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Transportation Access: A Key Employment Barrier for Rural Low-Income Families

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Findings from three sequential studies build an understanding of the transportation barriers facing poor rural families and the link between transportation access and economic outcomes. An in-depth, longitudinal qualitative study explored multiple dimensions of the role of transportation in family life. The results of this study yielded emergent themes and hypotheses used in the subsequent studies. The second study used multiple methods to analyze Census data, vehicle registration lists, and focus group interviews to identify transportation resources in a rural county and to assess transportation needs and barriers facing welfare recipients. The third study addressed the association between transportation and economic outcomes using a dual frame household survey in a cluster of five counties. The article concludes that although policies to provide access to transportation services for rural families may enhance employment opportunities, other related outcomes and longer term effects require additional study.

KEYWORDS transportation, vehicle ownership, employment, rural, low-income

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> A lot of people won't hire you . . . if they already know you don't have reliable transportation. That's one of the questions they ask you in interviews anymore: "Do you have reliable transportation? Is it yours?" When you say, "no, it's not mine,"— then it isn't reliable. (a welfare recipient in rural Iowa)

Promoting work among low-income populations has been an objective of public policies in the United States since the early 1960s (Blank, Danziger, & Schoeni, 2006). Shifts in women's labor force participation and family structure prompted incremental changes in the Aid to Families with Dependent Children (AFDC) program, culminating in passage of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA). PRWORA abolished the AFDC program and instituted the Temporary Assistance to Needy Families (TANF) program with work requirements and time limits for those receiving cash assistance. At the same time cash welfare programs were changing, other policy reforms expanded work incentives and targeted a broader segment of the low-income population. For example, changes in the food stamp program required some recipients to seek work, and expansion of the Earned Income Tax Credit provided additional financial incentives for low-income families to earn income.

Meeting these work requirements and, subsequently, improving economic outcomes for low-income families are concerns for people in rural and urban areas. However, rural areas have demographic, economic, and geographic characteristics that may translate into unique challenges for implementing policies to encourage work for social assistance participants. Compared with urban areas, many rural communities have higher poverty levels, greater unemployment, lower education levels, lower incomes, and longer distances between home, child care, and work sites. Because of lower population density, rural areas tend to have higher costs for services and frequently lack a full range of services (Weber, Duncan, & Whitener, 2002). These characteristics all contribute to a unique context in which to implement policies designed to encourage work.

An extensive literature explores the effects of welfare policies during the past decade, particularly the transition from welfare to work (e.g., Acs & Loprest, 2004; Danziger, Heflin, Corcoran, Oltmans, & Wang, 2002; Turner, Danziger, & Seefeldt, 2006). In general, studies document significant increases in employment rates among single mothers—the majority of welfare recipients. However, these studies identify a number of barriers to obtaining and retaining jobs. Among barriers to employment, welfare recipients consistently identify transportation as a serious problem. Several studies analyze the role of transportation in employment outcomes in urban labor markets; some investigate welfare populations (Allard & Danziger, 2002; Blumenberg & Manville, 2004; Holzer & Stoll, 2001; Pawasarat & Stetzer, 1998; Pugh, 1998), and others study a more inclusive sample of low-income

households (Blumenberg, 2000; Blumenberg & Ong, 1998; Lichtenwalter, Koeske, & Sales, 2006; McQuaid, Greig, & Adams, 2001; Ong & Blumenberg, 1998). None of these studies focus specifically on rural low-income populations.

This article synthesizes findings from three studies conducted in one state, Iowa. Each study explored the importance of transportation for employment among rural low-income families. In aggregate, the studies provide evidence of the importance of reliable transportation for increasing the likelihood that rural low-income adults would be employed. Results from the three sequential studies allow triangulation of findings and improve our understanding of the relationship between transportation access and economic outcomes. The three studies are presented in chronological order. The first was a longitudinal qualitative study of 35 welfare recipients (5 in each of 7 county seat communities) conducted over 3 years. The overall objective was to observe multiple dimensions of family well-being, including the role of transportation in achieving economic outcomes. The second study built on these findings and explored transportation as a strategy for moving rural welfare recipients into the labor force. It used multiple methods to identify transportation resources in a rural county and to assess transportation needs and barriers facing welfare recipients as they moved from welfare to work. The study analyzed commuting patterns, vehicle ownership among welfare recipients, and the views of transportation professionals and welfare recipients. The third study analyzed the associations between transportation and employment identified in the first two studies using a dual-frame household survey in a cluster of five counties. The paper concludes with a discussion of the implications of the findings from these three studies for rural transportation policies and programs.

PREVIOUS STUDIES

A number of studies prior to PRWORA explored transportation and job access for low-income households within the context of the spatial mismatch hypothesis. This hypothesis put forward an argument that the migration of people and employment opportunities from inner cities left behind an underclass of increasingly difficult to employ, low-income Black men (see Holzer, 1991; Kain, 1968, 1992; Wilson, 1987). More recent research conducted in urban areas lent support to the idea that a spatial mismatch existed between welfare recipients and job opportunities (Allard & Danziger, 2002; Holzer & Stoll, 2001; Pugh, 1998). Other studies have looked at employment patterns among low-income households and have documented that location is important in understanding economic outcomes (Blumenberg, 2000; Blumenberg & Ong, 1998; McQuaid et al., 2001; Ong & Blumenberg, 1998; Thompson, 1997).

