TRANSPORTATION RESEARCH RECORD 696

Rural Public Transportation

TRANSPORTATION RESEARCH BOARD

COMMISSION ON SOCIOTECHNICAL SYSTEMS
NATIONAL RESEARCH COUNCIL

NATIONAL ACADEMY OF SCIENCES
WASHINGTON, D.C. 1978

Transportation Research Record 696
Price $5.00

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Library of Congress Cataloging in Publication Data
National Conference on Rural Public Transportation, 3d, Houghton, Mich., 1978.
Rural public transportation.

(Transportation research record; 696)
1. Transportation–United States–Passenger traffic–Congresses. 2. United States–Rural conditions–Congresses. I. National Research Council. Transportation Research Board. II. Title. III. Series.
TE7.H5 no. 696 [HE11] 380.5'08s [388] 79-13672
ISBN 0-309-02835-3

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Introduction

The third national Conference on Rural Public Transportation, held June 28-30, 1978, in Houghton, Michigan, examined current practices and issues related to public transportation in rural areas. Some 250 participants discussed topics such as cost and finance, insurance, regulation, intergovernmental relations, recordkeeping, services for the elderly and the handicapped, marketing, and vehicle performance.

The conference sessions and workshops were sponsored by the Urban Mass Transportation Administration (UMTA) in cooperation with the Office of the U.S. Secretary of Transportation, the Federal Highway Administration (FHWA), the Transportation Systems Center of the U.S. Department of Transportation (DOT), the Michigan Department of Transportation, and the Michigan Technological Institute. The 3-day meeting was planned and conducted by the Transportation Research Board and its Committee on Rural Public Transportation.

PURPOSE

Douglas J. McKelvey of the National Transportation Policy Study Commission, conference cochairman, noted that the conference's primary purpose was "to provide and exchange information on rural public transit." He observed that the sessions were especially timely "because of local need, state interest, and federal legislation that has resulted in the allocation of some $75 million annually in operating assistance for rural public transit." Previously, "only capital assistance was available, and only $60 million from about $500 million was used for this purpose," McKelvey explained.

The persons attending the conference represented local, state, and federal transportation agencies, social service organizations, research units, public and private transit operators, and consulting groups. McKelvey pointed out that the conference provided "a forum for operators, state and federal transportation personnel, and others to better understand each other's capabilities and concerns and to benefit from each other's experiences in solving common problems."

UMTA'S PERSPECTIVE

Charles F. Bingman, UMTA's Deputy Administrator, described for conference participants what DOT considers as the terms and conditions of an effective program of public transportation for small towns and rural areas. This section is drawn from the text of Bingman's presentation.

Those of you who have tracked the course of federal involvement in public transportation will remember that the period of the late 1960s and early 1970s was spent largely to prevent the collapse of mass transit in larger cities through the purchase of failing private transit operations and their conversion to public service. In 1974, new legislation enabled UMTA to begin paying assistance funds for operating costs, and I see the late 1970s and early 1980s as a period in which major transit operations can achieve satisfactory levels of operating efficiency and some real progress can be made in creating new transit initiatives. It has only been in the last 6 years that UMTA's funding level has been sufficient to support these kinds of expectations, and it is apparent that we will see several more years in which the pressures for financial assistance will continue to be very great.

There is increasing recognition at all levels of government that mass transportation is now a public responsibility and a public service and that such transportation must be delivered in a more balanced and equitable manner. This is reflected in large urban areas in the increasing attention paid to questions of how the suburbs can benefit from the public transportation service they help pay for, along with the central cities and the high-density corridors of commuter travel.

Public transportation in small towns and rural areas is an issue of this kind. These communities have every right to ask whether their needs for public transportation cannot also be met with federal support. The answer is yes, and I would like to discuss what we in DOT perceive to be the terms and conditions of an effective program of public transportation for small towns and rural areas, and what we are doing to bring it about, both through administrative actions and through legislation. I might add that we are setting a general framework for such a program, and much work is needed to convert this framework into functioning action programs. This is why a conference of this kind is so important, and I can assure you that Secretary Brock Adams, Deputy Secretary Alan Butchman, and the rest of us in DOT are seriously interested in what you have to tell us. Now is exactly the right time to give us your ideas because they will influence our own thinking.

Most of you are familiar, I am sure, with the fact that the U.S. Congress included an authorization of $500 million for rural and small-town transit programs in UMTA's 1974 legislation. You also recognize that the reservation of these funds did not work magic, and we did not see the general national evolution of small community programs that many expected. I think it is very important to try and understand why, and I would like to convey our views on several key issues—specifically money, transportation motivation, political incentive, institutional capability, and operating capability.

First of all is the question of motivation. In many rural and small-town areas, the public still does not recognize that they may have a public transportation alternative to the private automobile and reliance on relatives, friends, and neighbors. However, many communities are beginning to ask their political leaders what the public alternatives may be. As they do so, I think they reveal the crux of the problem—what are the motivations of political and community leaders in small towns and rural areas? Are they willing and able to provide a public transportation service? If so, how do they go about it? How do you go about providing transportation service to a very diffuse population with highly diverse trip intentions in a way that makes sense and that can be afforded?

One of the primary reasons that the $500 million in UMTA's legislation was never used was the absence in most small communities of an institutional base to plan and carry out public transportation programs. We did not and do not have agencies or operators with clear-cut transportation authority or obligations and implementing skills who could identify the public need and

help their community leadership to understand how such needs could be met. There also is a lack of clearly available financial resources to be committed for transportation purposes. One of the major shortcomings of the federal statute has been the absence of federal financial assistance to cover operating costs in communities of less than 50 000 persons. DOT's proposed highway and transit legislation will correct this flaw, but it must be matched with comparable local political willingness to solve the problem of local funding for both capital and operating costs. This will be particularly hard in areas where public transportation will be a new public service competing with other types of existing demands.

Therefore, the creation or evolution of effective public transportation programs in rural and small-town areas must have as an essential thrust a period of heightened public motivation and institution building to create political know-how, program management capability, flexible and sustained financial support, and public acceptance. As these skills evolve, then and only then will the improvements we are offering from the federal level have real force and effect.

New Legislation

DOT has proposed legislation this year that contains the framework for substantially improved federal-level support for small communities. I would like to summarize and comment on these proposals and tell you where I believe we stand in legislative consideration of them. Our bill proposes a formula-allocated assistance fund to consolidate a number of existing highway and transit assistance efforts into a single program for rural and small-town areas. It is intended, for the first time, to be state administered and would provide operating assistance funds up to a limit of one-third of total eligible operating costs for areas of less than 50 000 in population. The Secretary of Transportation would have authority to establish whatever additional rules are necessary for the administration of the program, with emphasis on minimum federal procedural involvement and maximum local flexibility in determining what will be done and in making priority decisions about using available funds for roads or for public transportation purposes. The bill, however, does set a limit of at least 10 percent of available funds for public transportation with an initial minimum of $75 million per year and an 80 percent match for capital purchases. We believe that the development of rural roads and rural public transportation should be planned and executed in concert; thus a single source of funds that can cover both needs is being sought.

Both the U.S. House of Representatives' Public Works and Senate Banking and Currency committees have acted on this legislation, each with a somewhat different outcome. In the House a state-administered program is also proposed with annual funding of $125 million per year, apportioned by a formula based on the population of the state living outside of urbanized areas of 50 000 or more. It also sets limits of 80 percent for capital costs and up to 50 percent of net operating costs. Fifteen percent of the total available funds may be retained in the states for technical assistance and administration. The bill also permits states or local public bodies to pay up to 50 percent of the net operating cost of nonurbanized, nonlocal intercity bus service, with preference given to existing private intercity carriers. A special allocation of $50 million per year is authorized for this purpose.

In the U.S. Senate, the Williams bill also provides for 80 percent match for capital purposes and up to 50 percent of net operating costs; but in rural areas (under 5000), these matches go up to 100 percent and 50 percent of total operating cost. The Senate bill authorizes intercity bus operators as eligible recipients of state-allocated funds and permits the U.S. Secretary of Labor to waive the provisions of section 13c of the UMTA labor protection statute when it is clear that no employees will be adversely affected by a federal grant. Funding authorization is proposed at $100 million per year.

The legislation proposed in January 1978 was the result of extensive consultation with state and local officials. Much of what they told us was incorporated in our bill and is included in the legislation being actively considered by the Congress. Obviously, there are significant differences among these three bills that must be reconciled. It seems certain, however, that highway and transit legislation will contain a new and attractive program for rural and small-town communities.

DOT Working Group

DOT has begun to get ready for this event by establishing an internal working group from UMTA, FHWA, and the Office of the Secretary of Transportation to define our own management needs and how we will relate to states and local communities. One of the first things this working group is doing is setting up a number of field visits that will put senior personnel from DOT and other agencies in close touch with state and local elected officials, public and private transportation providers, consumer groups, and state and local agency officials for first-hand discussion of problems and opportunities in the provision of both public transportation and roads. The first trips will be to communities in Iowa, Wisconsin, and Michigan; further trips are planned for North and South Carolina, Florida, Tennessee, Oregon, California, Pennsylvania, Vermont, and Massachusetts. Each visit hopes to cover small-city transit and paratransit systems funded by UMTA and some of the demonstration projects conducted through FHWA's Rural Highway Public Transportation Demonstration Program.

Discussions will focus on problems faced by local officials and community leaders. The insights obtained will help us define more effectively the expanded assistance we are seeking from Congress. We will be particularly interested in program ideas and in ways to develop simple procedures for federal assistance. I believe that simple, straightforward, low-cost transportation systems can be developed, using a variety of transportation providers—intercity buses, taxi operators, vanpools and carpools, social service agency capability—whatever makes sense and can move people. We want to keep the federal rules simple and open so that local agencies are free to put together a program that meets their own needs and capabilities.

DOT also expects to strengthen its own capacity to administer both the highway and public transit portions of a total small-community transportation program. This is part of a broader organizational approach pointed toward comprehensive rather than modal solutions to the challenge of moving people and goods. We also expect to follow our field visits with the preparation of proposed program guidelines that should be available shortly after the legislation is passed. We also expect to conduct a more broadly based public consultative process in which our proposed programs, procedures, and organization can be assessed. Our goal is to develop and administer a program that gives each rural and small-town community the flexibility and necessary funding assistance to meet its transportation needs.

This is a year of fundamental importance to the future of public transportation in the United States. DOT

is committed to doing its best to support realistic planning, institution building, and program funding at the federal, state, and local levels. I urge you to make your support for this program known to Congress and to local community leaders. Conferences such as this one can advance our technical knowledge and can help in increasing public awareness and understanding of using public resources to provide stable, long-term implementation of needed services.

Overview of Problems and Prospects in Rural Passenger Transportation

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This overview of the state of the art in rural passenger transportation focuses on lessons that have and have not been learned during the past decade. Significant progress has been made on certain technical issues such as planning techniques, resource requirements, and performance standards. At the same time, very little progress is evident in some nontechnical areas—particularly in the areas of political leadership and financial stability. Future developments in rural passenger transportation will vary significantly.

Progress is being made regarding the section 147 rural highway public transportation demonstration program, and there is now a possibility that important rural transit legislation will be passed by the U.S. Congress. Thus, the current status of rural public transportation may be characterized as one of substantial achievements, great potential, and an uncertain future.

LESSONS LEARNED

A great deal has been accomplished in the last decade. Ten years ago, rural transportation meant a little money from the Office of Economic Opportunity, some General Services Administration buses, and much political philosophy. Many lessons have been learned since then. In particular, there have been significant advances in planning techniques, resource requirements, and performance standards—all fairly technical issues. However, our progress in technical areas is greater than progress in others (e.g., political and financial).

Planning Techniques

Rural transportation planning used to focus on schemes to acquire as many surplus vehicles as possible and then to try to keep them running long enough to acquire a few more. Today there are computers available for designing and scheduling rural transportation systems.

Demand Analysis

We are now well past the stage of heuristic needs analysis and have overcome the urban planners' biases for massive multimodal surveys of origin-destination patterns as means of predicting the demand for rural transportation. A variety of simulation models is available for predicting rural transit demands, some of which focus on the transportation system itself, while others focus on the household or individual consumer (1, 2, 3).

Substantial variations have been found in the number of riders being served by existing systems in rural areas. These variations are due, for the most part, to the characteristics of the service provided rather than of the persons served. The influence of service characteristics on demand suggests that demand estimates made by techniques that can account for differences in service.

What influences transit demands in rural areas? Although several service factors influence the simulation models in a statistically significant fashion, it is also important to have a realistic understanding of their influence. Factors having a major influence on the number of persons that can be expected to ride a given rural system may include the following:

1. Monthly bus-kilometers. The more service provided, the more people will ride the system. However, after a certain limit of service is reached, the increase in rides is not proportional to further increases in service. This means that bus-kilometers will increase faster than the number of riders. Moreover, a point will be reached at which the cost of adding bus-kilometers will be greater than the return obtained from additional passengers.
2. Availability of service. For fixed-route systems, this factor can be expressed as frequency (number of times per day or per week that a particular route is served); for demand-responsive systems, the factor is the reservation time (number of hours or days between a call for a ride and the pickup). As availability increases, more persons will ride. Once again the increase in patronage is less than proportional to the increase in service after a certain point is reached.
3. Population served. As the population served increases, the number of riders will increase, but at a slower rate than for the population. If population served and population density both increase, the increase in patronage will be greater.
4. Other public transportation systems. As the service provided by other transportation systems increases, the number of riders attracted to a given system decreases. The percent decrease in patronage will be less than the percent increase in competition.
5. Distance. As the trip distance increases, the number of passengers will decrease. The decrease in passengers will occur at a greater rate than the increase in distance for fixed-route systems and at a smaller rate than the increase in distance for demand-responsive systems. This means that increases in distance will have a more negative impact on fixed-route than on demand-responsive ridership.
6. Fares. As the cost of the trip increases, the

number of riders will decrease. The percent decrease in riders will be smaller than the percent increase in fares.

The greatest benefit of demand equations is that they provide an estimate of how many people might use a system according to specific rural area and transit system conditions. The equations allow experimentation with different levels of a service to find the most appropriate system configuration for a particular area. Probably the biggest mistake that can be made is to buy too many vehicles for the system. For this reason, the simulation models should be used to establish some general estimates of how many riders to expect, which can in turn lead to estimates of how many vehicles are required (when combined with the service specifications).

Cost Analysis

Cost analysis has lagged behind other investigations because of a lack of data. However, now there is a substantial amount of cost data available from the section 147 demonstration program. We have some idea about typical costs and about factors that influence or are responsible for those costs.

Table 1 shows recent operating experiences. The initial figures for the section 147 program are indicative of programs that are just starting: Some phases of the operations are running efficiently, although others must improve to equal the performance of systems that have been operating for longer periods of time (4, 5, 6). Although the average section 147 project had achieved a fairly respectable cost per vehicle-kilometer—$0.40 without capital costs or about $0.51 including capital costs—the cost per passenger trip was high, the load factor was low, and the operating ratio was very low. Presumably these statistics will improve over time as program managers learn to more effectively control costs. In fact, the more recent statistics in Table 1 show improvements in most of the evaluation statistics.

The majority of rural paratransit system costs are attributable to three factors: driver's wages and benefits, overhead costs, and vehicle capital costs. A breakdown of these costs is shown in Table 2. These cost categories typically account for two-thirds of total system costs.

But what about the manager who wants to control costs? How does he know where to begin? Quite simply, one begins to control costs by understanding which factors create or influence costs (7, 8, 9). Costs can be influenced by one or more of these major factors: operating characteristics, regional characteristics, operating speeds and environment, and inflation. Each of these factors is in turn influenced by a variety of other factors.

Table 1. Operating statistics of rural transportation demonstration projects.

Measure	October-December 1977[a]	January-March 1978[b]
Cost per passenger trip (one way), $[c]	3.16	2.47
Cost per vehicle-kilometer, $[c]	0.40	0.39
Cost per vehicle-hour, $[c]	10.22	10.58
Load factor, %	14.7	17.1
Operating ratio (revenues ÷ operating and administrative costs)	0.16	0.24
Passengers per vehicle-kilometer	0.14	0.23
Passengers per vehicle-hour	3.2	4.28
Annual passengers per service area population	NA	NA
One-way passengers per month	449	536
Monthly vehicle-kilometer per vehicle	3325	3215

Notes: 1 km = 0.6 mile.
NA = not available.

[a] National averages of 36 operating projects.
[b] National average of 49 operating projects.
[c] Costs shown do not include capital costs.

Integration of Cost Analysis and Demand Analysis

Standard transportation planning practice involves a sequence of steps in which demand analysis is performed for all systems in general, and cost analysis is performed several steps later for only a few remaining alternative designs (10). However, alternative planning procedures are often more appropriate in rural areas.

Rural transit systems are often as big as they can be instead of as large as they should be. This means that systems are often designed to fit a particular budget rather than to fit a certain level of transportation service for a region. Thus, the appropriate planning sequence becomes one of finding how much service can be provided within a given budget, finding how many trips will be served at that given level of service, and making vehicle and operating decisions.

Resource Requirements

We have begun to realize what the overall costs of a national rural transportation program might be. It has been estimated that the overall resource requirements for rural transit assistance might range from $146 to $724 million from FY 1977 to FY 1985 (11), depending on a variety of assumptions such as the following:

1. Level of transit service to be provided;
2. Vehicle utilization ratio;
3. Costs of equipment, labor, and supplies;
4. Alternative fare policies;
5. Proportion of all counties in the United States that will apply for assistance;
6. Financial aid available from federal, state, and local governments; and
7. Vehicle replacement schedules.

This includes federal, state, and local expenditures (12, 13).

Table 2. Rural transit costs attributable to various factors.

Cost Factor	S.147 Systems[a] (%)	12 Rural Systems (%)	Typical Fixed-Route Systems (%)	Typical Demand-Responsive Systems (%)
Drivers' wages and benefits	31	28	28	25
General and administrative expenses	24	38	20	20
Vehicle capital costs	15	6	16	14
All other costs	30	28	36	41

[a] Section 147 figures from October through December 1977.

Passengers served might range from 18 to 150 million in 1985, annual vehicle-kilometers could range from 48 to 298 million (from 30 to 185 million vehicle-miles), and the number of vehicles supported by federal efforts could range from 1200 to 7400. In general, there is an increasing demand for Urban Mass Transportation Administration (UMTA) funds through time, with no leveling-off after a few years. This is due to substantial inflationary pressures on operating costs, particularly for fuel and wages (14). The operating assistance requirements will grow through time at annual rates that vary from 6 to 10 percent. However, the need for operating funds will continue to grow regardless of what assistance is provided by UMTA. There will be no leveling-off in transit assistance requirements through time because the cost inflation that is already occurring will cancel whatever other effects (for example, scale economies in vehicle production or transit operations) that may tend to produce a leveling-off in demands for funds (11). If operating assistance were not provided, the demand for capital assistance would decline. The lack of operating assistance most severely affects smaller counties whose share of operating assistance is often double their share of capital assistance. However, the lack of operating assistance makes it necessary to curtail their operations. This contraction of rural transportation operations eventually results in a decreased demand for vehicles and thus for capital assistance.

The growth in demand for funds is likely to be rapid—about 12 percent per year—because there will be a need to include new systems and because the gap between urban and rural transit costs will narrow. This rapid growth curve suggests that the program should start at a modest level and grow substantially from year to year. The alternative—starting at a high funding level—may lead to overcapitalization of the first rural public transit systems.

Performance Standards

For the first time, we are now able to say something about operating standards or goals. At this time, the concept of standards should not be too strongly imposed because of the newness of our knowledge. In addition, if we have learned one thing, it is that substantial variation exists in the characteristics of appropriate systems from one rural region to the next.

LESSONS NOT LEARNED

Fatal accidents are as much the result of things we fail to do as of the actions we take. Some current failures—if they are allowed to continue—are likely to be fatal for rural transportation.

Responsibility

Who is responsible for rural transportation? Quite simply, the responsibility belongs to all of us. To an activist, the pace of progress in rural transportation is infuriatingly slow. Left to its own devices, the bureaucracy will move painfully slowly. On the other hand, without active support the bureaucracy can really do very little alone. If rural transportation is to be more than rhetoric, it must achieve political importance. Political importance is achieved only by the activities and the votes of large numbers of persons at the local, state, and federal levels. Do not leave this up to someone else. The responsibility belongs to all of us.

Financial and Programmatic Considerations

> Inevitably, the financing arrangements for rural transit service were found to be of great if not critical importance. Many project managers complained that they had to spend so much time finding funds that they could not give adequate attention to managing the transit service. Almost all the projects intended to become self-supporting in some fashion, through fares from riders, or through contracts with public or private groups, or through a continuing commitment of operating subsidies from a State or local government. At the time they were visited, however, few had succeeded .... In only a very few of the projects visited did revenues from local sources totally cover costs. Thus, when the initial financial support from nonlocal sources was discontinued, service, itself, was often an early casualty. Such failure had already occurred in a few of the projects visited. At least on the basis of these observations, a rural transit system should not be started on the assumption that continuing public subsidy will be forthcoming .... In sum, this investigation provided no sound basis for confident conclusions about the continuing financial viability of rural transit (15).

These words were written as a result of field visits conducted by U.S. Department of Transportation staff in 1972 and 1973. Nothing has changed since that time—a reliable continuous funding system that includes operating funds is still most desperately needed by nearly all rural transportation operations. However, the current legislative proposals in the U.S. Congress would resolve many of the funding problems. But these proposals have not yet been enacted into law. Once they are laws, it is necessary that full appropriations be made and that these appropriations are actually spent. In short, there are many points at which a seemingly solid program can be derailed. Constant vigilance will be required.

What would be the characteristics of an appropriate funding program for rural transportation? First, there would be a long-term commitment of support for local systems. The necessity to patch together different funding sources every year is a constant frustration to those who operate such systems. This forces the project directors to focus on where to get funding rather than on the issue of how to provide better transportation for the community.

Second, operating funds are vital. This has been recognized everywhere except where it counts. Legislation now being considered would rectify this problem.

Third, although it has been known for many years that there are no actual restrictions or prohibitions to coordinating various sources of transportation funding in federal laws, it is painfully clear that not much is done to encourage coordination. Some of the most successful coordinated projects have come about simply because the project director chose to ignore regulations that stood in the way of providing rational transportation. The first need is a clear policy directive, mandating coordination among those agencies that provide and purchase transportation and detailing ways to cooperate on those issues that many people have chosen to misconstrue, such as depreciation. Let this be a clear and simple statement of intent so that all will know what is expected. It is critical that diverse funding cycles and application requirements be standardized and rationalized so that

1. Funds flow on a dependable basis, without year-to-year uncertainty.
2. It is not necessary to be preparing grant applications every quarter of the year.
3. Multiyear funding is the rule rather than the exception.

Finally, with prospects for a new program of rural

transit assistance, the administration of that program must be carefully considered. We now know enough about transit assistance programs in rural areas to know what we do and do not want. We want the following:

1. The ability to innovate. System designs do not come from the top down, they come from the grass roots. Let local communities be flexible about how the funds are spent, which local transportation providers are included in the system, and how funds are divided between capital and operating expenses.
2. Sufficient staff. Whatever combination of federal and state agencies runs this program, they must have sufficient staff to make it work quickly and well. A rural transit assistance program will involve from three to four times the number of applications now processed by UMTA for urban areas.
3. Front-end money. The planning and administrative expenses that are necessary before vehicles start running must be eligible for assistance. This means federal assistance in many instances, at least until fledgling state agencies mature and develop funds of their own.

We also know what we do not want:

1. We do not want time gaps between the passing of legislation and spending the first money.
2. We do not want delays in processing applications for capital or operating assistance.
3. We do not want application packages that require extraordinary skills to fill them out or multiyear needs studies to justify them.

In all our efforts, let us remember that we started by trying to make rural areas better places in which to live. This does not mean developing a multidisciplinary planning infrastructure for each of the more than 3000 rural counties in the nation. It does mean keeping foremost in mind the limited resources of most rural counties and the seriousness of their transportation needs.

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State Role in Rural Public Transportation

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This paper reports on the efforts of various states to be more deeply involved in providing transit services in rural and small-town areas. Current state involvement, innovative programs initiated in a few states, existing problems, and future programs are discussed. Most of the information presented in this paper was obtained from a survey of all states by the North Carolina Department of Transportation. The survey results suggest that one of the most significant problems to be solved is the fragmentation of services due to the multiplicity of federal programs fund-

ing rural transportation—until now an issue usually dealt with at the local level.

Except for a few innovative programs, rural public transportation has been synonymous with human services transportation, designed to provide transportation for clients to programs administered by local human service agencies. This human service orientation has been due to the fact that the various federal social service programs funded by the U.S. Departments of Health, Education, and Welfare and Labor, and the Community Services Administration allow for the expenditure of funds for transportation. Interestingly, the U.S. Department of Transportation (DOT) has been relatively uninvolved in rural transportation, funding only demonstration and elderly and handicapped projects. Although funding is available for capital acquisitions, these funds have almost exclusively gone to small urban transit systems.

In the past few years, however, the elderly and handicapped program (i.e., section 16b2), which provides capital assistance to private, nonprofit organizations, now requires that the applicant prepare a transportation development plan (TDP). This plan should outline the anticipated use of the vehicle and its incorporation into other local transportation systems. The state agencies—primarily state departments of transportation—administering the 16b2 program are responsible for ensuring that the required planning is done. DOT made Urban Mass Transportation Administration (UMTA) section 9 funds available to states for such planning. The states have used these funds for statewide elderly and handicapped planning, regional or county TDPs, or as pass-through monies to allow local areas or consultants to do their own planning.

These planning efforts represent the first comprehensive examination of human services transportation in rural areas. For the first time, one state agency is in a position to deal with one of the biggest problems in rural transportation—the fragmentation of services due to the multiplicity of federal programs funding rural transportation, heretofore an issue addressed only at the local level.

In light of the changing role of the states in rural transportation, this paper summarizes current state involvement, highlights innovative programs initiated in some states, identifies some existing problems, and suggests areas of future state involvement, particularly with respect to efforts toward the coordination of transportation resources. The information presented in this paper has been obtained from a survey of the states completed by the North Carolina Department of Transportation in February 1978 (1).

OVERVIEW OF STATES' ROLE IN RURAL TRANSPORTATION

The states have been involved in a number of areas in rural transportation ranging from planning to operations. Most of this involvement has come about from the state administration of federal programs; the General Accounting Office has identified 114 programs that fund transportation (2). This multiplicity of programs administered by a multiplicity of federal agencies—each with a different state counterpart—has contributed to the failure of most states to take a comprehensive approach toward the provision of rural transportation.

As noted earlier, the states have been given the responsibility for ensuring that the necessary planning requirements of the UMTA section 16b2 program are met. Most, if not all, statewide transportation needs' assessments and transportation resource inventories are a result of this new responsibility. Thus, the states have assumed major planning tasks previously performed by local or regional agencies. The states are filling a gap left by the lack of local expertise in rural transportation because local human service agencies, and not transportation agencies, are providing the transportation services.

State departments of transportation have accepted other roles in addition to planning, including funding assistance, management and operations assistance, program administration, and state efforts at program coordination. Sixteen states either provide rural transportation services or provide operating subsidies to rural systems; only seven states provide staff for technical assistance in the areas of management and operations.

Sixteen states have taken positive steps to foster coordination of transportation resources by coordinating transportation funding at the state level or by coordinating resources at the local level. Among these actions are many innovative approaches to rural transportation.

INNOVATIVE PROGRAMS

Several states have led in the development of innovative rural transportation programs and policies. The major distinguishing factor in their efforts is the financial commitment of state funds. Considering the lack of a comprehensive rural transportation program at the federal level, these innovative state initiatives become crucial to the development of rural systems.

Delaware

The Delaware state legislature created an authority for specialized transportation, Delaware Authority for Specialized Transit (DAST). DAST operates with state funding and with contracts from human services agencies. The service operates statewide, is demand-responsive with a 24-h advance call requirement, charges agencies by the hour, and coordinates special services statewide. DAST also contracts with taxis for some service. It is felt that Delaware's success in coordinating human services transportation has been due to the establishment of a separate transportation entity to provide service.

Michigan

The Michigan state legislature earmarked ½ cent of state gasoline tax for public transportation. For rural areas, Michigan's department of transportation established a small-vehicle program that had three options:

1. Dial-A-Ride Transportation (DART) must be a full general public transportation system accessible to the handicapped. The local government must put up $1000; the state pays the rest. After the first year, if the local government opts to continue, the state pays one-third of the operating cost and 100 percent of the capital cost. The system can be operated by a local taxi company under contract to the city.
2. Elderly and handicapped transportation is an option for cities not wanting full general public transportation; it includes operating funds.
3. Section 16b2 is for providers serving the elderly and handicapped; it includes capital funds only. However, 16b2 operators are encouraged to get out of the transportation business and instead enter purchase-of-service arrangements.

These three programs allow a wide range of options to local communities and provide for a progression from essential service to general public service.

Minnesota

The Minnesota legislature initiated a $4.5 million paratransit demonstration program. The program is open to public and private agencies. The purpose is to plan, promote, demonstrate, and evaluate the effectiveness, cost, and efficiency of paratransit. A major objective is to increase the mobility of the transportation disadvantaged. In addition, the legislature has allocated $1.5 million for ongoing operating assistance to paratransit programs.

West Virginia

The Department of Welfare administers the Transportation Remuneration Incentive Program (TRIP), a statewide demonstration to establish ways to improve transportation for the elderly and handicapped. TRIP has two aspects: one involves selling books of tickets at reduced prices that are good on any form of authorized transportation, such as intercity buses, taxis, and public transit systems to go anywhere, as long as the fare was paid in West Virginia; the second involves setting up regional fixed-route transportation systems that will form the basis of a statewide public transportation system. TRIP has not been used widely by the human services agencies, but it is hoped that such use will increase.

California

In 1975, the California legislature established state demonstration funding for a variety of public transportation programs. Funding is available and has been used for rural projects, which must include dial-a-ride services and other paratransit systems capable of offering flexible scheduling and routing and capable of being operational within six months of project approval. Nearly all of the projects funded to date demonstrate the feasibility of coordinating services for the transportation disadvantaged who receive assistance through various human service programs.

In addition, the state makes money available to transportation from a retail sales tax (0.25 percent of 1 percent) that counties may impose. In rural areas these funds can be used for public transit capital, operating and planning expenses, and street and road construction.

Oregon

For many public transportation and human service providers, obtaining sufficient insurance at a reasonable cost can be a real problem. The problem compounds itself (a) when two different agencies use the same vehicle but at different times of the day or week, or (b) when two distinctly different client groups are transported on the same vehicle but at different times. Oregon has taken a positive step to combat this problem.

Spurred by the increased difficulties of private, nonprofit corporations in obtaining insurance in Oregon, a committee known as the Oregon Special Service Association (OSSA) was formed to find a solution to the problem. OSSA immediately adopted the strategy of increasing acceptance of special transportation through the establishment of a strong safety program enforced through self-policing. OSSA members would be required to adhere to a uniform set of policies regarding driver selection, vehicle maintenance, and ongoing safety programs. The concept was to make the liability associated with special transportation as attractive as possible through the economic leverage of wide membership and a safe driving record.

OSSA then hired an insurance agent of record or broker to transform this concept into reality. The agent was responsible for marketing the combined risk and translating one group policy into coverage for many agencies. One of the more difficult tasks was finding an insurance company that was interested in providing the coverage. An Oregon-based company finally accepted the business. Rates were agreed upon and varied according to age, value of vehicles, number of drivers, and type of agency programs. The rates resulted in considerable savings to some of the member corporations. Coverage offered includes the following: $100 000/300 000 liability, comprehensive, and collision with $250 deductible, and nonowned automobile.

COORDINATION OF RESOURCES

Because of the varied transportation-funding sources, regulations, and administering agencies, coordination of the resources is crucial to the operation of efficient and effective transportation programs. In the absence of a federal mandate on coordination, the impetus for coordination can and needs to come from the state level, i.e., the state agencies administering the federal programs. Several states have taken the lead in developing a state coordination procedure.

Iowa

The Iowa state legislature amended the Code of Iowa to require any state agency administering transit funds to submit all funding requests through its clearinghouse and the state department of transportation. All transportation funding must be in compliance with the State Transit Plan. This represents a new requirement for human service agencies; therefore, the state department of transportation has begun a vigorous campaign to first inform administering agencies of their responsibilities and then to enforce the intent of the legislation. The Iowa Department of Transportation has designated one agency in each multicounty region as the transit authority. Eventually all transportation funding will go to that one provider agency.

Maine

In 1975, the commissioner of the Maine Department of Human Services requested that all state departments and community agencies involved with transportation services work aggressively toward the consolidation of all transportation programs within the same geographical area. Efforts aimed at creating coordinated transportation systems have resulted in nine regional programs serving 16 counties. A recently appointed transportation task force oversees the coordination of existing funding sources for transportation. This action has all been handled administratively without an executive order or legislative change.

Michigan

In December 1977, an executive directive was issued to establish a section in the state department of transportation whose responsibility would be to coordinate all expenditures for transportation, including human services programs. Each agency administering a program was

interviewed regarding enforcement procedures and problems that might be encountered. Due to the problem with the awarding of block grants in which transportation is one of a number of fundable programs, it was determined that, before anything could be accomplished, a uniform accounting system must be developed and implemented. Data collected from this system will then be used to make decisions about future funding.

Pennsylvania

The Pennsylvania Department of Transportation created a new Division of Rural and Intercity Public Transportation within the Bureau of Mass Transit Systems. One function of this division is to develop standards and guidelines for administering state and federally funded programs. The division is also providing technical assistance to increase local coordinated systems. The state transportation department also has developed an executive order on coordination that it hopes to have adopted soon.

South Carolina

The South Carolina state legislature amended the State Highway Act to create the Department of Highways and Public Transportation and to create within the department the Interagency Council on Public Transportation. The council has the responsibility for coordinating all public transportation resources. Any local or regional agency requesting funds from a state agency must file the application with the A-95 office. The A-95 office flags all requests that might include funds for transportation and directs them to the council staff. The council staff then sends out a questionnaire to the applicant that asks detailed questions concerning the project. The applicant has 20 days to respond. The council then acts on the application. To date, nonapproval by the council has meant nonapproval by the funding agency.

South Dakota

A transportation planning and coordinating task force was established to study the potential for coordinating transportation services provided by state agencies. The task force recommended that the state department of transportation should be the coordinating agency and that the task force should continue operating in some capacity. Currently the task force reviews, discusses, rates, and selects transportation proposals submitted to the various agencies. State agencies that have a transportation element in their programs are represented on the task force; this eases verification of sources of funding contained in the applications.

Other States

Both North Carolina and Utah use an interagency review committee to review and select proposals for UMTA 16b2 applications. In North Carolina, the governor's committee on rural public transportation has recommended that grant review approval of the interagency committee be extended to all grant programs funding transportation.

A resource advisory group for human services transportation has been organized in Texas. This group encourages joint planning, coordination, and program development of human service-related transportation systems; makes information about funding available to human services transportation providers; and works toward standardizing the interpretation of regulations and reporting requirements.

