.3	9.0
Religious	19.7	20.8	10.4	13.1
Dining out	8.5	7.4	10.3	1.6
Other	19.7	17.2	6.9	10.7
Higher-order	61.3	56.5	44.8	34.4
TOTAL	100.0	100.0	100.0	100.0

the males (27.5 percent) indicated this purpose as their highest priority trip. In contrast, only slightly over 10 percent of the females indicated that this was their highest priority reason for making a trip.

These data indicate clear gender distinctions regarding the relative priority and significance of the reasons for travel. Completion of essential shopping is the single most important reason for travel for both genders, although less important for males than females. On the other hand, males indicated that social travel is twice as important when compared to the responses of the females. These trends indicate that each gender has different viewpoints regarding the significance of trips and may well be indicative of general gender differences. Current generations of elderly males were most likely the only family member that worked outside the home, while females were occupied mostly with household activities. When elderly males retire and the social interactions at work are eliminated, the need for satisfaction of these interactions may be enhanced. On the other hand, the limited exposure of males to household activities is most likely the reason for the lower importance of these trip purposes for males.

Another demographic characteristic that we felt may influence the trip behavior of elderly is the location of their residence. The data show that periurban elderly residents complete nearly 60 percent of their trips for "higher-order" purposes. Such trips, however, account for only one-half of the rural residents' trips (Table 7.8). Travel for medical reasons is an essential trip making choice for the rural residents and constitutes more than one-fifth of all trips they take (22.1 percent). When our respondents ranked their travel purposes, a distribution similar to the one observed for overall travel behavior was noted. Both periurban and rural residents ranked "life-maintenance" trips as highest almost 63 percent of the time. However, individual trip purposes within this category had a different significance depending upon the residential location. Periurban residents ranked essential shopping as their highest priority more than one-half of the time (54.9 percent). Rural residents indicated that this trip purpose was significant (47 percent),

**TABLE 7.8. REASONS FOR TRAVEL BY RESIDENTIAL LOCATION
(PERCENTAGES)**

Trip Purpose	Overall		Ranked 1st	
	Rural	Periurban	Rural	Periurban
Essential Shopping	20.7	23.3	47.0	54.9
Medical	22.1	13.8	14.3	8.8
Financial	4.5	3.2	2.0	0.0
Life-maintenance	47.3	40.3	63.3	63.7
Social	11.7	11.5	6.1	12.8
Religious	17.1	22.2	16.3	10.8
Dining out	8.1	7.3	0.0	4.9
Other	15.8	18.7	14.3	7.8
Higher-order	52.7	59.7	36.7	36.3
TOTAL	100.0	100.0	100.0	100.0

but not as significant as perceived by the periurban residents. For the rural residents, fulfillment of medical trips was more essential (14.3 percent) compared to the ranking of the periurban residents (8.8 percent). Even though the total share of "higher-order" trip purposes is the same between periurban and rural residents, there are differences in the relative importance of individual trip purposes between the two residential locations. Social activities were rated as the highest trip purpose 17.6 percent of the time by periurban residents and only 6.1 percent of the time by rural residents. These differences in the rankings of trip purposes may be due to the different lifestyles of residents in periurban and rural areas. It is reasonable to assume that essential shopping is a more organized activity for rural residents, since grocery stores may be far from home. Therefore, these trips tend to be satisfied less frequently. Moreover, the satisfaction of medical trips on a demand basis is more crucial for rural residents, again due to their distance from medical facilities. On the other hand, more choices for social interaction exist in more densely settled areas, and periurban residents are, therefore, exposed more often to such activities. These reasons may well explain the rationale of periurban residents for assigning high importance to the fulfillment of these mobility needs.

The impact of age distinctions upon the travel behavior of elderly was examined to determine the presence or absence of a relationship between these variables. As individuals age, trips with a "life-maintenance" purpose become more important. One reason for this increase is the corresponding rise of medical trips (Table 7.9). Continuous and on demand satisfaction of medical needs increases in importance, and the availability of transport means to fulfill these travel needs becomes more important. These reasons account for 29 percent of the trips that oldest-old take, a percentage that is almost twice as large as the one for the same trips taken by the young-old (15.7 percent). On the other hand, trips for social activities remain approximately the same as the individual ages.

TABLE 7.9. REASONS FOR TRAVEL BY AGE GROUPS (PERCENTAGES)

Trip Purpose	Overall			Ranked 1st		
	Below 75	75 - 84	85+	Below 75	75 - 84	85+
Essential Shopping	23.2	21.9	21.7	47.8	56.3	55.5
Medical	15.7	14.4	29.0	11.6	7.8	16.7
Financial	3.7	3.9	1.5	0.0	0.0	5.6
Life-maintenance	42.6	40.2	52.2	59.4	64.1	77.8
Social	10.8	13.7	5.8	10.1	12.5	5.6
Religious	21.0	21.9	13.0	14.5	10.9	11.1
Dining out	8.3	5.9	11.6	5.8	1.6	0.0
Other	17.3	18.3	17.4	10.2	10.9	5.6
Higher-order	57.4	59.8	47.8	40.6	35.9	22.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Examining the rating in importance of these trips, a pattern similar to the one representing the overall reasons for travel was again observed. The share of "life-maintenance" trips as the highest priority increases with the age of the individual; this is mostly attributed again to an increase in the share of trips with medical purposes. Another significant decrease in the highest ranking was that of dining out trips; while these occupy almost 6 percent of the high rankings of young-old, it is reduced to 1.6 percent for the old-old and it was never ranked as the highest by the oldest-old. In contrast, the oldest-old indicate that almost four-fifths of their highest ranking trips are to maintain and support life, and the small percent of their quality of life trips is viewed as not significant. These differences may be considered reflective of the natural aging process and the reduced desire of the individual to travel for reasons other than those essential for sustaining life.

Modes of Travel

Fulfillment of these trips greatly depends upon the available means of travel. In this respect, significant differences were noted between elderly males and females regarding the mode chosen to complete their trips (Table 7.10). For both genders, driving themselves was the mode of preference, but females drove only for 45 percent of their trips while males drove 61 percent of the time. Elderly females depend almost as much on a friend, husband, or relative to drive them to their various destinations (37 percent) as driving themselves. In contrast, older males depend only 26 percent of the time on someone else to drive them. Females also use public transportation to some degree (6.8 percent), while their male counterparts use it approximately one-half as frequently (3.2). Differences are also noted for the mode chosen between the "life-maintenance" and "higher-order" trips. Elderly males depend less on wives and friends to complete their "higher-order" needs, while females drive less themselves and use significantly more rides from their relatives and friends for the same needs. Differences are also noted among the mode used to complete trips for the various distinct trip purposes. To fulfill their social needs, elderly females

**TABLE 7.10. MODE OF TRAVEL BY TRIP PURPOSE AND GENDER
(PERCENTAGES)**

Trip Purpose	Mode						Total
	Walk	Drive	Household member Drives	Non-Relative Drives	Relative Drives	Public Transport	
MALES							
Essential Shopping	8.2	61.2	10.2	8.2	8.2	4.0	100
Medical	2.2	64.5	8.9	4.4	8.9	11.1	100
Financial	3.7	59.3	18.5	7.4	7.4	3.7	100
Life-maintenance	5.0	62.0	11.6	6.6	8.2	6.6	100
Social	13.2	68.4	5.3	7.9	2.6	2.6	100
Religious	9.8	60.8	15.7	7.8	3.9	2.0	100
Dining out	6.4	48.4	19.4	19.4	6.4	0.0	100
Other	16.7	62.5	11.1	5.7	4.2	0.0	100
Higher-order	12.5	60.9	12.5	8.9	4.2	1.0	100
TOTAL	9.6	61.3	12.1	8.0	5.8	3.2	100
FEMALES							
Essential Shopping	8.4	48.4	8.9	9.9	17.8	6.6	100
Medical	6.9	33.2	13.8	12.4	22.3	11.4	100
Financial	13.7	47.9	6.9	2.7	17.8	11.0	100
Life-maintenance	8.6	42.0	10.7	9.8	19.7	9.2	100
Social	18.9	43.9	9.2	9.2	15.2	3.6	100
Religious	7.9	44.1	10.4	19.8	10.9	6.9	100
Dining out	3.5	45.2	18.3	16.5	13.9	2.6	100
Other	15.4	50.8	11.2	6.9	9.8	5.9	100
Higher-order	12.5	46.8	11.6	12.1	11.8	5.2	100
TOTAL	11.0	45.0	11.2	11.2	14.8	6.8	100

walk more than males and depend twice as much on relatives and friends to provide them with rides than do elderly males, who either drive their own vehicles (68.4 percent) or walk (13.2 percent). On the other hand, both elderly males and females depend as much on a friend, spouse, or relative to drive them to their various destinations when they dine out (45 percent) as they do driving themselves. While females drive themselves only one-third of the time for medical trips and rely almost one-half of the time (48.5 percent) on friends and relatives to drive them, elderly males showed a different distribution. They drive twice as much as females (64.4 percent) and rely less on others for rides (22.2 percent).

As individuals age, they tend to drive themselves less to fulfill their mobility needs, and their dependency on friends and relatives to provide them with rides increases (Table 7.11). Young- and old-old showed that they drive approximately for the same percentage of trips, while a significant decrease was noted for the oldest-old for choosing "personal driving" as the means

TABLE 7.11. MODE OF TRAVEL BY TRIP PURPOSE AND AGE (PERCENTAGES)

Trip Purpose	Mode						
	Walk	Drive	Household member Drives	Non-Relative Drives	Relative Drives	Public Transport	Total
<i>Below 75</i>							
Life-maintenance	8.1	48.0	10.3	9.5	11.3	12.8	100
Higher-order	13.0	51.3	16.1	7.5	7.0	5.1	100
TOTAL	11.1	50.1	13.9	8.2	8.7	8.0	100
<i>75 - 84</i>							
Life-maintenance	8.4	45.6	11.9	8.7	20.2	5.2	100
Higher-order	11.5	49.2	8.0	15.9	12.3	3.1	100
TOTAL	10.3	47.8	9.5	13.1	15.4	3.9	100
<i>85+</i>							
Life-maintenance	4.1	36.7	8.2	10.2	34.7	6.1	100
Higher-order	15.5	40.9	8.5	8.4	18.3	8.4	100
TOTAL	10.8	39.2	8.3	9.2	25.0	7.5	100

for travel. At the same time, a gradual increase in the percentage of trips in which the elderly will accept rides by friends and family members was noted as the individuals age. While only less than one-third of the trips of young-old were completed using rides with friends and relatives, the percent of these trips increased to 42.5 percent for the oldest-old, representing almost a 150 percent increase. Similar trends were also noted for the "life-maintenance" and "higher-order" trips as the age of the individuals increased. These data indicate once more the dominant role of the personal automobile for travel and the way that this mode influences the travel behavior of individuals. The percent of trips completed by personal automobile remains the same across the age groups and no shift is observed to other means of transportation. Our data also show that dependence on friends and relatives for completing travel increases as individuals age. However, those individuals who no longer drive themselves depend upon relatives to drive them to their destinations; they do not utilize any available public or other means of transport.