Stricter requirements for public assistance receipt sparked renewed interest in spatial mismatch, especially with regard to moving welfare recipients into the labor force. Ihlanfeldt and Sjoquist (1998) concluded that spatial mismatch explained a class rather than a racial divide. Others, however, argued that spatial mismatch was not the key issue in understanding employment (Ellwood, 1986; Ong, 2002; Taylor & Ong, 1995; Zax & Kain, 1991). Taylor and Ong (1995) identified a "mode mismatch," not a spatial mismatch, in Los Angeles, California. That is, car ownership was found to be more important in determining employment than commuting distance. Other urban studies have supported the idea that access to a car was associated with employment and other positive economic outcomes (Cervero, Sandoval, & Landis, 2002; Danziger et al., 2000; Gustitus, Simmons, & Waller, 2008; Gurley & Bruce, 2005; Lichtenwalter et al., 2006; Ong, 1996; Raphael & Rice, 2002; Raphael & Stoll, 2001; Turner et al., 2006).

Early studies documented a positive correlation between car ownership and employment. Subsequent research has provided stronger evidence about causality by accounting for the simultaneity of employment and transportation decisions using instrumental variable techniques and panel study methods. Cervero et al. (2002) observed welfare recipients in three California counties who were unemployed and receiving welfare benefits when first interviewed. Their longitudinal data provided support that car ownership, along with education, significantly increased the odds of employment. Similarly, Gurley and Bruce (2005), using four waves of longitudinal survey data of current and former welfare recipients in Tennessee, found support that car access increased the odds of employment and leaving welfare. Other studies have addressed the issue of endogeneity of car ownership and employment through econometric techniques (e.g., identifying instrumental variables for car ownership) and have provided further support that vehicle access influenced employment outcomes (Ong, 2002; Raphael & Rice, 2002; Raphael & Stoll, 2001). Most studies have used quantitative analyses of the relationship between transportation and employment. Much less attention has been given to qualitative methods to capture not only a better understanding of this relationship, but also the full array of transportation needs of low-income populations. Focus groups were used to explore welfare-to-work policy issues with urban stakeholders (e.g., Multisystems et al., 2000), and Clifton (2004) used semistructured interviews to investigate mobility and food shopping strategies in a metro area, but there has been a dearth of multimethod research on transportation and rural poverty.

The results from the three Iowa studies reported in this article provide a better understanding of the need for and use of transportation resources in rural areas by low-income families. Generally speaking, these studies concur with the literature and find that access to reliable transportation widens job searches and aids low-income rural adults in obtaining and retaining employment. The qualitative findings also shed new light on the complexity

of meeting nonwork transportation needs when faced with time, financial, and distance constraints. Together, the findings from this unique set of studies have direct implications for the design of rural transportation policies and programs.

STUDY 1: THE FAMILY WELL-BEING AND WELFARE REFORM IN IOWA STUDY

The first investigation was a qualitative, longitudinal study of 35 families who were receiving cash welfare (called the Family Investment Program or FIP—Iowa's TANF program) benefits in mid-1997. This study was one component of a baseline study conducted by an interdisciplinary research team in the early years of welfare reform (see Fletcher, Flora, Gaddis, Winter, & Litt, 2002 for a detailed description of the study). Families were selected randomly from public assistance rolls in seven Iowa communities. Selection criteria for the targeted communities included population size, presence of a sizable Latino population, and geographic dispersion across the state. Six of the seven communities were in rural (nonmetropolitan) counties.

Six in-depth semistructured interviews were conducted between mid-1997 and early 2001 on a broad range of topics, including daily routines, family relationships, income and employment, housing and transportation, child well-being, and health (see Fletcher & Winter, 2007 for more information about the family interviews). At the first interview, more than one half (57%) of the families were headed by unmarried or divorcing women, one in four (26%) were married couples, and the remainder were women living with a partner. Seventy percent of the families had one or two children. One in four respondents had not completed high school, one half had a high school diploma or a General Equivalency Diploma (GED), and the remaining one fourth had training beyond high school. Interviews were tape-recorded and transcribed verbatim for subsequent coding and analysis. Qualitative analysis identified five themes that illustrate the transportation experiences of low-income families; however, these findings cannot be generalized.

- Barriers to owning and driving a car presented significant problems for rural low-income residents: Fourteen of the 35 respondents did not own or have ready access to a vehicle. Five did not have a driver's license and three could not drive a car because of physical limitations. Previous driving violations that resulted in unpaid fines and undocumented legal status were barriers to obtaining licenses. The high costs of purchasing and insuring a reliable vehicle were mentioned frequently. One respondent who did have a newer vehicle described her monthly car payments as

"killing her," yet she needed a reliable car to get to work. An uninsured respondent sold her car after an accident for lack of funds for repairs.