PROBLEMS

The questionnaire that North Carolina administered asked the states to highlight their findings in examining transportation problems of rural and small communities. Several themes repeated themselves from state to state. The major finding is that there is an absence of public transportation in rural and small communities, with the exception of taxi operations. The transportation provided by human service agencies is often the only available service. Consequently, lack of coordination among providers compounds the problem. Stuart Gwin of the Idaho Transportation Department summarized this problem: Too many categorical programs provide limited service to small client groups without concern for other provider organizations. Gwin noted that the millions of dollars now being spent for these categorical programs could be used to provide very good rural public transportation to all our rural residents and not just a few who qualify for programs.

Coordination, then, becomes crucial in rural and small community transportation and is the area deserving the greatest attention. In many rural areas the transportation resources of human services agencies are probably sufficient to meet the need. However, lack of coordination, inefficient operations, and duplication of service keep these resources from meeting their full potential. The increased transportation planning being required by DOT for its programs should lead to greater coordination.

Other problems cited evolved from the dependence on human service transportation. Misunderstanding and misinterpretation of program regulations have caused much confusion about what can and cannot be done with program funds or equipment purchased with program funds. Also, providers tend to underestimate their own transportation cost by excluding certain items such as administration. This makes agencies wary of contracting with other agencies or providers for service at what appears to be a higher cost. Finally, program funding limitations exist such as the fact that 16b2 provides only capital assistance. Basically, human service programs have made it much easier for a local provider to purchase a vehicle than to purchase service.

Those states that have initiated innovative services, either statewide or project by project, responded that the major stumbling block to rural transportation is the cost of service, which must be borne by local government with fares and by agencies. In fact, Michigan's transportation department felt that without state funding support, their small-vehicle program would never have begun because there is no federal funding available to cities of less than 50 000 population for operations aside from the various human services programs. The communities cannot support the services on their own. Thus, states must be willing to make a major financial commitment if they desire to establish public transportation systems in rural and small community areas.

Additional comments were that

1. There is a strong need for community support for a transportation system to succeed.
2. Florida's transportation department feels that a rural system must have a large demand-responsive component to be effective, because fixed routes can be applied in only a few circumstances.
3. States should do whatever possible to maintain public carrier service in rural areas.

4. The elderly, handicapped, and those without automobiles are the ones who really suffer in the complete automobile-oriented society that characterizes rural and small communities.

POSSIBLE STATE ACTIONS

The states can take actions to correct the lack of resource coordination and the lack of funding. The states must take action in the area of coordination. State agencies administering the federal programs can greatly affect the operations of local transportation systems through their funding decisions. First, state agencies need to recognize this power and, second, they must use it to the best extent possible to encourage maximum or efficient use of all resources.

Currently, local providers have taken little action to coordinate their transportation with other local agencies, especially when they are able to serve their own clients sufficiently. There is much the state can do to provide the appropriate incentives. First, the state can educate local agencies on the benefits of coordination, including potential cost savings and the ability to serve more clients. States should also work closely with local elected officials, who may be providing the local match for the federal grants. If the elected officials can be shown the benefits of coordination, then they can encourage the local agencies through their funding decisions.

All state agencies can require prior planning as part of the application process. For example, the development of a TDP by local agencies should bring about a realization of the true amount and extent of available public and private resources. The process will result in a plan of operation that accounts for efficient use of all available resources. Thus, the preparation of a TDP should enlighten the local agencies, should give them a plan of action based on coordination, and should give the state funding agency a sound basis for making its funding decision.

The state can also coordinate its own transportation funding process—perhaps the most important action. Currently, the various state funding agencies make their decisions unilaterally. These independent decisions often impact on one another because a local agency may apply to one state agency for capital funds and another for operating funds. Negative impact could be greatly lessened, if not totally avoided, by coordinating the state decision process. Furthermore, the current situation in which a multiplicity of funding agencies exists does little to encourage local providers to coordinate their own transportation systems. If the state coordinates its funding process and has good knowledge of the available local transportation resources through the TDP or some other source, then it can encourage the efficient and full use of current resources before funding any new resources.

There are several methods by which the state can coordinate the funding process, including giving funding authority to one state agency or using an interagency committee to review all program applications. Examples of states that implemented coordinated approaches have been cited earlier in this paper. States can adopt one of these approaches or an approach based upon a combination of methods. A coordinated approach to the funding decision process at the state level should lead to more coordination of resources at the local level.

States can also have a great impact on funding. For the most part, states help match federal grants. Only a few states, as described above, have chosen to provide significant state funding programs. Nevertheless, these states lead in innovative rural transportation programs. Local governments are often hard pressed to fund services such as water and sewer, and would find it even more difficult to fund rural transportation. If the states want to see innovative rural programs, then they must be willing to provide operating funds. However, the advent of the new federal rural transportation program should improve the overall funding situation.

The states have a great deal of flexibility in the manner in which they administer federal programs. Each action discussed here is within the capabilities of the states. It is a state decision to determine what role it wants to play in rural transportation.

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Rural Development Policy and Rural Public Transportation

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The transportation systems that serve rural people and their communities continue to dwindle. Local communities affected by the diminution of these transportation resources are under pressure to raise local money to subsidize, almost simultaneously, air service, rail service, and intercity bus lines, to maintain their off-system roads and bridges in usable condition, and to provide whatever forms of public transit may be achievable. The competition for local funds is among the problems to be faced if a small-town and rural-area public transit program is, as seems likely, at last obtained from Congress. Because the lack of accessibility to jobs, training, and other essential services will continue to be a major obstacle to a rational rural development policy, comprehensive planning and the maximum feasible coordination of transportation resources must be given high priority.

Recent developments in rural America require closer analysis than they have received. The steady migration of people from rural areas to the cities that has char-

acterized 20th century America has apparently halted. Population growth in nonmetropolitan areas has exceeded that in metropolitan areas during this decade. This phenomenon includes both counties beyond the commuting range of metropolitan areas and those within commuting range. However, these trends are not universal. Rural counties that are predominantly agricultural, black, or dependent on manufacturing alone continue to decline or have below-average growth.

The extent and full implication of this population change has yet to be studied or fully understood. The fossil fuel crisis and its impact on energy costs could inhibit it (1). But, in any case, there are now rural areas where populations are rapidly increasing as well as those of continued decline. It is beginning to be apparent to rural communities that population growth poses as many subtly complicated problems as does chronic decline. It should be obvious that the rationale for the neglect of rural development issues, including transportation, that has been common is no longer valid. There is a growing number of persons who must be served if we are not to be overwhelmed by the problems in the closing decades of this century.

In the light of this situation, what is the broad profile of transportation in rural America today? Both air and land transportation services affecting commodities and people are disappearing. In the next few years, almost 37 000 km (23 000 miles) of rail may be abandoned or discontinued because of rail reorganization legislation (2). No one knows how many additional lines will be so affected by railroad bankruptcies or technological advances in hardware that may make additional lines uneconomical, in the classical sense, to operate. Almost all of these lines are in rural areas and serve rural communities and small towns. Grain-producing states are particularly severely affected. South Dakota will lose close to 50 percent of its 1976 rail kilometers, and Wisconsin, Minnesota, and Iowa will lose 25, 23, and 20 percent respectively. At the same time, the realignment of the secondary (rural) road system required by federal-aid highway legislation has resulted in the discontinuance of federal assistance for more than 320 000 km (200 000 miles) of such roads (3). This is approximately one-third of such roads in existence in 1973. Thus, South Dakota has lost federal support for 21 percent of its secondary roads, and Wisconsin, Minnesota, Michigan, and Iowa have lost 35, 46, 32, and 60 percent respectively. This loss of assistance means an increased repair and maintenance bill for rural communities, and it can also mean greatly increased local costs for the replacement and rehabilitation of bridges and culverts if the roads happen to be located in communities impacted by rail abandonment (because the roads must then accommodate sharply increased truck traffic and weight loads). A recent study (4) by the National Association of Counties found that one-third of all bridges under county jurisdiction are structurally deficient, 38 percent are functionally obsolete, 9 percent are collapsed, and 24 percent are posted against excessive weight.

At the same time, a large and growing number of small towns and rural areas face the loss of air service. Since 1965, 114 small cities have lost service and 189 have faced suspension of their service (5). In broad terms, this has come about because certificated air carriers have used their federal subsidies and their full-journey ticket fares to replace their smaller propeller planes by jets. However, jets can land on only relatively large airfields. As propeller planes are phased out, the carriers have been authorized to discontinue service to those communities that lack jet facilities. Those towns may then fall back on air taxi or commuter service to a jet airport. But an air taxi or commuter service is not certificated. Because it receives no federal subsidy or share of the total trip fare, it often requires a local subsidy to stay in business.

Bus service presents just as serious a problem for rural people and their communities. Intercity bus lines yearly reduce their service to rural communities. They rarely serve a community too distant from an Interstate highway (6). As noted in the Interstate Commerce Commission News, April 4, 1978, for the last several years, although their operating revenues have increased, their ridership has declined about 6 percent/year. The number of points served has declined, and the amount of service has been reduced. In a study by Iowa State University, the intercity bus problem has been described (7):

1. Public transportation travel within rural regions is almost nonexistent.
2. Public transportation person travel to points beyond the boundaries of a region is subject to long schedule and terminal-transfer-point delays.
3. Rural regions need intraregional public transportation systems to provide people with access to essential services, many of which are dispersed on a regional basis.
4. An integrated system of local-service and express-service public transportation routes would increase the accessibility from rural regions of major metropolitan centers.

In more specific terms, the study points out that, in 1950, 21 different companies were operating a dense network of routes throughout Iowa but, by 1960, the route structure had shrunk to 14 companies operating a much lower density network. Primarily because of the reduction in bus service, the number of revenue passengers carried decreased from 19 million in 1950 to 1.4 million in 1960, and then to 1.1 million in 1970.

The number of public transit operations in small towns and rural areas has dwindled to the point where, of 20 000 towns having 50 000 or fewer people, only 313 still have a public transit system. In many states, a growing percentage of rural counties lack even a taxicab. The National Mass Transportation Assistance Act of 1974 that provided for a $500 million capital assistance program to nonurban communities was expected to alleviate this situation but, thus far, only $23 million has been obligated. Grants have been made in only 26 states (the majority in California, New York, and Wisconsin) and have assisted the grantees to acquire 379 buses (8).

Nor is ownership of private automobiles so extensive in rural America as is generally believed. This is particularly true in poverty areas or in those areas that have a higher than average population of minority or elderly residents. By either the standard of the number of households that do not have access to an automobile or the standard that 75 percent of households have access to zero or one automobile, the southern and southwestern states are severely disadvantaged. Thirty-three percent of the counties in Texas and 73 percent of the counties in Mississippi fall into such a designation (9).

Thus far, the federal response to this condition in effect has been to shift the problem to the states and local communities. A modified triage approach is used that forces the state and local communities to choose not only among modes of transportation and interests to be served but also among communities. Sometimes, as with the state and local assistance section of the Regional Rail Reorganization Act of 1973, the federal government provides a disappearing subsidy that covers part of the

costs of state-selected lines. Sometimes federal assistance takes the form of an 80:20 match for capital equipment but the local community has to bear the burden of operating expenses. Sometimes the total cost of saving a mode rests with the state or the local community.

The number and extent of local shares that a rural community must commit presupposes fierce competition among several interests for such support. How will the new kid on the block, rural public transit, fare under this situation? A recent observation by the recipient of a grant under Section 147 of the Federal-Aid Highway Act of 1973 is pertinent:

> To keep things in proper perspective, the funding for our 147 project for two counties for 2 years would be enough to resurface 1 mile [1.6 km] of blacktop highway, if one started before the price of asphalt goes up again. . . . It is hard to make inroads with the idea of transportation as moving people, when the dominant orientation has always been surfaces over which wheeled vehicles can move.

Because competition for the necessary state and local share is so intense, the initial task of those seeking funds for any sort of public transit in rural areas is the building of a case for it. Local community leaders and the general public have to be convinced of the important relationship between public transit and the development of their community. What is perceived at present is a categorical crisis response. Do the elderly need transportation to a nutrition program or a health clinic? Let's get a van and some volunteer drivers. Do workers being trained by the Comprehensive Employment Training Administration (CETA) need a ride to a vocational education institute? Maybe the U.S. Department of Labor has some funds with which we can rent a vehicle and provide a ride for those trainees conveniently located along the way. And thus, we can go down the list of 114 federal programs identified by the General Accounting Office (GAO) as providing or supporting rural public transportation (10). The 1970 census showed that 70 percent of the rural poor and 49 percent of the rural elderly did not own automobiles (11). What that means relative to rural development is found in scattered unrelated studies. There is hardly a program involving the quality of life, the delivery of services, or the participation in human resources development in rural America where the anticipated results have been achieved. Lack of transportation is widely recognized as a major obstacle to the delivery of health care. Training programs (including the current CETA program) are underused because those who should be reached have no consistent transportation. Vocational and adult education opportunities affect mostly those residing close to the urban centers of rural areas. More than 95 percent of the U.S. Department of Agriculture administered summer food-service program for children went to urban areas because rural sponsors lacked the resources to transport hungry or malnourished rural youngsters to feeding centers. Limitations on spending make it virtually impossible in many rural areas to provide the network necessary for transporting the rural elderly to food programs (12).

This situation also prevails in traditional economic development programs. An Economic Development Administration (EDA) study (13) published in February 1972 indicates that

> EDA's experience in funding projects in economic-development centers has not yet proven that the growth-center strategy outlined in the agency's legislation and clarified in EDA policy statements is workable. The agency's approach in assisting distressed areas through projects in growth centers has resulted in minimal employment and service benefits to residents of depressed counties. . . . only 14 percent of the jobs resulting from growth-center projects were filled by present or former residents of redevelopment areas (depressed counties). This compares with 87 percent for projects located directly in distressed areas.

Case studies accompanying the report noted the lack of transportation in areas where the work force of the new industries were largely made up of growth-center residents.

For example, in Oklahoma, inadequate transportation in the redevelopment counties surrounding the growth centers (Ada, Ardmore, and Durant), aggravated the failure to provide employment opportunities for rural residents. It was noted that, in the required positive-action programs, when unemployed or economically underprivileged members are mentioned, the references are usually to the center's own residents. In Ada, two large, new industrial activities that employed several hundred people employed no residents of the surrounding depressed rural county and a third employed nine. The vocational-technical school in Ardmore, the backbone of the training needed by the new industries, mainly served the residents of the growth center; the majority of the 600 students came from places other than distressed rural counties and were not economically disadvantaged. In Corpus Christi, Texas, the major center of a development district, only 2 out of 2100 employees of a major plant live in the rural county closest to the growth center. Participation in skill training in the local technical institute by rural residents was minimal.

In a more recent study (14), it was noted:

> Many respondents expressed dissatisfaction with employment opportunities in the area and, although they did not wish to move elsewhere, indicated the lack of jobs was likely to force such action. Lack of transportation was a major physical deterrent to employment. Sixty-four percent of those in poverty households. . . three in four households had a mean disposable income of $2591 in 1970. . . reputed they had no means of getting to work, although major industries were located within 5 to 25 miles [8 to 40 km] of the community.

The second task is to encourage the community to engage in comprehensive planning for rural community development. To be truly comprehensive, the transportation component must be included and, within that component, the accessibility problem must be addressed. The Area Development-Assistance Planning Grant Program administered by the Farmers Home Administration pursuant to section 306a11 of the Consolidated Farm and Rural Development Act of 1973 recognizes this interrelationship. These grants may be used to assist a community engaged in such planning. It will be interesting to discover how many applicants do include public transit planning as an element of their comprehensive plan.

The third task is coordination. In the competition for local-share funding, as well as for federal dollars, there will be increased attention to efforts to achieve a coordinated system. Predictably, this will affect federal, state, and local perceptions. A recent comment from the field put it like this:

> In formulating national transportation policy, one other consideration should enter into the deliberations. Local folk trying to operate often unrealistic programs imposed from above are constantly harrassed to coordinate with everybody in sight. It is patently obvious to all of us in the middle that the bureaucrats pushing this are not doing it. A little more example and a little less rhetoric would be most welcome.

The present leadership in the U.S. Department of Agriculture (USDA) is conscious both of its role as the

advocate of rural interests in transportation concerns, including public transit, and of the importance of coordination in achieving workable transportation systems. Secretary Robert Bergland has emphasized (15),

> mistakenly, and sometimes the Department of Agriculture has perpetuated this misconception, there is a widespread feeling that USDA is interested only in the movement of farm products. People are our concern, as well, and people should be our major consideration.

The Secretary is moving toward the establishment within the department of an Office of Transportation that will combine the several independent transportation divisions. The plans include placing rural public transit activities within the jurisdiction of the office and the study of the relationship of such transit to rural development. The primary emphasis of the office will be the development of long-range transportation policies in agriculture and rural development (areas of expertise to be drawn on include the present sections of transportation research, economics, and regulation).

At the suggestion of Alex P. Mercure, Assistant Secretary of Agriculture for Rural Development, a process has been started toward achieving coordination of rural public transit resources at the highest federal level. By using the Congressional mandate under section 603 of the Rural Development Act of 1972 to coordinate the direction of rural development at the federal level, the working group of assistant secretaries recommended a White House initiative directing the coordination of federally acquired people-moving transportation resources. The General Accounting Office study (10) found that there were no express statutory or regulatory restrictions that specifically prohibit coordination of transportation resources of these programs. But this framed the issue in the negative. To move it onward seems to require framing it in the positive: Not only is there nothing to prohibit coordination, there is a positive requirement to achieve it. Under the direction of Jack H. Watson, Jr., Assistant to the President for Intergovernmental Relations, an interagency task force is developing a proposed initiative that would require the following:

1. Any vehicle obtained directly or indirectly through federal funds for purposes of transporting people must be made available to any communitywide effort to achieve a coordinated transportation system.
2. Personnel assigned to any program for transportation-related services whose compensation is provided wholly or in part by federal funds must be made available to serve a coordinated transportation system.
3. Any transportation provider receiving a subsidy paid for wholly or in part from federal funds must undertake to coordinate its system with a communitywide coordinated system.
4. All federal, state, and local auditing agencies shall be encouraged, and in the case of federal agencies directed, to explore the problems of accountability, bookkeeping, and other paperwork involved in the operation of a coordinated system and develop a simplified set of auditing and accounting procedures to overcome these problem areas.

The Federal Regional Councils in two regions, IV and VII, have already pioneered activities along similar lines, and their ideas have been incorporated into these proposals. The flavor of the recently considered legislation indicates that Congress is interested in the same approach. Although not directly mentioned in the legislative package, it is highly possible that, through components of legislative actions, Congress will mandate such coordination. Eventually, we may be unable to tell a grandmother needing medical care that she may not ride in a Headstart van going by her doctor's office because the bookkeeper does not know how to account for her.

If we ever achieve a coordination policy at the federal level, there will still be a multitude of related obstacles at the state and local level. The essential of a truly national rural development policy is federal leadership, initiative, and example to the states and the local communities. There are many state and local barriers to overcome: overregulation by public utility commissions, insensitive consideration by insurance commissions, and restrictions on charters and parcel deliveries (some of these are a mixture of federal and state restrictions) and on the use of school buses for transportation resources. Even an advanced state such as Iowa exempts school buses from its coordination requirements. Finally, we may yet test the post-bus concept so that the transportation needed to pick up and deliver such essentials as invitations to buy deodorant or to contribute to a geometrically progressing number of causes or your utility bills can also transport people.

One of the many insightful conclusions of the Iowa State University study (7) found that

> The desirability of any rural region as a place of residence is directly related to the degree of accessibility to basic services; not only fundamental human needs such as food, medicine, and clothing but also social interaction, recreation, and governmental services must be provided. When a segment of the population has limited access to these services, they perceive an undesirable aspect in their life style. This same concept of an aspect of local and regional area undesirability may in fact be important to the mobile segment of the population due to their concern for their neighbors. It may be hypothesized, therefore, that rural public transit service enhances a region's suitability as a place to live.

ACKNOWLEDGMENT

This paper represents my views and not those of the Farmers Home Administration, U.S. Department of Agriculture, or the Carter Administration.

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Overview of Rural Transit Planning and Implementation

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A typical planning and implementation process for rural transit systems is summarized. Specialized rural transit systems usually are initiated when local authorities perceive and define a transportation problem. The next step in the process is a needs and feasibility study in which efforts are made to determine whether or not a system should be started. After financial and political support are obtained, the system must then be designed and implemented. Finally, a continuous evaluation of whether the system is solving the perceived local transportation problems is necessary. The synthesis of the planning and implementation process that is described in this paper was developed from extensive information on special rural transit systems that was gathered by field visits to 12 systems and from data on other operations.

There are few conventional transit operations in low-density areas. Even when there is an urban transit system nearby, it rarely provides mobility for residents of the rural areas that are adjacent. Frequently, there are peak-hour commuter lines to suburban areas, but a person in a rural area who does not have access to an automobile usually has no transit option available.

Human service agencies in rural areas have responded to this access problem by attempting to provide transportation services for their clients. Small and occasionally large transit operations have been established for this purpose. Although not ubiquitous, these special transit services have been initiated by a wide variety of agencies, funded by various federal, state, and local agencies and had a varied degree of success in increasing the mobility of agency clients.

Twelve of these rural transit systems were visited as part of a research project in rural public transportation. The research team attempted to synthesize the steps that had been taken in the conceptualization, planning, and implementation of these systems.

A model of this process was developed that includes the most successful techniques used in each phase. In addition, some of the major areas of operational problems of rural transit systems were identified and analyzed. A review of the model and its components will be the subject of the remainder of this paper.

SYNTHESIS OF PLANNING AND IMPLEMENTING PROCESS

During the field-site visits to the 12 rural transit systems, data were gathered on the development of each system. Interviews with local agency personnel included discussions of the steps that had been taken to initiate each system. From these interviews and subsequent discussions with others involved in rural transit, a simple model of the process was developed. This model (see Figure 1) shows the planning and implementation sequence for a typical rural transit operation.

In the sections that follow, each of the steps in the planning process will be reviewed. Some insights into the process are given, and recommendations are made about how to make good decisions.

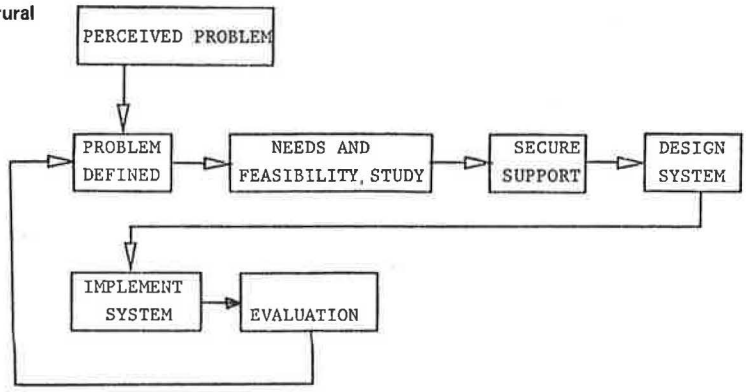
Perception of Problem

The problem is usually perceived by agency personnel who find that their clients have transportation problems. The initiator can be a perceptive agency head or a staff member who is spending too much time driving clients to and from appointments. Stories have also been told of agency clients paying exorbitant prices [e.g., $25.00 for a 32-km (20-mile) trip to a medical clinic].

Definition of Problem

Logically, defining the problem is the next step. In this phase, the boundaries and extent of the problem should be analyzed. As the first step in the ongoing planning process, a planning group should be established. A set of initial goals and objectives should be formulated, and a clear statement of the mobility problem should be developed.

Figure 1. Planning and implementation sequence for rural public transportation systems.



Unfortunately, this problem-definition phase is often overlooked or bypassed. Frequently, the project funds that remain at the end of a fiscal year are used to buy some vehicles and there is very little consideration of the transportation needs and how best to serve them.

Needs and Feasibility Study

As indicated in Figure 1, the next phase should be a needs and feasibility study. This is the most critical step in the planning of a system. This phase begins with a well-defined mobility problem and concludes with an assessment of whether or not a transit system should be implemented. Geographical coverage and the target population are considered first. Next, a number of simple surveys are used to estimate the number of trips (need or demand) that will be taken if a system is implemented. Enough data are available on the ridership of existing systems that the demand estimate derived from the surveys should be compared with the actual ridership found on similar systems. Overestimating the demand is the most frequent, and often the most serious, mistake that can be made during this phase. Comparison with similar systems is the easiest way to avoid this common error.

The demand estimate is then used with cost estimates to decide whether or not to proceed with the subsequent steps. Admittedly, by this time, the process has gained momentum and it is rare that progress will stop here. However, some planners would have been wiser if they had made no-go decisions because of low potential demand rather than started systems that had sparse ridership and high costs per trip.

Once the decision to implement has been made, the planning group should be involved in the securing of financial and institutional support and in the final planning and design of the system. Depending on local circumstances, these can be done in the order indicated in Figure 1 or in the reverse order, or they can be done concurrently.

Securing Support

Securing financial support means first identifying the available funding sources and then securing adequate funds to start and operate a workable system. There are many potential funding sources at all levels of government; more than 50 separate federal programs provide project funds for the transportation of elderly, handicapped, and poor persons. There are also a myriad of eligibility requirements. The planner is cautioned not to spend time in contact with funding agency representatives unless there is a reasonable probability that the proposed project is eligible and will receive funding if a proposal is prepared. Managers of rural transit systems usually spend an inordinate amount of their time pursuing funding.

As important in the long run as financial support is the enthusiasm and support for the system that can be generated in the potential service area. This means that a broad base of support among human-service-agency personnel, agency clients, local businessmen, and elected officials must be established. It is at this point that a citizen advisory group can be used to promote the system. Also important at this stage is the support of the state and regional transportation officials who are likely to be involved in any proposal for project funding.

Design of System

A final plan for implementing the system and a detailed design are the primary outputs of this phase. Data from the needs and feasibility study are used to decide on the type of service (fixed route, demand responsive, or a combination) and the frequency of service. Other service-related decisions (such as fares, routing and scheduling procedures, and eligibility requirements) are made. Decisions are also made about equipment, including vehicles, communication apparatus, and whether to have contracted or in-house vehicle maintenance.

This is where attention to details and a thorough analysis of the effects of each alternative are the key factors. The system manager should have been hired or appointed by the time this phase is under way. Because the manager's decisions will be the major factor that determines the success of the system, it is imperative that the manager participate in the final planning and design phases.

Implementation System

Starting the system is inevitably a more difficult task than was envisioned by the planners. Delays in hiring the staff, ordering and receiving vehicles, and receiving funds are some of the problems that must be dealt with during the start-up period. As in any business venture, some internal procedures must be established. The choices of accounting procedures and other routine data-collection efforts are particularly important. The manager and staff must decide on the information that should be collected and tabulated and how often this is to be done.

Personnel-related items are also part of implementation. Even before the staff is hired, job descriptions should be prepared and personnel policies established.

A set of rules governing the activities of drivers and dispatchers is also needed.

A marketing program must be developed. Although advertising is important, the marketing effort should permeate the entire system. Courteous drivers, clean buses, and reliable service are more effective than any advertising campaign.

EVALUATION

The tendency is for the manager to devote all of his or her time and energy to procuring funds and handling the daily crises that must be solved to keep the operation functioning. This leaves little time for ongoing evaluation of the system. But some evaluation is necessary, especially when public funds are being used.

The evaluation process depends on the existence of a set of measurable objectives and also requires data on the performance of the operation. This must be kept in mind during the implementation phase when record-keeping requirements are being established. Trends in costs and ridership are always needed, but a meaningful evaluation procedure will also include other indicators of the effectiveness and efficiency of the system.

As indicated in Figure 1, the results of the evaluation should be used to determine whether the transportation problem is being solved. Are agency clients receiving increased mobility and has the human-service-agency delivery system been improved by the rural transit system?

ACKNOWLEDGMENT

This paper is an outgrowth of a research effort sponsored by the Office of University Research, U.S. Department of Transportation. The statements and views expressed represent my position and not necessarily that of the Department of Transportation.

Dr. Saltzman was at the University of California, Irvine, when this paper was prepared.

Transportation Planning and Implementation in Small Cities and Rural Areas

E. James Flynn, Institute for Urban Transportation, Indiana University, Bloomington

The Indiana Mass Transportation Improvement Project is responsible for public transportation planning in the small urban and rural areas of Indiana. The goals of the Indiana Public Transportation Advisory Committee emphasize the public transportation system. In Indiana a unique working arrangement is established in which the mass transportation improvement project serves as the staff for local public transportation operators. The project attempts to combine planning and operations into a total management assistance program. Work currently is being done in nine cities of less than 50 000 population and 26 counties in the state. In rural areas, the transportation advisory committee plays a dominant role in local transportation planning and evaluation. It addresses the community's total transportation needs rather than having local social service agencies think only of their own transportation needs. The Indiana Mass Transportation Improvement Project is establishing transportation advisory committees in all of the state's 18 planning regions. Transportation problems must be addressed by the service or market area, not by political boundaries such as counties. The success of the transportation improvement project is defined by how well it designs and helps implement a public transportation system that serves public transportation needs in the state.

The Indiana Mass Transportation Improvement Project (IMTIP) is responsible for public transportation planning for more than 2 000 000 Indiana residents who live in urban areas with less than 50 000 population. IMTIP is a division of the Indiana University Graduate School of Business' Institute for Urban Transportation. Since 1975 the office of the governor has contracted with the Institute for all small urban and rural section 9 planning work.

IMTIP's operation is guided by the Indiana Public Transportation Advisory Committee. Serving almost as a division of public transportation under the State Planning Services Agency (SPSA), IMTIP is charged with carrying out the goals of the public transportation advisory committee. Its goals are

1. To provide quality public transportation in Indiana adequate to meet the needs of the general traveling public, especially those without ready access to other means of transportation;
2. To provide for the transit needs of special groups, particularly the elderly and handicapped;
3. To provide an alternative to the automobile in a period when the cost of private transportation has increased greatly;
4. To ensure that Indiana cities will be able to attract new industrial, mercantile, warehousing, and other economic activity, and to retain existing enterprise;
5. To help meet state and federal goals for safety, conservation of energy, and control of environmental pollution;
6. To recognize that mobility through high-capacity service in densely populated areas by means of light rail commuter service may be appropriate in certain regions of the state; and
7. To preserve and upgrade existing public transportation services and facilities and to encourage new

Table 1. Current operating statistics, 1977.

City	Population	Planning Status	Fleet			Deficit/Capita		Riders	
			Size	Engine	Age	Amount ($)	Change (%)	Number	Change (%)
Richmond	43 999	R	10	Gas	6.0	1.79	+0.5	467 204	+17.5
Bloomington	42 890	R	12	Diesel	4.8	6.43	+32.6	486 199	-5.3
Marion	39 607	R	7	Gas	7.7	2.78	+41.1	168 341	-5.2
Michigan City	39 369	R	6	Diesel	27.0	3.59	-41.0	91 000	-48.7
Columbus	27 710	R	5	Gas	4.8	1.87	+68.0	65 807	-6.8
La Porte	22 140	R	6	Gas	4.0	2.45	+12.4	117 666	-7.9
New Castle	21 215	P	-	-	-	-	-	-	-
Wabash	13 379	C	-	-	-	-	-	-	-
Washington	11 358	P	2	Gas	4.0	0.56	-44.0	10 005	-18.6
Total	261 667		48		7.7	3.16	+13.6	1 406 222	

Note: R = Reappraisal, P = In progress, C = Complete.

Table 2. Status of capital grants, 1977.

City	Grant Status	Cost ($)			Buses			
		Total	UMTA	State	Number	Capacity	Engine	Special Features
Richmond	A	635 817	508 654	61 250	10	20	Diesel	Air conditioning
					3	12	Gas	Lift equipped
Bloomington	P	721 738	577 390	65 500	4	25	Diesel	-
					4	19	Gas	-
Marion	A	386 287	309 030	38 628	4	19	Diesel	Lift equipped
					1	10	Diesel	-
Michigan City	P	430 137	344 110	43 013	4	25	Diesel	Air conditioning
					1	17	Diesel	Lift equipped
Columbus	A	370 103	296 082	37 011	3	19	Diesel	Air conditioning
					1	15	Gas	Lift equipped
La Porte	P	300 828	240 662	30 082	5	17	Diesel	Air conditioning
					1	15	Diesel	Lift equipped
Total		2 844 910	2 275 928	275 484	41			

Note: A = Approved; P = Pending.

and innovative forms of public transportation.

IMTIP is responsible for handling both statewide technical assistance including conferences, newsletters, consulting with executive agencies and the legislature, and local technical assistance programs to accomplish the goals of the public transportation advisory committee.

LOCAL TECHNICAL ASSISTANCE

Currently IMTIP works with nine Indiana cities that have fewer than 50 000 population: Bloomington, Columbus, La Porte, Marion, Michigan City, New Castle, Richmond, Wabash, and Washington. IMTIP has completed 5-year plans for eight of the cities and currently is working on a plan for New Castle. IMTIP is also working on a plan for La Porte County. The cities' service characteristics are shown in Tables 1 and 2.

IMTIP also has provided technical assistance for all section 16b2 applications submitted since 1975 by serving as coadministrators with the Commission on Aging and Aged. IMTIP also reviewed the section 147 rural demonstration grant applications and has prepared transportation development programs for 26 rural counties to meet section 16b2 planning requirements.

Currently IMTIP is establishing transportation advisory committees (TACs) for each of the state's 18 regional planning areas. IMTIP will work with the TACs to develop transportation plans to meet section 16b2 requirements.