Length of Travel

The distance associated with trip purposes taken by elderly was also of concern in our study. The analysis of the length of the trip by the gender of our participants showed only small variations between male and female elderly (Table 7.12). Both genders showed similar preferences for the distance within which their trip purposes and needs are satisfied. Both males and females complete almost two-thirds of their trips within a 5 mile radius from their homes. Elderly males and females showed the same preferences for the length traveled to complete their "life-maintenance" trips. Elderly males however, indicated that they are willing to travel further than females to satisfy travel for "higher-order" purposes. This difference is mainly attributed to their larger percentage of trips taken at further destinations when they dine out. This difference is

also likely due to the fact that husbands have more driving experience, drive most of the time for such trips, and are thus more comfortable driving longer distances. In general, no significant gender differences were noted for the length of the trip completed even when the distances were examined in their original six categories.

**TABLE 7.12. LENGTH OF TRAVEL BY TRIP PURPOSE AND GENDER
(PERCENTAGES)**

Trip Purpose	Male		Female	
	< 5 miles	5+ miles	< 5 miles	5+ miles
Essential Shopping	70.0	30.0	73.0	27.0
Medical	63.6	33.4	57.6	42.4
Financial	82.6	17.4	85.3	14.7
Life-maintenance	70.1	29.9	68.4	31.6
Social	58.3	41.7	59.1	40.9
Religious	76.1	23.9	79.0	21.0
Dining out	40.0	60.0	60.6	39.4
Other	67.6	32.4	77.7	22.3
Higher-order	63.1	36.9	70.5	29.5
TOTAL	65.7	34.3	69.7	30.3

However, significant differences are noted when the age of the respondent was correlated to the length of the trip (Table 7.13). The young-old complete 34 percent of their trips at distances longer than 5 miles, while these percentages are reduced as the age of our participants increases. The old-old complete 29 percent of their trips at distances longer than 5 miles, while this percentage is reduced to 23 for the oldest-old. Although the percentage of "life-maintenance" trips completed locally (less than 5 miles) remains approximately the same across age cohorts (with the exception of the oldest-old), the percentage of "higher-order" trips completed locally is increased as the person ages. For young-old, almost one-third of "higher-order" trips is completed out of town, while for the oldest-old only one-fifth of these trips are made out of town. This difference was attributed mainly to travel for social purposes, and their willingness to travel further to visit with friends and dine out in a social atmosphere. These results are indicative of the loss of mobility of older elderly, and they signify the desire of younger seniors to fully participate in social activities even if they have to travel long distances and out of town.

Summary

Our survey data indicate that almost one-half of the non-urban elderly females have stopped driving and a significant portion of these females (one-third) have never driven. The gender differences noted here are largely a consequence of low drivership among today's older females when they were younger. The documentation of these differences between genders

TABLE 7.13. LENGTH OF TRAVEL BY TRIP PURPOSE AND AGE (PERCENTAGES)

Trip Purpose	Below 75		75 - 84		85+	
	< 5 miles	5+ miles	< 5 miles	5+ miles	5 miles <	5+ miles
Essential Shopping	69.5	30.5	72.6	27.4	93.8	6.2
Medical	58.6	41.4	59.1	40.9	58.3	41.6
Financial	88.6	11.4	82.2	17.8	75.0	25.0
Life-maintenance	67.9	32.1	68.8	31.2	75.7	24.3
Social	58.1	41.9	57.5	42.5	76.9	23.1
Religious	71.8	28.2	83.2	16.8	100.0	0.0
Dining out	50.0	50.0	60.9	39.1	73.3	26.7
Other	71.3	28.7	80.2	19.8	76.9	23.1
Higher-order	64.7	35.3	72.0	28.0	79.4	20.6
TOTAL	65.9	34.1	70.8	29.2	76.6	23.4

coincides with and supports findings from previous studies which indicate that elderly females have a reduced driving experience and are more likely to depend on others to fulfill their mobility needs. Generally, other research shows that drivership is significantly higher among elderly males than among elderly females. This finding was also obtained in our study.

Access to a personal car is an important factor that limits the continuation of driving and maintenance of a driver's license. Individuals with limited income (less than \$15,000) indicated difficulty in maintaining a personal automobile on such an income. These individuals generally do not currently have a driver's license and have stopped driving. The location of the residence of these individuals did not affect their decision whether or not to continue driving or to maintain a driver's license.

When focusing on the non-drivers, females are more likely to travel outside of their home than males, and they also are more likely than males to use other means of transportation, particularly rides provided by friends and family members. Our study shows that even when males become frail and have to limit their driving privileges, they tend to retain their driver's license more than females do. It is possible that current generations of elderly males have a stronger feeling about maintaining their driving privileges, and they use these privileges as an indicator of their independence. For elderly females, surrendering this privilege may not be so significant due to their limited exposure to driving and their dependence on husbands for providing transportation. On the other hand, the use of other modes of transportation may have been more actively pursued by females in the past, and this may explain their currently higher use of other modes to fulfill their mobility needs.

Gender differences were also noted among the various modes chosen for completing trips. While elderly males were the driver of an automobile almost two-thirds of the time, their female counterparts drove significantly less. Non-urban elderly females were equally the driver or the passenger of an automobile, and utilized more frequently than males rides offered by friends and relatives. These gender patterns in the preferences between being the driver or the passenger in

an automobile are indicative of different attitudes and the different significance that automobile driving holds between them. It is apparent that surrendering driving privileges is more difficult for elderly males than females. This observation was also noted from the licensure and drivership data in our study.

Being the driver or the passenger in an automobile is equally chosen by elderly females for fulfilling trips required for life support. This pattern changes dramatically when trips associated with the quality of life are examined, for which being the driver is the preferred mode of transportation almost half the time. These findings support the notion that mobility independence may be more significant for certain types of trips. Maintaining their freedom to move about for fulfilling trips associated with life quality is of significant importance not only to non-urban but, probably, to all elderly.

Residents in either periurban or rural areas assign the same importance to the two general categories of trip purposes, but there are differences in the relative importance of *individual* trip purposes between the two residential locations. Periurban residents tend to place higher value on travel for social purposes than rural residents, while for rural residents medical trips are more important. These differences were attributed to the different lifestyles of the residents in each of the two areas. Distance for activity centers, such as for shopping and medical travel, necessitates different prioritization between rural and periurban residents. Moreover, exposure to social activities and opportunities is higher immediately within communities, and periurban residents are more accustomed to these activities.

As elderly become older, they tend to travel shorter distances. While young-elderly complete more than one-half of their trips out of town, old-elderly complete three-fourths of their trips locally. The loss of mobility as the person ages is the most probable reason for this change. On the other hand, having to travel out of town to maintain and participate in social activities indicates the desire of younger elderly to still be considered active members of the society and considered as useful individuals.

CHAPTER 8 - IMPACT OF LIVING ARRANGEMENTS ON TRAVEL BEHAVIOR

Introduction

Previous chapters have identified key factors associated with travel behavior and needs, including the notions of *frailty and vulnerability* among the elderly. Advanced age, for example, causes general health declines that may first affect an individual's ability to drive, soon lead to difficulties in getting into and out of vehicles, and eventually make even walking either very difficult or impossible. With respect to vulnerability, income was examined as a controlling factor in the elderly's ability to fulfill travel needs. Retirement is one example of an event that most often results in an immediate decline in personal income, with the extent of this decline varying among individuals according to their pre-retirement investment opportunities and strategies. Continued decline towards older age may be a consequence of progressive depletion of savings and investments, or health care expenses that tend to increase with age. Indeed, income statistics for Kentucky demonstrate that poverty levels increase as age increases, and that over a third of Kentucky counties (all nonurban in character) had *at least* one out of every three persons age 75 and over living in poverty in 1989. The level of an elderly person's financial resources plays an important role in travel behavior; it strongly influences the reasons why elderly travel away from home, it directly impacts the ability to purchase an automobile and/or maintain a vehicle, and in many cases very low incomes may prevent even the use of some types of public transportation.

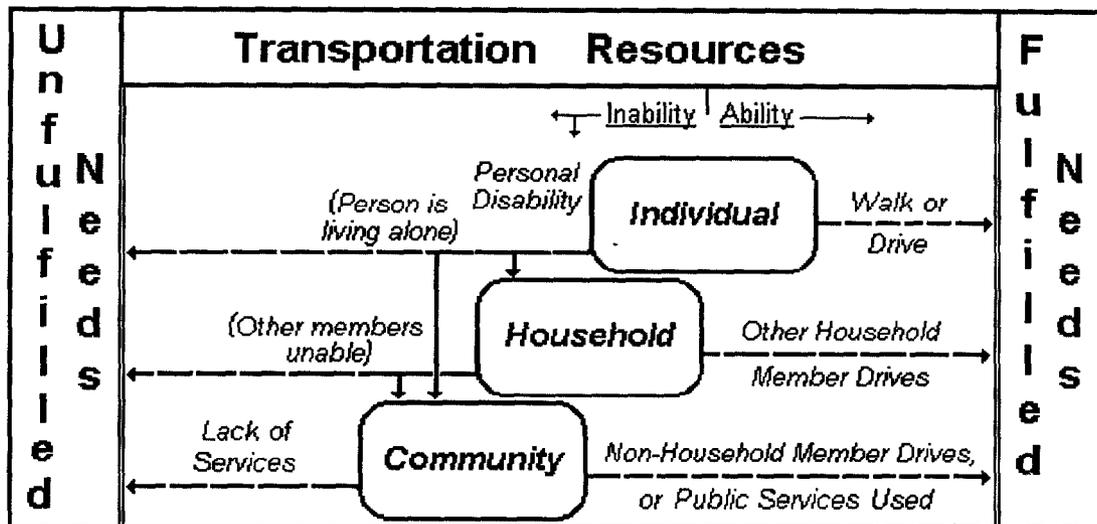
Another aspect of vulnerability that was addressed earlier dealt with place of residence: within the community (or periurban) or in surrounding rural areas. Clearly, increased *spatial* isolation (i.e., locations farther from communities) will influence travel behavior; any trip will necessarily be longer for individuals living in more remote areas, and there will be greater emphasis among these elderly to prioritize their needs in light of progressive frailty and the more limited transportation options available.

This chapter offers a different perspective on the element of vulnerability by emphasizing the notion of *personal* isolation, which explicitly places the elderly within a broader social network that provides expanded options for fulfilling travel needs. While personal isolation is tied at one level to the individual's willingness to interact with others, a second level--and one most relevant to this study--is the elderly's immediate access to others who are capable of providing transportation. The households in which elderly reside, therefore, become a critical factor in transportation behavior, with other household members potentially being principal resources for assistance. The chapter begins with a conceptual discussion of transportation decision making in which personal behavior is linked to a more comprehensive pool of providers, ranging from individual capabilities, through household resources, to community resources. This discussion provides a framework for the examination of results from Cynthiana and Harrodsburg, with special emphasis on the impact of living arrangements on individual travel behavior.