- Old, unreliable vehicles were typical; costly repairs frequently occurred: Those who owned cars invariably described them as old and frequently in need of repair. Finding and affording trustworthy mechanics were common problems. The costs of parts and repairs remained a challenge, often leading respondents to seek the help of friends or relatives who could repair cars. One car owner explained, "he [her spouse] can fix the car, we just don't have the money to buy the parts." Another woman took out a loan for school, but used some of the funds for car repairs.
- Respondents described many ways of getting where they needed to go. Some walked; some received rides from family, friends, and neighbors. Others borrowed a vehicle to make necessary trips. One woman who did not have a car walked "about everywhere." When she did have a ride, she would purchase a month's worth of groceries at a time because she did not know when she would get her next ride. The inconvenience and uncertainty of this situation was reflected in her comment, "It's hard. I hate it." A common theme in the interviews was the extensive help that many of the recipients received from family or friends. The type of help others provided varied greatly—from giving a person a loan or buying them a car, to taking them places, to buying gasoline, to loaning them a car. It was clear that without this informal network, many of the interviewed families would have been in far worse shape. However, relying on others had its disadvantages. One woman reported that "it's a real imposition and takes a lot of time" when a friend took her long distances for medical care. Others described the uncertainty that reliance on friends implied. However, the exchange was not one-way. Respondents with cars reported giving rides to relatives; carpooling to school, child care, or work with others; and giving rides to the grocery store to neighbors who did not have transportation.
- Lack of reliable transportation was a barrier to employment: Lack of reliable transportation limited the ability to obtain and retain jobs. One young woman reported that lacking a car kept her from having a job: "I'm going to get me a car so I can have a job." Another described better job opportunities in other communities, but she could not afford to move and her car was not "good enough" to commute. Therefore, she limited her job search to openings "in town." Even for residents in the largest community in the study, the existence of a city bus system did not ensure job access. An unemployed woman explained that a short commute by car would take an hour by bus, but "The buses don't even start out here until 6:15 in the morning. So how the heck can I get to work by 6:30?"
- Transportation access went beyond employment and affected critical everyday family care: Transportation access influenced many other decisions such as child care, school, and health care. One mother was

considering transferring her children to a different school that was closer to the babysitter so they could walk to school. The mother of a disabled child described the availability of the nearest respite care: "It's a pain to have to drive 40 miles one way for care, but this is the only approved place." Many respondents described health problems that required frequent doctor visits, often to distant services in larger cities. One family discontinued taking their child twice weekly to a specialty clinic 50 miles away because of vehicle problems.

STUDY 2: RURAL WELFARE-TO-WORK STRATEGIES NEEDS ASSESSMENT

The second study was conducted in 2000 as part of a U.S. Department of Health and Human Services initiative "to increase knowledge about strategies currently used in rural areas, to develop new strategies and approaches to be tested, and to assist in designing . . . methods to evaluate alternative strategies to reform welfare in low-income rural communities" (Marks & Wiseman, 2001, p. 1). Under the auspices of the Administration for Children and Families, 10 states received planning grants to each explore a strategy that would increase the ability of rural families to move from welfare to work.

The Iowa project focused on transportation, with an in-depth study of a rural county located in the southeast corner of the state (Fletcher & Jensen, 2000). The chosen county was rural (nonmetropolitan) and not adjacent to a metro area (Butler & Beale, 1993). Its population in 2000 reflected a 14% decline since peaking in 1960. Per capita personal income was about 10% below the state average of $21,587. Reflecting low household incomes, more than one in three children were eligible for free or reduced-price school lunches. Among the adult welfare recipients in the county in mid-1999 (at the time of the study), nearly 90% were in a current welfare spell lasting 12 months or longer.

The two-part study began with a needs assessment that entailed analyzing administrative and secondary data to develop a profile of work patterns in Iowa and to identify specific transportation issues in the targeted rural county. This was followed by two focus group interviews that provided qualitative data on local transportation needs. The county's welfare recipient roster was matched with vehicle registrations. About one in four (24%) welfare recipients were registered as the owner of a vehicle. Not surprising was that the vehicles owned by recipients were older; 85% of the vehicles were at least 8 years old. It should be noted, however, that vehicle registration was merely an indicator of access to private transportation on a regular basis. It was not possible to (1) identity all the adults (e.g., welfare recipients and vehicle owners) in a household, (2) match vehicle owners with

vehicle users and the vehicles available to a household, and (3) establish the working order and reliability of the vehicles.

To gain an understanding of the local labor market, the county's employment and commuting patterns were analyzed using U.S. Census Bureau data. (For this article, the original analysis (Fletcher & Jensen 2000) was updated using data from the 2000 census and extended to look at statewide trends.) Table 1 illustrates the earnings premium available to residents who commuted out of their home county to work by comparing mean annual salaries of commuters to resident workers. Statewide, commuters (either into or out of the county) had higher mean salaries than resident workers. Although all salaries in nonmetropolitan counties were lower than in metropolitan areas, gains from commuting held across all county classifications. Focusing on nonmetropolitan county commuters, in- and out-commuters in counties adjacent to a metropolitan county had higher salaries compared to corresponding in- and out-commuters in counties that were not adjacent to a metro county. Among nonmetropolitan resident workers, however, those in counties adjacent to a metro county earned slightly less than those in counties not adjacent to a metro county.