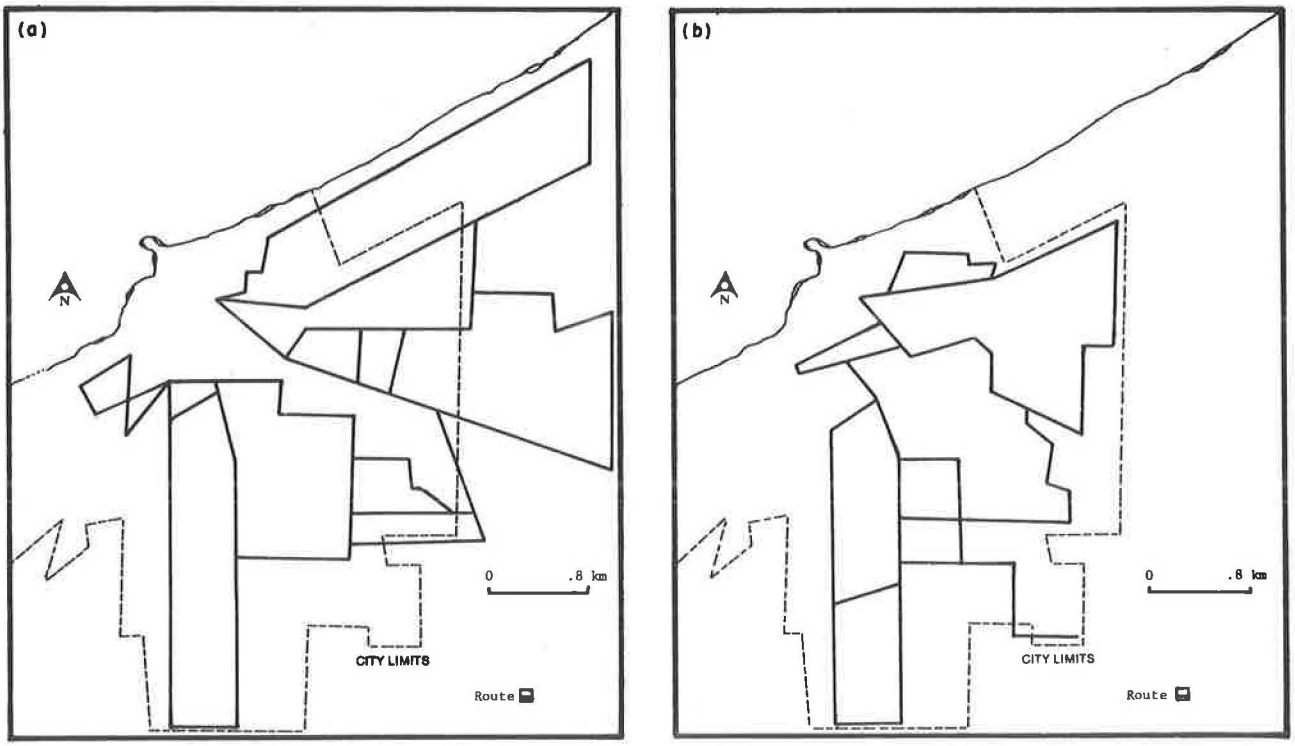
IMTIP's approach is based on the motto: Research is nice, but results are better. Under this philosophy, IMTIP has combined the traditional aspects of planning and operations into a program of management assistance.

Planners and transit operators often do not understand that planning is management of the future. If the planner and operator work together effectively, the operator works daily to achieve the desired results that the planner has projected for a year or more. A plan should have a set of objectives that are realistic and attainable. The objectives also must be quantifiable and consistent with the community's values or goals. A plan that has community support is easier to implement. But a plan also requires control, evaluation, and an ability to adapt to the future. If the planner and operator fail to work together, the plan becomes a document whose sole purpose is to show that it was prepared. IMTIP's approach is to develop comprehensive, 5-year organizational plans for public transportation systems.

The use of TACs on a regional basis helps IMTIP to coordinate human service transportation planning and operations within the service or market area. By addressing human service transportation problems by service area rather than by political boundary (such as a county), the agencies can identify their mutual goal of providing transportation to those who do not have adequate transportation. The primary purpose of the TACs is to enable all human service agencies to realize that their transportation goals are components of the area's unmet transportation needs.

IMTIP's work with the small cities and the TACs is the basis of its local technical assistance program. The local technical assistance staff functions as a staff of transportation operators in the state's smaller cities and rural counties. We provide management assistance for the analysis and evaluation local managers do not have the time to undertake. Our working relationship is based on personal trust and confidence developed during work on a technical study when IMTIP addresses

Figure 1. Michigan City route maps: (a) old route structure (1976) and (b) present route structure (1977—present).



local issues as its own issues.

IMTIP works to instill in the communities and operators the knowledge that our goal is to help them. IMTIP provides the information necessary for their decision making. IMTIP provides the knowledge and skills necessary to help local decision makers make the proper value judgments about their public transportation.

During the first contacts for a technical study, we interview local officials and community leaders to determine the community's attitudes about public transportation. During these interviews, IMTIP asks the government leaders to establish a TAC to ensure citizens' input in the planning and operation of public transportation.

IMTIP then establishes a tentative goal for the public transportation system. The community's transportation resources and needs are examined. To determine the community's unmet needs for public transportation, we develop options for public transportation service that meet those needs. We present the options to the TAC and the local executive and legislative bodies for formal review. Throughout the data collection and analysis, we give informal reports to these groups so they are familiar with the options before our formal presentation. The purpose of the formal review is to ensure that the recommended option is one that can be used. The plan must be manageable and worthwhile. Implementation will be the test of the plan's worth.

IMTIP firmly believes in the principle of home rule. Documentation of the technical study is not completed until community approval is granted.

After a city accepts a technical study, IMTIP assists in the preparation of a capital grant by ensuring that the required assurances are signed and that the rules and regulations are met. IMTIP corrects problems before the city submits the grant to the Urban Mass Transportation Administration (UMTA).

IMTIP continually evaluates the plan and refines and expands it as needed. With this integrated process, Indiana's small cities will provide more responsive, cost-effective public transportation to their citizens.

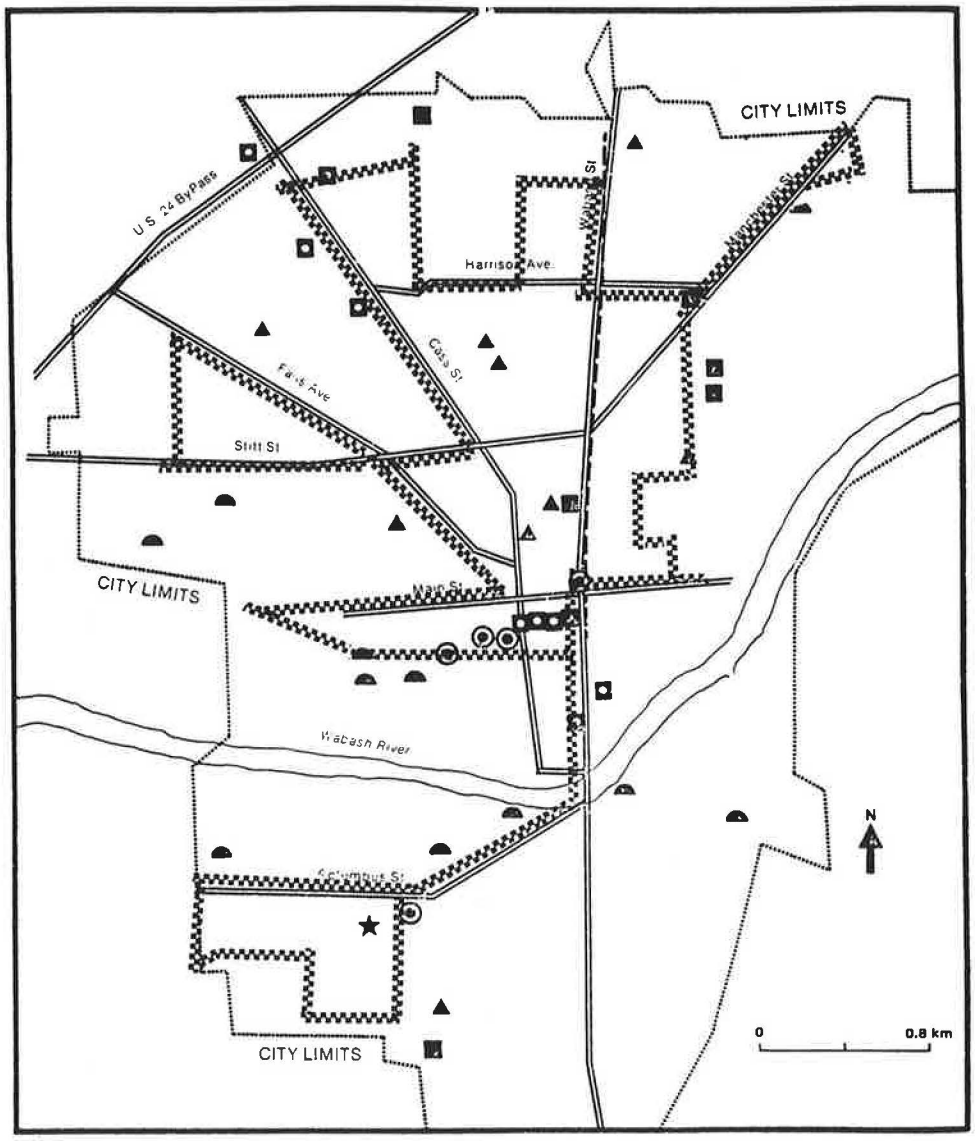
As part of IMTIP's assistance program to small cities, development of a generic marketing program has begun. The goal of this program is to institutionalize public transportation as part of small-city life. Citizens must be aware of the transit service and its benefits before they will use it. The marketing program includes a public information program, route and schedule designs, and system graphics.

SMALL CITIES

Many of the improvements recommended by IMTIP for small urban public transportation systems have been adopted:

1. In Bloomington—A load-factor analysis proved the need to use medium-sized buses on the system's most popular route. Currently the Indiana University campus bus system and the city system are considering the establishment of a transfer pass between the two systems, which only interface on the edge of campus.
2. In La Porte County—IMTIP is currently conducting a technical study to consolidate three other technical studies for areas within the county. Michigan City and La Porte are only 17.7 km (11 miles) apart in the highly populated northwestern corner of the county. IMTIP has completed studies for the city-owned systems in each city. In addition, IMTIP prepared a study of the Chicago, South Bend, and South Shore Railroad (South Shore) that runs across the northern part of La Porte County through Michigan City. The county-wide study will suggest options for commuter and shopping trip service in the northwestern corner of the county and will link this service with the South Shore's service along with coordinated human service agency transportation in the rest of the county. By expanding and integrating planning boundaries, IMTIP is attempting to use the synergism

Figure 2. Wabash route map.



of the new area to support a more rational public transportation system.

3. In Michigan City—Where finances are limited, service has been restricted to four routes from 6:00 to 10:00 a.m. and 2:00 to 6:00 p.m., and one route from 10:00 a.m. to 2:00 p.m. (see Figure 1). The city was providing service to its suburbs. When the system was analyzed, IMTIP discovered that the city was not charging the suburbs the actual cost of the service provided. When the suburbs balked at paying the actual cost, IMTIP designed a system to serve only the city on four routes from 6:00 a.m. to 7:00 p.m. at no additional operating cost. Now the citizens of Michigan City are getting more service for their money.

4. In Marion—The bus fleet the city had and its route structure both were deplorable. IMTIP persuaded the city to delay implementing a more direct route structure until reliable vehicles could be placed into service. The city agreed there was little to be gained by changing a poor system, often with missed runs into a good system with often missed runs.

5. In Wabash—The private operator provided one circuitous, fixed-route system for a $14 000/year subsidy from the city (see Figure 2). He was making only 65 to 70 trips/d. The relatively high subsidy for a city of limited resources of $0.75/passenger forced IMTIP to examine other transportation alternatives. IMTIP recommended providing a subsidy to the user. The privately operated taxi, the bus operator, and human service agencies would design their services to meet the needs of the transportation disadvantaged. The city already has revised its taxi ordinance and started to negotiate with the taxi operator to establish a fare subsidy for the rider.

TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED

In planning public transportation for elderly and handicapped people, UMTA and IMTIP are concerned about the lack of citizen participation in the development and implementation of service and the duplication of expensive services that human service agencies provide. IMTIP has promoted greater local participation by encouraging the development of TACs that are a strong representation of local service providers, users, and community leaders. The primary objectives of these TACs is to search for methods to avoid duplication of efforts and to promote cooperation in fuel purchase, maintenance service contracts, and insurance policies.

The use of TACs in these rural counties allows human service agencies to have more input into the planning process than is possible with traditional transportation planning. In addition, the agencies are able to understand the total transportation problem and how their service fits into it.

Plans are being prepared, or have been completed, in 26 of the state's 82 rural counties. As stated earlier, emphasis has been switched to doing plans according to the boundaries of the regional plan commissions. TACs have been started in nine counties.

IMTIP's role in these elderly and handicapped studies is that of moderator and consultant—to help the human service agencies identify transportation problems and then show them what their contribution is to solving the problem. The emphasis of this approach is on the end product—a coordinated public transportation service that satisfies the unmet travel demands of the elderly and handicapped. The agencies' values and perspectives have to be changed, which requires IMTIP to design the transportation system to achieve specific, mutually agreed on objectives.

CONCLUSION

IMTIP's success is measured by how well we satisfy the needs of our clients (service agencies, to provide effective and efficient public transportation. IMTIP's goal is not just to produce a plan but to produce a plan that is implemented because it is compatible with the communities' common purpose of providing the public transportation that the community wants.

Statutory Barriers to Coordination

Dolores A. Cutler, Ecosometrics, Inc., Bethesda, Maryland

This paper reports on an initial investigation of statutory barriers to coordination, especially concerning transportation, evident in seven pieces of federal legislation. Using data collected from three American cities, the study found that most of these statutes encouraged or mandated various forms of coordination. All included provisions that could prove to be barriers to coordination, such as inconsistent federal-local matching ratios, differing definitions of a handicapped individual, differing planning cycles among the programs included in this study, and state and local interpretations of federal audit provisions.

Much investigative research has been done during recent years on existing coordinated transportation systems. Many studies noted some degree of statutory or regulatory barrier to coordinating transportation services, but later works show that many of the earlier assumptions in that regard (e.g., eligibility and commingling of client groups) may have been overstated.

Ecosometrics has had extensive experience with agencies administering transportation and social service programs at the federal, state, and local levels. We have found that many such agencies are reluctant to even attempt to pool resources into a coordinated transportation system, due mainly to administrative or fiscal constraints (e.g., conflicting accounting, billing, and reporting procedures) or regulatory barriers.

For example, it has been noted that programs that reimburse clients for transportation on an individual basis require detailed, accurate records of each client's trip in terms of trip purpose, fare for transportation, and so forth. Thus, separate reporting systems and special billing systems would be required for a coordinated system. Transportation projects that include resources pooled from several different federal programs must also maintain separate accounting systems for each participating program in order to be adequately prepared for federal, state, or both, project audits. These requirements place an enormous administrative burden on a transportation system that is also attempting to overcome state and local barriers to coordination. Agencies that attempt to orchestrate such coordinated transportation efforts can be severely hampered by these requirements. If an integrated accounting, billing, and reporting procedure could be developed that would be applicable to large urban settings as well as smaller cities with relatively unsophisticated service delivery systems, much of the current reluctance to pool resources for coordinated transportation might be overcome.

Based on our experience in the field, we believe that the regulatory barriers to coordination can be traced to one of three sources:

1. Statutes that generate the regulations,
2. Interpretation of those statutes at the federal level that result in the regulations, and
3. States' interpretation of federal regulations and their guidelines or rulings that are superimposed on the federal regulations.

We have been given the chance to test our assumptions with respect to the statutory and regulatory barriers to coordination and the unified billing and accounting systems. In November 1977, Ecosometrics Incorporated contracted to conduct a study of the feasibility of coordinating human services and public transportation in three American cities of differing size: Roanoke, Virginia; Philadelphia, Pennsylvania; and San Antonio, Texas. A major component of that study is an analysis of the statutory and regulatory barriers to coordination. The federal statutes selected for study were those that governed those programs appearing most often in the baseline data we collected during sampling visits to the three cities. The analysis will be reviewed by relevant local- and state-level agencies and by key personnel in each of the federal agencies administering the program in question.

We are also preparing model unified accounting and billing systems for coordinated transportation to be reviewed at the federal, state, and local levels.

We have completed the statutory barrier analysis; the findings are discussed in this presentation.

The following statutes for barriers to coordination, as well as provisions that encouraged coordination, were reviewed:

1. Urban Mass Transportation Act of 1964, as amended;

2. Rehabilitation Act of 1973, as amended;
3. Mental Retardation Facilities and Community Mental Health Centers Act of 1963 (Developmental Disabilities Program), as amended;
4. Older Americans Act of 1965, as amended;
5. Community Services Act of 1974;
6. Social Services Amendments of 1974—Title XX of the Social Security Act; and
7. Title XIX (Medicaid) of the Social Security Act of 1936, as amended.

Program regulations often go far beyond the law in interpreting and providing policy direction on the legislative language found in the law. Therefore, the statutory barrier analysis must be viewed as an initial investigation, with interpretations subject to change based on our review and analysis of regulations and discussions with federal program officials. However, this early stage of the investigation has produced some interesting findings. Each of the statutes included in the study is briefly summarized here and is followed by an overview of the various statutes and their interrelations. More detailed analysis of some of the issues touched upon in these summaries will appear in the final report by Ecosometrics to the U.S. Department of Transportation (DOT).

STATUTORY BARRIER ANALYSIS

Urban Mass Transportation Act of 1964, As Amended

Coordination appears to be a key element in the programs administered under this act. Concern about the lack of coordinated transportation is expressed in the findings and purposes section of the act, with an implied commitment of federal financial assistance to develop "efficient and coordinated mass transportation systems."

Sections 3, 4, and 5 contain explicit coordination requirements. In addition, the law mandates that after July 1976, no section 3 project will be approved unless it is based on an "ongoing cooperative and comprehensive planning process covering all modes of surface transportation" carried out by the states and the governing bodies of local communities.

Section 16 does not include any coordination language. However, since the funds for sections 16a and 16b are set aside from the section 3 appropriations, the same coordination requirements set forth in sections 3 and 4 may also apply to section 16. We know that the Urban Mass Transportation Administration (UMTA) and Federal Highway Administration (FHWA) planning regulations and UMTA guidance materials will undoubtedly clarify and enhance our understanding of the implementation of the statutory provisions relating to coordination.

Although the law emphasizes coordination of transportation services and mandates coordinated planning, there are provisions that may act as barriers to some forms of coordination. For example, the provision prohibiting operators who receive assistance under section 3 from operating charter bus operations outside the urbanized area in which the operator provides regularly scheduled services—unless agreement is reached with private operators of intercity bus transport to ensure them that they will not be financially disadvantaged because of such activity—could be a barrier to coordination, if a transit authority in an urbanized area surrounded by a rural area attempts to coordinate services outside the limited urbanized area.

For example, assume that a transit authority in an urbanized area operates a supplemental coordinated service for the elderly and handicapped. The area is surrounded by a nonurbanized (rural) area, in which there is an intercity charter bus operation that does not provide the type of service needed by the elderly and handicapped residents of the rural area. The health and social service agencies in the rural area wish to participate in the coordinated service through purchase of service arrangements for their elderly and handicapped clients. The charter bus operator views this as a threat to business, even though the operator cannot provide the type of service required by the elderly and handicapped. The operator complains to the transit authority, the state department of transportation, and the state public utilities commission. If the intercity bus operator's complaint is considered valid (by any of the three parties), based on how the charter bus provision in section 3 is interpreted, the transit authority could be prohibited from providing service in the nonurbanized area. Thus, the extent of coordination that could occur is limited.

Federal matching requirements for sections 3 and 5 that conflict with those for the other federal programs included in this study could have a negative impact on the development of consolidated transport systems. For example, Federal matching ratios for Title III (for social services under approved area plans), and Title VII of the Older Americans Act of 1965 are 90 and 10; Title XIX of the Social Security Act of 1936 is either 72 and 25 or 50 and 50; Community Action Programs have a declining match, from 80 and 20 to 60 and 40 and to rural areas, 75 and 25 to 70 and 30. The only programs that have the identical matching ratio to sections 3 and 5 (capital assistance) are rehabilitation services and developmental disabilities with 80 and 20—but that is unlike the UMTA section 5 operating assistance match of 50 and 50. If a local transit authority attempted to consolidate (pool) the transportation resources of these various programs with some of their sections 3 and 5 funds (to meet their elderly and handicapped requirements), attempts to request different funding and matching ratios for each different program could generate so much confusion that local financial support (e.g., the local match) for the consolidated system could be delayed.

The 13c provisions could present barriers to coordinated transportation when a mass transit operator attempts to coordinate its service with transportation providers that do not use union drivers. Or the type of handicapped rider that could participate in a mass-transit- and social-service coordinated service might be limited to those persons who do not require hands-on service, thereby limiting the number and type of agencies that could participate in such a coordinated service.

The definition of a handicapped person that appears in section 16d will be compared to similar definitions in the health and social service statutes included in this study. Differences in language and interpretation of this and other definitions of handicapped persons may have an adverse impact on the development of coordinated transportation systems.

Rehabilitation Act of 1973, As Amended

Transportation as a means of solving rehabilitation problems appears as a key concern in the Rehabilitation Act of 1973. That concern is expressed by one purpose of the act and is one of the social services cited as necessary to "render a handicapped individual employable." As such, it must be provided with any vocational rehabilitation service provided under the act.

Groundwork for coordination is laid in several general provisions, e.g., in order to effect more interrelated services and effective planning of rehabilitation, states are permitted to consolidate state plans required under the act for rehabilitation services with those required for development disabilities services. They may submit a single state plan for both programs. This may have the effect of pooling common services for groups eligible for both programs, including pooled transportation services.

In addition to the general provisions, coordination is emphasized in several of the programmatic—as opposed to administrative—sections of the law. Some sections of the law could pose barriers to coordination. For example, the definition of "handicapped individual" is directed specifically to the major purpose of the act, which is primarily the delivery of services to handicapped persons that will enable them to obtain employment or to help the severely disabled develop skills so that they may live as independently as possible. Where the definition conflicts with the definitions of functional handicaps imposed by various transit authorities (to meet part of their elderly-handicapped requirements for UMTA capital assistance), it may constitute a barrier to coordination among mass transit operators and human service transportation services provider agencies.

Mental Retardation Facilities and Community Mental Health Centers Construction Act of 1963, As Amended

The definition of "services for persons with developmental disabilities" includes transportation as one of the services "directed toward the alleviation of developmental disability or toward the... habilitation or rehabilitation of an individual with such a disability..." In addition most of the other services listed require the provision of some form of transportation.

The state plan section of the law emphasizes coordination as follows:

1. The plan must describe the quality and scope of a range of services that might be provided to the developmentally disabled under federal-state programs other than the program authorized by this act. In addition, the plan must describe how the funds alloted under this act will be used to "complement and augment rather than duplicate or replace" those services for the developmentally disabled that are available through other federally assisted state programs.
2. The plan must ensure full coordination with related community programs and utilize as much as possible the resources and personnel in such related community programs to ensure the provision of "appropriate supplemental health, educational, and social services" for the developmentally disabled.
3. The plan must provide for maximum use of all available community resources, including volunteers in programs under the Domestic Volunteer Service Act of 1973 and other voluntary organizations. However, such volunteer services must supplement and cannot replace services provided by paid employees.

In addition, the authorization for special project grants includes specific reference to demonstrations that focus on coordination and the use of "all available community resources."

Provisions of the law that might act as barriers to coordination include the following:

1. The federal matching share for services, which is 75 percent, and 90 percent for projects located in poverty areas, conflicts with other statutes under study as noted earlier.
2. Control of operations of developmental disabilities facilities is afforded to the state or local level with no federal intervention. This provision relinquishes all federal control over the administration and operations of developmental disabilities facilities. Thus, control of these facilities rests with the state or local level, or with the individual facility. Rulings or guidelines set forth by any of these entities regarding the operation and services provided through such facilities may have an impact on their participation in coordinated transportation services.
3. Records and audit may create barriers, for example, local interpretations of federal audit requirements as a possible barrier to coordinated transportation.
4. The definition of "developmental disabilities" points to the necessity of hands-on transportation service, which could discourage coordination with public transit, because public transit systems seldom have personnel with appropriate training and because the work rules of most transit unions preclude such activities by union members.

Older Americans Act of 1965, As Amended

The framework for the development of coordinated transportation services for the elderly is established in Title I of the act—Declaration of Objectives for Older Americans. Objective 8 links access to low-cost transportation to community services that are to be provided in a coordinated manner.

The Administration on Aging (AoA) has a strong mandate to coordinate with other federal agencies under Title II of the law. Although it is known that AoA has carried out its coordination mandate at the federal level (primarily through its joint working agreements with other federal agencies, including DOT and UMTA), it is not clear whether this federal-level activity has had a positive impact on state- or local-level coordination.

The joint funding provision is identical to the provision in the Rehabilitation Act and the Community Services Act. A major purpose of the Title III program on aging is the development of comprehensive and coordinated service systems. Transportation is linked to the definition of "comprehensive and coordinated system" by the statement that such systems "facilitate accessibility to and utilization of all social services provided within the geographic area." In addition, the definition of social services includes specific mention of transport "where necessary to facilitate access to social services."

The area planning and social services program is the local social services program under Title III. The purpose of this program is to establish comprehensive and coordinated service delivery systems in state planning and service areas that are covered by area plans. Under area plan provisions of the law, area agencies (and in some cases, state agencies) are authorized to enter into agreements with local agencies administering programs under the Rehabilitation Act and Titles XIX and XX of the Social Security Act for meeting the common need for transportation services of persons in programs authorized by Titles III and VII of the Older Americans Act and individuals receiving services and benefits under the aforementioned acts. This language provides clear direction to state and area agencies on aging regarding the coordination of transportation services among several local agencies with similar program

goals and client groups. Of all the statutes included in this study, this provision stands out as the most positive expression of support for coordinated human services transportation.

Transportation is further emphasized here, as it is currently one of four national priority services that must be provided under state plans on aging. States are required to spend at least 20 percent of their area planning and social services' funds on transportation and/or three other services identified as national priority services.

The Title VII nutrition program for the elderly also requires the provision of transportation services, where necessary, to and from nutrition sites but local-level coordination is not emphasized.

The Title V multipurpose senior center program does not mention coordination, nor does it specifically cite transportation or any other service as a social service. However, because transportation is defined as a social service emphasized elsewhere in the law and because transportation would be required for access to many multi-purpose senior centers funded under Title V, it is likely that transportation services would be associated with such centers.

Although this statute strongly emphasizes coordination at the federal, state, and local level and one program (Title III) mandates coordinated services, there are provisions of the law that prohibit or could create barriers to certain forms of coordination. For example, AoA and all programs under the Older Americans Act of 1965 are exempted from any authority under the Joint Funding and Simplification Act of 1974. The provisions of that act provide a mechanism for a range of coordinated planning activities at the local level (subject to approval from the federal agencies having jurisdiction over the local programs in question).

Community Services Act of 1974

The basic purpose of community action programs is the coordination of all available resources toward the goal of helping low-income individuals and families. In addition, specific direction is provided to Community Action Agencies (CAAs) regarding the improved organization of services to enhance their efficiency and effectiveness. Federal-level coordination is emphasized throughout the act to encourage coordinated planning among the various community-based social service programs that have common goals.

CAAs are required to organize themselves and their component parts in a coordinated manner. They are mandated to engage in cooperative planning with other community-based programs and local officials and to make effective use of resources from a variety of related programs. Two special programs authorized by the law—Senior Opportunities and Services and Emergency Energy Conservation Services Program—mandate coordination at the federal level and also specifically authorize transportation as a service to be provided.

The Head Start Program authorized by Title V of this act (but administered through the U.S. Department of Health, Education, and Welfare) encourages coordination by requiring the establishment of procedures to account financially for the use of common facilities at the local level by more than one program. This is the only provision in any of the statutes included in this study that provides clear direction toward the development of unified accounting procedures.

An entire title (VI) of the act is devoted to administration and coordination, an indication of the importance of coordination to the programs under the act.

The joint funding provision is identical to that found in the Rehabilitation Act and the Older Americans Act.

Although the Community Services Act of 1974 has the strongest coordination mandate of any of the programs included in this study, there are several provisions in the act that could be viewed as barriers to coordination, such as:

1. The law mandates the establishment of community action boards that have administrative authority over CAAs. These boards must be representative of the community, with emphasis on neighborhood-based organizations. This may tend to inhibit coordination through local organizational or jurisdictional turf problems.
2. Funds under the community action program are based on a formula allotment to states. The program has a decreasing federal match for local agencies. Although the decreasing match could encourage coordination, it could inhibit coordination if the federal matching ratios (in any given year) conflict with those of other federal programs.
3. The fiscal responsibility and audit provisions could act as barriers to coordination if interpreted in terms that are inflexible or that conflict with those for other programs.

Social Services Amendments of 1974—Title XX of the Social Security Act

Although Title XX authorizes a consolidated program of federal financial assistance for the purpose of providing social services to low-income families—language that implies coordination—the actual act of coordination is mentioned only once in the law. Under the provision for a comprehensive annual services' program plan that is published by each state (and subject to public comment before the program can be implemented), such plans must include a description of how the Title XX services will be coordinated with services and benefits under Title IV-A (Aid to Families with Dependent Children), Title XIX, and Title XVI. The types of programs mentioned would imply an information-sharing or organizational form of coordination, rather than coordination of services, since they are cash-assistance, as opposed to service-delivery, programs.

The 1976 amendments to Title XX introduced the determination of eligibility on group basis to the Title XX program. This provision—if acted upon by a state—can reduce the complexity associated with the differing criteria for eligibility under the law, thereby making it somewhat less difficult to coordinate transportation services provided under Title XX with other federal programs. However, this is a permissive rather than a mandatory provision. It is the state's option whether to apply the group eligibility criteria (if all members of a group—75 percent are members of families whose gross monthly incomes are 90 percent or less of a state's median adjusted income), and the criteria may not be applied in some states. In fact, Arkansas does not utilize this provision.

Transportation is cited as one of a range of services that could be directed at the goals established for the Title XX Program.

Title XIX, Social Security—Medicaid

Medicaid (Title XIX) is a formula-grant program to states for the purpose of providing medical assistance to certain categories of low-income persons.

The state plan provisions of the act require the states to enter into cooperative arrangements with state agencies administering health services and vocational rehabilitation services with a view toward maximum utilization of such services in the provision of medical

assistance under Medicaid.

Although transportation is never mentioned in the law (it is defined in regulations), the necessity for transportation services is implied in the language that states that medical assistance be furnished with reasonable promptness. Medicaid recipients are provided with the freedom to select the type of provider they use for Medicaid-related purposes.

The opportunity for coordination under the law is limited to the state plan provisions noted above. Many other provisions could create barriers to coordination. For example, for one category of recipient, fees or charges for certain identified services are prohibited; for another category of recipient, a nominal fee may be charged. This raises the issue of conflicting public subsidies.

Another point should be made concerning barriers to coordination in Medicaid. This is essentially a state-administered program, with the federal role limited to funding the states and certain oversight actions to prevent fraud. The states are bound by law to provide only those types of services identified to the different categories of recipients; they interpret the listing of required five or seven services as broadly or as narrowly as they wish. Thus, the coordination decision may rest with the state and may differ from state to state.

CONCLUSION

Although most of the statutes included in this study encourage or mandate various forms of coordination, they all include provisions that could also prove to be barriers to coordination. These conflicts may be clarified when program regulations are reviewed and analyzed. On the other hand, some regulations only serve to cloud the issue or confuse it further. Ultimately, the interviews at the federal, state, and local levels about the statutory and regulatory barriers and the encouragement of coordination will determine whether, in fact, the provisions and requirements identified in our analysis act as barriers to or encouragement of coordinated transportation, or whether state or local rulings have as much, or more, of an impact on coordination than federal-level actions.

Summary List of Barriers

From this initial investigation, the barriers to coordination that appear most often are

1. Inconsistent federal-local matching ratios;
2. Differing definitions of a handicapped individual;
3. Differing planning cycles among the programs included in this study; and
4. State and local interpretations of federal audit provisions.

In addition, certain barriers may appear in only one statute but could affect the coordination attempts of several programs. For example, such barriers include

1. Title XX eligibility and reporting requirements;
2. UMTA 13c provisions and charter-bus restrictions outside urbanized areas; and
3. Older Americans Act exemption from coordination activities under the Joint Funding and Simplification Act.

In reviewing program regulations, we will pay special attention to how regulations interpret some of the common definitions (e.g., handicapped and coordination) found in more than one statute. We will also look for interpretations of the planning, audit, accounting, and reporting provisions found in all statutes. The coordination requirements and activities resulting from the research and demonstration provisions in most of the statutes will also be examined with a view toward program policy implications emanating from such research activity. Finally, program regulations governing the joint funding provision will be reviewed to determine its different interpretation among the several acts and its impact on coordinated transportation.

What we find in our analysis of these seven statutes is that the barriers to coordination are not obvious. For example, nowhere in any of the laws included in this study is there a prohibition, either implicit or explicit, of two or more programs sharing vehicles or other resources across program lines or mixing client groups from several different programs on one vehicle. And yet, that is what many local agencies believe, because the program regulations make explicit the prohibition of sharing facilities or their state agencies interpret related regulatory provisions as prohibiting a particular activity (or establish their own guidelines in that regard). Interviews at the federal and state levels should reveal where and how barriers and faulty interpretations of regulations originate.

Abridgment

Section 13c: Some Concerns and Considerations

Lynn A. Franks, U.S. Department of Labor

Section 13c of the Urban Mass Transportation Act of 1964, as amended, provides for the protection of employees when a mass transit system is acquired or improved by a state or local government with the use of federal funds.

The protective arrangements must include, but are not limited to, provisions that provide for

1. Preservation of rights, privileges, and benefits (including continuation of pension rights and benefits)

under existing collective bargaining agreements or otherwise;

2. Continuation of collective bargaining rights;
3. Protection of individual employees against a worsening of their employment positions;
4. Assurances of employment to employees of acquired mass transportation systems and priority reemployment of employees terminated or laid off; and
5. Paid training or retraining programs (1).

The U.S. Department of Labor (DOL) refers copies of the application for federal assistance to any labor organization that represents urban mass transportation employees in the affected project service area and solicits their views on appropriate terms and conditions for employee protection. The parties involved are then encouraged to reach agreement on employee protection terms and conditions. DOL furnishes technical and mediator assistance, if needed. DOL then reviews the agreement to ensure that it provides protections that meet the requirements of the law. By letter to the Urban Mass Transportation Administration (UMTA), DOL makes the required certification. In the event that no agreement is reached, the Secretary of Labor sets the terms and conditions considered acceptable for certification. If the employees are not represented for purposes of collective bargaining, DOL, in its letter of certification, sets the terms and conditions for employee protection (1).

Section 13c is more complex than it appears to be on the surface. The nature of section 13c is best learned by the grant applicant through the experience of working through the requirements of an UMTA application. The two primary areas of concern in this paper are paratransit and rural transportation.

PARATRANSIT

Nowhere does the act or its legislative history define the term employee. Such a determination is within the jurisdiction of the Secretary of Labor. Since UMTA funds in certain paratransit projects were used to reimburse taxi services, DOL was forced to develop a policy about the applicability of section 13c protections to taxi operations. Such a policy was developed by the case-by-case method of determining whether or not employee coverage was warranted in each individual case.

Where taxi drivers provide service under UMTA funding, DOL has conducted an inquiry into the extent of the individual driver's participation in project services. The Akron, Ohio, application, for example, indicated that the taxi drivers who were providing project services were only tangentially involved in such activity. They spent the great majority of their time in performance of traditional, exclusive-ride service. Accordingly, they were denied section 13c coverage.

The proposed agent-broker project in Pittsburgh, Pennsylvania, presented DOL with a different situation. Several taxi companies, having diverse operations, were considered likely providers of project services. One of the companies bidding on the project had some drivers who were involved exclusively in the provision of project paratransit services. In addition, this taxi firm derived a minimum of 15 percent of its revenue from project services. In view of the degree of involvement in project services, DOL concluded that certain employees of the company and others similarly situated could not be excluded from section 13c coverage. Specific section 13c negotiations between the grant recipient and the taxi company were not required in the Pittsburgh situation due to the urgent need for project certification; however, DOL applied substantially the same levels of protection to taxi employees as were afforded to employees of the Port Authority of Allegheny County, who are represented by the Amalgamated Transit Union.