Travel Behavior in Social Context

One premise on which this chapter is based is that the elderly follow a logical decision making hierarchy in terms of their choices of transportation modes, and that decisions are made in a social context. This hierarchy begins with the individual, and that individual's assessment of personal transportation resources, which include possession of a driver's license, access to an automobile, and the physical ability to drive (Figure 8.1). If the individual is capable of providing her/his own transportation, then few if any problems will be encountered in meeting

FIGURE 8.1. CONCEPTUAL MODEL OF TRANSPORTATION DECISION MAKING



personal needs. If, however, the individual is unable to drive (for whatever reasons) or is not ambulatory, then assistance must be found from other individuals or agencies. This assistance is sought first from within the household, whose resources, therefore, become an important determining factor in observed travel behavior. A spouse, child, or sibling residing with the elderly individual may or may not have access and ability to drive a vehicle, yet the elderly individual will likely begin the search for alternative means of fulfilling needs with these people. In the event that household resources are not sufficient, then the search will transfer to the community level, with consideration given to nearby relatives, friends, and eventually to available public transportation services.

Previous chapters have focused primarily on the individual component of the above model, with findings indicating that the vast majority of elderly still drive, although drivership declines significantly at older ages. A strong positive relationship was also found between income and drivership; elderly individuals with higher incomes were more likely to drive than were individuals with low incomes. Finally, it was demonstrated that, of all possible transportation alternatives, the elderly preferred to drive themselves in meeting both life maintenance and higher order needs. Significant levels of transportation are provided by others, however, and with respect to decision making processes the immediate household would be the next potential resource considered for transportation assistance. It is to this topic that we turn next.

Household Characteristics and Transportation Resources

Perhaps the most dynamic attribute of an individual throughout his/her life course is the household within which he/she lives. This dynamic begins with entry into a household through birth, and subsequent changes occur as the individual completes schooling and leaves that first familial home. Marriage and the addition of children may serve to further modify a person's household character. As the individual approaches and moves into retirement years, the household may further evolve as children leave home, a spouse dies, or the individual moves into a child's or sibling's home principally for assistance.

Throughout the life course, then, transportation resources available to an individual will change as the character of the household changes. In addition, current household resources are determined in large part by previous events during a person's life course, for example, whether a person had married or had children, or whether a person had brothers or sisters. Finally, how these resources will be utilized will depend upon the person's own capabilities and, in our study, how these capabilities have declined or disappeared with advanced age.

A noteworthy characteristic of our study respondents is that 60 percent of them live alone (Table 8.1.a). The remaining 40 percent live with others, and most of these respondents reside with only one additional person (34.2%) and much smaller shares live with either two or three others in the same household. Spouses are most frequently reported as the other member in 2-person households (i.e., one *other* person, Table 8.1.b), whereas children are most often reported as cohabitants in the larger household sizes.

TABLE 8.1. COMPOSITION OF RESPONDENT HOUSEHOLDS

a. Distribution by household size

Household Size	Percent
<i>Living Alone</i>	60.0
<i>1 Other person</i>	34.2
<i>2 Other people</i>	3.9
<i>3 Other people</i>	1.9

c. Availability of a car to other household members

Access of Others to Car	w/access	no access
<i>1 Other person</i>	69.8%	30.2%
<i>2 Other people</i>	66.7	33.3
<i>3 Other people</i>	55.6	44.4

b. Relationship of other household members

Household Size	Spouse	Child	Sibling	Parent	Other Relative	Other Non-Relative
<i>1 Other person</i>	84.8%	7.6%	3.8%	-	1.9%	1.9%
<i>2 Other people</i>	41.7	58.3	-	-	-	-
<i>3 Other people</i>	17.3	44.4	-	11.1	27.3	-

An apparently salient aspect of household composition in this study, however, is not so much who lives with the elderly, as it is whether or not others drive. In this context, Table 8.1.c

presents results that are quite revealing; *the percentage of other household members with access to a vehicle drops as household size increases*. Such a finding may at first appear to contradict logical expectations of the study, in which progressively larger numbers of household members should provide a potentially larger pool of transportation resources. A life course perspective helps to explain such patterns, and a variety of household change scenarios exist. For example, two-person elderly households are most commonly comprised of a husband and wife, and tend to be relatively young; either both members are capable of driving or, based on our sample, the husband is most likely to be the sole driver with the wife having never acquired a license and driving experience. This two-person household may take in an older parent or parents, which increases household size but does not increase the pool of transportation resources. Alternatively, one household member may die, or become disabled to the point of not being able to drive. This may result in a decision to move in with other younger family members. Such moves will *not* usually increment the household size by one; instead the elderly person, or couple, will move in with a child who is married, and there may or may not be grandchildren present (or, in Table 8.1.c, a child and other relative). Some of these children may also be in their elderly years, and it is likely that either the child or the child-in-law will not currently drive.

In summary, it is clear that the presence of other household members does not ensure the availability of transportation. Indeed, 32.4 percent of all elderly who live in multi-person households do not have others in the household with access to a car. Of this population of elderly, 19.7 percent are still able to drive themselves and are, in fact, the principal transportation resource of the household. The remaining 12.7 percent of the individuals are not able to drive, which means that they must rely on resources in the community to fulfill travel needs. It is necessary, therefore, to recognize the dynamics of elderly households in assessing transportation availability, use, and patterns. When an individual finds him/herself unable to drive, it is likely in a very significant number of cases that transportation decision making will revert immediately to the community since there are inadequate resources at the household level; the elderly are either living alone (highest probability), or they reside with others who are unable to drive (almost one out of every three elderly living in multi-person homes).

Living Alone: Personal Characteristics and Travel Patterns

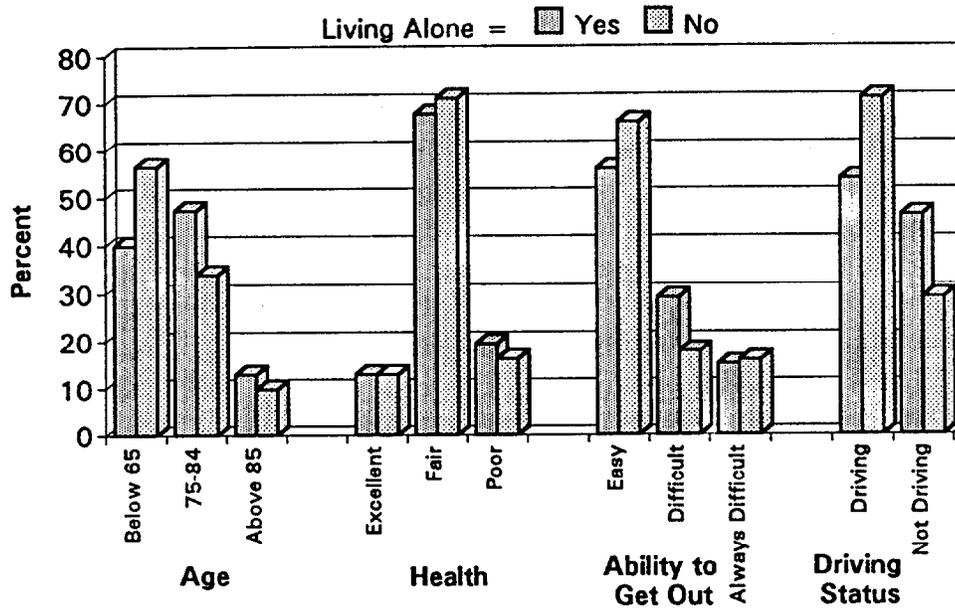
Personal Characteristics

The wide range of possible living arrangements of the elderly within multi-person households, and the rapid pace at which these arrangements change over time, prohibit a careful study of the impact of these arrangements on transportation. It is possible, however, to gain valuable insight by examining in detail the elderly who are living alone as compared to those who are not.

As illustrated in Figure 8.2, those elderly who are living alone tend to have several distinct characteristics. They are, for example, somewhat older than those who are not living alone, with the imbalance being most noticeable within the young-old and old-old age categories. They also tend to be slightly less healthy; although the percentage having self-reported health status as

"excellent" is identical, elderly living alone are more likely to report poor health than are elderly in multi-person households, and they are less likely to report fair health.

FIGURE 8.2. CHARACTERISTICS OF ELDERLY BY HOUSEHOLD STATUS



In terms of travel away from home, the majority of those living alone have few if any problems in getting out to fulfill their needs. They are, however, less able than their counterparts in multi-person dwellings, who more often tend to report their ability as "easy". Interestingly, those living alone are slightly *less* likely to report travel away from home as always being difficult. This is a consequence of elderly seeking assistance with family (or alternatively through nursing homes) when frailty causes severe restrictions on personal travel. Finally we find that elderly living alone are significantly less likely to be driving than those living with others. Women are far more likely to be living alone at advanced age than men; they have lost their husband who, throughout their married life, had taken care of most--if not all--of the household driving needs.

The final two characteristics suggest that determining the extent to which elderly "live alone" is an important consideration in assessing non-urban transportation needs. The majority of elderly in our study do live alone, and they commonly tend to have lower levels of personal mobility than those elderly living with others. As a consequence, they have much greater demands on community resources whether through the use of informal "friends and family" networks or formal community transportation services.

Travel Patterns

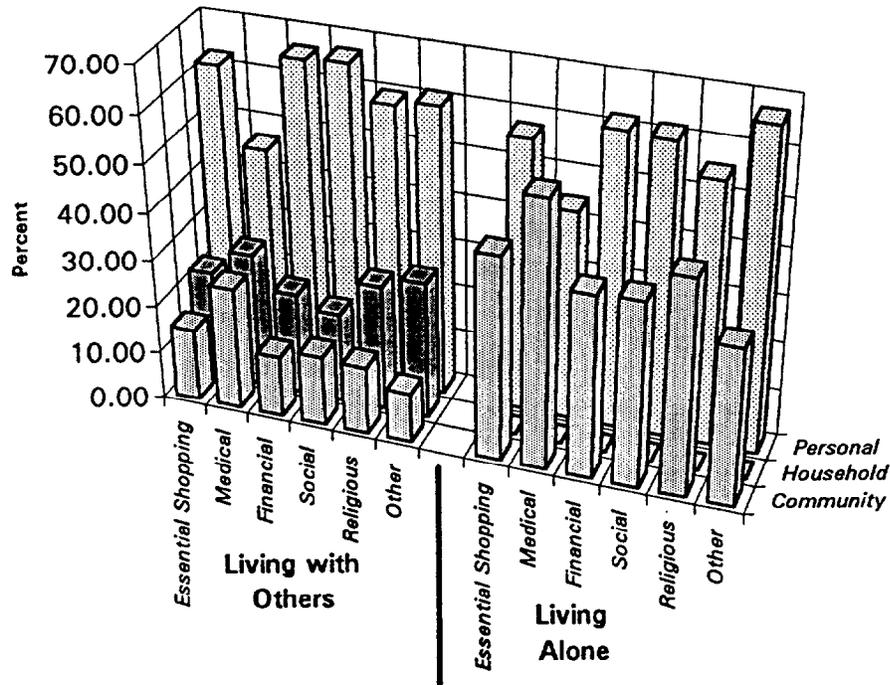
We would anticipate that the elderly living alone would make more efficient use of their travel in fulfilling their needs; resources are more scarce compared to elderly living with others and they would, consequently, tend to prioritize their needs with more emphasis given to "life-maintenance" trips. Table 8.2 confirms this general notion, but the difference between the two elderly groups is not necessarily significant. As found previously, "higher-order" needs--church and social meetings--dominate as reasons for leaving home regardless of the elderly person's living arrangements. Those who are living alone are slightly more likely to give higher priority to "life-maintenance" needs overall, although visiting family members (higher-order) is more often listed as a reason for travel among those living alone than among those living with others. The total percentage of the top five reasons given provides a cursory indication that the diversity of reasons given for travel is quite similar regardless of living arrangements.