In the study site—a nonmetropolitan county that was not adjacent to a metro county—the wages of out-of-county commuters were, on average,

TABLE 1 Mean Annual Salaries by Commuter Status

	Resident workers (1)	Commuters into county (2)	Commuters out of county (3)
All Iowa counties			
All counties	$27,507	$29,467	$30,279
County classification:			
Metropolitan	29,926	31,297	33,365
Nonmetropolitan/adjacent to metropolitan	24,115	27,540	27,642
Nonmetropolitan/not adjacent to metropolitan	24,489	26,035	26,427
Targeted Iowa county: Nonmetropolitan/not adjacent to metropolitan			
All workers	26,593	28,189	28,098
Industry			
Self-employed	26,814	31,153	15,355
Agricultural	16,339	—	43,846
Construction	29,087	32,390	34,137
Manufacturing	34,523	32,931	32,078
Transport, public utility	43,178	37,880	33,979
Wholesale/retail	20,885	19,398	22,258
Information, finance, insurance, real estate	25,767	31,291	22,406
Services	18,823	19,173	24,743
State & local government	27,519	34,385	30,799
Federal civilian, military	40,166	35,126	33,058

Source. 2000 Census. Salaries reported for 1999. Number of workers by county of residence by county of work. County classifications based on Butler and Beale (1993).

significantly higher than resident workers ($28,098 vs. $26,593, see Table 1). This expected result compensates, at least in part, for any increased commuting costs. The pattern held within the two industry sectors in which welfare recipients often find employment—wholesale/retail and services. Those commuting out of county for wholesale/retail jobs earned about $1,400 more than resident workers in the same industry in 1999; there was nearly a $6,000 earnings premium to out-of-county commuters in the service sector.

In addition to the needs assessment derived from secondary data, two focus group interviews were conducted. One focus group involved eight community professionals, including local government officials, front-line social workers, and transportation experts. A second focus group interviewed eight welfare recipients who ranged in age from 22 to 36 years and were mothers of one to four children. The focus group findings augmented the secondary data analysis and provided timely information about existing resources and needs to guide the development and implementation of a welfare-to-work strategy.

- In focus group interviews, both county professionals and low-income welfare recipients indicated that transportation posed a major problem for low- income residents in a rural county: County professionals and welfare recipients who were interviewed generally agreed that many transportation services were not available to rural (defined by the group as those residents living outside the two largest incorporated towns in the county) residents; most services were restricted to specific client groups. For example, most agencies and organizations that owned vans were located within these two communities and restricted their transportation services to their own clientele. A program that connected volunteers driving their personal vehicles with individuals needing rides operated in one of the towns and served only those residents.
- County professionals recognized a lack of coordination and communication among service providers: County professionals indicated that there was little communication or coordination among service providers; and that none of the existing transportation services—public or private—in the county would likely meet the needs of a welfare recipient commuting daily to work. Although the group acknowledged that any coordinated effort would have challenges in meeting the broad range of transportation needs in the county, the preference was clearly for some form of a multipurpose passenger system (or mass transit) instead of an individual approach (private vehicle) to meeting the specific needs of welfare recipients.
- Welfare recipients viewed reliable, private vehicles as the only transportation option that would meet their needs: The welfare recipients saw transportation as only one part of their general, locational challenges. Their discussion was dominated by the challenges of coordinating transportation

from home, to child care and/or school, to work and return. These mothers described the desire to be "on call" to meet children's needs during work hours and concluded that the only means of transportation that met all of their needs was reliable, private vehicles. They voiced skepticism that a multipurpose passenger system (as discussed by the professionals) would meet their needs and had many questions about the logistics, safety and continuity of such a system.

- Welfare recipients saw a need for assistance to obtain access to private vehicle ownership: The low-income residents discussed the high costs of insuring, repairing, and maintaining older, unreliable vehicles. They described multiple ways of "getting a ride" when their cars were not running and the drawbacks of relying on others for transportation. The group preferred an approach that would provide low-interest loans for welfare participants to purchase an automobile, regardless of their credit history.

STUDY 3: IOWA TRANSPORTATION AND EMPLOYMENT SURVEY

The first two studies informed the third study, but were limited in terms of being able to estimate the magnitude of the relationship between transportation and employment. The Iowa Transportation and Employment Survey (ITES) involved the development of a survey instrument that explored a number of dimensions of transportation access and barriers, and a survey sample design that would target welfare recipients and other important reference populations. The ITES allowed for the simultaneous estimation of probabilities of employment and access to transportation to evaluate the role of transportation as a predictor of employment among a low-income population that included, but was not limited to, welfare recipients. In this article, the analyses of Garasky, Fletcher and Jensen (2006) are extended by simulating the effects of selected variables on the probability of being employed.

METHOD

Data and Sample Design

The ITES gathered extensive information about each household's owned and leased vehicles, the reliability of each vehicle, and the respondent's access to each vehicle. Respondents also reported whether they had experienced financial problems associated with owning and maintaining their vehicle(s), their transportation needs and uses, and their human resources related to transportation—their ability to drive and whether they currently were licensed drivers. In addition, demographic and family economic data were collected.

The study population was households in a five-county cluster in northeast Iowa that included a small metropolitan county, two nonmetropolitan

counties adjacent to the metro county, and two nonmetropolitan counties that were not adjacent to the metro county (Anderson, Nusser, & Anderson, 2001). A county was classified as metropolitan or nonmetropolitan using a rural-urban continuum developed by Butler and Beale (1993). The sampling design incorporated an oversampling of low-income households defined as those reporting incomes less than 200% of the official U.S. poverty line.