RURAL TRANSPORTATION

The specific provisions, if any, relevant to section 13c that will be made applicable to the legislative provisions on rural transportation are unknown. DOL thinks that section 13c protections should apply to any rural transportation funding program that may be enacted into law.

Heretofore, DOL has dealt largely with urban transportation problems. Rural transportation, not unlike UMTA taxi project situations, will present innovative and complex employee protection issues. Experience shows that the parties themselves often provide the best solutions to problems applicable to a local area.

In all probability, because of the absence of organized transportation in most rural areas, the vast majority of rural transportation grants will be certified by DOL on a nonunion basis; that is, the Secretary of Labor will issue the section 13c terms and conditions to be put in the grant contract.

If intercity bus carriers receive funding under the impending legislation and provide mass transportation service to small towns, rural transportation providers and the intercity bus lines may be in competition with one another, creating the potential for adverse effects. Many rural transportation applicants will come into contact with unions for the first time. Under current procedures, a provider of mass transportation in the service area of the project is afforded an opportunity to negotiate specific section 13c protections with the recipient of federal funds. If this occurs, DOL's technical assistance and mediation services will be in great demand.

REFERENCE

1. Consumer Information Leaflet. U.S. Department of Labor, USDL-32 (LMSA-5), April 1978.

Abridgment

Implications of DOT Draft Section 504 Regulations for Rural and Small Urban Areas

Douglas B. Gurin, Office of Policy Development, Urban Mass Transportation Administration

This paper is a brief review of one, if not the most important and challenging, of the draft regulation of the U.S. Department of Transportation (DOT)—its Section 504 regulation that bars discrimination against handicapped persons. The handicapped must play a critical and urgent role in shaping the response of DOT to the Section 504 regulations as they relate to state agencies, rural and small-city residents, and small-scale operators.

The proposed regulation would implement Section 504 of the Rehabilitation Act of 1973, which provides that no otherwise qualified handicapped individual shall, solely by reason of his or her handicap, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity that receives federal financial assistance. The current emphasis in the regulations is on large urban bus and rail systems and metropolitan planning organizations, not on the institutions and conditions that the handicapped encounter or manage.

Concurrent with activity on the Section 504 regulations within the U. S. Department of Health, Education, and Welfare (HEW), the White House issued Executive Order 11914, which gives HEW the lead in developing accessibility guidelines for all other federal agencies that give out grants. This is intended to ensure consistency among the different agencies and to help monitor and implement the removal of barriers to the handicapped.

The process of developing HEW guidelines for DOT did not occur overnight. HEW published draft guidelines that were commented on by DOT and that went through the same kind of regulatory schedule that is outlined here for DOT.

In the context of large urban areas, DOT sought to have fixed rail systems exempted and tried to ensure that alternative paratransit or accessible bus systems might be substituted for accessible line-haul systems. However, it appears that no mode of transportation is exempt, and alternatives in the interim might be acceptable if they are comparable.

There has been much debate on how to provide accessibility—i.e., whether by fully accessible or specialized systems. Support for fully accessible systems has been voiced by some very articulate handicapped people. Although they are a small group, these people have been the driving force behind each of the HEW 500-series regulations, of which 504 is the latest. Many of their arguments are considered by DOT to be fundamental to the HEW Section 504 guidelines.

The first argument is the concept of mainstreaming—"separate but equal is not really equal"—which emphasizes mixing handicapped persons with nonhandicapped persons. A second idea expressed by some handicapped persons is that they have a civil right to the same transit service that everybody else has, regardless of the inadequacies of conventional transit service. Third, assuming that a reliable technology is eventually achieved, the accessibility approach would be relatively resistant to funding cutbacks; that is, the handicapped would be disadvantaged by service cutbacks to the same extent as the able-bodied. If there were a separate service, there could potentially be greater cutbacks in service.

Some argue that ridership is low on currently accessible services and that the costs do not justify the investment. However, a low response rate now is not necessarily indicative of a low response rate in the future. Other services will have to be accessible to qualify for other federal and state programs and will cumulatively provide many more opportunities for handicapped persons.

Finally, many accessibility improvements—such as larger signs, loudspeakers, or ramps and elevators—will help the general public as well as the transportation handicapped.

Some key points in the DOT response to the Section 504 regulations are the following. All recipients of Urban Mass Transportation Administration (UMTA) grant programs—Section 3, Section 9, Section 16, and any nonurbanized program—will require some form of compliance with Section 504. The regulation covers all modes: bus, paratransit, and a catchall mode (which might deal with small buses, ferryboats, even hydroplanes, and other kinds of vehicles). It covers all services. It covers all employment practices (except that employers may still impose job-related skill requirements). It covers both existing and new facilities and vehicles as well as terminals, offices, pathways, public meeting rooms, or other property within the control or lease of the recipients. It covers not just the direct provision of service but also information aids, billing, and other aspects of transportation programs. In short, if a mode, service, or facility receives federal funding (e.g., under UMTA Sections 3, 9, and 16), it must meet Section 504 regulations.

DOT also realizes that accessibility is not just a matter of capital equipment and the operating practices of bus drivers but also of things like marketing, insurance, and training that are necessary conditions for the whole service to fit together and be truly accessible. There are also statements in the DOT response that discuss public input, especially input from organizations for the handicapped and existing providers of specialized service on behalf of the handicapped. One of the most critical features of the sophisticated rule making of HEW is a requirement that all of these compliance activities must occur within 3 years of the effective date of the regulation except for a few major structural changes. The regulation requires grantees to prepare a staged transition plan to reach program accessibility within specified deadlines. In nonurbanized areas, these transition plans are to be submitted with each application rather than on an annual basis as in large urban areas.

The most relevant sections of the regulation for rural systems are the bus and paratransit sections. In the 6 years after the final regulation is issued, conventional bus operations (those that operate fixed routes and schedules with the standard 35- to 40-passenger transit

bus) must make 50 percent of the service they provide accessible to the handicapped by means of either bus lifts or ramps. The emphasis is on speedy compliance: 3 years from issuance of the final regulation. In the interim, some type of accessible service is to be provided, most likely a form of paratransit.

Urban and rural paratransit operators who receive UMTA funding will be required to provide accessible services within 3 years. Accessibility is defined as the ability to satisfy the needs of the handicapped in a manner that is approximately equivalent to service for the nonhandicapped. It does not mean that every vehicle in the fleet must be accessible, but it does mean that the wait time, the area coverage, and the other service features provided by the organization must be equivalent for both handicapped and nonhandicapped persons. The accessibility provisions apply to facilities as well as to vehicles. Exceptions would only be allowed if another provider were willing and able to handle all reasonable needs.

Other considerations associated with complying with Section 504 regulations include (a) safety and emergency handling procedures; (b) sensitivity training for drivers and other personnel; (c) escorts; (d) travel aids for the handicapped; (e) coordination among different types of operators, modes, and agencies; (f) marketing; (g) administration; (h) regulatory reform; and (i) insurance and labor agreements. The draft regulation also requires identification of barriers to serving the handicapped within the various systems and action on these as soon as possible.

What happens next? Public input has been solicited by DOT. The formal deadline for comments to the docket was October 20, 1978. Understanding the expected impacts of Section 504 regulations on rural and small-city systems is very important in the preparation of the final regulation by DOT.

Costs of Rural Public Transportation Services

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Typical costs for rural transportation operations and the factors that influence such costs are examined. Until now, few hard data have been available for the purpose of describing rural transportation costs. The data used in this research are taken from applications for funding and actual operations performed under Section 147 of the Federal-Aid Highway Act of 1973, the Rural Highway Public Transportation Demonstration Program. The following aspects of rural transportation costs are investigated: (a) general cost ranges and what constitutes average and "good" costs, (b) factors that affect the cost of operations, and (c) the characteristics of the most economical and most expensive hypothetical system designs.

There are relatively few references in the growing literature on rural transportation that describe the costs of these services. This subject has lagged behind others because there has been no standardized data-collection effort that covered the costs of rural paratransit operations. With the advent of the evaluation methodology for the Rural Highway Public Transportation Demonstration Program established in Section 147 of the Federal-Aid Highway Act of 1973, the lack of data will no longer be a problem. By using preliminary Section 147 data, it is possible to describe average costs for the initial operations of these systems. The figures now available should be refined through subsequent reports to the Federal Highway Administration.

This paper looks at several aspects of rural transportation costs. First, what general cost ranges are known to exist and what are average costs and "good" costs? Second, what factors influence the costs of operations? Finally, if we were to design systems with the objective of spending either as little or as much money as possible, what would such systems look like?

TYPICAL COSTS

Need for Caution

Before delving deeply into costs, we should restate the obvious disclaimer that cost is only one of many evaluation measures that should be used to assess rural transit operations. An evaluation that focused on cost alone—or on any other factor alone—would be deficient. Without service considerations, one could design a nearly costless system, but it probably would not serve enough people to warrant the name "system."

Thus, costs should be considered in conjunction with other evaluation measures. A complete evaluation would include assessments of efficiency (how well a transportation system uses available labor and capital resources) and effectiveness (how well a transportation system meets the goals and objectives set for it) (1). Such an evaluation would include at least the following factors:

1. Cost per one-way passenger trip—Total system costs (all operating expenses plus administrative costs plus capital costs on a depreciation schedule) divided by the number of passenger trips (costs and trips must be recorded over the same period of time);
2. Cost per vehicle kilometer—Total system costs divided by the total distance traveled by all vehicles in the system [the desirability of using passenger-kilometer rather than vehicle-kilometer statistics has been noted by Kidder and others, who have also pointed out the difficulty in obtaining these data (2)];
3. Cost per vehicle hour—Total system costs divided by the sum of the number of hours that each vehicle is operated;
4. Load factor—The sum of the distances for each

trip by each passenger divided by the sum of the seat kilometers provided by each vehicle (which is the product of the number of passenger seats times the kilometers the vehicle traveled);

5. Operating ratio—Total system costs divided by total system revenues;
6. Passengers per vehicle kilometer—The number of passenger trips divided by the number of vehicle kilometers provided by all vehicles;
7. Passengers per vehicle hour—The number of passenger trips divided by the sum of the number of hours that each vehicle is operated; and
8. Annual passengers per service-area population—The number of passenger trips taken per year divided by the population of the service area.

The first five items above are efficiency measures, and the last three are measures of effectiveness. Other indicators have been proposed for urban transit systems (3), but these eight measures are probably the most appropriate for rural systems. They are not always available at the same time, but when they are one can be sure of getting a complete and accurate picture of the system.

Actual Costs

Tables 1 and 2 give data on recent operating experiences. Despite the fact that the two sets of data do not necessarily describe comparable systems, some similarities are evident.

The data for the Section 147 program (Table 1) are indicative of programs that are just starting: Although a fairly respectable cost per vehicle kilometer is achieved—$0.68 without capital costs or about $0.83 including capital costs—the cost per passenger trip is high, the load factor is low, and the operating ratio is very low. These statistics will presumably improve over time. On the other hand, as data given in Table 2 (11) show, what are referred to as rural 16b2 systems (Section 16b2 of the Urban Mass Transportation Act of 1964) operate at an unusually low cost—$0.25/vehicle-km ($0.41/vehicle mile)—which suggests that the reliance on volunteer drivers is high among systems in this group. According to data developed by Briggs (4), there is a strong negative correlation between the percentage of driver hours that represents volunteer labor and the cost per vehicle kilometer for various types of transportation systems. However, Briggs' data show that this relation is much stronger in urban than in rural areas.

Goals for Costs and Other Performance Measures

Although our ideas of what constitutes really fine performance—something much better than the ordinary—are not firmly developed at this point, it is not too early to begin to suggest some values as goals for program managers. Good or "exemplary" values are given in Table 3; it is anticipated that only about 20 percent of all systems will perform at levels equal to or better than these values, and so these values represent a "much better than average" standard.

These values should be used as guideposts by program operators. To the extent that such goals can be met or exceeded, a system is performing extremely well; if operations are quite far from these values, obvious improvements are required.

This list can obviously be refined, and some improvements should be possible in the near future. For example, fixed-route and demand-responsive systems should be further segmented to ensure that low-density operations are not compared with high-density systems (a system of "peer groups" is now being used to report the Section 147 data). Ranges could be given for quartile or quintile groups so that individual operators could obtain a precise understanding of their performance in comparison with similar systems. At the moment, the real usefulness of this list is the discussion it will generate among professionals.

But such indicators can never replace a firm understanding of how such costs are incurred. This subject is discussed below.

FACTORS THAT INFLUENCE COSTS

The majority of rural paratransit system costs are attributable to three factors: (a) driver wages and benefits, (b) overhead costs, and (c) vehicle capital costs. A breakdown of these costs is given in Table 4. The general agreement of the cost breakdowns from various sources is noteworthy. These three cost categories typically account for two-thirds of total system costs.

But how does the manager who wants to control costs know where to begin? Quite simply one begins to control costs by understanding which factors create or influence costs (5). Costs can be influenced by one or more of the following major factors:

1. Operating characteristics,
2. Regional characteristics,
3. Operating speeds and environment, and
4. Inflation.

Each of these factors is, in turn, influenced by a variety of other factors.

Operating Characteristics

Seventeen major cost elements are given in Table 5 (10). All 17 are significantly influenced by the operating characteristics of the system, namely, vehicle kilometers, vehicle hours, the number of vehicles, and all other operating costs (except overhead). Table 5 indicates which of these cost elements are affected by which of the four output measures or operating characteristics.

As an example of the details of such an analysis, Table 6 (10) shows how the elements of cost per vehicle kilometer vary according to type of vehicle. As can be seen from the table, the cost per vehicle kilometer increases with the size of the vehicle. However, a close inspection also shows that the cost per seat kilometer declines as vehicle size increases (6).

Regional Characteristics

Table 7 gives those cost elements that are highly sensitive to regional characteristics. Driver wages are the most sensitive item; insurance costs also show substantial variation. Driver wages will probably continue to vary substantially by region, but the within-region variation in insurance costs may soon be greater than the between-region variation (research on insurance costs is being done by Davis at the University of Tennessee). Except for wage ranges for dispatchers, the other cost factors are essentially unaffected by regional differences.

Operating Speeds and Environment

The way vehicles are operated and the environment in which they are operated has much to do with actual operating costs. Average operating speeds will probably

range from 16 to 48 km/h (10 to 30 mph). The most recent statistics from the Section 147 program show average speeds of almost 26 km/h (16 mph) (7). The following guidelines should be noted:

1. Fuel consumption will increase as speeds increase,
2. Fuel consumption will increase as the quality of the road surface decreases,
3. Costs for engine oil, tires and tubes, vehicle repairs, and vehicle capital purchase will increase as the quality of the road surface decreases,
4. Fuel consumption will increase as the terrain becomes more hilly (8), and
5. Operating costs will increase as vehicle age increases (5).

Table 1. Operating statistics for rural Section 147 projects.

Factor	Measure	October-December 1977[a]	January-March 1978[b]
Efficiency	Cost,[c] $		
	Per one-way passenger trip	3.16	2.47
	Per vehicle kilometer	0.42	
	Per vehicle hour	10.22	10.58
	Load factor, %	14.7	17.1
	Operating ratio (revenues ÷ operating and administrative costs)	0.16	0.24
Effectiveness	Passengers per vehicle kilometer	0.14	0.23
	Passengers per vehicle hour	3.2	4.28
	Annual passengers per service-area population	NA	NA
Other	One-way passengers per month	449	536
	Monthly vehicle kilometers per vehicle	3330	3221

Notes: 1 km = 0.62 mile.
Data from Section 147 Rural Public Highway Transportation Demonstration Program tabulations; averages include both fixed-route and demand-responsive systems.
[a]National averages of 36 operating projects.
[b]National averages of 49 operating projects.
[c]Not including capital costs.

Table 2. Operating statistics for rural Section 16b2 projects in Pennsylvania.

Factor	Measure	High	Low	Mean
Efficiency	Cost, $			
	Per one-way passenger trip	13.29	0.29	1.19
	Per vehicle kilometer	1.61	0.025	0.25
	Per vehicle hour			NA
	Load factor, %			NA
	Operating ratio	8.28	0.12	0.78
Effectiveness	Passengers per vehicle kilometer	0.74	0.05	0.21
	Passengers per vehicle hour			NA
	Annual passengers per service-area population			NA
Other	One-way passengers per month	9375	133	1830
	Monthly vehicle kilometers	30 721	726	8480

Notes: 1 km = 0.62 mile.
All systems are demand-responsive.

Table 3. Exemplary values for rural paratransit systems.

Factor	Measure	Good Values: Fixed-Route Systems	Good Values: Demand-Responsive Systems
Efficiency	Cost, $		
	Per one-way trip	1.00	2.00
	Per vehicle kilometer	1.00	0.50
	Per vehicle hour	16.00	10.00
	Load factor, %	35	25
	Operating ratio	0.75	1.0
Effectiveness	Passengers per vehicle kilometer	1.0	0.3
	Passengers per vehicle hour	16.0	6.0
	Annual passengers per service-area population	20.0	2.0

Note: 1 km = 0.62 mile.

Inflation

Inflation seems to have become a constant pressure for many industries, and public transit operators are a prime example. The American Public Transit Association has noted that unit operating costs for transit increased 108 percent from 1970 to 1976 (a real cost increase of 43 percent after adjusting for inflation). The largest portion of the increase was caused by inflation and the second largest by increased costs of labor (above and beyond increases attributable to cost-of-living adjustments). In those 7 years, the operating ratio declined from 90 to 56 percent (9).

Varying inflation factors might change the relative importance of the different cost factors. Actually, this is not expected to happen. The highest annual rates of real cost increases are projected to occur for driver and dispatcher wages and benefits (2.1 percent), administrative expenses (2.0 percent), and fuel and oil costs (1.7 percent). Vehicle capital costs are projected to grow at a relatively slow rate (0.5 percent), but dispatching equipment costs will increase fairly rapidly (1.5 percent) (10).

Table 4. Rural transit costs attributable to various factors.

Cost Factor	Percentage of Costs: Section 147 Systems[a]	12 Rural Systems[b]	Typical Fixed-Route Systems[c]	Typical Demand-Responsive Systems[c]
Drivers' wages and benefits	31	28	28	25
General and administrative expenses	24	38	20	20
Vehicle capital costs	15	6	16	14
All other costs	30	28	36	41
Total	100	100	100	100

[a]October through December 1977.
[b]From Chen, Saltzman, and Johnson (12).
[c]From Ceglowski, Lago, and Burkhardt (5).

Table 5. Cost elements for rural transportation systems and their relation to system operating characteristics.

Cost Category	Operating Characteristics	Cost Element
Operating costs	Vehicle kilometers	Fuel
		Oil
		Tires and tubes
		Vehicle repairs and maintenance
		Parts
		Nonvolunteer labor
		Volunteer labor
	Vehicle hours	Driver wages
		Nonvolunteer labor
		Volunteer labor
		Dispatcher wages
		Nonvolunteer labor
		Volunteer labor
	Number of vehicles	Insurance
		Maintenance of dispatching equipment (base and mobile equipment)
		Driver examination, training, license, and tags
		Vehicle storage costs (including covered storage and shelters)
	All other operating costs	General and administrative overhead expenses
Capital costs (including depreciation and interest charges)	Vehicle kilometers and number of vehicles	Vehicle capital costs
		Dispatching equipment capital costs (including dispatching base, repeaters, and mobile equipment)

Table 6. Typical costs per vehicle kilometer for fixed-route rural transportation in the northeast and mid-Atlantic regions (FY 1977).

Category	Automobile or Station Wagon	Van	Transit Bus			School Bus
			Small	Medium	Large	
Number of adult seats	8	12	20	30	50	44
Operating speed, km/h	30	25	18	18	15	15
Cost per vehicle kilometer, $						
Fuel	0.032	0.043	0.057	0.050	0.060	0.057
Oil	0.002	0.002	0.0025	0.0025	0.003	0.0025
Tires and tubes	0.004	0.006	0.012	0.014	0.031	0.025
Vehicle repairs and maintenance	0.028	0.043	0.056	0.077	0.093	0.087
Driver wages and fringe benefits	0.085	0.102	0.142	0.142	0.170	0.170
Dispatcher wages and fringe benefits	-	-	-	-	-	-
Insurance	0.018	0.025	0.037	0.049	0.062	0.049
Maintenance of dispatching equipment	-	-	-	-	-	-
Driver examination, training, licenses, and tags	0.002	0.0025	0.005	0.007	0.012	0.012
Vehicle storage costs	0.012	0.012	0.012	0.012	0.012	0.012
General and administrative expenses	0.057	0.074	0.102	0.111	0.139	0.130
Vehicle capital costs	0.039	0.065	0.079	0.120	0.189	0.053
Dispatching equipment capital costs	-	-	-	-	-	-
Total costs	0.281	0.375	0.505	0.587	0.772	0.599

Notes: 1 km = 0.62 mile.
Fleet size: five vehicles, 40 322 km (25 000 miles) of annual operation per vehicle, 10 percent discount rates.

Table 7. Cost factors and their dependence on regional characteristics (FY 1977).

Cost Factor	Range of Estimates	Cost by Region ($)			
		South	Northeast and Mid-Atlantic	Midwest and Mountain	Pacific
Driver hourly wage rate	Low	2.10	2.40	2.30	2.65
	Mean	2.50	3.50	3.22	4.26
	High	2.90	4.30	4.20	5.72
	Highest[a]	3.54	6.00	4.90	7.00[b]
Fringe-benefit rate	Mean	0.15	0.18	0.15	0.18
Annual insurance costs per 10- to 12-seat van	Low	350	450	300	410
	Mean	695	1000	450	730
	High	1200	1200	1200	1200

Note: Tabulations by Ecosometrics from applications for Section 147 Rural Public Highway Transportation Demonstration funds.

[a]The highest cost figures represent wage conditions typical of unionized labor and wages paid in nonurbanized areas of metropolitan counties.
[b]Driver wage rates of $10/h characterize applications from Alaska.

SOME HYPOTHETICAL RURAL TRANSIT SYSTEMS

In light of the above discussion, what would be the difference between extremely low-cost and high-cost rural transportation services? What would be the characteristics of idealized systems at either end of the spectrum?

A very low-cost system would almost exclusively use volunteer drivers who supplied their own vehicles. Direct out-of-pocket expenses for gas and oil would be reimbursed for those who required it. Gasoline would be purchased through municipal or county depots. Trips would be made on a scheduled basis but only if a sufficient number of riders could be found. Administration and record keeping would be performed by agency personnel on a part-time basis as a part of their regular job (i.e., these services would be provided at no cost to the project). Insurance would be provided by the drivers themselves or as an add-on to the fleet policy of the local municipality, the county, or the state.

A program of this nature should operate at an extremely low cost, perhaps on the order of $0.04/vehicle-km ($0.06/vehicle mile) and about $0.15/passenger trip for trips that average 16 km (10 miles) one way, assuming four passengers in the vehicle. If you asked riders for a contribution of $0.25/trip, you could make a profit of more than 50 percent (not everyone will contribute)!

But these costs are much lower than even the typical volunteer driver system, which often makes an attempt to reimburse the driver for the "true cost" of the transportation—gas and oil plus insurance plus depreciation plus other expenses. Such systems typically reimburse drivers at the rate of $0.09 to $0.10/km ($0.15 to $0.17/mile); most of the systems average between $0.06 and $0.13/km ($0.10 and $0.22/mile). At $0.09/km ($0.15/mile), an average trip of 16 km (10 miles) one way would cost $1.50, or $3.00 for the round trip. Thus, even for volunteer systems, methods for increasing vehicle use—that is, transporting more than one passenger at the same time—will obviously be required to create truly low-cost systems.

There are reasons to suspect that all-volunteer systems would probably serve few passengers. Total reliance on volunteers would decrease the reliability of service and increase the administrative time spent. The need to preschedule trips and travel only when others were traveling to similar destinations would seriously limit travel demand. Many volunteers have become discouraged by prohibitive clauses in their personal automobile insurance policies, and many fleet policies will not cover volunteers. Finally, the administrative costs of such a program may become more than can be "hidden" in someone else's budget.

On the other hand, a high-cost system would exclusively employ trained, professional drivers and use vehicles that are specially designed and equipped for serving the nonambulatory as well as the ambulatory. A full fringe-benefits package would be provided that would approximate 40 percent of salary costs. Services would be provided on a demand-responsive basis, with a guaranteed wait time of no more than 30 min from the call for service. Service would be provided on an exclusive-ride basis (one driver and one passenger). All general and administrative expenses would be directly charged to the system's accounts. Maximum liability insurance ($5 million with a cost-of-living escalator) would be carried to ensure full protection for drivers, passengers, and the corporation.

The cost per vehicle kilometer of such a system would be approximately $3, and passenger trips would probably cost at least $20 one way. Thus, the superlative quality of this service is more than offset by the exorbitant costs of providing the service.

Obviously, few systems operate at either of these extremes. The best values for cost-effective operations will be determined by a careful analysis of local conditions. Values for various evaluation measures that can be considered good (those given in Table 3) are now being achieved by some systems. These figures should be looked on as goals to guide improvements and system modifications.

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Nonfederal Funds for Public Transportation: Special Reference to Nonurban Areas

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From a sample of 25 states, it was observed that only 3 percent of the nonfederal funds for public transportation that serve the general public are expended in nonurban areas. Furthermore, the extent of support for public transportation in rural areas varies widely; the more affluent states are more likely to support programs for the nonurban sectors. Thus, the more wealthy sections are likely to benefit from a federal support program that requires substantial local contributions. Far more important from a dollar standpoint is the social service agency nonfederal support, which in many rural areas is the only source of funds for transportation, albeit client-oriented mobility. Evidently the need for mobility support for disadvantaged groups is recognized by state and local groups. However, there has been little coordination among social service funds for public transportation by state governments; congressional action to provide stronger incentives for such coordination would be advantageous.

There appears to be a growing financial commitment to public transportation on the part of state legislatures, as reflected in the dollar outlays for this purpose from nonfederal sources. However, unlike the federal level, the states for the most part do not distinguish between urban and nonurban areas in the formulas by which their transit funds are allocated. A recent study by the Transportation Institute of North Carolina A&T State University (1) explored the extent to which a random sample of 25 states contribute funds to public transit purposes, particularly in nonurban areas. It is the purpose of this paper to report the major findings of that study.

As of FY 1976, 13 of the sample 25 states were spending state funds on public transportation. Annual state funds from these sample areas totaled more than $400 000 000. Furthermore, in states for which there are data for FY 1974 through FY 1976, it is apparent that the trend in state expenditures has been upward. In California, the 3 years showed a growth index of 224 percent in the constant dollar value of the state contribution to public transportation. In Michigan, the growth index was 144 percent; in New York, 149 percent; and in Wisconsin, 157 percent. The largest growth index—419 percent—was recorded by Oregon. In three states—Indiana, Ohio, and Pennsylvania—state-paid transit programs were begun in those 3 years (see Tables 1 and 2).

In the overwhelming majority of cases, these funds are spent for travel in urban areas. Only $3/$100 of state assistance goes to nonurban areas. However, several states have significant expenditures for public transportation in nonurban areas. As indicated in Table 1, Michigan alone accounts for more than half of the funding going from sample state sources into general public transportation in nonurban areas. More than four-fifths of all the funds identified from these 25 sample states come from three states alone: Michigan, California, and Pennsylvania.

Table 1. Nonfederal funds for public transportation by type of state assistance: general public transportation only—FY 1976.

State	Statewide Funds ($000s)			Total State Funds for Nonurban General Transportation ($000s)	Nonurban Share (percentage of statewide total)
	Capital	Operating	Total		
Alabama	0	0	0	0	
Arizona	0	0	0	0	
California			150 727	2 199	1.5
Florida		0	4 863	42.5	0.9
Idaho	0	0	0	0[a]	
Indiana	300	1 700	2 000	500	25.0
Kansas	0	0	0	0[a]	
Kentucky	1 900	0	1 900	-[b]	
Louisiana					
Maine	0	0	0	0	
Massachusetts			19 465	300	1.5
Michigan	14 400	15 700	30 100	6 397	21.2
Montana	0	56.5	56.5	40	70.8
Nevada	0	0	0	0	
New Hampshire	0	0	0	0	
New Mexico			50		
New York	14 280	103 000	117 280	492	0.5
North Dakota	0	0	0	0	
Ohio	5 000	1 000	6 000	100	1.7
Oklahoma	0	0	0	0	
Oregon			640	56	8.7
Pennsylvania			76 040	1 453	1.9
South Carolina	0	0	0	0[a]	
Vermont	0	0	0	0	
Wisconsin	300	3 237	3 538	863	24.4
Total (25 states)			412 659.5	12 442.5	3.1

[a]Idaho, Kansas, and South Carolina as of 12/77 have new state programs that fund public transportation including rural areas.
[b]Kentucky's funds could not be identified by area but are a significant proportion of total state funds.

Table 2. Trends in expenditures by states for general public transportation in nonurban areas: selected states—1974-1976.

State	FY 74 ($000s)		FY 75 ($000s)		FY 76 ($000s)		Index of Growth: 1974-1976
	Actual	Constant[a]	Actual	Constant[a]	Actual	Constant[a]	
California	857	857	668	612	2199	1925	256.6 224.7
Indiana			500		500	437	Significant[b]
Michigan	3881	3881	4314	3951	6397	5600	164.8 144.3
New York	289	289	1483	1358	492	431	165.1 149.2
Ohio			15		100		Significant[b]
Oregon	134	134	642	588	642	562	479.1 419.4
Pennsylvania					1453		Significant[b]
Wisconsin	294	294	692	634	863	755	293.5 256.8
Average (selected states)							271.8 238.9

[a]Deflated by wholesale price index for all commodities: 1974 = 100.
[b]Rapid growth but cannot be computed mathematically.

Table 3. Comparison of fiscal indicators of states that do and do not have state funds for general public transportation in nonurban areas: sample states—FY 1976.

Fiscal Indicator	States That Have Transit Funds (%) (N = 12)	States That Do Not Have Transit Funds (%) (N = 13)
More than 8 percent of state population below poverty level: 1969	50	85
Income per capita less than $4600: 1969	17	46
More than 0.75 automobiles per capita	7	55
High fiscal capacity[a]	50	27
High levels of state expenditure for education and public welfare[b]	58	18
High levels of expenditure for highways[c]	17	55

[a]Measured by revenue per $1000 of personal income and property (FY 75) in excess of $50 (Facts and Figures on Government Finance. Tax Foundation, New York, 19th biennial Ed., 1977).
[b]Measured by expenditures per $1000 of personal income in excess of $125 (FY 75) (1970 Census of Population, U.S. Summary. Bureau of Census, Dec. 1971).
[c]Measured by expenditures per $1000 of personal income in excess of $25 (FY 75). This figure is inclusive of federal funds.

INEQUALITY IN STATE FUNDS FOR RURAL AREAS

Ironically, it is the states that have higher levels of need (measured by income per capita or poverty level) that are least likely to provide state funds for public transportation. States that significantly support public transportation in nonurban areas are characterized by lower poverty levels, higher income per capita, higher levels of fiscal effort, and higher than average expenditures per capita for human services such as education and public welfare (see Table 3). For example, 17 percent of the states that have transit funds from state sources had an average income per capita of less than $4600 in 1969; almost half (46 percent) of the states that did not have funds had an average income per capita of less than $4600 in 1969.

States that in 1976 did not use their own state funds for public transportation are less likely to have a high fiscal capacity [measured by revenue per $1000 of personal income and property (FY 1975) in excess of

Table 4. Comparison of nonfederal state funding for general and special public transportation in nonurban areas: selected states—FY 1976.

State	State Funds for Nonurban General Transportation		Identified State Funds for Nonurban Special Services Transportation		
	Value ($000s)	Percentage of Total	Value ($000s)	Percentage of Total	Total ($000s)
Alabama	0	0.0	242	100.0	242
Arizona	0	0.0	315	100.0	315
California	2 199				-[b]
Florida	42.5	24.4	132	75.6	174.5
Idaho	0				-[b]
Indiana	500				-[b]
Kansas	0	0.0	76	100.0	76
Kentucky			3 160		-[b]
Louisiana			810		-[b]
Maine	0				-[b]
Massachusetts	300	49.3	309	50.8	609
Michigan	6 397	86.8	974	13.2	7 371
Montana	40	69.0	18	31.0	58
Nevada	0				0
New Hampshire	0	0.0	157	100.0	157
New Mexico			75.7		-[b]
New York	492	4.1	11 520[a]	95.9	12 012
North Dakota	0	0.0	506	100.0	506
Ohio	100				-[b]
Oklahoma	0	0.0	606	100.0	606
Oregon	56	22.3	195[a]	77.7	251
Pennsylvania	1 453	35.0	2 700	65.0	4 153
South Carolina	0	0.0	596	100.0	596
Vermont	0	0.0	39	100.0	39
Wisconsin	863	36.3	1 516	63.7	2 379
Total (25 states)	12 442	34.2	23 946.7	65.8	36 389.2[b]

[a]Prorating of total expenditures for special transportation by percentage of nonurban population.
[b]Total shown is sum of known funds; totals within each state are not shown if part of the information is not available.

$50 000]. There is a correlation between expenditures for transit and expenditures for education and public welfare. More than half of the states that have transit funds (58 percent) spent more than $125/$1000 of personal income on education; only a quarter of the other states did so.

Interestingly, states that do not have funds for public transportation in nonurban areas have higher than average rates of automobile ownership per capita and higher than average expenditures per capita for highways. The southern states in particular have large proportions of rural populations and low levels of income per capita but, for the most part, do not appropriate state funds for public transportation. It may be that the desire of rural communities to attract industry based on low local tax rates lowers the fiscal capacities of such rural states and, despite the presence of a transit-dependent population, sends transportation dollars in the direction of highways rather than of transit.

The regressive character of the state funding allocations suggests that the Urban Mass Transportation Administration (UMTA) program to support capital funds in nonurban areas will result in monies flowing to the relatively more wealthy states rather than to those states that have the larger proportion of isolated, transportation-disadvantaged rural poor. It should be noted, however, that two forces offset this regressive effect: there are numerically large rural populations in the predominantly urban states, many of whom may be elderly and in need; and furthermore, the bulk of state transportation money, as is discussed below, flows not from department of transportation budgets, but from state social service agency budgets.

STATE FUNDS FOR SPECIALIZED TRANSPORTATION

State funds for special, client-oriented transportation services are large in proportion to the funds spent on general transportation in nonurban areas. As shown in Table 4, states such as Kentucky that have comprehensively reviewed the availability of these funds have found millions of dollars. During the current survey, an attempt was made to contact various social service agencies at the state level to determine the value of state funds used as a match for the transportation components of federal programs operating in nonurban areas. Agencies contacted included the bureaus of aging and those that administer titles XIX and XX of the Social Security Act of 1974 and titles III and VII of the Older Americans Act of 1965; other items included are the value of drivers' time paid out of funds from the U.S. Department of Labor under the Comprehensive Employment and Training Act of 1973 and the Federal Highway Administration programs administered as rural transit demonstrations under section 147 of the Federal-Aid Highway Act of 1973. The figures shown in Table 4 represent a minimum (and probably severely understated) estimation of the value of nonfederal contributions to specialized client-based transportation. No one has been able to gather complete data for any state on the full extent of these travel funds, because the expenditures are often blurred with "other services." Nonetheless, it is striking to note that about twice the amount of state funds for general transit are being spent annually for special transit in nonurban areas. In many cases, these funds are spent in a fashion totally uncoordinated with the transit plan process cultivated by federal and state governments.