TABLE 8.2. REASONS FOR TRAVEL BY GENERAL HOUSEHOLD STATUS

Reason for Travel	Living Alone	Living in Multi-person H.H
Life-maintenance	36.7%	34.9%
Higher-order	63.7%	65.1%
Total	100%	100%
<i>Rank by top five specific reasons:</i>		
	<i>Grocery Shopping - 11.7</i>	<i>Grocery Shopping - 10.6</i>
	<i>Church - 8.7</i>	<i>Church - 10.0</i>
	<i>General Medicine - 7.6</i>	<i>General Medicine - 7.3</i>
	<i>Banking - 6.8</i>	<i>Salon/Barber - 6.4</i>
	<i>Visit Family - 6.5</i>	<i>Banking - 6.2</i>
<i>Top Five Total:</i>	41.3%	40.5%

The transportation resources used to fulfill both life-maintenance (including essential shopping, medical, and financial reasons) and higher-order (including social, religious, and "other" reasons) needs would necessarily be different between individuals living alone and those living with others. At the most fundamental level, a lack of household resources among those living alone would require increased use of either personal or community resources. Furthermore, given the comparatively lower drivership of elderly living alone, we would expect community resources to bear much of the additional transportation burden. Figure 8.3 illustrates these notions. Personal transportation resources are clearly preferred regardless of living arrangements for all travel reasons, with one exception being medical reasons for which those living alone are more likely to use community resources. Personal driving is indeed lower among those living alone for all travel reasons except "Other," where we find personal resources dominating for such trips as dining out, volunteer work, laundry, beauty salon visits, and recreation. Most noteworthy, however, is that the lack of household transportation resources among those living alone is compensated through the use of community resources for all reasons of travel.

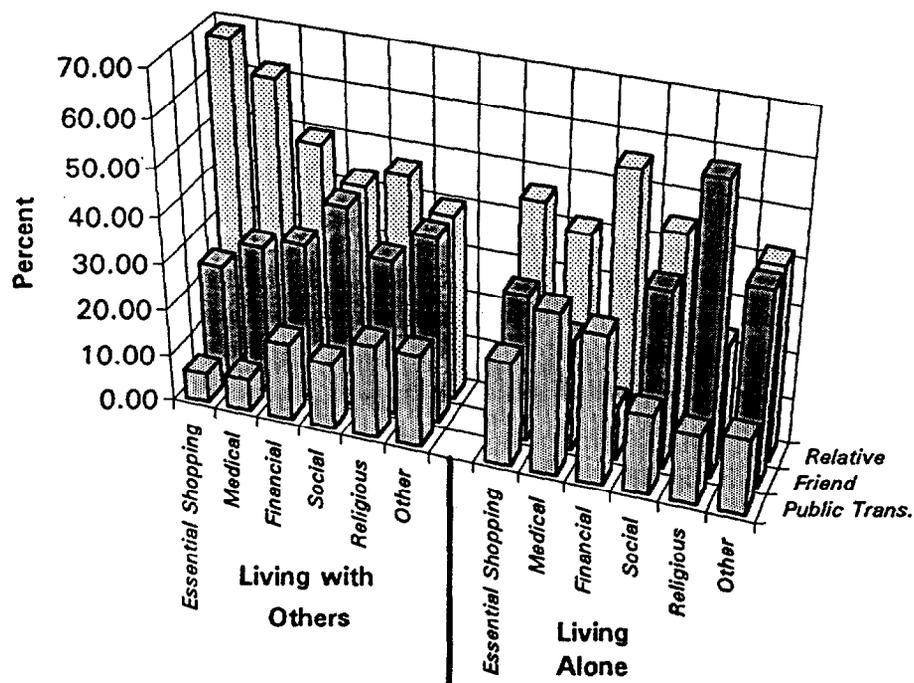
FIGURE 8.3. LIVING ARRANGEMENT IMPACT ON TRANSPORTATION RESOURCE USE



Considering that the majority of our sample live alone, and that these individuals rely on community resources for much of their travel, it is necessary to examine more closely the types of community resources used. Such resources are limited in nonurban areas to only a few public carriers (e.g., CATS and BUS), services associated with community programs (Senior Centers and churches), and relatives and friends who may live in the area.

Just as individuals allocate their personal and household transportation resources differently across travel needs, so too may they be expected to allocate community resources differently. This is shown in Figure 8.4, which distinguishes community resources between formal systems ("public transport") and informal networks that are based on friends and relatives. Following from the previous figure, this one portrays the elderly living alone as being more likely to use public transport systems. This is particularly true for life-maintenance reasons, while religious and other--predominantly higher-order--needs are fulfilled slightly more by friends and relatives than is found for elderly in multi-person households. Perhaps the most distinguishing feature of the graph is the predominance of relatives as a transportation resource among elderly living both alone and in multi-person homes, regardless of the reason for travel. The only exception to this is among elderly living alone traveling for religious purposes, where friends provide a significantly larger level of assistance. Friends are, however, well represented as providers, especially for higher-order travel purposes. One additional observation is that the level of public transportation use varies when living arrangements are considered; those elderly living alone are more likely to use it for life-maintenance purposes, while elderly in multi-person households are more likely to use it for higher-order travel needs.

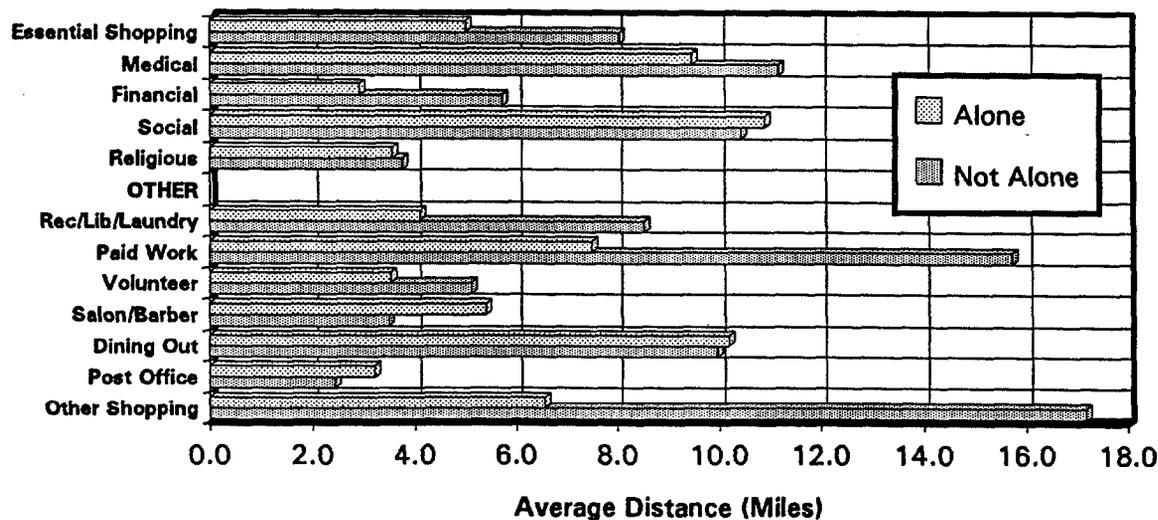
FIGURE 8.4. COMMUNITY TRANSPORT TYPES BY REASON FOR TRAVEL



A final analysis considers the association of distance travelled with particular reasons for travel. With respect to transportation decision making, we would anticipate a reduction of distance travelled corresponding to a reduction in the extent of the transportation resource pool. As mentioned earlier, the elderly living alone would be more inclined to prioritize their travel needs. This would especially be true when personal resources are restricted, with the intention being to reduce the social demand on outside resources. As a result, those elderly who are living alone would be expected to travel shorter distances, on average, than elderly living with others.

Figure 8.5 shows average distances travelled in fulfilling specific needs according to living arrangements. As anticipated, shorter travel distances are found among elderly living alone.

FIGURE 8.5. TRAVEL DISTANCES BY PRIMARY NEEDS CATEGORY



This is particularly true for the life-maintenance needs of essential shopping, medicine, and finance. Of these three life-maintenance reasons, medical needs tend to encompass longer distances, as expected, because of the study communities' locations relative to Lexington, the nearest large city with complete medical services. Our findings indicate that while some general medical, dental, and pharmacy needs are met locally, a significant number of elderly, and especially those living with others, will travel to Lexington for these services.

The higher-order needs of socializing and religious worship and service tend to be relatively balanced in terms of distance travelled. Elderly living alone are somewhat more likely to travel longer distances to socialize than those elderly living with others, which is a consequence of the isolated elderly not having immediate household contact with relatives. Similarities in distance travelled for religious purposes are a function of the number and diversity of churches available in both study communities. Considerable variation is observed, however, in the more specific types of higher-order travel. Recreational purposes, paid work, and other shopping (gifts, jewelry, autos, etc.) account for much longer distances among the elderly living with others, which is related to both their slightly younger age structure and their enhanced ability to acquire transportation services from within their homes. Dining out and visits to beauty salons/barbers encompass shorter distances among those living with others; both of these trip purposes tend to be highly social events among the elderly, and this finding confirms the importance of social contact among elderly who are living by themselves.

Summary

Non-urban areas will naturally have lower levels of public transportation support given the limited market size of nonurban populations. Despite this restriction, the non-urban elderly of our study communities are generally capable of fulfilling their needs for both physical and emotional survival. They appear to have accomplished this by being more cognizant of all forms of potential transportation resources, from their own abilities, through those of household members, and to the community level that encompasses both informal "friends and family" and formal public services.

This chapter has examined in some detail the structure of transportation decision making; it builds on the findings of previous chapters by incorporating explicit reference to the household component of transportation resources. A primary concern is the extent to which the elderly who are living alone, and are consequently isolated from immediate assistance from household members, align available means of transportation with their travel needs. This population, by virtue of social isolation in their living arrangements, is especially vulnerable and it also happens to represent the majority of elderly in our study. We have found that they tend to be older than their counterparts in multi-person homes, and that they also tend to be of poorer health and less able to travel by themselves. Not all elderly who live by themselves are frail. Indeed advanced frailty usually results either in a move to join younger family members (especially daughters or sons) or a move into an extended care institution. A more common scenario is that elderly living alone are generally capable of fulfilling many of their basic life-maintenance needs using their own

personal resources, and resources available through informal social and formal community networks. Their vulnerability becomes evident through recognition that health status changes rapidly at advanced age, and it is enhanced by the fact that they have no choice but to rely directly on community resources when they are no longer capable of fully meeting their own needs.