The dual-frame design for the five counties included a random-digit dial (RDD) sample of the general population plus a list of all cash welfare and food stamp recipients for November 2000. Both sampling frames were stratified according to population density and location relative to a metropolitan county (i.e., adjacent or nonadjacent) based on rural-urban continuum codes (Butler & Beale, 1993). Telephone interviews were conducted from February to May 2001 with a randomly selected household respondent. The final data set included 768 households, 535 reached via the RDD frame and 233 contacted from the welfare frame. Household weights were developed to be representative of the five-county population. All analyses in Garasky et al. (2006) and Study 3 here used these weights.

This discussion focuses on low-income ITES households building on the analysis of Garasky et al. (2006). Garasky et al. investigated the role of reliable vehicles in facilitating employment among low-income households using a multivariate regression strategy (a three-step system estimation) that simultaneously controlled for the likely endogeneity of employment and transportation (i.e., employment is affected by access to reliable transportation and access to reliable transportation is affected by employment) (Greene, 2000; Zellner & Theil, 1962). This approach allowed access to a reliable vehicle to be included among the variables in the employment probability equation and employment status to help predict access to transportation. See Garasky et al. (2006) for more methodological details.

To more clearly explicate the public policy implications of the research findings, regression coefficients from of Garasky et al. (2006) were used in employment simulations that altered the values of variables (i.e., "policy-relevant variables") that reflect areas over which policy makers often attempt to affect individual and social outcomes (e.g., education, public health, transportation). More specifically, the mean characteristics of the sample population were assigned to a respondent, referred to as the "hypothetical respondent." Next, one (or more) of the policy-relevant characteristics of the hypothetical respondent changed values (e.g., the hypothetical respondent has not earned a high school education compared to having graduated from high school). The likelihood that the hypothetical respondent was employed was predicted for each value of the policy-relevant characteristic while holding the values of the other variables stable at their sample means. The difference between the probabilities of employment estimated the potential impact of that changed policy variable on the probability of employment.

RESULTS

Garasky et al. (2006) restricted their analysis to ITES households with respondents between ages 18 and 64 and incomes less than or equal to 200% of poverty (N = 290). Transportation problems presented a significant challenge for this low-income group. As shown in Table 2 (from Garasky et al., 2006), only 62% of the adults always had access to a reliable vehicle. Nearly

TABLE 2 Transportation Characteristics of Iowa Transportation and Employment Survey (ITES) Low-Income Sample (weighted % distributions)

Variable	≤ 200% of Poverty
Number of vehicles in household[a]	
0	14.0
1	42.8
2	25.5
3+	17.7
Own at least one vehicle	
Yes	86.0
No	14.0
Own or access to vehicle[b]	
Yes	91.3
No	8.7
Reliable vehicle available[c]	
Yes	62.4
No	37.6
Past government or transportation assistance[d]	
Yes	28.6
No	71.4
Past transportation problems[e]	
Yes	12.1
No	87.9
Past financial transportation hardship[f]	
Yes	48.2
No	51.8
Number (unweighted)	290

[a]Number owned or leased by all household members.
[b]Respondent owned or "always" had a vehicle available for use.
[c]A "very reliable" vehicle was "always" available for use. (Self-reported "very reliable" vs. somewhat reliable, somewhat unreliable, very unreliable or not working at all. Self-reported "always" vs. often, sometimes, seldom or never available for use).
[d]Reported that, because income was low, someone in household received either government assistance or transportation assistance from government in calendar year 2000.
[e]Reported that transportation problems caused one or more of the following to happen during calendar year 2000: (1) had to quit a job, (2) had to quit a training activity or school, (3) unable to start or take a job, or (4) unable to start a training activity or school.
[f]Reported experiencing "transportation financial hardship" in the past 12 months (self-reported neglect of repairs, lack of money for gasoline, lapse of insurance, missed car payment and/or vehicle repossession).

TABLE 3 Descriptive Statistics for Variables Used in Multivariate Analyses

Variable	Proportion or Mean Value	*SD*	Min.	Max.
Employed (yes = 1)	0.62		0	1
Reliable vehicle available[a] (yes = 1)	0.63		0	1
Mean age (years)	36.85	12.84	19	64
Race (White = 1)	0.85		0	1
Female (yes = 1)	0.65		0	1
Education: Less than high school[b] (yes = 1)	0.12		0	1
Education: High school graduate or General Equivalency Diploma only[b] (yes = 1)	0.38		0	1
Health: Fair or poor[c] (yes = 1)	0.18		0	1
Past financial transportation hardship[d] (yes = 1)	0.48		0	1
Another adult(s) in household (yes = 1)	0.58		0	1
Mean unearned monthly income[e] ($)	704.66	716.40	0.00	2917.00
Mean county unemployment rate (%)	4.28	1.23	2.8	8.1
Metro[f] (yes = 1)	0.72		0	1
Adjacent to metro[f] (yes = 1)	0.12		0	1

Source. Reprinted with permission from Garasky, Fletcher, & Jensen (2006).

[a]Reported that a "very reliable" vehicle was "always" available for use. Base case is no "very reliable" vehicles were always available.

[b]Base case is some education beyond high school which includes vocational school, technical school, and college.

[c]Self-reported rating of own health. Base case is not fair or poor (excellent, very good, or good).