A number of states are attempting to dovetail their planning for general and special transit. In Kentucky, for example, an attempt was made to identify a lead agency in each area that would receive transportation funds on behalf of all social service agencies. State agencies were encouraged to purchase vehicles through the capital assistance available under section 16b2 of the Urban Mass Transportation Act of 1964, thus freeing agency budgets for spending on operating costs, not currently available from federal sources to nonurban areas. The state of Maine also provides a good illustration of consolidation of funding. Several states, notably Massachusetts and Kansas, reported that they were using demonstration funds to study the potential benefits of the current survey. Few states had any mechanism for en-

forcing consolidation of expenditures of social service funds for transportation. However, because the various agencies depend heavily on disparate federal sources that have differing funding cycles, reporting requirements, and auditing practices, it seems unlikely that the states will initiate consolidation in the absence of federal legislation that makes it financially attractive to do so.

The potential payoff to such consolidation of funding at the local level is evident from an example of local funding consolidation supplied by the National Association of Counties. The table below (2) (1 km = 0.6 mile) illustrates the possibility of funding realized from nine sources, as well as fares, in Miami County, Ohio.

Source of Funding	Amount ($)
CETA (7 drivers)	31 399.00
Charitable donations	200.00
Fares [from public at 9¢/km (15¢/mile)]	59.15
Title XX	4 722.92
Children's services	41.55
Rehabilitation Programming, Incorporated	309.75
Welfare Department compact	10 106.50
Board of Mental Retardation (Riverside School)	492.00
Community Action Council	
Title III of Older Americans Act	723.60
Program account 05 of Community Service Administration	685.45
Total	48 765.64

The benefits of forming a rural transportation authority are derived from the enlargement of the fleet size, the increased ability to handle dispatching, and the possibility of increased ridership per vehicle.

SUMMARY AND CONCLUSION

The purpose of the current study was to determine the extent to which states are spending nonfederal funds in support of public transportation in nonurban areas. Nearly half of the states in the sample used state funds for these purposes. In the states where these funds had already been appropriated, the trend over the last 3 years has been sharply upward.

The upward trend in expenditures for public transportation in nonurban areas should not obscure the great diversity among states in funding levels, legal restrictions on fund use, and future outlook on funding for public transportation. States that do not have funds (and thus cannot, except at the local level, match federal funds) are characterized by lower incomes per capita, lower tax efforts, and lower percentages of urban population and are likely to be located in the South or the West. The have-not states have higher than average expenditures per capita for highways and have been experiencing a decline in public transportation in the private sector and, consequently, have an increasingly transportation-dependent population in the rural communities.

The special needs of the transportation dependent are most frequently met through large outlays of state and federal funds for specialized client-oriented transportation. These systems are typically unrelated to the overall state transportation planning process; indeed, many state transportation planners do not know how much special transportation occurs in rural areas nor how much money supports it. The figures given in the current study were derived by direct communication with the social service agencies in a variety of states in 1977.

The findings of the study suggest the following needs: (a) a Congressional inquiry into the total funding picture in isolated rural communities; (b) legislation that would make transportation more evenly available throughout the country; and (c) incentives that would bring the unrelated facets of transportation into a broader, connected system. Multicounty programs to provide coordinated service for a variety of social service agencies' clients should be costed out against current single-agency approaches. New legislation to make funds available for public transportation in nonurban areas may be the means for bringing about such service improvements.

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Private Enterprise Techniques Improve Productivity of Rural Transit Systems in Iowa

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The primary objective of the Iowa Department of Transportation rural transit program is increased productivity—to be able to produce more output (passengers carried) while using less input (money). When the department assumed control of rural transit in 1976, it became obvious that traditional methods of developing rural transit would hinder, if not actually negate, progress toward the objective of improved productivity. Consequently, the private enterprise philosophy of management was implemented. This philosophy dictated the

consolidation of the 275 rural transit systems into 16 systems and the elimination of nonproductive systems, provided authority equal to responsibility, holding specific people and agencies responsible for results, and implemented management and business decisions into an area of social work. The results, after 3 years of effort on a statewide basis, show that the output has increased by 33 percent and the input has decreased by 10 percent. The implications of these results are that transit in general (urban, rural, or intercity) can benefit from consolidating authority and responsibility, managing by objectives, and making decisions that are based on economic and productivity analyses.

At first glance, it may seem contradictory to speak of transit organizations and services in the same context as private enterprise corporations. We are all well aware that transit systems in general, and rural transit systems in particular, are not capable of producing profits and that profits are the objective of private enterprise corporations.

However, the private enterprise philosophy of management could be as effective in achieving the human and social objectives of rural transit as it has been in achieving the financial objectives of private enterprise. In fact, the most serious deficiency of rural transit in general is the lack of understanding and use of corporate management techniques such as consolidation of resources; leveraging of capital assets; long-range planning; development of new markets for existing services; increasing the output of existing investment; designation, delegation, and consolidation of authority; identification of responsibility; synergism; commitment to specific goals and objectives; and investment in personnel training and upgrading.

The history of rural transit in Iowa is probably not dissimilar to the past and present development of rural transit throughout the rest of the nation. The remainder of this discussion will deal with the following areas:

1. Problems associated with the historical development of rural transit in Iowa,
2. Suggested solutions for overcoming these problems,
3. Actions taken to achieve these solutions,
4. Benefits obtained,
5. Obstacles encountered, and
6. Future directions.

PROBLEMS ASSOCIATED WITH HISTORICAL DEVELOPMENT OF RURAL TRANSIT IN IOWA

Rural transit in Iowa grew out of a need for transportation services for those who are generically referred to as the transportation disadvantaged. Although there was a need for some form of transportation for persons such as the elderly, the handicapped, the poor, the jobless, and children, no single state agency was given primary responsibility to fulfill this need. Consequently, various state and local agencies whose primary responsibility was for human resource programs quickly came to the logical conclusion that such programs have little impact if their clients cannot travel and thereby receive their benefits such as a congregate meal, medical attention, a Head Start education, or a job interview.

Therefore, each agency saw the need to provide transportation for its individual clientele as a matter of self-survival. Rural transit became an individual agency means to an individual agency end. In light of the fact that no one else was going to help them, these human services organizations deserve credit for their initiative in solving the problem. However, as more and more agencies began to see the solution, fewer and fewer failed to see the problem. Rural transit shifted from being a means of reaching an end to being an end result in itself—rural transit became a program.

In fact, more than 275 rural and special transit systems developed in Iowa. Some of the problems associated with this rapid growth and the subsequent development of territorial prerogatives on the part of various human service agencies were (a) the my-own-bus syndrome, (b) lack of perspective of the total transportation system and available resources, (c) inefficiency and underuse of capital resources, (d) inefficient use of personnel, (e) duplicative expenses, (f) market competition in a limited market place, (g) inequity of service availability, (h) lack of accountability, (i) inconsistency between public and individual needs and services, (j) lack of future direction and plans, (k) potentially unlimited financial demands on limited financial resources, and (l) lack of authority.

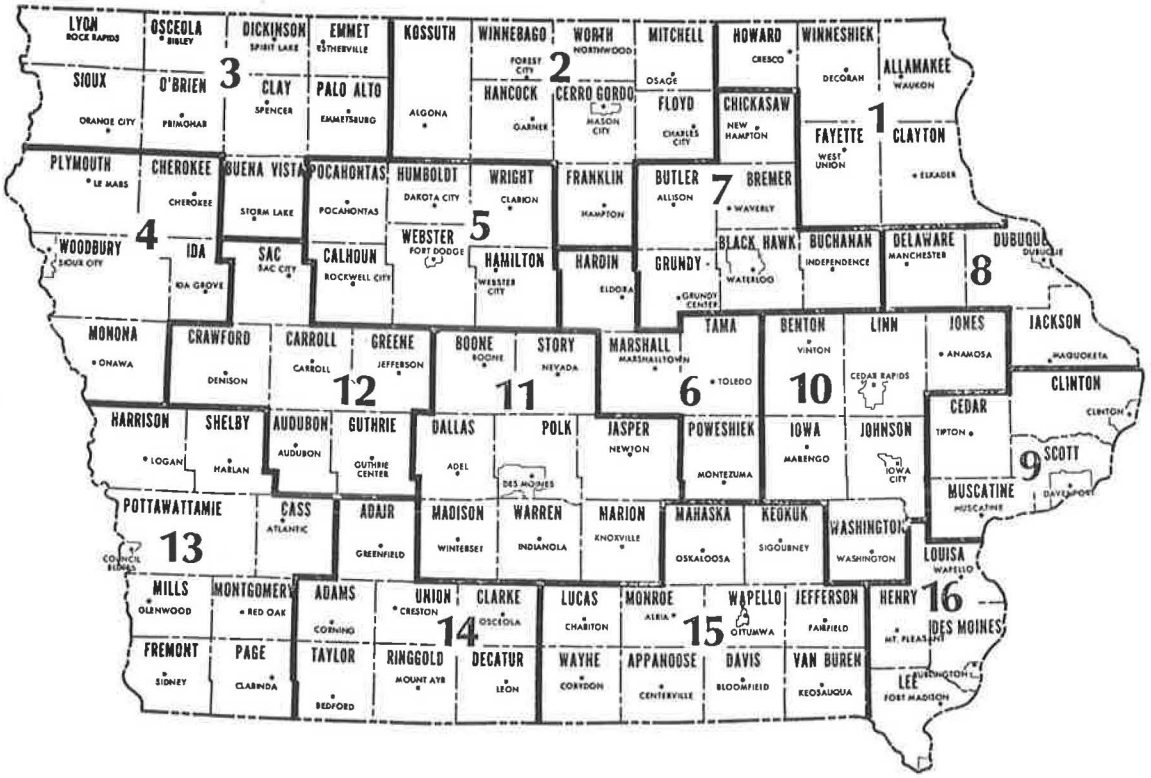
SUGGESTED SOLUTIONS FOR OVERCOMING PROBLEMS

The Iowa Department of Transportation (IDOT) was formed in January 1975 and given the responsibility that had previously been lacking—the development of a total transportation system that would fulfill the needs of Iowans through the effective coordination and consolidation of the various subsystems, i. e., to manage the transportation system such that the total is greater than the sum of its parts. The public transit division developed the concept of the regional transit system (1) in November 1975 after studying the problems associated with the previous development (and neglect) of rural transit systems.

The regional transit system concept is based on the following goals and proposed solutions:

1. To provide an equitable distribution of public transit services throughout the entire state—(a) The state is divided into 16 multicounty transit districts (see Figure 1), (b) the county supervisors mutually agree on one transit agency per region, (c) locally elected officials decide on the service level and the local funding, and (d) service is available to the general public as well as to elderly and handicapped;
2. To eliminate duplicative expenses and services—(a) There is only one agency per region, (b) administrative and overhead expenses are consolidated into one agency, (c) vehicles are available for multiple use rather than for single use only, and (d) existing resources are used rather than new services started (e.g., taxicabs, intercity buses, private businesses, public agencies, car pools, and van pools);
3. To improve management—(a) Responsibility and authority are consolidated in one agency, (b) rural transit is the single objective and sole job of its managers, (c) the specific system objectives are mutually determined at the local level but based on statewide and previous local performance indicators, and (d) a single regional plan is developed and agreed to at the local level that encompasses all forms of public transit;
4. To improve financing—(a) The single multipurpose regional transit agency has access to multiple state and federal funding programs versus single purpose-single funding, (b) expenses are reduced, (c) market (revenues) are expanded, (d) financial reports to all state agencies are consolidated into a single report to IDOT, and (e) federal funds are used

Figure 1. Iowa transit regions.



where state and local funds were previously used;

5. To improve local commitments and long-term continuity—Long-range plans and finances are developed and agreed to at local level before the fact (no surprises); and

6. To improve services—(a) A single agency provides one-stop shopping, (b) the system is designed for multiple use (including the general public) based on local plans and public input, (c) there is expanded market coverage for intercity buses (the regional system provides feeder service to intercity buses), and (d) intercity services can eliminate frequent stops (because of the feeder service) and provide intercity trip times that are close to express (or automobile) trip times.

ACTIONS TAKEN TO ACHIEVE SOLUTIONS

Once the problems had been identified and solutions proposed, it was necessary to take action to ensure that the solutions would be accepted and implemented. Otherwise, the entire program would remain merely a concept.

The following actions were taken to implement the regional transit system concept:

1. The concept was included in the statewide transportation plan and presented statewide over public television in November 1975;
2. Public hearings were held and input was received from November 1975 to February 1976;
3. The concept was published by IDOT as a commitment for future direction; and
4. Legislative action was taken—(a) The appropriations to IDOT for transit purposes (1) left complete discretion to IDOT on the use of funds and (2) contained a nonreversionary clause permitting the IDOT to add savings to future appropriations and (b) the passage of the administrative bill (2) required that (1) all applications for state or federal funding go through IDOT; (2) no local, state, or federal funds are spent on transit in Iowa unless in conformance with the IDOT state transit plan (regional systems); (3) IDOT (or a designated recipient) receives and distributes federal aid; (4) IDOT provides technical and management on-site assistance to transit properties (for purpose of consolidating, coordinating, and improving services and management); and (5) IDOT provides recommendations to the legislature each year on actions necessary (to improve the consolidation, coordination, and efficiency of transit programs at the local and state levels).

After receiving input from the public and subsequently informing the public of future direction of public transit, it was necessary for IDOT to then take action toward developing administrative rules:

1. Financial assistance (3)—(a) Only regional systems are eligible as recipients of local, state, or federal aid; (b) a 5-year plan is required that addresses the economic and service analysis of various alternatives; (c) financial assistance is based on a quid pro quo in which system objectives and actual accomplishments assist in determining the amount of funds awarded; (d) a contract is signed that identifies specific performance standards and objectives along with specific financial assistance budgets; and (e) state agency funding other than IDOT plus federal funding is used to finance the agreed-upon programs [21 different funding services were consolidated and used to support the regional transit programs (4)] and
2. Technical and management actions—(a) Each property was assigned a staff member from the public transit division to act as a management consultant for

assistance in organization, planning, grants, schedules, routes, budgeting, service improvements, marketing, financial operating statements, accounting procedures, and strategy plans for reaching predetermined objectives; (b) statewide training seminars were developed and conducted for one or more regional managers and their staffs and policy makers and addressed both the management and staff functions in areas that needed greatest assistance (these needs were discovered from an on-site analysis of all transit properties in Iowa and included management and policy makers' training in establishment of goals for policy makers, measurement and analysis of performance, employee selection, and economic and management benefits gained by consolidation and employee training in bus operations, mechanics and servicing, dispatching techniques and procedures, writing specifications for purchase of services and capital equipment, and identifying with and gaining ridership); (c) a complete transit library was developed that included programmed-instruction management courses, audiovisual aids, and written material (such as reports, plans, and research); (d) a statewide computerized data bank was developed that provides real-time access to a complete file of property information ranging from the general manager's name to how the property is performing against established objectives and how it compares against other properties in the state; (e) a statewide marketing program was implemented that included statewide market research, a marketing manual and seminars, television and radio spots produced and distributed by IDOT, posters, brochures, newspaper advertisements, a statewide transit service directory, and an education program for school children; and (f) planning assistance was offered that included completion of the regional plans, implementation of alternative-analysis guidelines and procedures, completion of the state transit plan, and a study of the intercity bus industry.

Thus, within the constraints of time and money, everything possible was done to set the stage for the most important action: sixteen functioning regional transit systems covering the entire state of Iowa were organized and implemented. This process was started in the first quarter of 1976 and, on July 1, 1978, public transportation was available to all Iowans, both those who lived in the city and those in the country.

BENEFITS OBTAINED

The real test of an idea—the proposed solutions and the actions taken—rests with the bottom line—the benefits obtained.

The table below compares data collected during 1976 in an area that adopted the regional concept (region B) with those in an area that continued to allow various local transit systems to do business as they pleased, without regard to an overall transit program for the region (region A) (1 km = 0.6 mile and 1 km^2 = 0.38 $mile^2$).

Data	Region A: Separate Systems (avg. per county)	Region B: Coordinated System (avg. per county)
Operating		
Passengers	4808	8018
Service, km	36 096	35 744
Number of vehicles	1.4	1.8
Number of overhead personnel	1.6	1.2
Number of drivers	1.80	1.54
Population density, persons/km^2	15.1	12.9
Financial, $		
Total expenses	23 722	18 390
Revenue	4885	3395
Overhead expense	8444	3361
Operations expense	13 314	12 584
Payroll	17 200	12 195
Derived		
Overhead, %	36	18
Expense per passenger, $	4.93	2.29
Expense per km, $	0.66	0.52

It is interesting to note that the primary difference in total expenses ($5332) can be attributed to administrative and overhead expenses ($5083). Regional systems consolidate administrative and overhead expenses and thereby reduce costs. However, even with the reduced costs, the regional systems haul more passengers (8018/county versus 4808/county) over a similar number of kilometers. In addition, the number of drivers per vehicle is less (0.8 versus 1.3), reflecting reduced operating expenses.

The table below compares, on a statewide basis, the productivity of the statewide regional transit system program (1977) with the productivity of the various systems that operated in Iowa before the regional transit system concept was implemented (1975) (1 km = 0.6 mile):

Item	Value	Item	Value
Passengers		Deficit	
1975, no.	685 000	1975, 1977 $	1 569 902
1977, no.	910 840	1977, 1977 $	1 550 221
Change, %	+33	Change, %	-1
Revenue travel		Deficit per ride	
1975, km	2 851 200	1975, 1977 $	2.29
1977, km	3 841 358	1977, 1977 $	1.70
Change, %	+35	Change, %	-26
Service		Systems	
1975, km/capita	1.01	1975, no.	275
1977, km/capita	2.14	1977, no.	24
Change, %	+113	Change, %	-89
Expenses		Ridership per capita	
1975, 1977 $	2 077 812	1975, no.	0.25
1977, 1977 $	1 870 129	1977, no.	0.53
Change, %	-10	Change, %	+112

The statewide productivity of regional transit systems is obvious. Service has been extended to more areas (revenue kilometers increased by 35 percent), which has resulted in more passengers (a 33 percent increase) riding transit and, at the same time has reduced expenses for the overall system by 10 percent and for the individual rider by 26 percent. Not to be overlooked, also, is the reduction in bureaucracy: Twenty-four agencies are now producing more tangible results than the previous 275 agencies combined. For most Iowans, public transit is now one-stop shopping at a single agency that is readily found.

OBSTACLES ENCOUNTERED

The development of regional rural transit systems in Iowa is an on-going process that was started in October 1975. It required and will continue to require the assistance and hard work of numerous groups and organizations in the public and private sectors at the local, state, and federal levels. Neither time nor space allows a detailed discussion of the many nuances and activities required to carry out the processes of politics and training. It is easy to assume that the

process was without difficulty when the end results are observed; however, it was not and is not without obstacles.

Some of the obstacles encountered along with way include the following:

1. Apprehension at the local level about working within broad state-issued parameters (many local agencies want IDOT to be extremely specific rather than set out broad guidelines),
2. Resistance to change,
3. Inexperienced management in making business decisions and understanding finances and budgets (the previous work of most of the managers had been in the field of social service activities),
4. Local views of regional transit as a state program rather than as a local program (because the idea had originated at the state level),
5. Difficulties in understanding the concept of consolidation (there continues to be a philosophy of diffusing decisions and responsibility into a committee framework and a reluctance to eliminate present agencies and programs),
6. Difficulties at the local level in viewing private enterprises as being on an equal footing with public agencies in supplying resources,
7. Turf fighting, and
8. Skepticism about the benefits to be achieved—each area thinks of itself as unique.

Every day brings new obstacles. However, success appears to rest with the ability to be flexible and adaptable but committed to a defined objective and published strategy.

FUTURE DIRECTIONS

The future direction of IDOT will be one of providing greatly increased on-site consulting. In 1978-1979, IDOT shifted from being a developing organization to being one of implementation and management. Each regional property will have a specific consultant assigned from the public transit division to assist in all facets of property management. This assistance will include everything from planning through implementation, evaluation, and adjustment and will cover financing, hiring, training, and day-to-day management problems. Each member of the staff of the public transit division will be functioning in a manner similar to a group vice-president in private industry who is responsible for the productivity and bottom-line results of a number of operating divisions.

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Mr. Fritz was with the Public Transit Division, Iowa Department of Transportation, when this research was performed.

Abridgment

Overview of the Social-Service Insurance Dilemma

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Please help me. I am a prisoner. My surroundings are clean and neat and orderly, for I am a prisoner of my own home.

My children are grown and live far from this small town where they were raised. The grocery store is only three blocks away, but I am 77 years old and my legs won't carry me there and back again. Each day I see people pass by and sometimes they wave. Other times they seem too busy.

I know there is work to be done and I could help. There are small hands that would fit in mine—babies that need holding and faces I could touch with my eyes.

Instead, I sit on my porch and watch the darkness come and the lights go on in your world. I'm not in a hurry because when I get up, I will only go back inside.

This letter, originally written to the Governor of Tennessee and read in July 1977 at hearings on social-service insurance issues held by the U.S. Senate Special Committee on Aging, indicates the needs to which social-service agencies respond. They hear the cry of the elderly, the poor, the handicapped, the disabled, the very young, the Indian on the reservation, and many others who suffer the pain, anguish, and alienation of not being able to be a part of a society that is so dependent on the automobile for personal mobility.

To respond to these needs, government at all levels has funded many programs that transport either the service to the client or the client to the service. These programs range from Head Start to Meals on Wheels to transportation services on Indian reservations. The U.S. General Accounting Office (GAO) indicates that there are now 112 federal programs that provide these services. The U.S. Department of Health, Education, and Welfare estimates that, after the states match their funds, $1.8 billion/year is spent on social-service transportation. This does not include programs of the U.S. Department of Labor, the Appalachian Regional Commission, the Urban Mass Transportation Administration, the U.S. Department of Agriculture, or the Federal Highway Administration. It also does not include programs under

the Comprehensive Employment and Training Act (CETA), which in many cases provide drivers and administrators of social programs.

A typical program is often started by a social-service agency by obtaining a grant to purchase a vehicle. Once the vehicle is purchased, the director of the program discovers that insurance is a major barrier to efficient operation. As one director said, the agency has six choices:

1. They can provide transportation with full realization that their clients are not adequately protected in case of accident;
2. On limited budgets, they can provide adequate insurance protection for their clients, but then they do not have sufficient funds to provide transportation for them;
3. They can improve the efficiencies of transportation by coordinating trips with other agencies, but the increased insurance cost eliminates any operating efficiencies;
4. They can increase the size of the budget by charging fares, but then the increased insurance and regulatory costs more than absorb the increased revenue;
5. They can stretch the budget by using volunteer drivers and dispatchers, but insurance restrictions prohibit the use of retirees (over age 65) and that is the most plentiful source of volunteers; or
6. They can stretch their budgets by using school buses, church buses, or privately owned vans and buses, but the insurance on these vehicles does not cover their clients.

Thus, the efforts of the agency director to meet an intense social need are totally frustrated by insurance limitations.

PROBLEMS AND RECOMMENDATIONS

Social-service agencies complain of the following problems with insurance limitations:

1. Approximately 18 percent of social-service agencies have difficulty finding an insurance company to accept the insurance risk.
2. When the agencies can get coverage, annual costs range between $200 and over $5434/vehicle and average $1238/vehicle.
3. When coverage is obtained, the policy frequently restricts the use of drivers over age 65 or under age 25, prohibits the charging of fares, restricts the passengers that can be hauled, limits the use of certain vehicles, and limits the area in which the vehicles can operate.
4. Nine percent of the agencies have had their insurance canceled, and in over half of the cases there have been no accidents by which to justify this cancellation.

But these are only symptoms. The real problems can be described as follows:

1. Social-service transportation is a new field, and there are no reliable statistics available. Although logic would predict that accident rates would be low, the very significant passenger exposure to risk is a real concern to underwriters, who have no data on which to base rates.
2. The disfavor of charitable and governmental immunity plus the general disallowance of guest statutes have forced social-service agencies to purchase liability insurance to protect clients in case of accidents. Unfortunately, this well-meaning approach leaves the clients with little or no coverage when the agency is not at fault. It also makes the agencies purchase the most expensive form of insurance available (general liability insurance costs $2.40 per $1 of benefit to the injured compared with first-party insurance, which costs only $1.20 per $1 of benefit delivered to the injured individual).
3. Agencies are limited in their ability to use volunteers since the volunteer must assume full responsibility for the client in case of accident. Currently, the agency has no insurable interest and has difficulty relieving the volunteer of this liability. This approach effectively blocks efforts to use volunteers to alleviate the impact of Proposition 13 on local budgets.
4. The legal status of social-service transportation under the law is unclear in almost every state. Classifying these agencies as common carriage instead of private carriage increases insurance costs by approximately 1500 percent because of the lack of legal defenses in the case of common carriage.
5. Like all classification systems, classifications in the insurance industry create real problems when the social-service program varies substantially from the stereotype on which the classification was designed. One way to avoid this problem is to base insurance risk on distance traveled and passengers carried. Basing passenger risk on passengers carried also means that volunteers, contract vehicles, and any other vehicle used by the agency might also be covered under the policy for the passenger hazard.
6. Under the current approach to insurance, government may pay several times for the same accident—once through insurance on the vehicle used, once through Medicaid or Medicare, and again through various other social-service programs.
7. The current claims procedure encourages an adversary relationship and long delays in payments, which severely disadvantages social-service clients, many of whom are on limited incomes or are elderly and may become wards of the state while awaiting settlement of their claims.
8. Very few social-service agencies have effective risk-management programs for either volunteers or drivers.
9. The current legal-regulatory-insurance process forces government to purchase and operate vehicles because this is the only legal way transportation can be provided and clients can be partially protected in case of accident.

Six recommendations emerge from this work:

1. The Insurance Services Office (ISO) and the insurance industry should develop new classifications for the various social-service programs so that they can begin to accumulate accurate statistical data. In the future, such problems can be avoided if the insurance industry and the government set up a liaison so that new classifications can develop as federal transportation programs evolve. The new rates on social-service programs should be based on vehicle distance traveled and passengers carried. These two readily available measures of exposure are easily determined and understood, and they eliminate the classification problem that arbitrarily limits areas of operation, vehicles that can be used, and duplication of services by each agency because of insurance. Passenger protection should cover not only passengers in agency vehicles but also passengers carried by volunteers and contractors.
2. Congress or the appropriate agencies should address the collateral-sources problem of multiple benefits obtained with public funds, which allows the injured to collect social-service payments as well as to sue the

agency for tort liability. This could probably best be done by making existing social programs the primary source and vehicle insurance the secondary source. The reason for this approach is that the mechanics for handling existing social programs are firmly established and would be difficult to change where social-service vehicle insurance is applicable. Making social-service insurance secondary would substantially lower rates for vehicle insurance.

3. State laws need to be changed to identify positively that social-service transportation is a new type of service to eliminate the uncertainty as to whether it is for-hire or private carriage. School buses and social-service vehicles should probably be classified in the same category.

4. State laws need to be changed to allow and encourage social-service agencies to purchase first-party insurance that will provide certain, unconditional coverage for all users of social-service transportation. One approach is legislation built around the workman's compensation model that would guarantee passenger protection at a much lower cost to the agencies by stating the amount of protection required.

5. A claims procedure needs to be developed whereby the agency coordinates the settlement of claims as a friend of the injured. If this concept were combined with the collateral-source recommendations in item 2 above, the agencies could effectively control their insurance cost by helping the injured obtain benefits due under existing social-service programs. The advantage of such a program is that it would ensure that everyone received compensation for injury while minimizing litigation, inflated claims, and double payment.

6. The insurance industry and the government should jointly develop a driver selection and training program for social-service agencies. The underwriting guidelines are too arbitrary, and many agency directors have no basis on which to select full-time, part-time, or volunteer drivers. Most agencies would welcome an effective risk-management program that they could implement. The new risk-management program must be oriented to the needs of social-service agencies, which do not have the budgets of truck lines or transit systems to hire full-time professional drivers at high salaries.

IMPACT OF PROPOSED CHANGES ON SOCIAL-SERVICE TRANSPORTATION PROJECTS

Currently, passengers can only be carried on vehicles that are licensed, certified, and insured to carry passengers. Thus, the only way to transport social-service clients is to purchase and operate vehicles that are properly licensed, insured, and registered with the appropriate agencies. As a consequence, public transportation is rapidly being nationalized since government agencies are the only groups that can legally and competitively provide transportation.

If social-service activities were exempt from regulation and if insurance could be obtained on an activity basis rather than a vehicle basis, agencies would be able to use virtually any of the 104 million vehicles on the highway for transporting clients. Thus, the role of the social-service agency director would probably shift from buying and operating vehicles to purchasing and coordinating transportation for clients. This is not to say that agencies would not own any vehicles but that, if all options were made available to them, they could select the most cost-effective service. Thus, at any one time the social-service agency or the local coordinated transportation agency would be using a combination of agency-owned vehicles; contract, volunteer, and casual carriage; and so on.

When a social-service agency has 40 senior citizens that need to make a trip, the agency would be able to use a church bus, to hire a school bus contractor, or to use housewives to drive family vans to complement agency vehicles. Since passenger risk would be covered by the agency's activity policy, the church, the contractor, or the housewives would not be required to purchase special insurance to haul the group. In rural areas, the county administrators could hire local citizens to transport clients without having to have each vehicle obtain special insurance. The taxi and paratransit companies could be much more competitive since the activity policy of the agency would provide passenger insurance coverage.

Such an approach would allow social-service agencies much greater flexibility in providing service. Attention would focus on selecting drivers, coordinating service, obtaining service in the most cost-effective manner, and dispatching instead of (as it focuses now) on vehicle procurement, maintenance, operation, and replacement.

It should be noted here that activity insurance is not no-fault insurance. States that have not embraced the no-fault approach have developed uninsured (underinsured) motorist coverage and automobile medical coverage to protect passengers in the owned vehicle as a means of overcoming the arguments for no fault. This approach likewise builds on the concept of insuring the passengers in the vehicles to cover them in case the other party had insufficient insurance. If the other party is at fault, the insurance company retains the right of subrogation to recover from the at-fault party. In the case of injury to another vehicle or to individuals outside the agency vehicle, the tort liability system or no fault would remain as is.

STATUS OF THE ISSUE

Currently, a task force that includes representatives from the executive and legislative branches of the federal government, the insurance industry, a state regulatory committee, and a state department of transportation as well as technical advisors is developing a program for implementation that may include a White House conference.

Funding, Insurance, and Regulation Developments in Oregon

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This paper identifies funding, insurance, and regulation as the three major problems confronting rural public transportation in Oregon. Solutions to these problems on the state, federal, and local levels are suggested, along with future national possibilities for reducing insurance difficulties.

Oregon is a rural state. It covers 247 680 km^2 (96 000 $mile^2$) and has 2.3 million people. About 70 percent of the population live within the Willamette Valley. The valley contains the state's three largest cities and is bordered by Portland on the north, Eugene on the south, coastal mountains on the west, and the Cascade Range on the east with Salem, the state capital, in the center.

Each of the three large metropolitan areas within the Willamette Valley has a public transit system. Outside of the valley, there are 12 cities or counties providing public transit. Of the 240 incorporated cities within the state, 50 have taxi service. There are over 60 nonprofit corporations providing transportation for their clientele. Ten intercity public transportation carriers transport approximately 2 000 000 passengers between cities annually.

State government efforts are largely devoted to making the public transit system work by encouraging usable services at reasonable cost. Although solutions to the problems of rural public transportation (transit within and between communities under 50 000) must be suited to individual situations, Oregon has identified three problems: funding, insurance, and regulation. This paper addresses these basic problems as they affect Oregon and outlines actions that have been taken to solve them.

FUNDING

Intercity, rural, and small-city public transportation has been declining because of the national emphasis on the automobile. However, recent studies indicate that public transportation services are needed for old, poor, and young people as alternatives to expensive modes of transportation and as insurance in case of future energy shortages.

State Operating, Capital, and Experimental Funds

The availability of state general funds (highway funds are designated for highway purposes by the state constitution) has improved public transportation. Oregon has a grant program to help pay one-half of the operating deficit of transit systems in nine small-city and rural areas. The capital grant match program will pay one-half the local cost of new buses in three small cities. The state's experimental program recently assisted the city of Woodburn (population: 10 000), a retirement community that has been without even taxi service for 2 years, in beginning a single-bus system.

In addition, state experimental funds have been used to match local funds in starting services both within the city of McMinnville (population: 12 640), within Yamhill County, and into Salem. The experimental program contributes one-half the cost of initiating services. Once developed, we find that transit users in the smaller communities increase each month as people become accustomed to the service. Some earlier experimental projects have been transferred to the present operating assistance program.

Rural Highway Public Transportation Demonstration Program

Oregon moved aggressively to receive four grants under the rural highway public transportation demonstration program. The four experimental projects have shown that there are many people in need of public transportation service because they cannot or should not drive. The state program will help one community with operating assistance funding when the federal program phases out. The other three areas are eligible to receive federal operating assistance through a large metropolitan transportation district.

Intercity

Studies of intercity public transportation carriers indicate declines in service, the number of communities served, passengers, and profitability. However, this industry is extremely important to the population, as intercity buses often represent the only form of public transportation available to many communities. Our choice is to enter the process and try to reverse the service decline with public funds.

In June 1978, we submitted a proposal to the Legislative Emergency Board to use state funds for the following purposes:

1. To help buy bus shelters for small communities,
2. To purchase and install bus directional signs for small communities,
3. To prepare an intercity ticket jacket that will also serve as an information guide,
4. To participate in planning a multimodal terminal, and
5. To support a local intercity bus system by contributing operating assistance funding.

Approval was obtained for this proposal, and the individual program activities are now well under way.

Federal Funding

There are two bills now before the U.S. Congress that expand and restructure federal transit assistance. Each bill provides an operating assistance program for public transportation in small urban and rural areas. Both programs are loosely structured to cover the range of transportation providers in these areas. The programs also provide sufficient funding with which to maintain and build good public transportation services. The Urban Mass Transportation Administration (UMTA) will probably administer the program through the states to take advantage of their experience in handling small urban and rural transit assistance.

Prospects for approval appear mixed, however. Oregon's experience indicates that such help is neces-

sary to ensure continuity of public transportation services.

INSURANCE

Experience

Insurance is the most widespread problem that bus operators face in Oregon today. In many cases, intercity, small-city, and rural operators have nearly eliminated services because of the lack of insurance or because of its high price. Hamman Stage Lines, a Salem-based intercity carrier providing services to numerous small communities, had an increase from $19 000 to $56 000 for liability coverage over a 1-year period. A rural demonstration project faced service termination because an insurance company refused to renew a policy. In Woodburn, a one-bus funding experiment was almost dropped a week before startup because the agent did not find a company to provide insurance coverage. In short, if carriers can be found at all for coverage, their policies continue to double and triple in price.