An important consideration that emerges from this chapter is that, while it is necessary to evaluate public transportation systems in a non-urban community, it is especially useful to recognize the dynamics of both individuals and households over time and how these dynamics relate to familial and social networks that exist within the community. A focus on the elderly living alone illuminates this consideration. This population does, in fact, rely more on community transportation resources than elderly living in multi-person households. This is expected. One salient feature of this reliance, however, is that public transportation, when used, is mostly conspicuous for the life maintenance needs of medical care and economic security. Finally, relatives and friends contribute a significantly large share of transportation assistance for higher-order needs, which the literature clearly identifies as being critical for promoting and maintaining quality of life.

CHAPTER 9. POLICY ISSUES

Access, Aging and Travel Behavior: A Synthesis

We have analyzed in this report data related to the non-urban elderly's access to personal vehicles, the influence of the aging process upon travel behavior, as well as the impact of household structure and size upon access and travel patterns. In the first topic we find that a significant portion of the non-urban elderly no longer drive and do not hold drivers licenses. However, and especially in light of the above finding, we must note that the automobile is the universally preferred mode of transportation. Non-urban elderly complete almost 85 percent of their trips either as drivers or as passengers. Self driving accounts for the largest proportion of trips completed by the non-urban elderly in our sample and this, we assume, reflects their interest in maintaining their independence and the highest degree of flexibility.

Trip behavior may be dichotomized as those mobility journeys which serve to sustain life (life-maintenance) and those required to maintain and improve the social and emotional quality of life (higher-order). More than 60 percent of trips taken by the non-urban elderly respondents in our study were identified as those associated with 'higher-order' activities. Social trips are an important component of this pattern. Overall, our non-urban elderly more frequently rely on other drivers with respect to life support trips, while for trips to enhance life quality they rely less on others to provide them with rides. Our findings on trip distances mesh with the findings of other research. That is the non-urban elderly travel within five miles of their home for over two-thirds of their trips. Finally our findings indicate that for a large portion of our respondents 'trip chaining' is practiced on a regular basis. It also appears that trip chaining is more commonly practiced as the individual grows older.

In regards to the second topic--demographic distinctions and travel behavior--we found that almost 50 percent of the non-urban elderly females do not drive. The gender distinction is also conspicuous in another sense; when focussing upon non-drivers, females are more likely than males to have higher travel frequency, and to use other means of transport when travelling outside their homes. This may be explained by the fact that many women in our sample did not have the opportunity to learn to drive, and consequently they may have become more expert in searching out alternative means of transportation. As the elderly continue to age they tend to travel shorter distances, and in all likelihood this is attributable to the loss of personal mobility as frailty increases.

Finally the third topic of inquiry introduced household composition as an influential factor in elderly travel behavior. Chapter 8 began with the development of a simple modeling framework that takes a decision making perspective based on transportation resources. This framework proposed a hierarchical decision making process that begins with an evaluation of personal resources (i.e., capabilities to walk and/or drive), defers to household transportation resources if personal abilities are inadequate, and finally moves on to community level resources that include both informal and formal transportation resources.

The analyses, which focussed primarily on the household, determined that the reasons for travel were quite similar among elderly regardless of their household situation. The mode of travel, however, was found to be quite different. Elderly living alone, who comprised a significant share of our sample, did not have the immediate access to alternative transportation at the household level of their counterparts living in multi-person homes. As a result, community resources, and especially friends and family, tended to be a much more valuable means of travel for elderly living alone. Of the possible community resources, these elderly were more likely to use public transportation for life-maintenance purposes, while elderly living in multi-person households were more likely to use public transportation for higher-order travel needs. A final element of the household examinations considered travel distance, finding that elderly individuals in multi-person homes were more likely to travel longer distances than those living alone. During our interviews it became apparent that our respondents were uniformly hesitant to impose upon others within the community, and particularly friends, for travel assistance. Still we found the friends and family networks to be a valuable and often used transportation resource. These networks were used, however, in such a way as to minimize imposition; trips were short and often associated with some type of social activity, either by itself or as part of a trip chain that involved life maintenance reasons. Elderly living alone were more likely to use these resources, thus their travel distances were shorter. In contrast, we did not find that the elderly living in multi-person homes considered travel assistance as an imposition on other household members, and their trips often were much longer because a daughter or son was fully capable--and willing--to drive to such larger cities as Lexington, Louisville, or Cincinnati. We might also speculate that these trips were not considered an imposition because such travel was undertaken by relatives for their own personal reasons. That is, many of these trips were not made for the needs of the elderly, but provided an opportunity for the elderly individual to fulfill her/his travel needs in conjunction with a trip planned and made for another purpose.

Our aim now, with the above analyses as background, is to focus directly on several issues which have direct policy implications. First we are interested in knowing the extent to which the non-urban elderly are aware of the public transport systems which are available for their use. Second we also seek to learn the extent to which volunteerism is practiced with our sample areas and additionally whether such a system would be used if organized on a more formal basis. A final matter is the critical aspect of the adequacy of access to transport services for specific needs. The discussion begins with the knowledge of public transport systems.

Public Transport Awareness and Use

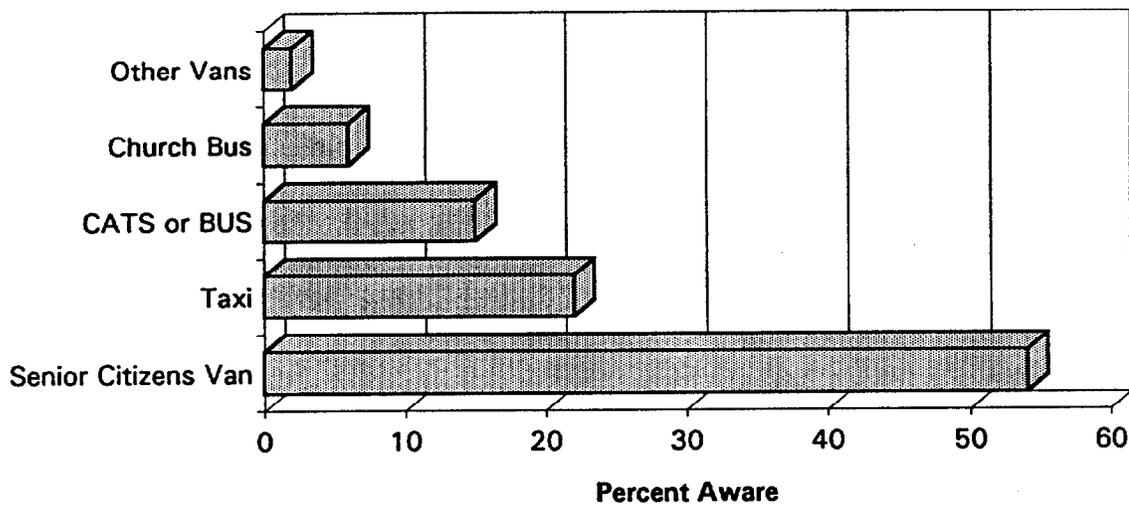
In order to address this issue we placed several appropriate questions within our household survey instrument. Our first question was essentially: "Are you aware of any public transportation that you can use from your residence?". About 44 percent of our sample respondents replied that they were *unaware* of any public transport system that could be accessed from their residences. This finding and relatively large percentage immediately alerts us to a potential general concern: *a large percentage of non-urban elderly may not be aware of the transport opportunities which exist for them.* This finding, of course, also implores us to inquire how we can better inform the non-urban elderly about the availability of the existing services. We

discuss below several actions which might be appropriate given this critical piece of information, as well as other findings, from our analyses.

Of the 56 percent of the total respondents (87 persons) who were aware of specific public transport forms that could be used from their homes, only 17 percent (27 respondents of the total) were able to identify at least two sources of public transportation while only about 6 percent (10 respondents of the total) were able to identify and knew about three sources of public transportation. Therefore in our sample, there was a general lack of knowledge in regards to the variety of formal transport opportunities available.

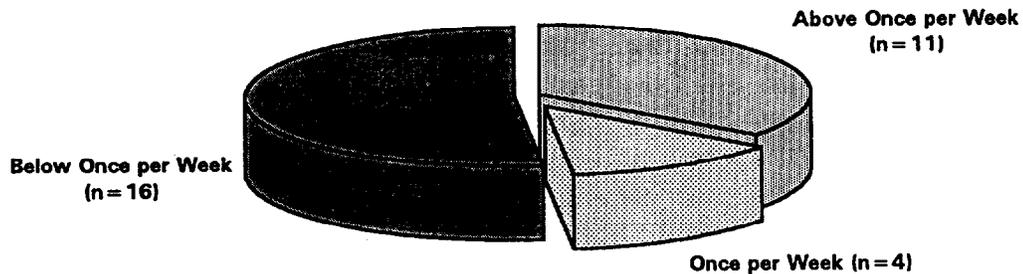
The tabulated responses with respect to specific sources of transport are shown in Figure 9.1, and provide some additional insight regarding travel knowledge.

FIGURE 9.1. AWARENESS OF PUBLIC TRANSPORT FORMS



In regards to the actual use of public transportation (FR1), 80 percent of our respondents reported that they did not use any form of public transport in the past year. Of actual users (31 individuals) the frequencies of use are shown below:

FIGURE 9.2. USE OF PUBLIC TRANSPORT



These findings essentially suggest that only a relatively small proportion of the respondents use public transport at all; but more important, of those people who do use some form of public transportation less than 10 percent (only 15 non-urban elderly of the total sample) use the services once a week or more frequently.

The results of the responses, while not really surprising, provide support for the critical role of the Senior Citizens Center programs, *and especially access to those programs*, in each community. Given the source of many of our respondents we might expect that the SCC transport would be quite conspicuous as a response type. On the other hand many respondents came from church and other sources, and there exists among these individuals as well an awareness of SCC provided transport.

Aside from the SCC van transport, respondents often mentioned the availability of taxi service in the community. This is somewhat surprising since a taxi service no longer exists in Harrodsburg, but was available over the past 15 years. However, a taxi service does exist in Cynthiana and operates both within the town area and outside. The latter service operates with two rates: one for the general public and another for the elderly. The Cynthiana service also offers a drug delivery service for those who cannot get out of the house. This service costs 5 dollars for those who have a senior citizens card, and provides one free trip after four paid trips.

Finally it is noted that public transport--the CATS and BUS services--are not conspicuous providers in the minds of our respondents. While the demonstration of knowledge of the transport through the SCCs and their various programs is important, the essential message in our observations is that formally provided transport is, in general, not well known nor used in regards to the existing and potential travel of the non-urban elderly in our study.

In addition to the assessment of knowledge of public transport sources, it is clear that relatively few non-urban elderly truly rely on these forms of transportation. They simply are not used sufficiently frequently to be a primary factor in maintaining the life quality of the non-urban elderly. On the basis of these data it would appear that public transport clearly serves as a secondary access source in our sample.