[d]Reported experiencing "transportation financial hardship" in the past 12 months (self-reported neglect of repairs, lack of money for gasoline, lapse of insurance, missed car payment and/or vehicle repossession).

[e]Reported total household income in 2000 on a monthly basis (divided by 12) minus reported monthly earnings including tips. Unearned monthly income is set to zero if reported monthly earnings including tips are greater than reported total household income on a monthly basis.

[f]Categorization of the urbanicity of the respondent's county of residence based on Beale codes (See Butler & Beale, 1993). Base case is residing in a rural area.

29% had received past government or transportation assistance. Nearly one half (48.2%) had experienced some type of financial hardship related to transportation in the last year.

Table 3 (from Garasky et al., 2006) provides descriptive statistics of the study sample for the variables included in their multivariate analysis and used in our employment simulations. Sixty-two percent of the respondents were employed at the time of the interview; 63% had access to a reliable vehicle. Respondents were predominately White (85%) and female (65%) with a mean age of 37 years. About one half of the respondents had some education beyond high school and 18% reported being in fair or poor health. About one half (58%) of the households had another adult(s) in addition to the respondent. Mean monthly unearned income was $705. Three fourths (72%) of the sample was from the metropolitan county.

Table 4 presents the estimated coefficients from the multivariate regression model of Garasky et al. (2006). As discussed above, the sample characteristics reported in Table 3 and the regression coefficients in Table 4 were used in our employment simulations. That is, the hypothetical respondent in the

TABLE 4 Estimated Coefficients for Vehicle Availability and Employment Equations

	Employment equation			Availability of a reliable vehicle equation		
Variable	Coeff.	*SE*	*SE β*	Coeff.	*SE*	*SE β*
Constant	0.421	0.260	1.618	0.334**	0.117	2.859
Reliable vehicle available[a]	0.331†	0.169	1.956			
Employed				0.689**	0.114	6.072
Age	0.005	0.009	0.568			
Age squared	–0.0001	0.0001	–1.020			
White	0.114*	0.054	2.117			
Female	0.064†	0.036	1.743			
Education: Less than high school[b]	–0.198*	0.083	–2.399			
Education: High school or General Equivalency Diploma only[b]	–0.029	0.037	–0.802			
Health: Fair or poor[c]	–0.290**	0.064	–4.559			
Financial transportation hardship[d]				–0.198**	0.053	–3.714
Another adult(s) in household	0.188**	0.053	3.551	–0.265**	0.058	–4.558
Unearned monthly income[e]	–0.0003**	0.00003	–9.672	0.0003**	0.00005	5.331
County unemployment rate	0.008	0.025	0.303			
Metro[f]	–0.017	0.100	–0.169	–0.072	0.072	–0.998
Adjacent to metro[f]	0.209†	0.107	1.948	–0.157	0.103	–1.515

Source. Reprinted with permission from Garasky, Fletcher, & Jensen (2006).

[a]Reported that a "very reliable" vehicle was "always" available for use. Base case is no "very reliable" vehicles are always available.

[b]Base case is some education beyond high school which includes vocational school, technical school, and college.

[c]Self-reported rating of own health. Base case is not fair or poor (excellent, very good, or good).

[d]Reported experiencing "transportation financial hardship" in the past 12 months (self-reported neglect of repairs, lack of money for gasoline, lapse of insurance, missed car payment and/or vehicle repossession).

[e]Reported total household income in 2000 on a monthly basis (divided by 12) minus reported monthly earnings including tips. Unearned monthly income is set to zero if reported monthly earnings including tips are greater than reported total household income on a monthly basis.

[f]Categorization of the urbanicity of the respondent's county of residence based on Beale's codes (See Butler & Beale, 1993). Base case is residing in a rural area.

†$p < .10$, *$p < .05$, **$p < .01$.

simulations was a 37-year-old White woman with an education beyond a high school degree. This typical respondent had a "very reliable" vehicle that was always available to her. She lived in a metro county, was in good or excellent health, and reported $705 in unearned income per month. Her county of residence had an unemployment rate of 4.3%. There was at least one other adult member in her household. Based on these characteristics and the regression results in Table 4, this hypothetical respondent had a predicted probability of employment of 82.5%.

The results of the simulation showed that transportation resources play an important role in employment outcomes (Figure 1). The lack of a reliable vehicle that was always available reduced the probability of employment by nearly 10 percentage points. Private transportation had the largest impact on