State Action

The Public Transit Division became the focal point for solving the statewide insurance problem because it administers UMTA's section 16b2 capital grant program for elderly and handicapped transportation. Ours is the agency normally contacted first when insurance expires or costs increase. The Office of Elderly Affairs of the Department of Human Resources became involved because it often provides operating assistance funds to run the buses.

Oregon Special Services Association

As the insurance problems increased, the Transit and Elderly Affairs' agencies and the insurance commissioner's office collectively tried to solve them. Following a meeting of operators and agencies, a committee was formed to explore possible solutions. This evolved into the Oregon Special Services Association (OSSA) and became an operators' membership organization. OSSA emphasized a strong safety program enforced through self-policing and established a uniform set of policies regarding driver selection and vehicle maintenance. Membership was contingent upon compliance with the established policies. It eventually became a large enough program to warrant the retention of an agent of record, or broker. OSSA then established marketing and loss review subcommittes; it compiled a Membership Standards Manual consisting of required standards, recommended standards, and procedures.

OSSA was instrumental in obtaining an insurance company to provide vehicle insurance within certain liability limits. To date, OSSA has helped find insurance for one of Oregon's rural highway public transportation demonstration projects.

National Effort

Experience with OSSA in Oregon is encouraging but limited. From the literature on rural transit, it appears that a broader national effort to attack insurance problems is necessary. A task force, study team, or commission needs to devote considerable attention to the growing issue.

REGULATION

Regulation of intercity public transportation has become a very complex business. By use of an intricate body of laws, administrative procedures, and precedents, the Oregon Public Utility Commissioner has granted a series of franchises to carriers to provide passenger and freight transportation services. The small nonprofit organizations providing passenger services are struck by the complexity of the regulatory process; however, certain procedures have evolved in recent years to integrate the services provided by the small operators with large-scale rural and intercity programs.

Public Agency Exemptions

Cities are exempt from state regulation concerning passenger transportation within city boundaries and within a 4.8-km (3-mile) limit of those boundaries. At the request of the Public Transit Division, the legislature has also exempted transportation districts from state regulations. Transportation districts can be formed in any Oregon county by a vote of the people within the proposed district. We have one operating transportation district in Oregon, located in the Medford-Ashland area.

Nonprofit Corporation Exemptions

In 1973-1975, the legislature amended the regulatory process to allow the Public Transit Division to make exemptions from regulations and weight-kilometer taxes for nonprofit corporations that are providing transportation for their clientele with either regular buses, school buses, or vans. Basically, exemptions are allowed as long as the services provided by the organization do not compete with either a regular intercity carrier or services provided by transit or transportation district. Three of Oregon's rural highway public transportation demonstration projects and one elderly nonprofit corporation provide transportation under state regulatory exemptions.

Contract Services

In 1977 the Oregon legislature provided the Oregon Department of Transportation with authority to contract for improved intercity bus services, thus identifying the respective roles of the public utility commissioner and the transportation department when services are offered. Intercity bus companies can now contract with the state to provide experimental services without requiring carriers to provide the services when the contracts expire. The law also allows the state to receive and disburse federal funds in the event federal operating or capital assistance becomes available.

CONCLUSION

Funding, insurance, and regulation are all essential considerations in providing rural public transportation. The problems of funding intercity, small-city, and rural public transportation can be partially solved by congressional approval of any one of the different operating assistance programs now under consideration. Fortunately, there are agencies of the federal government that have had experience in providing operating and capital assistance to transit operators. This could be rather easily extended to meet the needs of the smaller operators and intercity carriers.

Our experience indicates that insurance problems are

increasing. Establishment of OSSA in Oregon appears to be a partial answer; however, on a broader national scale, there appears to be a need for a study committee, task force, or national organization to suggest insurance alternatives.

We have only begun to alter the regulatory process to organize different transportation services into a working system. Because of the nature of the laws, rules, and precedents, it will probably take a number of years to revise the regulatory process so that it works for the system's many users.

Abridgment

Joint Funding and Depreciation

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In developing materials for encouraging more effective use of transportation resources through coordination and cooperative agreements, the Institute of Public Administration (IPA) regularly encounters the problem of depreciation and the use of depreciation accounts involving public investments. Most disagreement is based on the contention that depreciation is not allowed when public monies are used for capital purchases. The counter argument is that depreciation should be permitted under coordinated systems because (a) it permits projects to recover that portion of their vehicle that is used by other than their own clients and probably at a more accelerated rate than would otherwise be true, and (b) it will provide for continuity of funding for vehicle replacement (although, as will be seen, that is only true if there are cash reserves set aside and it does not provide for operating-fund continuity). These questions and the resulting debate have been observed as obstacles to successful coordination of several transportation projects.

It is worth noting that, although much of the discussion about depreciation relates to vehicles, the concept applies to all capital investments. Depreciation is one of several financial costs that cover the expenses of debt costs, including interest on loans, bonds, and notes. In the traditional classification of depreciation accounts, one may include—as far as transportation systems are concerned—the vehicles owned by the system (and depreciated in a legally prescribed manner or as set forth in governing legislation or regulations on an annual basis); the buildings owned and used by the transportation system in the operation of its service; support equipment, such as nonrevenue vehicles and office machinery and equipment; and other items such as shelters, wheelchair lifts, and any special equipment necessary to routine operations (radios and other communication devices).

CONCEPT OF DEPRECIATION

Depreciation is the value of a capital resource, such as a transportation vehicle or other equipment, that declines over time as a result of use and age. Because it is recognized that depreciation is a very real business cost, most accounting systems include a method that systematically allocates this cost to the accounting period during which benefits from the services of the capital equipment are realized. [This section is based on an article written by Lemond and Knautz (1).]

Depreciation is typically used by private enterprise as the basis for taking into account two major factors: (a) the capital replacement cost of plant and equipment as a cost of operation (e.g., vehicles and other related equipment) and (b) conversion of this capital cost (i.e., depreciation) into an annualized expense that reduces income and in turn lowers the amount of taxable income. Thus, for the private profit-oriented firm, depreciation serves as a means of converting the cost of a plant or other asset to an expense item and reflects the fact that these physical (capital) investments have a limited life span and must eventually be replaced. Using depreciation accounts for this purpose, the accounting formats for depreciation allocate the cost of the asset over a period of years during which it is used and reflect the rate at which physical deterioration of an asset, and thereby its loss of market value, is expected to occur. Private businesses often depreciate equipment at accelerated rates in early years of ownership; this action assumes that material value declines faster for new equipment than for older objects. This practice of accelerated depreciation qualifies private business for larger income tax deductions on the high cost of depreciation in early years of ownership.

In the case of publicly owned transit systems of public or nonprofit agency sponsored projects, the requirement for accounting for depreciation takes on a somewhat different format and the previous description loses some of its relevance. This is particularly true when fares are not changed to recover the cost of operation. In this situation, depreciation only serves to identify unrecovered costs, and income tax considerations are not relevant because in most cases these are untaxed operating units. Private nonprofit enterprises (e.g., special transportation projects for the elderly and handicapped) or government transportation projects that do not pay taxes often depreciate capital equipment—if they are permitted—at a constant annual rate with a small residual value for scrap material or trade-in value at the end of the anticipated useful life of equipment. This practice of straight-line depreciation is easy to calculate and simple to estimate based on the acquisition cost of the object and its projected useful life. In general, most projects prepare a list of all their capital equipment by category. This list includes not only the number of pieces of such equipment but generally identifies the life span of each type of equipment in order to determine the basis on which these costs can be spread over a period of time. In this process of spreading cost over a specified life span, the basis is provided for translating a capital cost into a direct operating cost on an annual and even on a day-to-day basis. In developing estimates for

the expected life span of each piece of equipment it is essential to have reasonable knowledge of these life spans.

USING DEPRECIATION

A frequently cited justification for using a depreciation account in transportation operations operating under nonprofit or public agency funded projects is to provide a basis for reserving cash for the purchase or replacement of equipment. A depreciation account is often mistaken for a fund to replace deteriorated capital stock. But this is not necessarily true. A special replacement account may be created to substitute new equipment for old, but this is not the primary purpose of depreciation. From an accounting standpoint, an accumulated depreciation account has a credit balance; it is not an asset and therefore cannot be used to pay for new equipment. The purchase of equipment requires cash that is shown as an asset in the cash account.

An accumulated depreciation account, sometimes called a depreciation reserve, is generally set up to record the deterioration of capital equipment over time. The use of the word "reserve" often leads to the mistaken conclusion that a fund has necessarily been created to provide for the eventual replacement of the diminishing asset. In fact, the accumulated depreciation account or depreciation reserve is merely a provisional debit to the asset account; in other words, the cost of the asset allocated to use and wearing out is reflected by the accumulated depreciation account. The amount in this account is shown on the business's balance sheet as a deduction from the asset.

If a business or transportation project wishes to create a special fund for the replacement of equipment, financed from revenues collected for the cost of depreciation, it may certainly do so. However, the purchase of equipment requires cash revenue that is shown as an asset in the cash account. Therefore, in the public sector it is necessary to distinguish between accumulated depreciation as a reduction in an asset account and cash reserved for future replacement of equipment.

GOVERNMENT GRANTEES

The federal government makes money available to a wide variety of public and private social service organizations. Those organizations that use federal money to purchase transportation equipment are faced with one of the same problems as organizations that receive no federal funding. At periodic intervals, the business will charge its accumulated depreciation account to reflect the deterioration cost of the vehicle. It will also increase the amount of cash revenue in its special reserve account reflecting a fund that has been set aside to replace the vehicle when it eventually wears out.

For the federally funded organization, the solution is not so simple, especially if the organization is making an attempt to coordinate the transportation services available in the community it serves by providing services to another federally funded organization. Coordinated social service transportation projects typically combine a variety of federal sources of funds with federally sponsored programs in need of transportation. For example, a coordinated transportation project may acquire vehicles from the Urban Mass Transportation Administration's (UMTA) 16b2 funds, Older Americans Act Title III funds, and other capital sources for the transportation of Title III elderly clients and Title XX Social Security clients, among others. The depreciation cost of these vehicles should be distributed over all beneficiaries of the service—just like other operating costs in order to allocate transportation resources equitably. However, Office of Management and Budget (OMB) regulations in Federal Management Circular (FMC) 74-4 prohibit the reimbursement of federal grantees for depreciation from the same source of funds that financed original capital acquisitions, and this has been widely misinterpreted to preclude federal reimbursement of depreciation to any federally funded transportation project as well.

Before coordination was a common practice, the prohibition on reimbursement of depreciation was not a major problem. If a social service program provided transportation with capital and operating funds from a single source, it simply did not charge depreciation against the same source and depended on new capital grants for replacement of deteriorated equipment. On the other hand, if a social service program purchased transportation from a private provider, such as a taxi company, the cost of depreciation was included in the established passenger fare and paid by the agency.

Federal regulations did not prohibit depreciation expenses between second parties, such as independent transportation providers and client organizations. In fact, one set of regulations issued by UMTA on charter and school bus operations (49 CFR 604) requires grantees of UMTA capital funds (section 3) to include depreciation expenses in charter rates on federally assisted buses, facilities, and equipment as an element of cost. This expense is passed on to consumers in order to avoid unfair competition with private charter bus operators. The dilemma of federal restrictions on depreciation expenses results from the unusual degree of cost sharing in coordinated projects.

Current IPA research indicates that OMB limitations on depreciation cost sharing are not as restrictive as commonly believed. Capital depreciation may not be charged against the same grant program that previously funded the purchase of capital equipment; however, where cost-sharing agreements are sought between second party grantees (with potentially different federal sources), OMB regulations do not appear to prevent cost sharing for depreciation. The OMB directive at issue is FMC 74-4 and is discussed in greater detail in the following section.

FMC 74-4

In a study of the federal regulations relating to depreciation, IPA found that of approximately 114 federal programs with some transportation component, nearly all are covered by FMC 74-4, entitled Cost Principles Applicable to Grants and Contracts with State and Local Governments. This circular provides "principles for determining the allowable costs of programs administered by state and local governments under grants from and contracts with the federal government. They are designed to provide the basis for a uniform approach to the problem of determining costs and to promote efficiency and better relationships between grantees and the federal government." FMC 74-4 has two parts, identified as attachment A and attachment B. Attachment B discusses standards for selected items of cost.

Subparagraph 11 of paragraph B of attachment B, concerning depreciation and use allowances states that

1. Grantees may be compensated for the use of buildings, capital improvements, and equipment through use allowances of depreciation. Use allowances are the means of providing compensation in lieu of depreciation or other equivalent costs. However, a combination of the two methods may not be used in connection with a single class of fixed assets.

2. The computation of depreciation or use allowance will be based on acquisition cost. Where actual cost records have not been maintained, a reasonable estimate of the original acquisition cost may be used in the computation. The computation will exclude the cost or any portion of the cost of buildings and equipment donated or borne directly or indirectly by the federal government through charges to federal grant programs or otherwise, regardless of where title was originally vested or where it presently resides. In addition, the computation will also exclude the cost of land. Depreciation or a use allowance idle on excess facilities is not allowable, except when specially authorized by the grantor federal agency.

3. Where the depreciation method is followed, adequate property records must be maintained, and any generally accepted method of computing depreciation may be used. However, the method of computing depreciation must be consistently applied for any specific asset or class of assets for all affected federally sponsored programs and must result in equitable charges considering the extent of the use of the assets for the benefit of such programs.

4. In lieu of depreciation, a use allowance for buildings and improvements may be computed at an annual rate not exceeding 2 percent of acquisition cost. The use allowance for equipment (excluding items properly capitalized as building cost) will be computed at an annual rate not exceeding 6.67 percent of acquisition cost of usable equipment.

5. No depreciation or use charge may be allowed on any assets that would be considered as fully depreciated, provided that reasonable use charges may be negotiated for any such assets—if warranted after taking into consideration the cost of the facility or time involved, the estimated useful life remaining at time of negotiation, the effect of any increased maintenance charges or decreased efficiency due to age, and any other factors pertinent to the utilization of the facility or item for the purpose contemplated.

Item 2 above specifically permits capital depreciation as a cost attributable to a program only for buildings and equipment that were purchased with nonfederal money. Though this may suggest that one way to avoid problems with FMC 74-4 would be to pay for vehicles with nonfederal funds, in most instances this would be tantamount to either no capital availability or seriously limited availability. There are shortages of both capital and operating funds—as well as the fiscal capacity to raise them—at the local levels, and there is considerable dependence on federal programs as a source of capital and operating funds. It is this shortage of funds that has provided much of the impetus in developing coordinated transportation services, thus obtaining more effective use of the limited resources available.

FMC 74-4 regulations on depreciation at first glance appear to restrict a project's ability to include depreciation as part of a user charge made to another project. According to an OMB official, this is not the case. FMC 74-4 applies only between a federal grantee and the government; it does not apply between two federal grantees. Although paragraph 11 of attachment B of FMC 74-4 sometimes prohibits a grantee from charging the cost of depreciation to the federal government, it does not prohibit one grantee from charging depreciation to another grantee. For example, if one federally funded program wants to loan a vehicle to another federally funded program, it can do so and charge the borrower a fair and reasonable price for the use of the vehicle. The various components of the price would not be probed, so long as the price itself was fair and reasonable. One of these components could be depreciation. This would not violate FMC 74-4 because the charge is being made against another federally funded program and not against the federal government.

Although a federal grantor might have its own regulations prohibiting its grantees from charging other grantees depreciation, OMB has indicated that there is no basis for a federal grantor using FMC 74-4 as a basis for disallowing depreciation in the situation described above. (OMB has indicated that FMC 74-4 does not prohibit an agency from forbidding grantee-grantee depreciation charges.) It was noted that if any federal agency holds FMC 74-4 as a barrier to charging depreciation, this would not be in accordance with the intent of the regulation; FMC 74-4 is not meant to be applied by individual agencies.

Therefore, it would appear that those departments that have essentially adopted FMC 74-4 as their own interdepartmental regulation could only interpret their regulations in a similar fashion. In other words, the restrictions on charging depreciation should not apply if the grantee seeks to make the charge against another grantee. OMB has no difficulty with a project recovering these funds to the extent that they permit their capital and equipment to be used for activities other than those specifically designated within their project's objectives and requirements. It is fairly clear that coordination between grantees does not appear to be restricted by any OMB circular; however, one should check rather carefully with regard to other possible restrictions relating to specific legislation.

OMB Circulars A-102 and A-110

OMB Circulars A-102 (formerly FMC 74-7) and A-110 are two additional governmentwide regulations issued by OMB that address the issue of cost sharing implied by the practice of transportation coordination. Though these are not directly concerned with depreciation, they do have significant bearing on coordination.

OMB Circular A-102 promulgates standards for establishing consistency and uniformity among federal agencies in the administration of grants to state, local, and federally recognized Indian tribal governments. The circular contains 15 attachments, A through O. Attachment N, dealing with property management standards, prescribes uniform standards governing the utilization and disposition of property furnished by the federal government or acquired in whole or in part with federal funds or whose cost was charged to a project supported by a federal grant. Paragraph 2c of attachment N defines nonexpendable personal property as "tangible personal property having a useful life of more than 1 year and an acquisition cost of $300 or more per unit." Nearly all transportation equipment would fall into this category.

Attachment N also defines shared use:

> During the time that nonexpendable personal property is held for use on the project or program for which it was acquired, the grantee shall make it available for use on other projects or programs if such other use will not interfere with the work on the project or program for which the property was originally acquired. First preference for such other use shall be given to other projects or programs sponsored by the federal agency that financed the property; second preference shall be given to projects or programs sponsored by other federal agencies. If the property is owned by the federal government, use on other activities not sponsored by the federal government shall be permissible if authorized by the federal agency. User charges should be considered if appropriate.

A similar definition appears in OMB Circular A-110, which applies to institutions of higher education, hospitals, and other nonprofit organizations. However, this

definition in Circular A-110 would not be interpreted to require sharing between different grantees; instead, OMB's intent was to require a grantee to share such property among programs of activities that it sponsors. This interpretation is clearly at variance with the plain language of the circular, which sanctions sharing between a federal grantee and activities not sponsored by the federal government and sharing between projects or programs of two different federal agencies—although with secondary priority.

Both OMB Circular A-102 and Circular A-110 conclude that user charges should be considered where appropriate. But nowhere is there any indication of what a grantee should consider when making such a charge.

REFERENCE

1. W. H. Lemond and D. Knautz. Exploring the Usefulness of Depreciation. Passenger Transport, Vol. 36, No. 8, Feb. 24, 1978, p. 7.

Coordination, Costs, and Contracting for Transportation Services

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Studies of contractual and cooperative agreements among U.S. social-service agencies that provide transportation services have shown that one of the most serious barriers to coordination among agencies is lack of knowledge about transportation costs. In this paper, categories of transportation costs and services developed by the Institute of Public Administration as cost-accounting guidelines for transportation projects are identified and defined. The issue of allocation of data collection responsibilities among the personnel of transportation projects is discussed. Cost accounting and reporting systems developed under Section 15 of the Urban Mass Transportation Act of 1964 (as amended) are related to the Institute of Public Administration guidelines to provide a basis for cost-sharing agreements among transportation agencies.

The provision of transportation services to their clients has long been an important part of the programs of social-service agencies. Their growing concern and involvement with the issue of coordinating these transportation services arise out of (a) the substantial and relatively sudden increase in the number of projects that provide such services (in the face of the inadequacy of public transportation and the lack of private transportation among certain social groups), (b) the scarcity of funds for social-service programs in the 1960s and 1970s, and (c) recognition of the importance of coordination in the face of the need and the scarcity of funds.

The Institute of Public Administration (IPA), in its 1974 survey of the transportation problems of the elderly (1), estimated that between 1000 and 1500 projects were providing transportation services to the elderly and other disadvantaged groups. By 1976, when IPA undertook the updating of that work, the estimate had increased to the range of 3000 projects. Recent experience and inventories that have been undertaken throughout the country suggest that the number is substantially higher. For example, in a recent inventory in Los Angeles County alone, over 850 paratransit services were identified as providing transportation services. Although these included taxi services and may have included some double counting, it is clear that a broad range of transportation services are being provided by social-service agencies throughout the country.

An important element in the provision of these transportation services and especially in developing coordination among them has been the use of contractual arrangements and agreements. The purchase of transportation services draws on a substantial existing tradition of purchase of services by social-service agencies and has helped to overcome a number of difficulties associated with coordination and cost sharing, especially in relation to accountability requirements.

Throughout the United States, a number of barriers have been identified in studies on the issue of developing coordination through contractual or cooperative agreements (among social-service agencies and others). IPA itself undertook a survey of each of the state agencies on aging, and from this survey a number of stumbling blocks to coordination were identified. Included in the category of statutory and legal barriers were user eligibility restrictions as well as franchise and labor problems. On the administrative side were regulations, accountability requirements, lack of knowledge about transport costs, turf protection, preferential treatment of clients, concern about mixing one's own clients with others, and discontinuity of funding. This paper focuses on the one element that was identified over and over again as one of the more serious constraints on agreements and on developing contractual arrangements: lack of knowledge about transportation costs.

UNIFORM COST ACCOUNTS AND COST SHARING

One of the more important elements in the development of contractual or shared transportation services by social-service agencies (and others) is the reliable identification of the cost of the service and the measurement of the units of output obtained from these cost inputs. These cost accounts and unit-of-service measures are essential for most agency operators—in terms not only of ensuring effective use of budgets and resources but also of meeting the many accountability requirements set forth by federal, state, and local statutes and regulations.

As difficult as keeping good records and appropriate data on costs and service may be for an individual

transportation project, the difficulties are compounded when two or more projects attempt to coordinate their efforts through agreements, contractual or otherwise. Many projects surveyed by IPA and others have indicated that social-service agencies typically have little idea of their total cost for transportation and often have no real understanding of their own operations and that these two factors serve as barriers to coordinated efforts by agreements.

Most special transportation projects encounter difficulties such as the following:

1. Rudimentary accounting systems;
2. Variations in accounting definitions that make project comparisons difficult;
3. Variations in the coverage of the accounts from system to system (e.g., some projects leave out depreciation because they are not permitted to include it);
4. Insufficient traffic or operating data that would permit evaluation and monitoring of system operations;
5. The exclusion of some transportation costs or the inclusion of nontransportation costs in transportation cost accounts; and
6. The difficulty of making comparisons between systems because of (a) differences in the time covered by data and accounts (i.e., because of inflation or other time-related cost differences), (b) differences in the length of operating experience so that system averages may not be typical or representative, (c) variation in the markets served (e.g., rural versus urban), (d) variation in the type of service or service mix, and (e) differences in vehicle type and vehicle mix between projects.

When the administrative staffs of transportation projects are confronted by these problems, they find that their cost and operating experience is often structured so that comparisons between their projects are much like adding apples and oranges to bricks. However, although direct comparison of services is not easy, if coordinated services and some cost sharing are to be undertaken through contractual agreements or arrangements, some reasonable estimate of cost and service levels must be made to provide interested agencies with a common basis on which they can develop such cost-sharing programs.

In general, social-service agencies have been content to tally costs on the basis of the accounts needed to obtain the funding required to provide transportation services, usually as a minor portion of their overall program. Transportation accounts are typically captive to the cost accounts of the program as a whole, and transportation expenditures are often placed in nontransportation accounts and vice versa so that the real cost of transport is never fully identified. However, if cost sharing and coordination among these programs are to occur, these practices are no longer adequate. On the other hand, if the development of uniform cost and service guidelines is approached from a strict accounting viewpoint, the resulting paperwork can be cumbersome and discourage coordination efforts. There must be a practical balance between the genuine need for providing comparable cost and operating data and the minimization of paperwork.

To meet the need for uniform cost accounts and service definitions, IPA has developed a set of uniform transportation cost and service guidelines. These guidelines have been tested on rural transportation projects in Iowa and Missouri and are now available for general use. The guidelines have been structured so that varying levels of detail may be developed depending on the need of particular projects or groups of agencies. They are not intended to be used line for line for each item. They are designed to provide a guide toward developing uniform cost accounts and service definitions. Thus, a greater amount of detail is included than is likely to be needed by most small rural projects.

Obviously, projects that are attempting to coordinate transportation services (or even single projects that are trying to develop uniform accounts and service definitions) should simplify and adapt to their particular project needs and the special characteristics of their own localities. It is not possible to design a single set of cost accounts and definitions that will fit all projects, and the descriptions contained in the IPA guidelines do not eliminate the need for carefully thought-out cost accounts and service definitions. But it is hoped that they will make that task easier and provide the basis on which several agencies that wish to cooperate in the provision of transportation services can meet and develop common accounting and service definitions as the basis for cost and service sharing.

I have included some description of the so-called Section 15 accounts set forth by the Urban Mass Transportation Administration (UMTA). Again, I have tried to keep them as straightforward as possible, but cost accounting is not always a simple matter nor is it always straightforward. More details may be included than many projects feel are necessary for their own efforts. However, discussion of Section 15 provides the background needed to understand the basic accounting elements used by transit properties and, if social-service agency transportation projects or other nonprofit or private agencies are going to try to develop contractual arrangements with public transit, it is essential that they understand something of the background of their accounts.

In the remaining portion of the paper, the basic elements of the uniform cost and service guidelines are summarized, and their content is illustrated.

TRANSPORTATION COSTS AND SERVICES

In providing guidance for coordination and contracting activities, three categories of definition may be identified: (a) service, (b) cost, and (c) operating and user categories. These areas present the most difficulties in coordinating or sharing of costs and services. In the guidelines, a series of definitions have been developed for each category to serve as the basis for developing common agreements. Again, one must caution against literal interpretation and application of these accounts and definitions. They must be tailored to the specific needs of each coordination effort, but they can (and have) served as the basis for developing the required agreements.

Service Categories

The relation between costs and the transport service provided will vary according to the technology (e.g., vehicles) used to deliver the service and the type of service provided. In general, the service guidelines assume some form of four-wheeled, rubber-tired vehicle, and a wide range of service and rate possibilities may be available, from simple expense or voucher reimbursement to the complex purchase of service contracts with transit or taxi operators. To provide a reasonably workable and practical basis for discussion, seven broadly based service categories have been defined:

1. Fixed-route, fixed-schedule service—Most public

transit authorities provide services of this type, using standard transit buses. Fixed-route, fixed-schedule services have specific terminal points, and headways or frequencies of service are established on a timetable basis. The vehicle is typically available for anyone who desires service, and (if permitted) fares are generally collected at the time of boarding. For social-service agencies involved in the coordination of services, this category of service may involve a service contract, especially if a third-party operator is involved.

2. Modified fixed-route service—This service category provides for a line-haul or route that is fixed but that is allowed to deviate somewhat for greater flexibility. Typically, the vehicle may detour or deviate from the conventional route (usually by two to four blocks and ordinarily based on some advance request by the user).

3. Subscription service—Subscription service provides for prepaid, guaranteed transportation services in which the vehicle typically stops at or very near the user's residence at an assigned time for conveyance to a specific location or a series of limited stops within a specific destination area. This type of service is most feasible when many people desire transport to a specific location from a small geographic area at the same time.

4. Demand-responsive service with advance reservations—This category of service provides for a completely flexible route and schedule. The user informs the operator of the desired trip destination 12 to 24 h in advance. Trip assignments are then developed for the vehicles to optimize the accommodation of passenger traffic with minimal vehicle running time. This type of service is often associated with a shared-ride operation and requires a dispatching function. It may be operated by contract with a local taxi operator or operators.

5. "Real-time" demand-responsive service (taxi)—This category of service is similar to conventional taxi operations in that users telephone a central office and indicate their destination and the time the vehicle is desired. No advance notice is required, and a vehicle is usually dispatched within 10 to 30 min, depending of course on available capacity at the time of the request. This category of service is typically not used for shared-ride operation because of the limits placed on quick response, but it does provide quick, highly personalized, flexible service.

6. Charter service—When agencies do not have sufficient budgets to develop their own systems and the existing urban transportation systems do not provide relevant services, the agency may charter service for specific needs. Charter operations remove the need to spend major amounts of administrative time on the provision of transportation service and are useful when only occasional trips are needed.

7. Volunteer service—Volunteer service uses volunteer drivers who may or may not be reimbursed, depending on the rules that federal, state, or local agencies have established for their own operations. Some services provide an honorarium or compensation for the driver's time (depending on local statutes); other services simply use the time of the driver on an unpaid, voluntary basis. In low-density or rural areas, this type of transportation service often provides agencies with transportation not available in any other way. Because of its volunteer character, this type of service is difficult for agencies to organize on a consistently scheduled basis.

These service categories are not intended to exhaust every possible variation. But they do cover the major classes of service that most projects will have to consider. To the extent that only one type of client is served, perhaps only one of the service categories may be needed, especially where several agencies are attempting to share costs and are combining different client needs (in terms of transportation services).

Transportation Costs

An important requirement in using uniform cost accounts is to understand their uses and applications for transportation services. The guidelines contain a description of these uses and applications. However, a general overview may be helpful in understanding uniform accounts.

Although it is sometimes useful, in considering transportation costs, to differentiate between financial and economic costs, this discussion focuses exclusively on financial costs. It is these costs with which the operator and community officials will be most concerned and with which cost-sharing negotiations will be involved. In this context, transportation costs must be designed so that they permit not only planning for future and present services but also allocation or assignment to the particular service that incurred the costs; i.e., it should be possible to classify the cost of each category of service if there is more than one such category. This requires some allocation of fixed or indirect costs; when such allocated costs have been determined, the agencies can determine the cost relation for the provision of transportation to the various target groups.

Transportation costs can typically be separated into two categories. One category of costs is the variable costs of performing such services. These are generally considered to be direct or out-of-pocket costs, which include drivers, repairs, fuel, tires, and other factors that have a direct relation to the use of vehicles. The other basic cost category is fixed costs. Fixed costs come in basic and indivisible units and represent either annual payments or prorated amounts of capital assets. These costs are various types of overhead expenses that are indirect and are usually allocated by (derived) formula to various transportation service activities. The basic accounts that comprise variable and fixed costs are defined below.

Direct or Variable Costs

Within the direct or variable cost category, there are three basic subgroups: actual operations, servicing and maintenance of vehicles, and maintenance support. A combination of these three account categories (to whatever level of detail appears suitable and feasible for a particular project or group of projects) should provide cost information on the direct or variable costs of providing transportation services. The specific cost items listed here are intended to show what cost items are to be included in each category. Although it may seem unimportant how, for example, vehicle washing is treated, it is very important to ensure that all projects treat incurred costs in the same way.

Operations

The operations category consists of (a) vehicle revenue operations and (b) vehicle dispatch and network control.

Vehicle revenue operations relate to cost elements that are incurred in the routine functioning of vehicles for provision of specified service capacity. Nine subelements are included in this category:

1. Salaries and wages for drivers and attendants;

2. Fringe benefits for drivers and attendants;
3. Honorariums or compensation for volunteer or temporary personnel who function in responsibilities different from those of full-time drivers or attendants;
4. Fuel, lubricants, tires, and other consumables used in the daily transportation function;
5. Miscellaneous materials, including expenses that relate to nonlabor cost for fare collection or revenue collection for transportation provided;
6. Insurance (or provision for self-insured) liabilities that relate to vehicle accident damage;
7. Insurance and provision for liability for personal injury covering passengers who use the service;
8. Technical services such as training of drivers, on-board contracted services, and rentals of on-board equipment; and
9. Purchased transportation service (the expense incurred when a transportation service obtains its vehicles from, and provides service by using the vehicles of, a third party).

Vehicle dispatch and network control relate to the introduction of various dispatching techniques and control systems for vehicles when the service offers more personalized and lower volume types of operation. There are five basic elements in this category:

1. Salaries of all controllers, assistant controllers, field inspectors, and other related personnel;
2. Fringe benefits for these staff members;
3. Radio and electronic materials, including all costs for daily use of radio control systems and directly owned software systems used in dispatching and trip matching;
4. Miscellaneous materials (office supplies and other routine, nonlabor expenditures); and
5. Purchased technical services (the cost of computer, telephone, and radio lease or contract agreements for the various types of equipment used in control and dispatching of vehicles).

Vehicle Servicing and Maintenance

Vehicle servicing and maintenance includes (a) routine vehicle servicing, (b) vehicle maintenance, and (c) nonlabor miscellaneous.

Routine servicing of vehicles is that amount of activity required in the day-to-day functioning of transportation vehicles. Six elements are included in this category:

1. Salaries and wages of staff related only to the daily or routinely scheduled servicing of vehicles;
2. Fringe benefits for these staff members;
3. Washing and cleaning requirements, both interior and exterior, for all vehicles in use;
4. Inspection of each vehicle on a daily or weekly basis or any other routinely scheduled activity that results in minor adjustment of mechanical or nonmechanical parts;
5. Miscellaneous servicing costs, including all other nonlabor expenses; and
6. Costs for off-street storage and parking facilities.

Vehicle maintenance encompasses the cost incurred for staff to repair and maintain vehicles and for necessary parts to effect the repairs. These costs are set up in the following form:

1. Salaries and wages for mechanics [broken down into (a) senior professionals and (b) helpers and apprentices];
2. Fringe benefits for all maintenance staff;
3. Contracted repair and maintenance services performed out of shop; and
4. Materials and spare parts, including those for (a) body and suspension and (b) engine, power-train, and chassis (both types of items are broken down into "renewable" parts—parts normally consumed over given periods of time or distance in the regular operation of the vehicle—and "unprogrammed" parts—parts necessary to reactivate the vehicle after accident, vandalism, or unforeseen disabling).

Nonlabor miscellaneous is a general category that indicates all costs incurred for expenses not classified under routine servicing or vehicle maintenance.

Maintenance Support

Maintenance support relates to all costs involved in the provision of facilities and enabling factors for the maintenance and servicing functions and can optionally include the following elements:

1. Buildings and tools (necessary shelters for maintenance operations and equipment, machinery, and tools to permit maintenance staff to perform properly and well);
2. Nonrevenue equipment (the expense incurred for fuel, oil, and tires and miscellaneous expenses involved in the operation of nonrevenue equipment such as staff automobiles, fork-lift trucks, and small cranes);
3. Utility costs, including water, electricity, gas, and sewerage used by the various facilities necessary to maintenance activities;
4. Administrative services incurred as a result of maintenance activities;
5. Insurance and protection of assets such as necessary buildings, general property, and shelters for maintenance activities; and
6. Volunteers and temporary staff employed in various functions that pertain to the maintenance of vehicles.

Indirect or Fixed Costs

In the area of indirect or fixed expenses, experience shows that fixed expenses can consume more than a third of the total costs incurred in transportation operations. There are many costs involved. In the context of delivery systems for social-service transportation, these costs may be set up under four major headings: (a) administrative or general, (b) taxes and tolls, (c) finance, and (d) noncash contributions. As in the case of variable costs, the appropriate combination of fixed-cost detail will depend on the particular project, location, clients served, and services being provided (not to mention funding sources). In combination with variable costs, the fixed costs described here can provide the basis for effective project management and cost sharing through billing agreements or service contracts.