An appropriate and reasonable question related to knowledge of formal transport services is simply: What characteristics distinguish those who seem better informed about these opportunities? In this context separate non-parametric analyses were carried out relating knowledge of public transportation to critical characteristics of our respondents. Our findings suggest, for example, that there is no clear relationship between awareness of public transportation and gender, age and income. Simply put, given our current sample, if we allow gender, age and income variations to predict whether someone will have knowledge of and be able to identify formal sources of transportation, these criteria will not be useful. On the other hand, household structure and residential location are important discriminators. In the first instance those individuals who comprise single person households (i.e., those elderly living alone) are *more likely* to have knowledge of formal sources of transportation. This suggests, presumably, that such individuals who are living alone make an effort to acquire knowledge of

transportation resources in the absence of, or as a supplement to, family-friends provided transport, even though others may visit and even provide transport. Most significant, perhaps, is the residential location variable. Clearly those elderly living predominantly in peri-urban or town situations are much more likely to have knowledge of formal transportation systems than will those individuals who are living in more rural and sometimes isolated situations.

Even more important, however, are the *characteristics of the actual users* of public transport services. As with the analysis of the characteristics associated with knowledge of public transport, gender and age have little predictive value in determining who uses any form of public transport. On the other hand, and unlike the knowledge analysis, income is a relevant and important predictor. Individuals who are poorer, especially with incomes under \$15,000, are the most likely users of public transport. In addition, as in the knowledge analysis, those elderly who are living alone are not only more likely to be aware of public transport forms but they are also *much more* likely to actually use these forms of access. Finally, and in contrast to the knowledge analysis, residential location is not a good predictor of actual use of transport. While intuitively we would expect more isolated and therefore rural elderly to make use of the services, in actual fact peri-urban residents use the services as much. This undoubtedly is a function of the difficulty of serving remote locations with limited vehicles and drivers.

In this light we turn now to a discussion of the knowledge and nature of volunteerism as an alternative means of providing access to the non-urban elderly. The matter of volunteerism, of course, has been acknowledged for some time as an important means of delivering transport services in both urban and rural areas. Essentially the basic idea behind volunteerism is that nearby friends or neighbors, more distant friends, nearby or more distant relatives, or other individuals such as church members, offer to provide an elderly individual with transportation for a variety of purposes. The actual logistics may be organized formally through a church or a neighborhood organization, but more frequently such systems develop in a spontaneous manner.

An initial question in our survey was stated: "Many communities, friends, relatives or neighbors provide transport for those who need it. Do any of the following offer transport to you?" Responses to this item are presented in Table 9.1. From these results, it is clear that

TABLE 9.1. TRANSPORTATION PROVIDERS AVAILABLE TO NON-URBAN ELDERLY.

Source of Transport	Yes	No
Neighbors (<i>n=142</i>)	58 %	42 %
Friends (<i>n=129</i>)	41 %	59%
Nearby Relatives (<i>n=131</i>)	63 %	37 %
Distant Relatives (<i>n=123</i>)	42 %	58 %

neighbors and relatives situated nearby are the most likely candidates for volunteering transportation to the elderly. It is also noteworthy, however, that friends and relatives further away are not insignificant as potential providers of access.

Obviously it is of interest to know not only whether transportation was offered, but in addition whether the offer is accepted. The following data provides some basic results from this question in our survey instrument (Table 9.2).

TABLE 9.2. TRANSPORTATION ACCEPTED FROM PROVIDERS.

Source of Transport	Yes	No
Neighbors (<i>n=126</i>)	62 %	38 %
Friends (<i>n=104</i>)	49 %	51%
Nearby Relatives (<i>n=119</i>)	69 %	31 %
Distant Relatives (<i>n=104</i>)	51 %	49 %

As with the 'ride offered' data from Table 9.1, it is clear that the *acceptance* rates are highest also for the two most commonly offered sources of transportation. The data further suggest that, were a community to consider organizing a formal volunteer effort or strengthening an existing one, there are not only relatives who could potentially play an important role but indeed neighbors as well.

With respect to questions related to the acceptance of transport if it was offered, we further sought to highlight characteristics that might allow us to identify those individuals who would be more apt to respond positively. In other words, what characteristics form the profile of an individual who is a typical 'acceptor'? In contrast with the sample as a whole, the typical acceptor is much more likely to be living alone without spouse or any other relative, and also is much more likely to live in a peri-urban area as opposed to a rural area. Both of these characteristics make sense as individuals living alone are clearly much more dependent on outsiders for transport access. In addition, in areas of higher residential density, it is more likely that someone will offer transportation to an individual who does not have immediate access to it. Finally there is also evidence from our data to suggest that the typical acceptor is slightly older (i.e., from the old-old age grouping as opposed to the young-old category) and is more likely to be female.

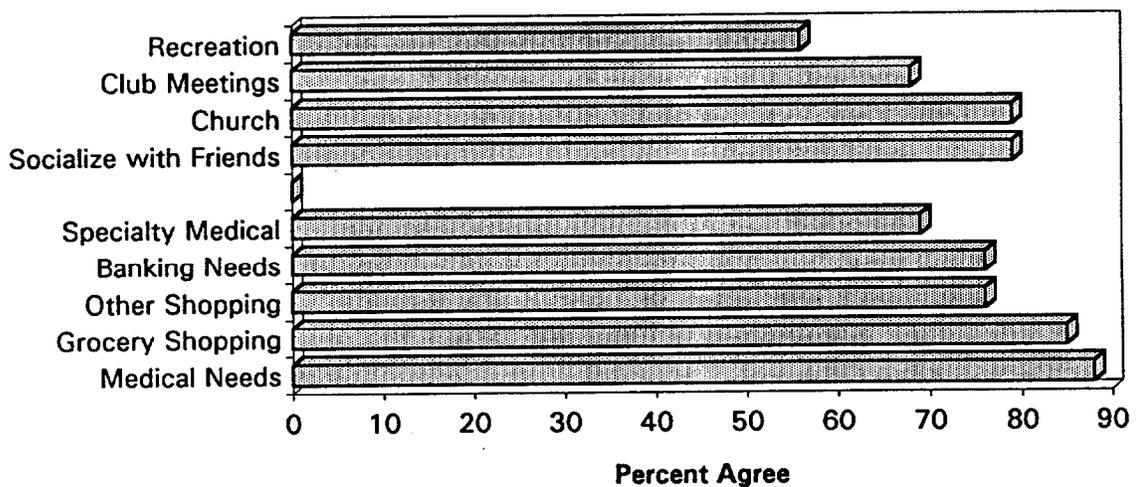
An additional question regarding volunteerism was posed: "If the community were to organize a formal system of volunteer drivers who would offer transportation, would you use it?" There was an overwhelming positive response to this question: 77 percent of the respondents indicated that they would utilize a formal system of volunteer drivers if the community were to organize such a system. In our view, a particularly revealing use of this question is to examine

the characteristics of those individuals who respond *negatively* to this question, especially in contrast to the larger sample.

Of the 35 respondents who replied negatively to the above question, 57 percent were in the young-old category (i.e., under 74 years of age). This percentage was considerably lower--46 percent--in the total sample. In addition these individuals were somewhat more wealthy, with a much higher proportion having incomes in the \$10-15,000 and \$15-20,000 brackets in contrast to the overall sample. Fewer of the negative responders to this question were living alone. But most critical in assessing the characteristics of this group: 75 percent indicated that they held a driver's license and were still able to drive.

A final topic of analysis which has important implications for policy analysis is the degree to which respondents in our sample felt that there was *adequate access* to transport services for a variety of purposes. The responses are illustrated in Figure 9.3.

FIGURE 9.3. ADEQUATE ACCESS TO TRANSPORT SERVICES FOR SELECTED TRIP PURPOSES.



What do the above results show? First, assuming that we have a reasonably representative sample, it appears that there is a clear need to improve access to a broad array of needs *required* by the non-urban elderly group. While our respondents in general expressed a 75 percent satisfaction rate, there was considerable variance around this average value. Moreover, these levels of satisfaction dropped considerably when controlling for age, income, residential location, household structure and size, and especially, of course, driving status and access to a car. We discuss these more fully later in this chapter.

Second, it is encouraging to see that such life maintenance purposes as medical care and grocery shopping are, in fact, best satisfied from those purposes represented. Yet it would appear that it is much more difficult, in the perception of our respondents, to find transportation for other more routine--yet nonetheless critical--trips. In this respect access to recreation activities and/or the absence of these activities seems most acute. Furthermore, transportation availability for

church, social meetings with friends, and even specialty medical needs, also appears to be deficient.

Finally, if we once again attempt to create a profile of an average individual who is generally dissatisfied with access to transportation services given our bundle of purposes, what characteristics would identify the 'typical' dissatisfied non-urban elderly. In this simple creation of a composite description, we must bear in mind that there is some variation in characteristics of the typical individual by different trip purposes and needs. With this caveat, our typical dissatisfied non-urban elderly individual would be situated in the young-old age group (less than 74 years), is living alone, would have an income less than \$10,000, and is living in a peri-urban area. Most important, a very high proportion of those who expressed dissatisfaction with transportation for these particular bundle of needs are individuals who do not drive and do not have access to a car when they need one. These findings indicate that dissatisfaction is most likely greatest among the young-old who feel a need to 'get out' for a wide variety of purposes yet cannot afford transportation, and at the same time are isolated in their household setting despite the fact that they reside in a peri-urban area of higher residential density.

Policy Summary

It is clear that, for many non-urban elderly, public transportation is not a viable solution in fulfilling travel needs. Further, it is doubtful that such formal transportation could become a stronger delivery mechanism without a significant infusion of economic resources. Even were this possible it is, in our opinion, unlikely that such a system would encourage significantly more elderly to become more mobile since public systems are largely impersonal and foreign. While 60 percent of our sample respondents are able to drive, there is the problem of eventual loss of license and the declining ability to drive as frailty increases; in many cases, moderate disabilities do not totally prevent personal driving, but rather increase the use of multiple forms of transportation. Further, it has been shown that 40 percent of the non-urban elderly do not drive and thus are immediately dependent on other means of transportation. Their first alternative choice is to seek assistance from other people within their household. Yet many elderly live alone, and assistance must then be obtained at the community level, most often from acquaintances in the area and less often from public services.

These observations indicate that an effective alternative must be devised to extend accessibility to transportation resources to a larger segment of the non-urban elderly population. We wish to emphasize, however, that the problem to be addressed is not simply one of providing the means of transportation; the delivery system must be 'user friendly' so that it indeed encourages the elderly to fulfill a wider variety of their travel needs.

The Senior Citizens Centers now provide transportation to a select group of elderly for specific social purposes. These efforts to provide access to social opportunities are critically important in promoting and maintaining well-being among the elderly. Similarly the elderly who belong to local churches may often, but not always, be offered transportation for religious worship and for limited other needs. However, we believe that volunteerism, an inherently informal concept but preferably operated on a more formal basis, must be a first step in

improving the accessibility of a broader segment of the non-urban elderly to a wider variety of opportunities. Existing informal operations, nominally labeled as 'volunteerism', do not adequately meet the mobility needs of the vast majority of the non-urban elderly. Thus, while informal volunteerism currently operates with some apparent success in both communities, its service is predominantly limited to members of extended families or close social networks; the existence of such efforts does not by any means insure that all elderly who require and/or desire transportation are served and included.