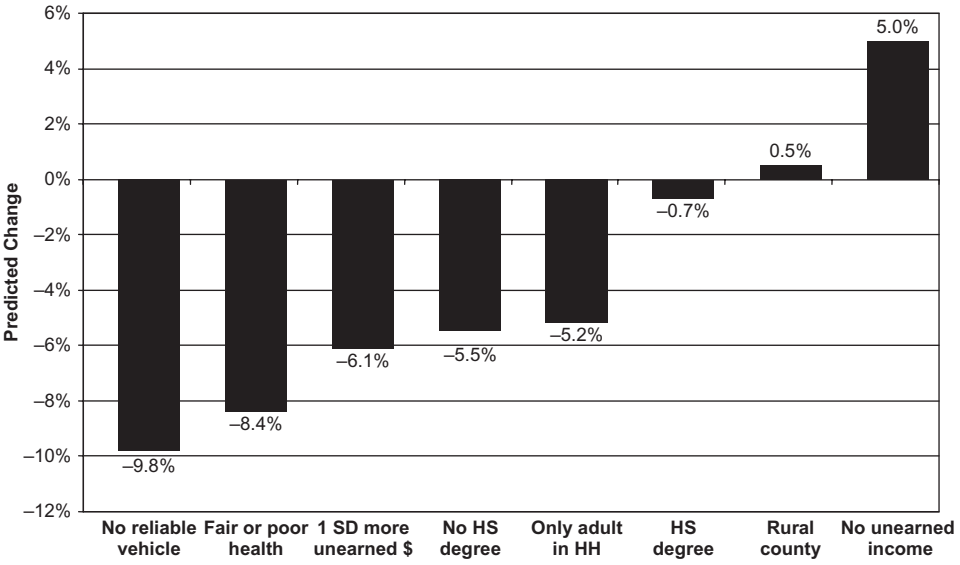

FIGURE 1 Predicted percentage point change in the probability of employment for hypothetical respondent.

Note. The hypothetical respondent with mean characteristics of the sample has a predicted probability of employment of 82.5%.

the probability of employment among the factors considered in the simulation. The second largest effect related to health; having fair or poor health reduced the likelihood of being employed by 8.4 percentage points. As expected, less education also reduced the probability of being employed. Interestingly, living in a rural location had little effect on the probability of employment for our hypothetical respondent.

The simulations reported in Figure 2 focus on three variables in the model that are relevant to policy makers: transportation, health, and education. The hypothetical respondent in these simulations had sample mean characteristics except for not having a high school education, having fair or poor health, and not having a reliable vehicle that was always available. With these three barriers to employment, the hypothetical respondent had a predicted probability of employment of 54.7 %. Addressing any one of these barriers to employment increased the likelihood that the hypothetical respondent would be employed. The strongest effect came from providing the respondent with reliable transportation. Always having access to a reliable vehicle increased the likelihood of employment by 12.6 percentage points. This impact was nearly double the effect of obtaining a high school degree (6.5 percentage points). The impact of improved health was nearly as strong as that of transportation (11.1 percentage points). As one might expect from the simulations that addressed the three obstacles independently, the strongest impact when jointly addressing two of the three

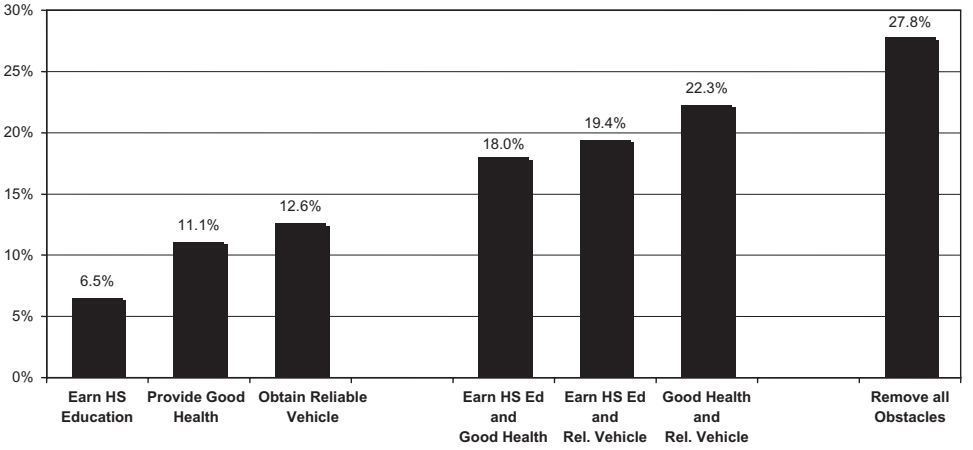

FIGURE 2 Predicted percentage point change in the probability of employment when policy-relevant obstacles removed.

Note. The hypothetical respondent has sample mean characteristics except for not having a high school education, having fair or poor health, and not having access to a reliable vehicle. The predicted probability of employment for the hypothetical respondent is 54.7%.

obstacles came from transportation and health (22.3 percentage points). Finally, addressing all three obstacles increased the likelihood of being employed by 27.8 percentage points. Stated another way, the probability of employment was more than 50% higher (27.8 percentage points) when education, health, and transportation obstacles were simultaneously removed.

SUMMARY

In sum, the first study showed the lack of reliable transportation presented many challenges to the 35 low-income families who participated in the interviews in terms of access to employment, high costs of private vehicles, and the basic management of everyday family life. The same constraints that created barriers to employment were also present for their nonwork travel needs, but spatial distances of rural Iowa exacerbated the financial and time pressures facing these families.

The second study analyzed county-level secondary data augmented by two focus groups and revealed a compelling, but perhaps not a surprising, need to address transportation as a critical strategy for rural welfare recipients to attain steady, well-paying jobs. A high proportion of welfare recipients in rural Iowa did not own private vehicles. Those who owned vehicles typically had older, unreliable cars. Although the majority of residents worked in the county, those who commuted out of county received, on average, higher wages. Importantly, the analysis suggested this

pattern of a wage premium for residents who commuted out of county held true when all Iowa counties were examined. There were no public transportation systems that met the daily commuting needs of rural county workers in the study county. Focus group interviews with community professionals and with welfare recipients demonstrated the challenges faced by policy makers who want to address barriers facing rural welfare recipients seeking jobs: Neither group perceived the needs presented by the other group. Although the moderator deliberately introduced this type of discussion in both sessions, each group had its own, unique view of the solutions to the transportation problems facing welfare recipients in the county.