Administrative or General Costs

Administrative or general costs include all costs incurred in the general administration of transit operations. In the context of delivery systems for social-service transportation, a number of elements are necessary to maintain uniform and accurate statistical data:

1. Salaries and wages of directors and senior staff

and, accounted for separately, salaries and wages of support and clerical staff;
2. Fringe benefits for the overall (senior and clerical) administrative staff;
3. Marketing, advertising, and public relations;
4. Temporary staffing;
5. Rents and leases for office space and other spaces necessary to house administrative functions adequately;
6. Support, maintenance, and custodial services; and
7. Utilities and telephone service, including necessary heat, light, and water (not included in rent), and particularly the telephone or other communication devices necessary to the proper operation of administrative functions.

Taxes and Tolls

Taxes and tolls include items of expense adjunct to ownership of property and use of taxable items. Most taxes may not apply to most publicly funded transportation services. However, they apply to privately funded (and many nonprofit) services, and coordination may require that records be maintained on taxes paid as a cost. Tolls, of course, are expenses incurred by vehicles operated over roads, bridges, or in tunnels traversed in transporting clients. In view of the various applications of taxes, this category may be subdivided into various items:

1. Fuel and oil or petroleum-related products used in the operation of the transit services offered;
2. Property (payments to various jurisdictions under the laws governing such taxes for both real and nonreal properties);
3. Utilities (that portion of utilities expenditures considered taxes rather than payment for services, products, or other offerings);
4. Vehicle licensing (costs of assessments necessary to obtain permission to operate in the various jurisdictions traversed by the vehicles being operated by the transit service); and
5. Other taxes that may become legal and necessary in the operation of the business under the laws of the particular jurisdiction in which operation occurs.

Finance

Finance covers the expense of debt costs: interest on loans, bonds, or notes and other legal costs for the use of cash needed in the day-to-day operation of transportation services. Also included in this category is depreciation, which is subdivided into four separate elements:

1. Revenue vehicles owned by the system and depreciated in a legally prescribed method or as set forth in governing legislation on an annual basis;
2. Buildings owned and used by the transit authority in the operation of the service and reflecting the legal depreciation allowable under existing legislation;
3. Support equipment, including nonrevenue vehicles, office machinery, and equipment used in support of general operations; and
4. All other depreciation taken on items such as transit shelters, wheelchair lifts, and any other special equipment necessary to routine operation.

Noncash Contributions

Noncash contributions include the noncash resources that are provided (or received) without cash payment being made but that contribute to the operation of the system. Two major divisions are included in this category:

1. Volunteer services, which should indicate the number of hours of "donated" time and any actual cash outlays involved—for such items as meal allowances and gasoline furnished—as well as the actual commercial value of the time and skills contributed by unpaid volunteers; and
2. Donated resources, which should encompass the commercial value of materials donated for use by the transit service in accomplishing its social-service objectives (this might cover fuel, service, vehicles, and equipment supplied without charge to the transit facility).

Service Units

In addition to service categories and account groupings, it is essential for contracts and agreements to be negotiated to develop common definitions of units of service. In the section that follows, units of service are defined in terms of three elements: (a) users, (b) vehicles, (c) service and monetary functions, and (d) productivity measures. These elements are summarized below. Again, it must be cautioned that the definitions given here are only points of departure for coordinating services among agencies. They must be modified to suit the needs of each project or group of projects.

1. The client or user, the person who uses or has a potential for using transportation services, includes (a) the ambulatory, (b) the semiambulatory, (c) the physically handicapped, (d) the mentally handicapped, (e) the paraplegic, (f) the quadraplegic, (g) the transportation disadvantaged, (h) the general user, (i) the contract user, (j) the user of nonexclusive service, and (k) the user of exclusive service.
2. Vehicle functions, which describe the various options for determining the use of vehicles, include (a) total vehicle kilometers traveled, (b) vehicle kilometers of revenue service, (c) nonrevenue vehicle kilometers, (d) total vehicle hours, (e) vehicle hours of revenue service, (f) vehicle hours during which the vehicle is unavailable for service, and (g) vehicle hours during which the vehicle is available but unused.
3. Service and monetary functions, which are commonly used terms for the performance of operations and remuneration for conducting transportation services, include (a) fares, (b) total revenues, (c) public service assistance, (d) contract service, and (e) service to observers who ride without paying or are ineligible for service.
4. Productivity measures, which are routine factors used to evaluate the cost and service levels of each transportation system, include (a) direct or variable cost per vehicle revenue kilometer, (b) total cost per vehicle revenue kilometer, (c) direct cost per vehicle revenue hour, (d) total cost per vehicle revenue hour, (e) variable cost per one-way passenger trip, (f) total cost per one-way passenger trip, (g) estimated passenger kilometers generated, (h) estimated average length of passenger trip, and (i) passenger trips generated per person (target group).

For some projects, especially in rural areas, contractual agreements with public transit may be necessary. Although concepts such as vehicle revenue kilometers and fares may not be entirely relevant for

transportation providers who are funded by federally supported grant programs, modifying these terms is not difficult and, if coordination with transit is to occur, these terms must be included for consideration. If no revenues are collected consistently (if service is free to the user), the revenue terms may be dropped.

It is evident that, when they are combined with appropriate costs, service measures—especially those that cover vehicle functions and productivity—not only provide important information on the effective management of transportation services but also become the basis for coordinated cost-sharing agreements between agencies and projects.

DATA COLLECTION RESPONSIBILITIES

Successful negotiating of contractual or other coordination agreements that relate to cost sharing and billing procedures involves developing a uniform set of cost accounts, service definitions, and measures of service. These three elements make it possible for transportation projects to discuss costs and cost sharing in the same terms. More complex billing procedures that reflect trip length, vehicle hours, or other variables that reflect the impact of service on cost are not workable unless the participants who negotiate the agreements have confidence that they are all discussing the same elements.

Throughout the United States, disagreements over the actual cost of transportation have been found to be the most common problem in negotiating cost-sharing agreements and contractual arrangements for the purchase of transportation services. Projects that have low cost per vehicle kilometer or vehicle hour have often been found to be low in cost only because some of their transportation costs have not been included in the transportation account but have been allocated to nontransportation functions. Workable contract agreements for coordination require agreed-on definitions of costs, services, and measures of service productivity.

Unfortunately, the implementation of these three elements requires some data collection, and for most rural transportation projects data collection is typically done by whatever office staff is available and by drivers. The range of responsibility will vary considerably, and the data requirements will expand as project size increases. If coordination and contractual agreements are to succeed, they will require more extensive monitoring of transportation activities. The development of effective means for carrying out this monitoring and evaluation effort becomes an important and integral part of the coordination effort as well as a contributor to its success or failure.

Obviously, the collection of data generates more than just monetary costs. It is difficult to require volunteer drivers or participants to collect elaborate amounts of information. It is easy to specify in principle that data collection should be simple; it is more difficult to carry this out in practice because each project requires a range of information on costs, traffic, and operations for accountability purposes alone. There is no simple formula. Neither is there any replacement for careful judgment as to how much data should be collected and by whom. To that end, I have attempted to summarize some directions from the IPA guidelines. Again, I caution that data requirements and collection for transportation services must be specifically designed to meet the needs of each project or group of coordinating projects.

Collection of required data for project management, evaluation, and monitoring is an obvious task for any transportation service. It is also obvious that information is needed by agencies that must report, or be accountable for, their expenditures. As already noted, if transportation coordination is to be achieved through contractual arrangements, the range of data requirements becomes more complex, and it is therefore essential to provide for a clear set of responsibilities in this regard. As in the case of costs and units of service, no simple balance fits all cases.

Figure 1 shows the division of effort between the driver or attendant and the staff of a social-service agency for various categories of service. In splitting the responsiblity for data collection, the workload of drivers in relation to documentation should be minimized as much as possible. However, the driver does represent an important collection point for data. Table 1 (from the IPA guidelines) gives a tentative allocation of responsibility between the driver and the administrative staff of the agency for specific transportation data described earlier. Different data requirements are shown by service categories. The table appears to represent a realistic data collection effort by administrative staff and the vehicle operator.

Figure 1 shows that, the more personalized and flexible the category of service is, the less should be required of the driver in terms of data collection. For example, on conventional fixed-route, fixed-schedule transit services, the driver's role in data collection is substantial, but much of the information collected may be simplified or minimized by the use of special cards or magnetic tickets, data processing, or the farebox or special equipment for fare collection. In the case of demand-responsive services such as taxis, where drivers may have many more obligations associated with serving passengers, greater emphasis must be placed on data collection by the staff of the social-service agency. (The precise proportions of each of the bars in Figure 1 indicate orders of magnitude and not actual workloads.)

Table 1 provides overall guidance on the focus of data collection responsibility as it relates to specific data elements. The table should be used as a checklist and a point of departure; it is not intended to be used without modification to suit specific needs. In conjunction with Figure 1, it provides the basis for coordination of data collection among participating transportation services, but it obviously does not consider the data required for purposes of accountability. That is, in most cases, an "add-on" to transportation-related information.

COSTS AND UNITS OF SERVICE AND UMTA SECTION 15 SYSTEMS

The definitions and categories discussed in this paper provide the basis for developing common cost accounts and service units for coordinating transportation services among a number of social-service agencies. They serve as checklists and guideposts by which to raise important cost and service issues that must be settled and negotiated if agencies are to agree to share their costs and services. This is true whether they operate in some loose, cooperative arrangement or through more formalized contract agreements with a third party or even if they form a new agency to provide integrated transportation services.

An important consideration in coordination among transportation agencies is obtaining the participation of public transit. To do so will require some basis for comparing and relating costs and services; for that purpose, the relation between the uniform accounts developed by IPA and the cost accounts and reporting sys-

tems developed under Section 15 of the Urban Mass Transportation Act of 1964 (as amended) is given in Table 2.

With the growing importance of federal support to local public transit services (through both operating and capital funding programs), the U.S. Department of Transportation (DOT), and specifically UMTA, realized that the urban public transportation industry was using varying definitions for its accounting and financial activities as well as inconsistent methods in the development of measures of productivity and traffic operation. Taking precedent from the experience of the Civil Aeronautics Board and the Interstate Commerce Commission (ICC), UMTA decided to require the transit industry to function with a uniform set of accounts and reporting and activity measurements.

In the spring of 1971, with the encouragement of UMTA, industry trade associations submitted a grant request to undertake the development of a uniform accounting system for the entire industry. Work was started on the program in March 1972, and in November 1974 the Urban Mass Transportation Act of 1964 was amended to include Section 15 and the requirement for uniform accounts, records, and reporting systems. In December 1975, UMTA began the final task in its program to develop a uniform reporting system called

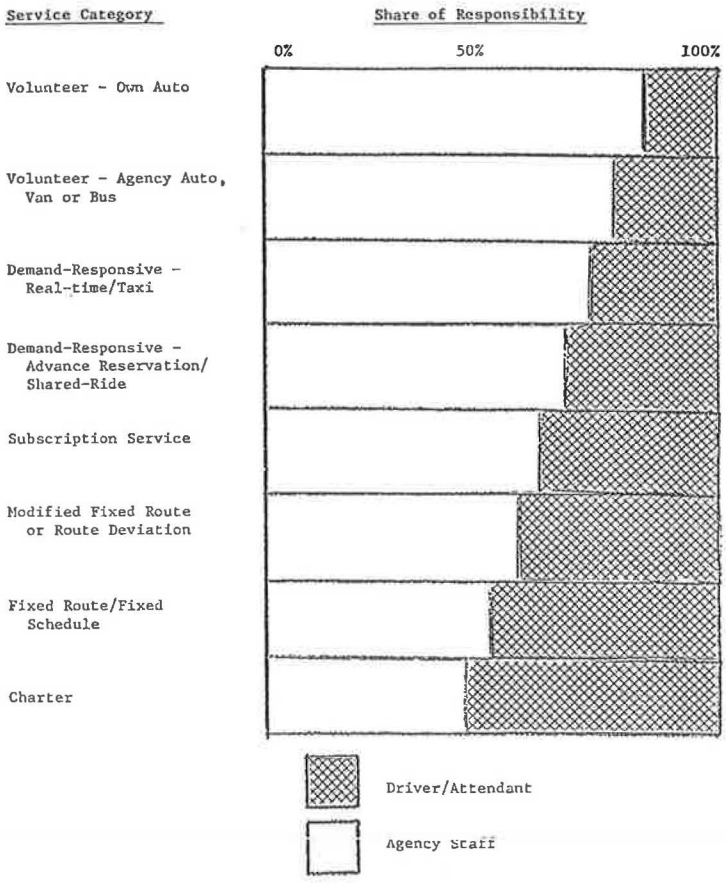

Figure 1. Allocation of responsibility for data collection for various categories of transportation service.

Table 1. Allocation of responsibility for data collection by service category and key data elements.

Service Category	On-Off Time, Active Drive Time, Wait Time	Distance (start-end)	Elapsed Drive Time	Distance Check[a]	Trip Length		Origin-Destination		One-Way Passenger Trips[c]	Passengers Served by Agency
					Passenger	Vehicle	Passenger	Vehicle[b]		
Volunteer										
Own automobile	D	D	S	DS	S	S	D	DS	D	S
Agency automobile, bus, or van	D	D	S	D	S	S	D	DS	D	S
Demand-responsive										
Real time (taxi)	D	D	S	S	S	D	S	D	D	S
Advance reservation or shared ride	D	D	S	S	S	D	S	D	D	S
Subscription	D	D	D	D	S	D	S	DS	D	S
Modified fixed-route or route-deviation	D	D	D	S	S	D	S	DS	D	S
Fixed-route, fixed-schedule	D	S	D	S	S	S	S	S	D	S
Charter	D	D	D	S	S	S	D	DS	D	S

Note: D = driver or attendant, S = administrative staff, and DS = both driver and staff.

[a] At each passenger destination.

[b] Vehicle movements are intended to provide the basis for analyzing the productivity of vehicle use. This requires that drivers or attendants note every change of location of the vehicle throughout the day. This is especially relevant for demand-responsive services.

[c] Trips should not be confused with the number of unduplicated persons served. Although the latter is important to agencies as a measure of their outreach, it is less relevant from a transportation point of view.

Table 2. Relation between Section 15 cost accounts and IPA uniform accounts.

Cost	UMTA Section 15 Level C Code[a]
Vehicle operations	
Salaries and wages	501.01-02
Fringe benefits	502.15
Honorariums or compensation for volunteer or temporary personnel	503.04
Fuel, lubricants, tires, and other consumables	504.01-02
Miscellaneous materials	504.99
Insurance (vehicle damage)	506.03-05
Insurance (personal injury)	506.03-05
Technical services	503.03
Purchased transportation service	508.01
Vehicle dispatch and network control	
Salaries and wages	501.02
Fringe benefits	502.15
Radio and electronic materials	504.99
Miscellaneous materials	504.99
Purchased technical services	503.03
Routine servicing	
Salaries and wages	501.02
Fringe benefits	502.15
Vehicle washing and cleaning	504.99
Vehicle inspection	504.99
Miscellaneous servicing	504.99
Off-street storage and parking	504.99
Vehicle maintenance	
Salaries and wages	501.02
Fringe benefits	502.15
Contracted services	503.05
Materials and spare parts	504.99
Nonlabor miscellaneous	504.99
Maintenance support	
Buildings and tools	509.99
Nonrevenue equipment	504.99
Utilities	505.02
Administration	503.99
Insurance and protection of assets	506.01
Volunteer and temporary staff	503.04
Administrative or general	
Salaries and wages	501.02
Fringe benefits	502.15
Marketing, advertising, and public relations	503.02, 509.08
Temporary staff	503.04
Rents and leases	512.01-13
Support, maintenance, and custodial services	503.05-06
Utilities and telephone	505.02
Taxes and tolls	
Fuel and oil	507.05
Property	507.03
Utilities	507.06
Vehicle license	507.04
Other	507.99
Tolls	509.03
Depreciation	
Revenue vehicles	513.04
Buildings	513.07
Support equipment	513.07
Other	513.99
Noncash contributions	
Volunteer services	–[b]
Donated resources	–[b]

[a]From Urban Mass Transportation Industry Uniform System of Accounts and Records and Reporting Systems (2).
[b]No Section 15 equivalent.

Project FARE (Uniform Financial Accounting and Reporting Elements), and a four-volume report (2) was published that contains all of the findings, recommendations, and major plans for implementation of the Section 15 accounts and all of the reporting requirements and uniform system of accounts and records required by transit operations for all modes of transit service except commuter rail (commuter railroads are expected to maintain their internal accounts in the manner specified by ICC).

In view of the fact that the schedule called for implementation of the Section 15 systems by July 1978, it is evident that social-service and other agencies attempting to coordinate with transit will have to be informed on and able to relate to these Section 15 systems.

Section 15 Systems

The Section 15 systems (2) consist of two elements: a system of accounts and records and a reporting system. The uniform system of accounts and records consists of (a) various categories of accounts and records for classifying financial and operating data, (b) precise definitions of the data elements to be included in these categories, and (c) definitions of practice for systematic collection and recording of such information. All three are considered necessary to ensure that information is uniformly defined. The reporting system described in the UMTA report consists of forms and procedures (a) for transmitting information from the operators to some central processing agency designated to collect data from all operators, (b) for editing and storing information, and (c) for the central processing agency to report the information to various user groups. The Section 15 systems and particularly the uniform system of accounts and records and the reporting systems include provisions for both mandatory and voluntary collection and reporting of data, and the definitions vary according to the level of detail required.

Uniform Accounts

In the Section 15 system, costs or operating expenses incurred are classified within any given mode according to two dimensions: (a) the type of expenditure and (b) the function or activity performed. The types of expenses are classified into a series of accounts that specify by code number each particular category of expense. These expenses can be shown in considerable detail, depending on the level of detail one desires. The functional categories relate to the aggregating of expenses within each category and include operations, maintenance, and general administration. Specific codes have been assigned to each functional category.

Since it was found that most transit systems did not collect or classify expenses according to functional categories but did collect costs by organizational responsibility center or some other unit, it was decided that, to achieve uniformity in collection and reporting costs, it would be necessary to define a standard set of functional classifications and that consideration would have to be given to the complexity, needs, and capabilities of various sizes of operation. Obviously, large systems are better able to develop specialized activities and to identify labor and other expenses directly with these activities, whereas small companies have less need to develop such specialized activities. For these reasons, three levels of detail for functional categories were developed: Level A applies to operations with more than 500 vehicles and all rail rapid operations, level B applies to operations with from 101 to 500 vehicles, and level C applies to operations with 100 or fewer vehicles.

Table 3 (2), Vol. 1) summarizes the relation between expenses and the functional categories specified in the Section 15 accounts for level of detail C. This table represents the minimum level of detail provided for in Section 15.

An example of how a table is set up to indicate the relation among levels A, B, and C functional categories so as to illustrate the varying degrees of detail that are provided for is given in Table 4 (2, Vol. 1). The relation between the uniform accounts developed by IPA in its guidelines and the UMTA Section 15 system has been given in Table 2 (the code numbers given in that table correspond to Section 15 account designations).

It is important to note that some Section 15 cost accounts are used for more than one functional category. For example, code 501.02 (salaries and wages for other than drivers) is used in all three functional categories (010, 040, and 160). This indicates that the wages and

salaries accumulated in account 501.02 apply to a number of different labor activities under each of the three functions and must therefore be separated or allocated into each of these separate accounts. Where similar accounts are found, allocation must be determined from among more than one use. The allocation can be based on vehicle kilometers, vehicle hours, or passenger transactions, whichever appears to be most relevant.

In addition to uniform cost accounts and definitions, there are also uniform revenue classes and balance-sheet classes. These accounts may be seen in the full report (2).

Table 3. Section 15 aggregation of functional categories for expense classification.

Level A	Level B	Level C*
011 Transportation Administration 012 Revenue Vehicle Movement Control 021 Scheduling of Transportation Operations 031 Revenue Vehicle Operation	010 Administration of Transportation Operations 020 Scheduling of Transportation Operations 030 Revenue Vehicle Operation	010 Operations
041 Maintenance Administration—Vehicles 042 Maintenance Administration—Facilities	040 Maintenance Administration	040 Maintenance
051 Servicing Revenue Vehicles	050 Servicing Revenue Vehicles	
061 Inspection and Maintenance of Revenue Vehicles	060 Inspection and Maintenance of Revenue Vehicles	
032 Accident Repairs of Revenue Vehicles	032 Accident Repairs of Revenue Vehicles	
071 Vandalism Repairs of Revenue Vehicles	070 Vandalism Repairs of Revenue Vehicles	
081 Servicing and Fuel for Service Vehicles	080 Servicing and Fuel for Service Vehicles	
091 Inspection and Maintenance of Service Vehicles	090 Inspection and Maintenance of Service Vehicles	
101 Maintenance of Vehicle Movement Control Systems	100 Maintenance of Vehicle Movement Control Systems	
111 Maintenance of Fare Collection and Counting Equipment	110 Maintenance of Fare Collection and Counting Equipment	
121 Maintenance of Roadway and Track 122 Maintenance of Structures, Tunnels, Bridges, and Subways 123 Maintenance of Passenger Stations 124 Maintenance of Operating Station Buildings, Grounds, and Equipment 125 Maintenance of Garage and Shop Buildings, Grounds, and Equipment 126 Maintenance of Communication System 127 Maintenance of General Administration Buildings, Grounds, and Equipment 128 Accident Repairs of Buildings, Grounds, and Equipment	120 Maintenance of Other Buildings, Grounds, and Equipment	
131 Vandalism Repairs of Buildings, Grounds, and Equipment	130 Vandalism Repairs of Buildings, Grounds, and Equipment	
141 Operation and Maintenance of Electric Power Facilities	140 Operation and Maintenance of Electric Power Facilities	
145 Preliminary Transit System Development	145 Preliminary Transit System Development	
151 Ticketing and Fare Collection	150 Ticketing and Fare Collection	
161 System Security 165 Injuries and Damages 166 Safety 167 Personnel Administration 168 General Legal Services 169 General Insurance 170 Data Processing 171 Finance and Accounting 172 Purchasing and Stores 173 General Engineering 174 Real Estate Management 175 Office Management and Services 178 General Management 162 Customer Services	160 General Administration	150 General Administration
183 Promotion 164 Market Research	170 Marketing	
177 Planning 181 General Function	180 General Function	

*Required functional categories.

Table 4. Example of structure of table giving relation between required object classes (expenses) and functional categories.

	Functional Categories			
Object Class	010 Operations	040 Maintenance	160 General Administration	All Functions
501. Labor				
01 Operators' salaries and wages				
02 Other salaries and wages				
502. Fringe benefits				
503. Services				
504. Materials and supplies consumed				
01 Fuel and lubricants				
02 Tires and tubes				
99 Other materials and supplies				
505. Utilities				
506. Casualty and liability costs				
507. Taxes				
508. Purchased transportation service				
509. Miscellaneous expense				
510. Expense transfers				
511. Interest expense				
512. Leases and rentals				
513. Depreciation and amortization				

COST ALLOCATION AND CONTRACTING

In negotiating contracts for sharing services or costs, the availability of common units of costs and service makes the negotiation process easier and workable. There still remain, however, important issues of how costs are allocated, even within the uniform transportation accounts. The way in which these costs are allocated has a considerable bearing on how contract agreements are worked out, particularly in relation to the rates that may be used for billing purposes.

The allocation of direct operating (variable) costs tends to be relatively easy in that such costs can be typically assigned to directly related transportation services. However, since fixed costs are not always so directly and simply related, a number of possible variables can be used as the means for allocation. For example, fixed costs may be allocated among functional categories by using number of passengers, vehicle kilometers, vehicle hours, or other measures of service levels. The particular measure that might be used for allocating fixed cost will depend to a considerable extent on the nature of the particular service; the cost-allocation models used for demand-responsive services are considerably different from those used for fixed-route or charter services. It is essential that, in considering which cost-allocation formulas to use in arriving at contractual agreements on unit cost of service, there be agreement on the method of cost allocation.

In urban areas (particularly in areas where drivers may spend many hours in their automobiles in congested traffic conditions), vehicle hours are typically used because they tend to reflect more accurately the cost intensity of the use of vehicles as well as cost and labor. In rural areas, vehicle kilometers may be more relevant because of the long trip distances involved. In most rural settings, vehicles tend to move easily and are only occasionally subjected to congested conditions. Since vehicle-kilometer data are relatively easy to develop (in contrast with those for vehicle hours), vehicle kilometers may be a perfectly reasonable (and simple) basis on which fixed cost can be spread. To the extent that there is considerable variation in the mix of trip lengths and service categories within a coordinated system, a single contractual billing rate may not be appropriate. It may be necessary to develop two (or even three) separate rates—some expressed on a vehicle-hour basis and others on a vehicle-kilometer basis. Where demand-responsive systems are involved, the cost-allocation formulas and billing rates may have to include utilization or load factors as well.

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Abridgment

Iowa's Approach to Transit Marketing

Joanne Short, Public Transit Division, Iowa Department of Transportation

Through the years, Iowa has been no different from other states in its "social consciousness" about citizens who need help. Gradually, however, government has been expected to "take care" of older people, the mentally or physically handicapped, the poor, and children. Some feel that, in pouring money into countless federal agencies, the federal government has overreacted to the problem. Eventually, there were 28 federal agencies handling 114 programs in the area of transportation alone. There appears to be enough money available, but finding and getting it is another story. Unfortunately, there is no overall direction, plan, or program—let alone a way to find out if the money from the most commonly tapped sources is being used to solve the problems in the best way.

Especially in rural areas, special programs like congregate meals, medical services, and sheltered workshops are no good unless people can get to them. That means transportation. In the past, little transportation was available to pick people up and take them to these special service locations. So most agencies began transporting their own clients, not knowing—and in some cases not caring—what transportation was costing or what anyone else was doing. Marketing consisted of publicity for the agency's specific social programs, and transportation was considered only an adjunct of these programs.

By about 1975, survival was the issue in the private sector. Intercity bus service to small towns had declined, rail passenger service had all but disappeared, and local taxi companies could barely make ends meet. Although effective marketing was needed, it was generally thought to be unaffordable, if it was understood at all. When Iowa began establishing order out of this chaos, coordinating and consolidating 300 or more public and private services into 16 regional systems, marketing was an essential element in the process.

At this point, let us define marketing. Marketing is not an end product. It is a continuing process of identifying consumer needs and providing services or products to satisfy those needs. It is an attitude and an approach to problem solving that is oriented to the consumer. It extends beyond the narrow concept of advertising, promotion, and printed information into systemwide activities such as research, maintenance, and service development.

Rural transit marketing in Iowa really began in 1975 when the Iowa Department of Transportation (DOT) be-

gan to find out exactly what resources existed in the state and what transportation was being provided by whom. But it wasn't that easy. There was no one place to find out. State DOT staff collected newspaper articles, asked local agencies for information, and tracked down rumors for about a year. The results were published in the state's first transit service directory.

When Iowa regional planning agencies began their preparation of the first regional transit development programs, they used this directory as a base, performed more detective work, and identified additional services. From this inventory, the regions found out who was being served. The next step was finding out who was not being served. Basic market research was needed, and several approaches were used.

Statewide attitude surveys on local and intercity travel patterns, needs, and desires were conducted by the state DOT in 1977. In 1978, a cooperative research project was undertaken by Iowa regional planning agencies and the state DOT. Passengers were asked for their ideas about transportation through extensive on-board surveys, and social-service agencies were surveyed and asked about their clients' travel needs. Regionalized household surveys were conducted by mail for a dual purpose: to find out about potential riders and to discover the degree of public support for transit. Articles were placed in newspapers throughout the state to generate self-identification information from individuals of limited mobility (this approach was not effective).

All of the data collected were organized, tabulated, and used in each region's transit plan to provide direction on how to improve existing services and make more transportation available. In addition, survey results were used by the Iowa DOT to shape overall transit programs.

Market research has been only a part of a statewide program in marketing, communication, and awareness. Research indicated that most people did not realize how much service was actually available or what the purpose of public transit was. A large percentage knew that there were buses for specific groups, such as the elderly, but these were not regarded as public transit. The first program had several parts:

1. One television spot and a companion radio spot,
2. Four newspaper advertisements,
3. Two posters, and
4. A brochure with a tear-off postcard for citizen comments.

The Iowa DOT investment in this program was $9800. The media materials were all placed as public service announcements. The participation of the media exceeded expectations. More than $90 000 of media time was obtained; this represented more than 29 000 000 exposures.

Local marketing efforts in rural areas during this period were minimal since the regional systems were concentrating on organizational development. To fill this gap for a time, a second statewide campaign was developed and implemented. Four 30-s television and four 60-s radio public service announcements were produced on the themes of energy, economy, planning, and public service. In 1978, these spots were still running on stations statewide, and media participation had exceeded 1977 results.

Two additional household surveys were conducted by telephone, and a marketing manual for transit operators was begun. A marketing tool was developed for transit systems through a project called Focus on Transit. This program consists of a package to be used for presentation to fourth through sixth graders on the following subjects: community awareness; the public transit partnership—bus and driver; the big three—safety, pride, and respect; and HELP (Help Eliminate Litter and Pollution). Each module consists of manuals, a short-story slide presentation, skill sheets, games, and puzzles.

Regional systems in Iowa have reached the point in their development where advertising, promotion, system image, and public relations are critical to success. One of the major areas of attention is that of changing the established image in rural areas of buses for the elderly, for Head Start, and for the handicapped so as to convey to the public and the passengers the idea that everyone can ride on all buses. That is why the names of regional systems are changing. Now we have systems called P-RIDE Transportation, Scenic Valley Transportation, Country Traveler Transit System, North Iowa Area Regional Transit System, The Trolley, and East Central Transit, not to mention ITS, SITS, SATS, and SEATS. Pricing strategies are also receiving attention; a better system and combination of donations and fares will make system revenue more predictable and the passenger's participation more equitable.

Telephone information systems are being organized. This is clearly an especially frustrating area for many people. Imagine trying to find a transportation number in the telephone book (especially if you don't know the name of the agency), going through the process required to qualify to use the transportation, and then finding out that the transportation is only for certain types of trips.

Several regional administrative agencies are designing comprehensive local marketing programs for their systems. Logos are being designed, same-format information brochures are being prepared for system components, counter cards are being distributed, radio and newspaper ads are being produced and placed, and general marketing plans are being written. Some of these programs are being prepared by local advertising agencies, and some are being developed in-house with DOT assistance.

If one subscribes to the philosophy that marketing permeates the entire system, then other types of assistance from the state DOT should be mentioned. The better management and service are, the more there is to market. The Iowa DOT is

1. Working with state regions to develop transit plans to make the best use of their own people and resources and improve service to the public;
2. Helping regional systems to manage better by putting together seminars and workshops to reinforce or improve management skills;
3. Promoting better operations through training programs for drivers, mechanics, and service persons as well as through individual operational analysis; and
4. Working on making the financial requirements easier by simplifying applications, developing a single reporting package, and coordinating with other state agencies.

This is all in addition to helping to get people on the buses by the previously mentioned statewide awareness programs, market research, and individual marketing plans and assistance. These programs are backed up by state money for planning, administration, and operations.

What does the future hold for rural transportation in Iowa? If we keep the 10 transit commandments in mind, we can't go wrong:

1. Thou shalt not propose universal solutions.
2. Thou shalt create a climate for local initiative and solutions.
3. Thou shalt not cause people to feel foolish by

forcing them to ask, "Where does this bus go?"

4. Thou shalt never provide technological solutions for sociological problems.
5. Thou shalt never force introductions between strangers.
6. Thou shalt not cause long waits for passengers.
7. Thou shalt bring the bus to passengers and passengers to their destinations.
8. Thou shalt be dependable, predictable, safe, and convenient.
9. Thou shalt satisfy stockholders as well as customers.
10. Thou shalt never be a "bus company."

A good foundation has been laid in Iowa through the dedication, commitment, and hard work of many people. A great deal of marketing work always needs to be done in the areas of special promotions, consistent media advertising, effective and planned public relations, realistic goals and objectives, useful monitoring and evaluation, development of a system image, and financing, not to mention the 10 objectives listed above. Good rural transportation will not happen by itself. It takes more than good plans, good programs, and good intentions. People make the difference.

Abridgment

Federal Regional Councils and the Uniform Cost-Accounting Project

John B. Kemp, Mid-Continent Federal Regional Council

The General Accounting Office (GAO) has identified 114 federal programs that provide federal assistance for passenger transportation and has concluded that there are no statutory or regulatory instructions that specifically prohibit the coordination of transportation resources. It has, however, identified a number of hindrances to coordination (1). This paper focuses on the development of a common cost system that should increase coordination between agencies and providers of transportation.

FEDERAL REGIONAL COUNCIL SYSTEM

The Federal Regional Council (FRC) system is an interagency coordinating mechanism. The idea began in the late 1960s. In 1969, 10 standard regions were created.

Initially, regional councils consisted of the principal regional officials from 5 federal agencies. That number has been increased to 11 member agencies; others serve on an ad hoc basis as appropriate. The councils were given responsibility for interagency coordination and intergovernmental relations with the objective of improving the federal grant delivery system. The chairperson of a council is a regional official from one of the 11 member agencies and is appointed by the President to a 1-year term.

The councils as such have no budget, no grant authority, and no line authority over any of their members. Each agency assigns a staff person to work with a council.

Overall direction for the FRCs is vested in the undersecretaries group for regional operations. The Office of Management and Budget is responsible for oversight of FRC activities.

Some FRCs have assumed major responsibility for improving rural public transportation. The Region 4 FRC established a rural task force in 1972 to develop technical materials, exchange information between agencies and states, and assist with and review proposals for the Rural Highway Public Transportation Demonstration Program established under Section 147 of the Federal-Aid Highway Act of 1973. Region 1 has also established a rural transportation task force, and it is planning a regional workshop for providers of services, sponsoring agencies, and client groups that will include information on institutional, operational, and financial aspects of rural transportation. The development of a uniform funding process and a simplified reporting system will be a major part of the workshop.

The development of a demonstration of a simplified cost-accounting system has also been the major effort of the FRC in Region 7. The Rural Transportation Committee in this region includes representatives from federal agencies, each of four states, and state associations of county officials. The committee has pursued two approaches: (a) developing strategies that would lead to better coordination and (b) developing the tools needed for better measurement of cost and effectiveness.

One important tool is cost accounting. It helps to eliminate biases and turf issues. Further cost information is essential to equitable contractual arrangements between public agencies and public and private providers of transportation services. There have been instances in which public agencies believed that private transportation firms charged exorbitant fees and that they—the agencies—could provide the service themselves at a lower cost. Generally, such a view could not be documented because of the lack of uniform cost information. Initiation of service by public agencies has in some cases decreased the revenues of the providers of private transportation. Thus, there is sometimes a barrier between public agencies and private providers. There are also problems in coordinating the vehicles, funds, and clients of different public agencies, primarily because of turf issues, insurance rates, interpretation of program guidelines, and lack of a common cost-accounting system for rural systems

that coordinate different funding sources.