A more structured and accessible system must gradually evolve within the respective communities. This can only be accomplished if a specific entity is designated and assigned the responsibility for its operation. The most logical agency candidate is the Senior Citizens Centers. It is our belief that the SCCs could very effectively generate a more formal volunteer program by assigning and dedicating personnel to the specific task of organizing a simple yet effective demand response scheme. The essential notion behind this program would be to enlist the assistance of a cadre of young-elderly in specific locations who still drive and maintain a vehicle. These individuals would receive some simple training (e.g., paramedical and psychological instruction with special emphasis on geriatric problems), and would subsequently serve to respond to needs of non-urban elderly within a designated rural or peri-urban areas. The objective here is to have local individuals be available to satisfy needs of the elderly on a regular basis and for a variety of purposes. Indeed, these individuals should be specifically trained and instructed to seek out and assist those elderly who do not explicitly request transportation, but in fact have this need.

Obviously, additional monetary resources earmarked for this purpose would have to be allocated to the SCCs initially on an experimental basis. These funds would be used for additional SCC personnel, some of whom are assigned the task of coordinating the system's resources, and others who would serve as 'volunteers', being reimbursed for fuel and maintenance expenses. These individuals should also receive a basic wage as payment for their efforts. This 'volunteer hire' scheme and its operation could easily be designed by a combined group of local officials, SCC personnel, and senior volunteer experts. A critical aspect of the system would be to view the target population in a disaggregate manner. That is, it is vital to recognize the diversity in the local population in terms of age, gender, income, and living arrangements, and be able to identify those elderly who are most 'at risk'; these will most often include the old-old, elderly living alone, and especially individuals who have no alternative means of transportation. Similarly, it is important to design such a system with flexibility in mind, for example, to recognize the need for specific on-demand services that do not fall into the realm of usual week-day working hours.

In sum then, a more structured informal-volunteer system has a number of distinct advantages. First, it can be designed with flexibility; it is of relatively low cost, especially when compared with more formal capital intensive systems, and has a broader spectrum of times during which it would be available. Moreover, such a system would use local people, who are familiar with the community and to the users, and will thus be able to effectively attract and serve elderly with any assortment of needs.

References Cited

- Carp, F.M. 1988. "Significance of Mobility for the Well-Being of the Elderly," in *Transportation in an Aging Society*. Washington, D.C: Transportation Research Board, pp.1-20.
- Cottrell, F. 1971. "Transportation of Older People in a Rural Community," *Sociological Focus*, pp.29-40. (reprinted in *Social Problems of the Aging: Readings*. Belmont, CA: Wadsworth Publishing Co., Inc. p.237-245.
- Cutler, S.J. and R. T. Coward. 1992. "Availability of Personal Transportation in Households of Elders: Age, Gender, and Residence Differences," *The Gerontologist*, 32(1):77-81.
- Del Green Associates, Inc. 1984. *Use of volunteers in the Transportation of Elderly and Handicapped Persons*. Washington, D.C.: UMTA, Office of Technical Assistance.
- Eisenhandler, S. 1990. "The Asphalt Identikit: Old Age and the Driver's License," *International Journal of Aging and Human Behavior*, 30(1):1-14.
- Jette, A.M., and L. G. Branch. 1992. "A Ten-Year Follow-Up of Driving Patterns among the Community-Dwelling Elderly," *Human Factors*, 34(1):25-31.
- Kihl, M. 1991. "The Need for Transportation Alternatives for the Rural Elderly". Paper presented at Transportation Research Board 70th Annual Meeting, January 13-17, 1991. Washington D.C.
- Kline, D.W., et al. 1992. "Vision, Aging, and Driving: The Problems of Older Drivers," *Journal of Gerontology: Psychological Sciences*, 47(1):27-34.
- Marottoli, R.A., et al. 1993. "Driving Cessation and changes in Mileage Driven among Elderly Individuals," *Journal of Gerontology: Social Sciences*, 48(5):S255-S260.
- McKelvey, D.J. 1979. "Transportation Issues and Problems of the Rural Elderly". in Stephen M. Golant, ed. *Location and Environment of Elderly Population*. Washington D.C.: V.H. Winston & Sons. p.135-140.
- Payne, B. 1983. "Volunteerism and Transportation of the Elderly and Handicapped". *Specialized Transportation Planning and Practice*, vol. 1. p.263-273.
- Rosenbloom, S. 1988. "The Mobility Needs of the Elderly". in *Transportation in an Aging Society*. Washington, D.C.: Transportation Research Board.
- Schmitt, R.R. 1979. "Transportation Issues and Problems of the rural Elderly". in Stephen M. Golant, ed. *Location and Environment of Elderly Population*. Washington D.C.: V.H. Winston & Sons. p.127-134.

Stem, S. 1993. "A Disaggregate Discrete Choice Model of Transportation Demand by Elderly and Disabled People in Rural Virginia," *Transportation Research A: Policy and Practice*, 27A(4):315-327.

Yeatts, D.E., T. Crow, and E. Folts. 1992. "Service Use Among Low-Income Minority Elderly: Strategies for Overcoming Barriers," *The Gerontologist*, 32(1):24-32.

APPENDIX

Survey Methodology and Forms

This appendix provides a brief overview of the research methodology followed in this research. It is provided as elaboration to material found in the report. The Appendix is composed of the following:

- Description of sampling frame
- Description of interview protocol and coding procedures
- IRB Informed Consent Form
- Survey Instrument
- Respondent "cards" used with the survey instrument

Sampling Frame

Fieldwork within each community (Harrodsburg and Cynthiana) began with meetings scheduled with the Mayors, Chiefs of Police, County Judge Executives, and the directors of the Senior Citizens Centers. These meetings were made first to acquire the cooperation of the communities, and second to begin establishing contacts for soliciting volunteers for participation in the research. Indirect contacts included radio stations and newspapers, which provided announcements of the work and the need for participants. Direct contacts included directors of local housing projects, hospitals, volunteer organizations, and churches. Meetings were scheduled with both indirect and direct contacts to inform them of the research and to establish strategies for collecting names of potential respondents.

The above approach was taken for several reasons. First, neither time nor budget permitted a complete coverage of all residents in each community as a way of randomly selecting elderly respondents from the households contacted. Second, the communities were too small to conduct a random sampling of all households while ensuring an acceptable sample size of elderly respondents. Finally, mailing lists (such as those obtainable for the AARP) would not reflect a representative cross-section of individuals within their elderly years who were residing in these non-urban areas.

Lists of names were, therefore, collected from all indirect contacts, with all lists being compiled into a master list (to avoid duplication) before assignment to interviewers. Interviewers would directly contact names on their assigned lists to first establish willingness to participate, and then to schedule a meeting for an interview.

Interview Protocol and Coding Procedures

All interviews were conducted at a place of the respondent's choosing, which was most often at home. Each interview generally lasted anywhere from 45 to 90 minutes. Respondents were first asked to read and sign the required IRB Informed Consent Form. The interviewers would then proceed to ask questions as outlined on the attached survey form. It is important to note that each survey form was filled out by the interviewer; elaborations on each response and additional anecdotal information was recorded on the form for use in subsequent analysis.

Certain questions required the respondent to rank-order certain items. In such cases (notably questions 2b, 9, and 29, as shown in the attached "Cards,") the possible individual responses were printed on 3"x5" cards that were given to the respondent in random order. Respondents would, therefore, sort through the cards and arrange them on a table according to their ranking. This approach was taken to avoid any biases implied by the ordering of responses listed on a single card.

All survey data were coded into machine-readable form using an interactive data-entry program written specifically for this project. This program included both a full array of error checking routines (to avoid out-of-limits and basic typographical errors) and data editing routines (to allow researchers to go back and change information when errors were not detected by the program.) Subsequent data analyses were carried out using SPSS-X.

INFORMED CONSENT FORM

Consent for Research Study

"Mobility Needs of Non-urban Elderly in Kentucky"

IRB Approval
92-10081
THIS FORM VALID
12/7/92 - 12/6/93

I _____ agree to participate in the research study under the direction of Drs. T. Leinbach, N. Stamatiadis, and J. Watkins. I understand that while the study will be under the supervision of Drs. Leinbach, Stamatiadis, and Watkins other professional persons who work with them may be designated to assist or act in their behalf.

The purpose of this research is to examine the travel characteristics and needs of non-urban, central Kentucky elderly. The major objective of the project is to evaluate means of transport and to suggest how these means may be managed and modified to improve mobility and better serve the elderly.

During a ten day period in January I will be asked to enter every trip I will take in a trip diary provided by the researchers. In this diary I will enter the date and time the trip was taken, its length, the beginning and end points of the trip, the mode used, and the reason for taking the trip. At the end of this period, an interviewer will contact me and set an appointment to come and get the diary and conduct an interview. The interview will last approximately thirty minutes and it will take place either at my home or a place that I select. I understand that I am to complete a second trip diary and complete another interview in May.

This research will be used to identify the travel needs that non-urban elderly have and attempt to find ways to provide the means and modes to cover these needs. This study will also look into providing alternatives other than driving to fulfill their mobility needs. Participation in this study is voluntary. I will receive a \$5.00 check after my completion of each diary.

The records pertaining to my name and other data will be used only for this study and no access will be provided to others than the researchers. The data collected will not be associated with my name.

For any further questions regarding this experiment I can contact Dr. Leinbach at 257-1276 or Dr. Stamatiadis at 257-8012 or Dr. Watkins at 257-4140. A copy of this form will be provided to me.

Participation is voluntary; refusal to participate will involve no penalty. I understand that I may discontinue participation at any time.

Participant _____ Date _____

I have explained and defined in detail the research procedure in which the subject has consented to participate.

Principal Investigator _____ Date _____

Participant #: _____

Date: _____

NONURBAN TRANSPORTATION SURVEY

1. Do you have a valid current drivers license? 1. Y__ N__
2. Do you currently drive a car? 2. Y__ N__
- 2a. How many years have you been driving? 2a. _____
- 2b. Which factors would make you avoid driving? (*Refer to CARD 2b*)

Please sort these factors from most influential to least influential.