The third study involved the development and application of a specially designed survey to collect data in a rural setting focused on various aspects of transportation access and barriers, especially related to employment. The study of a five-county area showed transportation problems to be significant for many of the adults surveyed. Nearly 40% lacked access to a reliable vehicle and transportation problems resulted in financial difficulties for nearly one half of those surveyed. Simulations showed that health and transportation presented significant barriers to improved employment outcomes and lifting either of these constraints would have a relatively large and positive impact on employment.

Each of the studies has certain limitations, but in sum they present a common picture of the constraints posed by lack of access to reliable transportation in rural areas. Although most of the work focused on specific local areas and labor markets, the findings are supported by state-wide data and the common themes that emerged across the studies. We are constrained in our ability to generalize the findings beyond the specific study areas and samples under investigation. In the third study, for example, longitudinal data could better inform the direction of causality of vehicle access and economic outcomes by facilitating analyses that consider the time order of events. Longitudinal data would also extend our understanding of the long-term effects of vehicle access on other dimensions of family well-being. However, given these limits, the findings were consistent with other studies that have investigated transportation and other barriers to employment among low-income populations, and provided unique insights into the potential effect of location on employment.

DISCUSSION AND POLICY IMPLICATIONS

Meeting the transportation needs of rural low-income households is a complex challenge. Together, the findings from these three studies that use multiple research methods and data sources contribute to a growing literature in several ways. First, the longitudinal, qualitative study of welfare recipients has broadened our understanding of multiple, underlying problems facing

many welfare families that contribute directly or indirectly to a lack of transportation access. Their stories describe a range of transportation problems that reflect a lack of driving skills, inability to obtain a valid driver's license, lack of access to consumer credit, as well as the high costs of insurance, maintenance, and repairs. Although the social networks of these families allow for the extensive exchange of transportation resources, the informality of these arrangements adds stress and uncertainty to decision making. The families are fully aware that transportation barriers limit job search, retention and options for second- or third-shift jobs that ultimately lead to higher pay. The qualitative approach of Study 1 provided depth and breadth to understanding transportation barriers; it also provided a springboard for the types of questions our subsequent studies posed.

The multiple methods of Study 2 provide contextual depth to our understanding of rural transportation needs and insights that can directly inform programs and policy. First, we are unaware of any other study that has matched welfare recipient lists with vehicle registrations. The finding that only one in four welfare recipients owned a registered vehicle is a strong indicator of private transportation access. Although many low-income drivers arrange access via borrowing vehicles or sharing rides, such arrangements are often fragile. As one recipient described having access to a reliable vehicle: "[if] it's not mine—then it isn't reliable." Compared to other methods of determining transportation access, this approach suggests that other studies have underestimated the extent of the transportation problems facing low-income households. Second, the analysis of commuting patterns and wage levels documents the advantage held by workers with reliable transportation. Commuting workers had higher earnings. Finally, focus groups with community professionals and with welfare recipients highlight the disconnect that exists between the two groups and their differing perspectives on how to address transportation needs.

The quantitative data collection and analysis in Study 3 allowed an estimation of the causal relationship between transportation and economic outcomes. Building upon previous analyses, the simulation specifically explored policy-relevant findings. The simulations demonstrate the importance of reliable transportation for increasing the likelihood that low-income adults are employed. Focusing on three factors that can be influenced by policy—transportation, health and education—the simulations indicate that providing reliable transportation can have the largest effect on employment.

The results suggest that public policies that promote vehicle ownership and access to reliable, affordable private transportation will increase the abilities of rural, low-income households to obtain and retain jobs by widening their job search geographically and allowing them to access nontraditional work shifts. Many states have increased or eliminated vehicle asset limits for participants in cash welfare programs; early evidence suggests these policy changes have influenced car ownership and employment

outcomes (Hurst & Ziliak, 2006). Several states have developed car ownership programs as a part of their package of welfare benefits. Examples include a Tennessee program that provides zero-interest loans for the purchase of preowned cars. Wisconsin and Michigan also offer low-interest loans whereas Texas, Maryland, Vermont, and Colorado promote vehicle ownership in conjunction with car donation programs. Virginia and Ohio allow the purchase and resale of government vehicles. New York provides participants with mechanical training and then allows them to purchase the cars they have reconditioned (Gurley & Bruce, 2005).

Evidence is building that access to transportation is a mechanism for enhancing economic outcomes for families, especially for low-income households who struggle to manage employment and daily needs with very limited resources. Nevertheless, more needs to be done regarding understanding the role of transportation in affecting other aspects of family life and capacities, such as managerial skills within the household. In addition, because promoting car ownership is a policy goal in a growing number of states, systematic evaluation of the long-term effects of these programs on employment, access to services, and other dimensions of well-being is needed. Although the results show that transportation may have a stronger effect on employment than other policy-relevant factors important in the lives of low-income rural families, more needs to be learned about the long-term effects of transportation on the households' well-being and measures of longer-term success.

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