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____

3. Do you have access to a car when you need one? 3. Y__ N__
4. (*Is respondent in a retirement or nursing home?*) 4. Y__ N__
- 4a. How many people, besides yourself, live in your household and are 16 years of age or older? (*If applicable*) 4a. _____
5. Please indicate the age, sex and relationship of these other people. (*If applicable*)

	AGE	SEX	RELATIONSHIP	HAVE CAR?
A.	_____	_____	_____	Y__ N__
B.	_____	_____	_____	Y__ N__
C.	_____	_____	_____	Y__ N__
D.	_____	_____	_____	Y__ N__
E.	_____	_____	_____	Y__ N__
F.	_____	_____	_____	Y__ N__

CIRCLE IF MORE ON BACK

6. Which of the above people have a car? (*Check in column above*)
7. Do you have a telephone in your home? 7. Y__ N__
8. Based on the following scale, how would you characterize your own health? 8. _____
1. EXCELLENT 2. GOOD 3. FAIR 4. POOR 5. VERY POOR
- 8a. How would you characterize your ability to get get around outside your house? 8a. _____
1. EASY 2. DIFFICULT AT TIMES 3. ALWAYS DIFFICULT 4. IMPOSSIBLE

9. Please indicate by number all reasons why you would leave your house. (Refer to CARD 9 and pull all indicated cards)

10. Please indicate the TEN most important reasons. (Pull these cards) Now sort the cards according to which reason takes you out of the house most often to least often. (record order)

1. _____ 2. _____ 3. _____ 4. _____ 5. _____
 6. _____ 7. _____ 8. _____ 9. _____ 10. _____

11. Please indicate which reasons that take you away from the house are associated with the following means of travel:

Walk	Drive	Other HH Member Drives	Non-HH Member Nonrelative Drives	Non-HH Member Relative Drives	Public Transport
1. _____	1. _____	1. _____	1. _____	1. _____	1. _____
2. _____	2. _____	2. _____	2. _____	2. _____	2. _____
3. _____	3. _____	3. _____	3. _____	3. _____	3. _____
4. _____	4. _____	4. _____	4. _____	4. _____	4. _____
5. _____	5. _____	5. _____	5. _____	5. _____	5. _____
6. _____	6. _____	6. _____	6. _____	6. _____	6. _____
7. _____	7. _____	7. _____	7. _____	7. _____	7. _____
8. _____	8. _____	8. _____	8. _____	8. _____	8. _____
9. _____	9. _____	9. _____	9. _____	9. _____	9. _____
10. _____	10. _____	10. _____	10. _____	10. _____	10. _____
11. _____	11. _____	11. _____	11. _____	11. _____	11. _____
12. _____	12. _____	12. _____	12. _____	12. _____	12. _____
13. _____	13. _____	13. _____	13. _____	13. _____	13. _____
14. _____	14. _____	14. _____	14. _____	14. _____	14. _____
15. _____	15. _____	15. _____	15. _____	15. _____	15. _____

12. Finally, please indicate which reasons are associated with the following distances. (Use full card)

1-2 Blocks	About 1 Mile	1-5 Miles	5-10 Miles	10-20 Miles	20+ Miles
1. _____	1. _____	1. _____	1. _____	1. _____	1. _____
2. _____	2. _____	2. _____	2. _____	2. _____	2. _____
3. _____	3. _____	3. _____	3. _____	3. _____	3. _____
4. _____	4. _____	4. _____	4. _____	4. _____	4. _____
5. _____	5. _____	5. _____	5. _____	5. _____	5. _____
6. _____	6. _____	6. _____	6. _____	6. _____	6. _____
7. _____	7. _____	7. _____	7. _____	7. _____	7. _____
8. _____	8. _____	8. _____	8. _____	8. _____	8. _____
9. _____	9. _____	9. _____	9. _____	9. _____	9. _____
10. _____	10. _____	10. _____	10. _____	10. _____	10. _____
11. _____	11. _____	11. _____	11. _____	11. _____	11. _____
12. _____	12. _____	12. _____	12. _____	12. _____	12. _____
13. _____	13. _____	13. _____	13. _____	13. _____	13. _____
14. _____	14. _____	14. _____	14. _____	14. _____	14. _____
15. _____	15. _____	15. _____	15. _____	15. _____	15. _____

13. Do you feel that you have adequate access to transport services for the following purposes?

- a) medical needs (routine)
- b) specialty medical
- c) grocery shopping
- d) other shopping
- e) physical recreation
- f) church
- g) informal meetings with friends/family
- h) club/hobby group/committee meetings
- i) banking/financial/legal

- 13.a. Y___ N___
- b. Y___ N___
- c. Y___ N___
- d. Y___ N___
- e. Y___ N___
- f. Y___ N___
- g. Y___ N___
- h. Y___ N___
- i. Y___ N___

14. Are you aware of any public transport that you can use from your residence?

- 15.a. _____
- b. _____
- c. _____
- d. _____
- e. _____

15. What public transport systems *that you know of* serve this area?

- 14.a. _____
- b. _____
- c. _____
- d. _____
- e. _____

16. How often do you use each type of transport listed above?
(use responses to #14)
(record times per week, month, or year)

- 16 a. _____
- b. _____
- c. _____
- d. _____
- e. _____

17. How would you rate each of the services listed above, using "Excellent, Satisfactory, or Poor"? (Record below rating by service (a-e) by factor (1-6). Use responses to #16.)

- | | | | |
|-------------------------------|------------|--------------|-------|
| | (1) | (2) | (3) |
| 1) easy to access | (Excellent | Satisfactory | Poor) |
| 2) reliable/on time | (Excellent | Satisfactory | Poor) |
| 3) adequate schedule | (Excellent | Satisfactory | Poor) |
| 4) comfort of vehicle | (Excellent | Satisfactory | Poor) |
| 5) safe/courteous driver | (Excellent | Satisfactory | Poor) |
| 6) can select necessary dest. | (Excellent | Satisfactory | Poor) |

a. _____	b. _____	c. _____	d. _____	e. _____
1. _____	1. _____	1. _____	1. _____	1. _____
2. _____	2. _____	2. _____	2. _____	2. _____
3. _____	3. _____	3. _____	3. _____	3. _____
4. _____	4. _____	4. _____	4. _____	4. _____
5. _____	5. _____	5. _____	5. _____	5. _____
6. _____	6. _____	6. _____	6. _____	6. _____

18. How could each of these services be improved? (Use responses to #14)

a. _____

b. _____

c. _____

d. _____

e. _____

19. Many communities, friends, relatives or neighbors provide transport for those who need it. Do any of the following OFFER transport to you? And do you ACCEPT it when its offered?

	OFFER	ACCEPT
a) nearby neighbors/friends	a. Y___ N___	Y___ N___
b) friends NOT nearby	b. Y___ N___	Y___ N___
c) nearby relatives	c. Y___ N___	Y___ N___
d) relatives living over 30 min away.	d. Y___ N___	Y___ N___
e) other (specify)	e. Y___ N___	Y___ N___

20. If the community were to organize a system of volunteer drivers who would offer transportation, would you use it?

20. Y___ N___

21. When you take a trip, do you ever combine purposes on a single journey? For example, do you go to several places or try to do several things in a single trip away from home? (Record number)

- (1) NEVER (2) OCCASIONALLY (3) REGULARLY

21. _____

22. What purposes do you commonly combine in single trips? (use codes from full CARD 9)

a. _____ + _____ + _____ + _____ + _____ + _____
 b. _____ + _____ + _____ + _____ + _____ + _____
 c. _____ + _____ + _____ + _____ + _____ + _____
 d. _____ + _____ + _____ + _____ + _____ + _____
 e. _____ + _____ + _____ + _____ + _____ + _____

23. Why do you combine purposes? (Open-ended: check all that apply or fill in reasons)

- | | |
|---|----------|
| a) Prefer to make multiple stops | a. _____ |
| b) Necessary because transport is not often available | b. _____ |
| c) It saves money | c. _____ |
| d) It is less stressful | d. _____ |
| e) Saves gas | e. _____ |
| f.) Saves time | f. _____ |
| g) Opportunity for socializing | g. _____ |
| h) Proximity of chained destination to each other | h. _____ |
| i) other (specify) | i. _____ |
| | j. _____ |
| | k. _____ |

23a. Compared to when you were younger, do you now tend to combine purposes in a single trip:

- 1) MORE OFTEN 2) ABOUT THE SAME 3) LESS OFTEN 23a. _____

24. What do you think are the major problems associated with getting out to satisfy your needs?

24. a. _____
 b. _____
 c. _____
 d. _____

25. If you are UNABLE to go out, could you indicate how WELL the following needs are met using a scale of 5 (being very good) to 1 (being very poor)?

- | | | | | | | |
|----------------------------|-----------|---|---|---|---|----------|
| a) grocery delivery | a. (Good) | 5 | 4 | 3 | 2 | 1 (Poor) |
| b) prepared meal delivery | b. (Good) | 5 | 4 | 3 | 2 | 1 (Poor) |
| c) social visits | c. (Good) | 5 | 4 | 3 | 2 | 1 (Poor) |
| d) medical needs | d. (Good) | 5 | 4 | 3 | 2 | 1 (Poor) |
| e) religious needs | e. (Good) | 5 | 4 | 3 | 2 | 1 (Poor) |
| f) banking/financial/legal | f. (Good) | 5 | 4 | 3 | 2 | 1 (Poor) |

25a. If you are UNABLE to go out, HOW are the above needs met?

- a) grocery delivery _____
- b) prepared meal delivery _____
- c) social visits _____
- d) medical needs _____
- e) religious needs _____
- f) banking/financial/legal _____

26. In what year were you born? 26. _____

27. Sex: 27. M___ F___

28. Zip Code: 28. _____

29. General income category: (refer to Card 29) 29. _____

30. (Where is the residence located. Ask if meeting is somewhere other than at respondent home.)

Within Corporate City Limits _____
City Fringe _____
Rural _____

CARD 2b

Factors That Would Make You Avoid Driving

(101) Too Close to Destination

(102) Destination Too Far Away

(201) Type of Road (county / interstate)

(202) Quality of Road

(301) Overcast Skies

(302) Rainy Weather

(303) Snowy Weather

(304) Foggy Weather

(401) Time of Day (Available Light)

(402) Amount of Traffic

(501) Availability of Passengers

(502) Fuel Expense

(503) Dependability of Vehicle

(504) Physical Limitations

CARD 9

Reasons for Going Outside of Home

- (101) Grocery Shopping
 - (102) Shopping for Clothes
 - (103) Shopping for Household Items
 - (104) Other Shopping
 - (105) Post Office

 - (201) General Medical
 - (202) Specialty Medical
 - (203) Dentist
 - (204) Drug Store

 - (301) Breakfast at Restaurant
 - (302) Lunch at Restaurant
 - (303) Dinner at Restaurant

 - (401) Visiting Friends
 - (402) Visiting Family

 - (501) Clubs, Committees, etc.
 - (502) Church - Services
 - (503) Church - Other Activities

 - (601) Movies
 - (602) Athletic Recreation
 - (603) Other Recreation
 - (604) Library
 - (605) Laundry/Dry Cleaning
 - (606) Beauty Salon/Barber

 - (701) Volunteer Work
 - (702) Banking
 - (703) Meetings: other Professionals
 - (704) Non-volunteer Work
-

CARD 29

Household Income Categories

(101) Below \$5,000

(102) \$5,000 - \$9,999

(103) \$10,000 - \$14,999

(104) \$15,000 - \$19,999

(105) \$20,000 - \$24,999

(106) \$25,000 - \$34,999

(107) \$35,000 - \$49,999

(108) \$50,000 or more

NOTICE

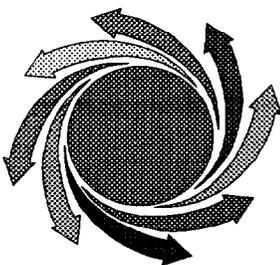
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