COMMON COST-ACCOUNTING SYSTEM

Common cost definitions and categories, units of service, and performance measures are being developed. Common definitions are essential to ensure that agencies and providers are talking about the same thing. Cost categories include (a) administration, (b) operations, and (c) maintenance (consistent with the Urban Mass Transportation Administration Section 15 prescribed system of accounting). Costs reflect total real costs; i.e., costs include such items as depreciation schedules for capital acquisitions, donated resources, and volunteer time. These data should provide the foundation for sound decision making between grantor and grantee, between grantee and grantee, and between the grantee and the private sector.

The four basic units of service selected are (a) total vehicle distance traveled, (b) vehicle distance traveled in revenue service, (c) vehicle hours, and (d) one-way passenger trips. These units were selected on the basis of the ease with which records can be maintained and their usefulness in terms of contracting, reporting, and management analysis. As the system becomes more sophisticated, it may become necessary to go beyond these minimums.

Performance measures will relate units of service to costs—e.g., operating cost per vehicle hour.

TESTING THE COST SYSTEM

In 1978, the uniform cost-accounting system was tested on two rural transportation projects—one in Missouri and the other in Area 15 in Iowa.

PROPOSED FUTURE ACTIONS

Developing a common cost-accounting and reporting system for passenger transportation service is a first step. Many more measures are needed to maximize the potential for coordination. For example, credit cards and coupons are being used in an increasing number of systems. These have the advantage of minimizing data collect by the provider while allowing the agency to collect the information it desires. Computers also appear to be useful and efficient in tabulating and summarizing ridership, travel patterns, and costs. PRCs play a special role because they have the potential for coordinating the cost and reporting systems used by different agencies, providers, and states.

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Data Recording and Evaluation: The Barnstable County Experience

Robert P. Warren, Cape Cod Regional Transit Authority, Barnstable, Massachusetts
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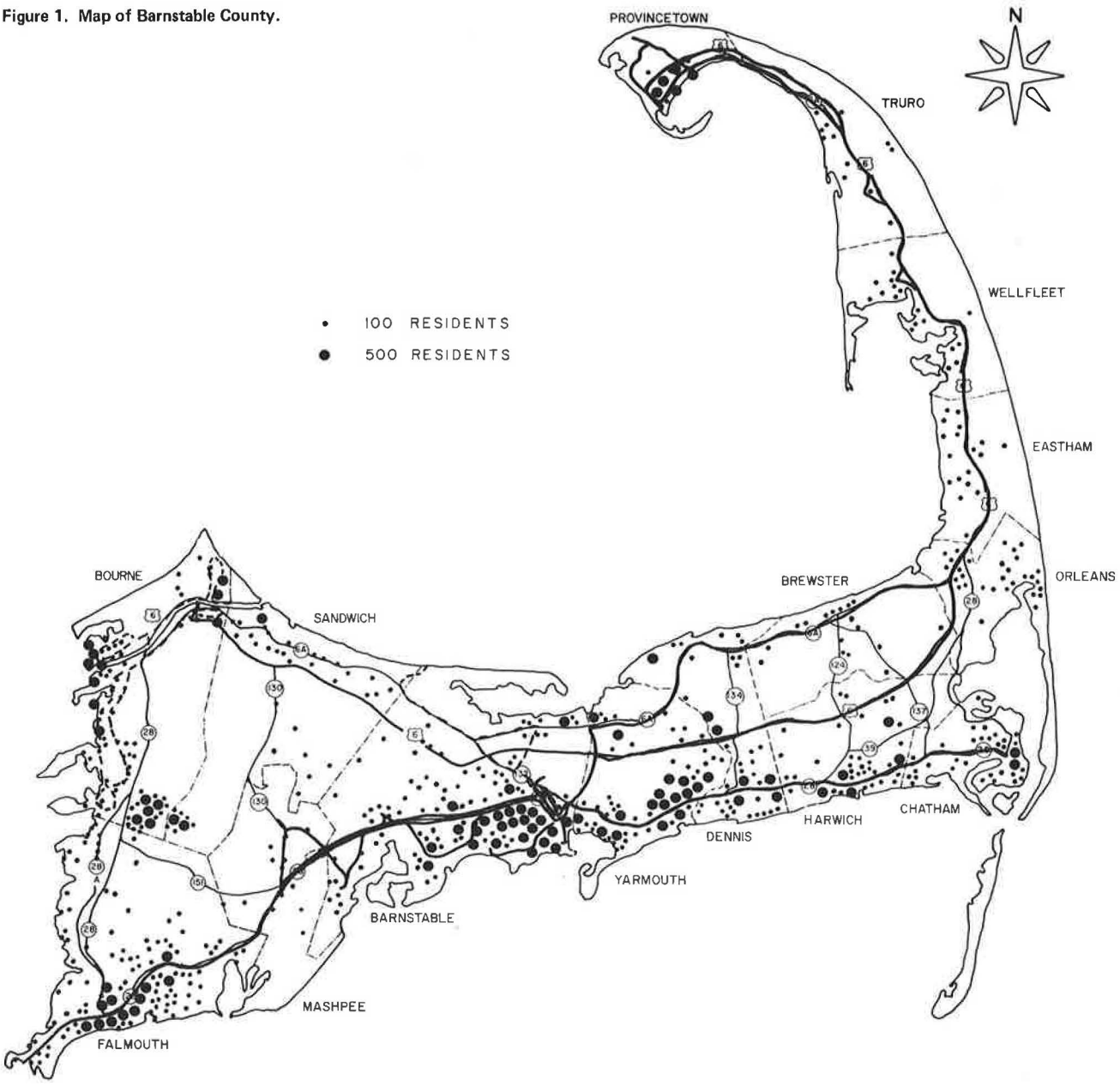
A mechanism for collecting data on rider and operating characteristics of regionwide public transportation services is described. The mechanism, a serially numbered rider identification pass, is being tested as part of an ongoing demonstration project in Barnstable County, Massachusetts. Service is provided on a prearranged demand-responsive basis by use of ten 12-passenger vehicles. Passengers acquire passes in advance and complete a questionnaire on their socioeconomic characteristics and physical disabilities. When passholders telephone to schedule a trip, the dispatcher records their pass number, pickup time, trip purpose, and origin and destination. Special attention has been given to minimizing the data to be collected by the bus driver: The driver records only on and off odometer readings for each trip. By using the passholder questionnaire and the daily driver log forms, socioeconomic and trip data are collected for all riders. These data may be used to (a) evaluate vehicle productivity and efficiency, (b) examine the impacts of local policy decisions, (c) assess the portion of a deficit to be paid by each town, (d) develop user charges and contractual agreements for use by social-service agencies, (e) identify those persons who are eligible for the services of a social-service agency, and (f) describe user characteristics. The uses of the pass in fare collection and marketing are discussed, and capital and operating costs of the pass are estimated.

Many persons living in rural and small urban areas do not have adequate transportation (1, 2, 3). These persons include the elderly, the handicapped, the young, those with low incomes, and other individuals who do not have access to a private automobile. This lack of transportation is significant because it contributes to the problems of social isolation, cultural deprivation, inadequate health care, and poverty.

In response to this need for public transportation in nonurbanized areas, major government actions have been taken (4, 5, 6). One federal action was the passage of the Federal-Aid Highway Act of 1973. Section 147 of the act provided $25 million to finance the capital and operating costs of public transportation demonstration projects in rural and small urban areas. Another federal action was the setting aside of $500 million of Urban Mass Transportation Administration (UMTA) funds for assistance to transit in nonurbanized areas.

A number of factors will determine whether these federally funded projects will be successful and continue on a permanent basis. One is the amount of financial support committed by local governments. Another factor is the willingness of social-service agencies to participate in a coordinated regionwide

Figure 1. Map of Barnstable County.



program. A third factor is the extent to which the services being provided are cost-effective and equitable. Questions that will be of considerable interest to local governments planning and implementing regionwide public transportation services are the following:

1. How should the deficit to be paid by each town be assessed?
2. How should the user charge to be paid by social-service agencies be determined?
3. How should the services being provided be evaluated to ensure that they are effective, efficient, and equitable?

Answers to these questions will not be simple because of complex institutional and political issues. However, the availability of a comprehensive set of data on the users and operating characteristics of such services will provide information for use by public officials in addressing these questions.

The purpose of this paper is to describe a mechanism for collecting these data. The mechanism, a serially numbered rider identification pass, is being tested as part of an ongoing Section 147 project in Barnstable County, Massachusetts. The paper includes (a) a description of Barnstable County, (b) a discussion of the Barnstable County transit development plan (TDP), (c) a description of the rider identification pass, (d) an evaluation of the various uses of the data collected by means of the pass, and (e) a summary.

DESCRIPTION OF BARNSTABLE COUNTY

Barnstable County is the governmental boundary of Cape Cod, a peninsula that extends seaward 129 km (80 miles) from the southeastern Massachusetts coastline (Figure 1). The county is in the shape of

a flexed arm that covers 1010 km^2 (394 miles^2) of flat or gently rolling terrain. The climate includes mild winters and cool summers. The proximity of the Gulf Stream to the south creates a warm-air influence on the winter air masses, and the same sea area provides gentle offshore breezes to relieve the heat of the summer sun. These climatic conditions make Barnstable County a choice location for vacations and retirement.

According to the 1975 official state census, the 15 towns in the county have a total year-round population of approximately 130 000. The average population density is 125 persons/km^2 (321 persons/mile^2). The highly populated areas are in the Barnstable-Yarmouth and Falmouth-Bourne regions (Figure 1). During the summer months—June through August—the population increases to approximately 450 000.

The focal points of activity are in the towns of Barnstable, Falmouth, and Orleans. These three towns are the major employment and shopping centers in the county. Barnstable and Falmouth also maintain complete hospital facilities. It should be noted, however, that, because of the elongated geography of Cape Cod [116 km (72 miles)] and its decentralized community structure, smaller shopping and employment districts do exist in the towns of Bourne (location of county hospital and cancer clinic), Yarmouth, Dennis, Chatham, and Provincetown (7).

Many residents are unable to own or operate a private vehicle for reasons of age, income, and health. According to a 1974 report of the National Clearinghouse on Aging, persons 60 years of age or older comprise 26.5 percent of the total year-round population of the county—almost twice the national average. Analyses show that the greatest concentrations of elderly persons stretch from the town of Barnstable to Harwich along the south side of the cape and across the south side of Falmouth. The 1975 median family income was $9242, or 15 percent less than the state average. This problem has been exacerbated by chronically high levels of unemployment. For example, in February 1976 (according to information obtained from the Massachusetts Division of Employment Security), the unemployed totaled 18.4 percent of the population—more than twice the national average.

The existing intercity bus and taxi services provided by private carriers do not meet the year-round needs of many persons who are without private transportation. The darker lines in Figure 1 show the private intercity bus service available in the county. Relatively low levels of service exist from September to May; for example, during this 9-month period only two round trips are provided daily from Barnstable to Provincetown. Limited taxi service is also available from September to May.

COUNTY TRANSIT DEVELOPMENT PLAN

In June 1976, the Cape Cod Planning and Economic Development Commission submitted its Five-Year Countywide Transit Development Plan to UMTA. This program was approved by UMTA in January 1977. Countywide demand-responsive service began on June 6, 1977. The total estimated cost of this service is $868 750. The service is being financed by the Federal Highway Administration (FHWA), UMTA, the Barnstable County Commission, and the Comprehensive Employment and Training Act (CETA). The two primary goals of the demand-responsive service are

1. To meet the special transportation needs of the elderly and handicapped residents of Barnstable County and
2. To determine the feasibility of providing countywide demand-responsive service in a low-density, decentralized regional area with 15 towns, a population of 130 000 persons, and a land area of 1010 km^2 (394 miles^2).

Service is provided by ten 12-passenger vehicles between 8:00 a.m. and 4:00 p.m. Monday through Friday. Each vehicle is equipped with a hydraulic lift for persons in wheelchairs. Garfield and Sargent, a private bus company, operates the service under a contractual agreement with the county commissioners. The policy board that oversees the demonstration is the Cape Cod Regional Transity Authority (CCRTA). The members of CCRTA are town selectmen.

RIDER IDENTIFICATION PASS

An integral part of the Barnstable County demand-responsive service is the use of a serially numbered rider identification pass. The pass is acquired in advance at various local town halls at designated times during the week. Each pass contains a four-digit identification number. Each person who obtains a pass can purchase a sticker that, once placed on the pass, allows the passenger to make an unlimited number of trips for any purpose during a 3-month period. A sticker for elderly and handicapped persons costs $10; for other persons, the cost is $14. Elderly and handicapped passholders may travel without a sticker, but on health-related trips only. The table below gives the number of passes and stickers purchased in the first two quarters of service:

Item	First Quarter (June-Aug.)	Second Quarter (Sept.-Nov.)
Number of passes acquired	1759	444
Number of stickers purchased for first time	1052	307
Number of stickers revalidated	–	494
Number of passholders with stickers	1052	801
Percentage of passholders with stickers	59.8	36.4

Finally, it should be pointed out that each person who acquires a pass completes a questionnaire on his or her socioeconomic characteristics and physical disabilities (Figure 2). When a passholder telephones to schedule a trip, the dispatcher records his or her pass identification number and trip data such as trip purpose and origin and destination (Figure 3). The bus driver records on and off odometer readings for each trip.

USES OF THE PASS

Evaluating Vehicle Productivity and Efficiency

The daily driver logs and the operator's monthly cost invoices generate data that can be used to evaluate the productivity and efficiency of each vehicle. Typical measures of vehicle productivity are trips per hour and passenger kilometers per hour. Efficiency measures include cost per vehicle hour, per vehicle kilometer, per passenger kilometer, and per trip.

These measures are being calculated by using a computer. All driver-log data are keypunched and analyzed at the University of Massachusetts Computer Center.

Figure 2. Pass application.

HOME ADDRESS _____ PHONE NO. _____
(Street and Number)

(Village) (Town) (Zip Code)

☐ In order to improve service to our patrons, we need to know certain information which will only be used for statistical purposes.

☐ 1. Have you purchased a pass before? ☐ Yes ☐ No

☐ 2. How many persons, including yourself (total adults and children) are in your household? _____

☐ 3. What is your sex? ☐ Male ☐ Female

☐ 4. How many vehicles (autos, pick-up trucks, vans and motorcycles) are there in your household in running condition?
☐ None ☐ One ☐ Two ☐ Three ☐ More than Three

☐ 5. Is a car available to you during the day to make your trips? ☐ Yes ☐ No

☐ 6. Do you have a current driver's license? ☐ Yes ☐ No

☐ 7. What is your age? _____

☐ 8. What is your employment status?
☐ Retired ☐ Unemployed ☐ Employed Full-Time ☐ Employed Part-Time ☐ Housewife

☐ 9. Do you have any problem or conditions which make it difficult for you to walk or use certain types of transportation?
☐ No ☐ Yes If yes, please specify _____

☐ 10. What is your residence status?
☐ Year-Round Resident ☐ Summer Resident ☐ Tourist

☐ 11. What is your total annual family income?
☐ 0–$4,999 ☐ $5,000–$9,999 ☐ $10,000–$14,999 ☐ $15,000 or More

Thanks for your help.

Issuing Agent _____

Location _____
(Village) (Town)

Date _____

PASS NUMBER ☐☐☐☐☐

STICKER NUMBER ☐☐☐☐☐

QUARTER NUMBER ☐

It should be noted that these measures could also be calculated manually on a monthly or quarterly basis for all trips. The total trips and hours of service for each vehicle can be taken directly from the log form. The average cost per vehicle can be determined from the operator's monthly invoice. Passenger kilometers per vehicle can be estimated by multiplying total trips per vehicle by average trip length per vehicle. Average trip length can be estimated by taking the difference of the on and off odometer readings for a random sample of trips on each vehicle.

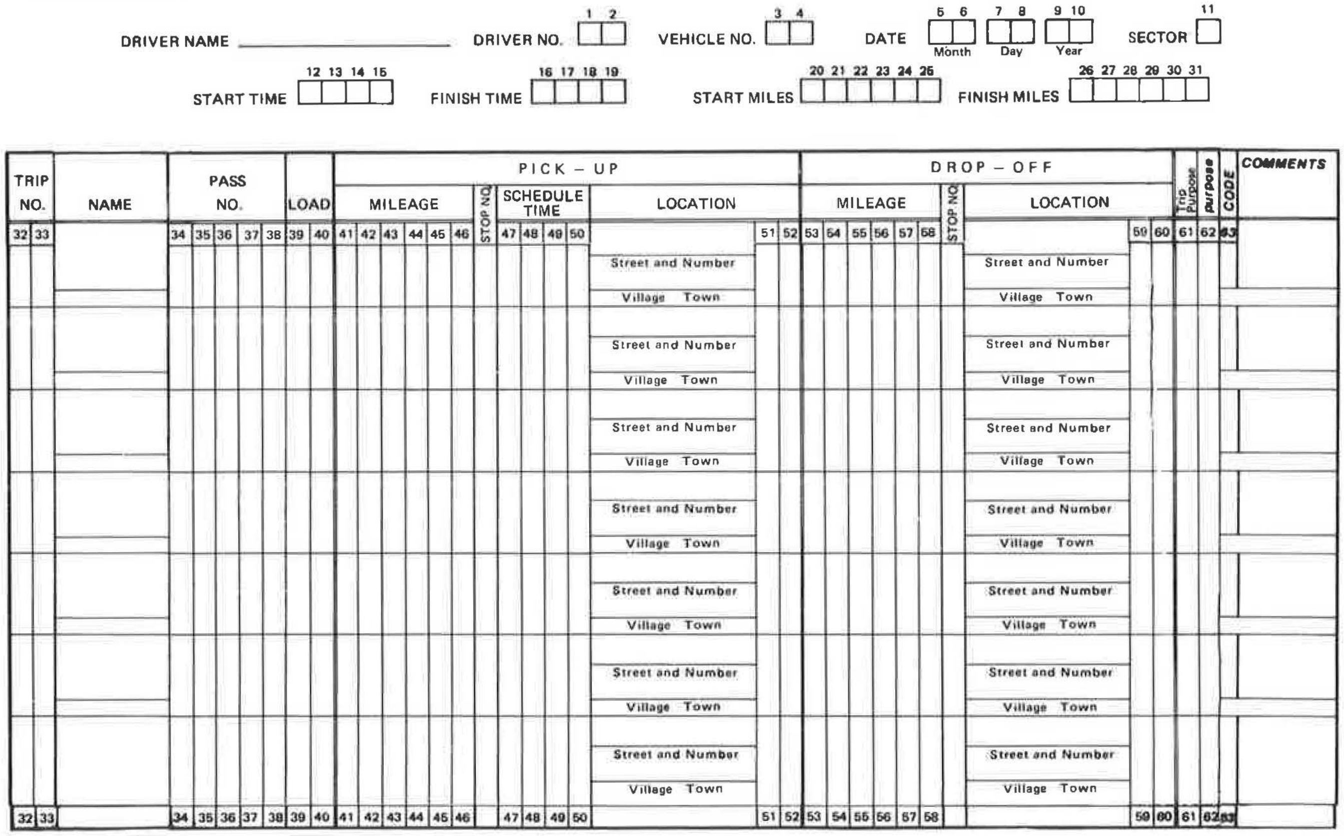
These productivity and efficiency measures provide the operator and CCRTA administrator with a means of continuously monitoring the performance of each vehicle. This will assist the CCRTA administrator in making recommendations to CCRTA, regarding potential changes in operations. In addition, these measures could be used by state and federal departments of transportation (DOTs) in allocating operating subsidies.

Examining Effects of Local Policy Decisions

Data from the driver log forms and the passholder questionnaire can be used to examine the effects of local policy decisions. For example, in the third quarter of service the price of the sticker was doubled. At the time this paper was written, analyses were being done for CCRTA to determine the effects of the price increase on (a) revenues, (b) sticker revalidation among various socioeconomic segments of the population, and (c) trip frequency of individual passholders. The analysis of revenues was done manually; the other analyses were done on a computer.

The effects of other local policy decisions (e.g.,

Figure 3. Driver log.



TRIP CODE: 1 = Scheduled, 2 = No Show, 3 = Flag Stop, 4 = Cancelled, 5 = Out of Service

extending daily hours of service from 7:00 a.m. to 6:00 p.m.) can also be examined by means of the passholder questionnaire and driver-log data. Whether a computer may or may not be required would depend on the effects being examined.

Assessing the Local Deficit

At the present time, CCRTA is addressing the following question: If services are to continue beyond the demonstration period, how should the local share of the deficit be financed? Should a countywide tax be imposed? Should town tax sources be used? If so, should each town pay on a per capita basis or should some formula be developed based on each town's level of use? If so, should level of use be measured in terms of trips, passenger kilometers, or some other parameter? The use of such formulas may require certain data that are provided by the passholder questionnaire and driver logs.

Consider a formula based on trips by residents of each town:

$$D_A = D_T(T_A/T_T) \qquad (1)$$

where

- D_A = annual deficit to be paid by town A,
- D_T = total annual deficit to be paid by all towns,
- T_A = number of trips yer year made by residents of town A, and
- T_T = total number of trips per year.

Use of Equation 1 requires the number of trips by residents of each town. This information can be obtained for all trips by using the questionnaire and driver-log data. Figure 4 provides a breakdown of trips by residents of all 15 towns for September, October, and November. This breakdown was obtained from a computer analysis. Such a computer analysis could be done annually, and each town could be billed accordingly.

A similar formula could also be considered by substituting PK_A/PK_T for T_A/T_T where PK_A is the passenger kilometers traveled by residents of town A and PK_T is the total passenger kilometers traveled. Passenger-kilometer data could also be derived from the questionnaire and driver logs by use of a computer.

It should be noted that only two possible formulas have been identified. Obviously, other formulas can be developed for which a computer may or may not be needed. The major purpose of discussing these formulas is to demonstrate how the data collected by using the questionnaire and the log form can be used to assist CCRTA in assessing the local deficit to be paid by each town.

Developing User Rates and Contract Agreements for Social-Service Agencies

Another question that has been addressed by CCRTA is, What steps can be taken to encourage coordination among social-service agencies? One step is to ensure that social-service agencies pay fair and equitable rates for transportation services. One way of doing this is to charge social-service agencies for that portion of operating costs that are in-

Figure 4. Percentage of riders by town.

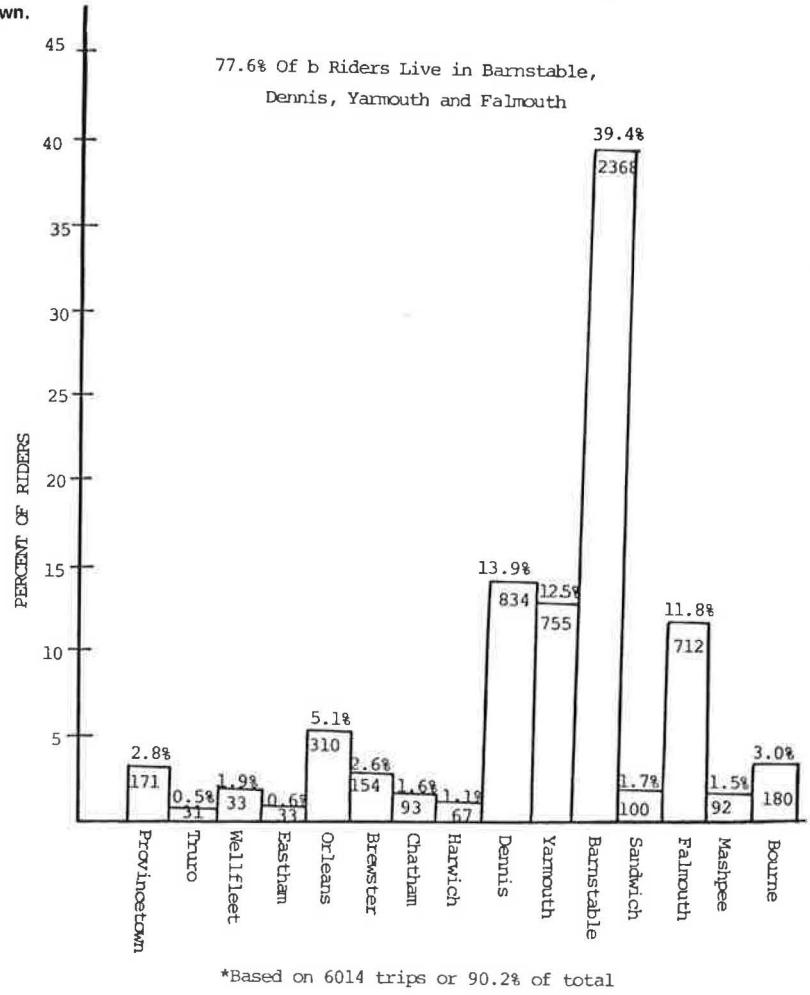


Table 1. Socioeconomic characteristics of passholders and riders.

Characteristic	Percentage of All 1970 County Residents	Percentage of All Passholders		Percentage of All Riders	
		First Quarter	Second Quarter	First Quarter	Second Quarter
Female	52.0	77.1	76.6	78.8	79.4
60 years of age or older (25.4 percent in 1975)	22.9	84.3	83.4	59.5	59.4
Annual family income less than $5000	49.4	55.8	58.7	63.1	74.3
Retired (aged 65 or older receiving Social Security)	11.8[a]	65.2	64.0	47.6	45.1
Living alone or with one other person	31.7	85.5	85.5	68.6	67.2
No vehicle in household	8.7	42.2	43.9	66.8	75.5
No driver's license	NA	51.7	53.5	76.5	82.2
Physical disabilities	9.0	29.8	29.9	30.8	44.5

[a]Or 69.7 percent of all aged 65 or older.

curred by services provided to their clients only. For example, a social-service agency could pay for transportation services per trip or per passenger kilometer. The information needed to use such rates could be obtained manually from the questionnaire and the driver log. State and local social-service agencies could be billed quarterly. Other rates that could be used with the driver-log data include services per vehicle hour and per vehicle kilometer. These rates will encourage group riding. Efforts are being made to develop such rates to increase the use of such services by clients of social-service agencies.

Another step that is being taken to encourage social-service agencies to participate in the project is to develop lump-sum agreements with the agencies. For example, passholder and driver-log data have shown that about 60 percent of CCRTA riders are elderly. It is hoped that such evidence may get agencies with elderly clients to develop annual lump-sum agreements. For example, assume that a council on aging has $15 000 to spend on transportation for its 100 clients. By using a cost per trip of $3, CCRTA and the council on aging would develop an agreement whereby each client would be allowed to make 50 one-way trips/year. The analysis required to monitor such an agreement could be done manually.

Identifying Those Eligible for Social Services

Many Barnstable County passholders are elderly, low-income, or handicapped persons. Such persons are eligible for financial assistance for transportation purposes through various social-service agencies. The use of the passholder questionnaire allows

CCRTA to identify those potentially eligible for social services and to inform them about available financial assistance. Steps have also been taken by the administrator of CCRTA to make it easier for persons to receive such financial assistance. For example, CCRTA has gotten the Massachusetts Department of Welfare to reimburse eligible welfare recipients for the full price of a sticker.

Table 2. Estimated costs of issuing passes and selling stickers.

Cost Category	Amount ($)
Operating per quarter	
Salaries	
Clerical (1.5 person weeks)	255
Treasurer's office[a]	-
Supplies	
Envelopes (2500)	20
Enclosures (cover letter, mailing address card, self-addressed envelope)	45
Stickers (800 at $0.0225/sticker)	18
Postage (two mailings: one bulk, one first class)	120
Passes [$0.50/pass × 3000[a] passes × (1/20)]	75
Council on Aging facilities and labor[a]	-
Total per quarter	533
Capital (five cameras at $916.80/camera[b])	4584

[a]In-kind services. [b]Excludes rental costs of cameras incurred in first quarter.

Describing User Characteristics

The use of the questionnaire and the driver log also allows comprehensive analyses to be carried out on all riders and passholders. For example, the socioeconomic characteristics and physical disabilities of riders and passholders can be monitored regularly. Table 1 gives the typical characteristics of passholders and riders. A majority of riders and passholders are female, are 60 years of age or older, have an annual income of less than $5000, live alone or with one other person, and have no driver's license. No significant change from the first quarter to the second quarter is indicated in the passholder characteristics. However, there are differences between quarters in income, vehicle availability, and physical disabilities of riders. These differences are largely a result of the group rides by handicapped, low-income individuals, which started in the second quarter.

Computer analysis of user characteristics does not necessarily have to be done for 100 percent of all riders. Manual analyses based on a small on-board survey may be adequate.

Collecting Revenues

The stickers are purchased from the county treasurer

Table 3. Potential uses by various agencies of pass identification data.

	Local			State		Federal	
Potential Use	Operator	Regional Transit Authority	Social-Service Agency	Department of Transportation	Social-Service Agency	Department of Transportation	Social-Service Agency
Evaluating vehicle productivity and efficiency	X	X		X		X	
Determining effects of local policy decisions (such as fare changes)		X					
Assessing the local deficit		X					
Developing user rates and contract agreements for social-service agencies		X	X		X		X
Identifying those eligible for social services		X	X		X		X
Describing user characteristics		X	X		X		
Determining user attitudes	X	X					
Collecting revenues	X	X					

Table 4. Data requirements, sources, and type of analysis for each use of the pass.

Potential Use	Typical Data Required	Data Source	Type of Analysis Required
Evaluating vehicle productivity and efficiency	Daily vehicle trips	Driver log	Manual
	Daily vehicle passenger kilometers	Driver log	Manual
	Daily vehicle hours	Driver log	Manual
	Vehicle operating cost	Operator's invoice	Manual
Examining effects of local policy decisions (such as fare changes)	Stickers sold before and after price change	Sticker validation sheets, driver log, passholder questionnaire	-[a]
Assessing the local deficit	Daily trips by residents of each town	Driver log and passholder questionnaire	Computer
	Daily passenger kilometers by residents of each town	Driver log and passholder questionnaire	Computer
	Population by town	State census	Manual
Developing user rates and contract agreements for social-service agencies	Daily trips by clients of each agency	Driver log and passholder questionnaire	Manual
	Daily passenger kilometers by clients of each agency	Driver log and passholder questionnaire	Computer
	Daily vehicle kilometers by clients of each agency	Driver log and passholder questionnaire	Manual
	Age, income, trip purpose, trip frequency	Driver log and passholder questionnaire	Manual
Identifying those eligible for social services	Age, income, handicap	Passholder questionnaire	Manual
Describing user characteristics	Age, income, automobile availability, trip purpose, trip frequency	Driver log and passholder questionnaire	Computer[b]
Determining user attitudes	Attitudes toward service hours, bus driver, telephone operator; physical condition of bus	Attitudinal questionnaire	Manual

[a]Depends on the effects being examined. [b]Manual analyses based on a small on-board survey may be adequate.

through the mail. After a person receives a pass, he or she mails to the treasurer's office a check or money order for the sticker. Three weeks before the end of the quarter, passholders are sent a notice that reminds them that their stickers will become invalid and encourages them to acquire their new stickers. A self-addressed return envelope is provided to facilitate revalidation of stickers. Such a mailing process eliminates the need for the persons who distribute the passes to handle cash or checks and reduces the potential of pilfering and theft of fare-box revenues.

Acquiring Information for Marketing Program

As mentioned previously, 3 weeks before the end of the quarter, each passholder is sent a letter that encourages him or her to purchase a sticker for the upcoming 3-month period. Enclosed in this letter are brochures on the service. In addition, the letter explains that a survey questionnaire is enclosed and requests that the questionnaire be completed. The questionnaire is returned, along with the check for the sticker, to the county treasurer in a self-addressed envelope.

The questionnaire obtains information on the attitudes of passholders concerning the services being provided. The results of this survey have led to proposed system changes. For example, it was found that 36 percent of respondents felt that the existing daily hours of service (8:00 a.m. to 4:00 p.m.) are inadequate. Consequently, the following steps have been taken to explore the possibility of extending daily hours of service:

1. A request has been made for funding from several sources: FHWA ($10 000), the Yarmouth CETA Consortium ($20 000), and Barnstable County ($5000).
2. Discussions have been carried out with the operator to identify necessary operational changes.
3. A marketing approach has been developed to inform the general public of new hours of service with the intent of penetrating new markets, particularly for the work trip.

In short, the mail-back nature of the pass system provides a useful way to acquire information on user attitudes and to disseminate information on the program.

COSTS AND USE OF THE PASS

The costs of issuing passes and selling stickers are given in Table 2. The costs are divided into two categories—capital and operating. The capital costs of $4584 include the costs of purchasing cameras and related equipment. The quarterly operating costs of $743 include the costs of clerical assistance, supplies, stickers, passes, and postage. Excluded from these costs are the in-kind services of issuing passes provided by town councils on aging. Also excluded is $5400 in rental costs for eight additional cameras that were needed during the first quarter when over 1800 passes were acquired.

SUMMARY

Table 3 gives the primary uses of the pass, and Table 4 summarizes the data requirements, data sources, and types of analyses required for each use. It should be pointed out that a more comprehensive evaluation of the pass system is to be carried out at the end of the demonstration in early 1979. This evaluation will compare the use of the pass to the use of other fare-collection mechanisms.

ACKNOWLEDGMENTS

We sincerely thank Douglas J. McKelvey of the National Transportation Policy Study Commission and Robert L. Smith, Jr., of the University of Wisconsin—Madison for their constructive comments in the preliminary preparation of this paper.

We appreciate the excellent technical assistance provided by the following persons: transportation program manager Toivo Lamminen, transit planner Dennis P. O'Leary, Jr., and cartographer Curt Slocum of the Cape Cod Planning and Economic Development Commission (CCPEDC); general manager John Hunter and data analyst Robin Murphy of Garfield and Sargent; and research assistants Ronald Bukoski, Michael Hornbrook, James Ryan, Sara Warner, and Michael Yacyshyn in the Civil Engineering Department, University of Massachusetts, Amherst. Special gratitude should also be expressed to other members of the CCPEDC staff, especially Beverly Campbell, Doris Lorch, Barbara Grenier, and Wendy Rose for their exceptional clerical, editing, and typing assistance.

We would like to acknowledge the data collection efforts of the bus drivers and dispatchers involved in the demonstration program. In addition, the support of Barnstable County town councils on aging as well as that of other social-service agencies and the entire Barnstable County community has been invaluable.

The preparation of this paper was financed in part by the Section 147 Rural Highway Public Transportation Demonstration Program of FHWA.

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Record Keeping and Evaluation

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This paper identifies major sources of information, record-keeping issues, and evaluation methodologies. Much is being learned about developing a unified reporting system. Record-keeping needs are addressed in terms of data availability, problems in data collection, and the potential impact of a federal operating subsidy. A systems approach to system evaluation is outlined together with the trade-off or balance sheet evaluation methodology. Service standards are proposed as a means of institutionalizing system evaluation.

If, as expected, federal operating subsidies for rural transit become available with the passage of the new transportation bill now before Congress, many new rural transit systems will be initiated and existing systems will be expanded. Successful implementation and expansion of these systems will depend significantly on the efficiency of the record-keeping and evaluation systems used.

INFORMATION SOURCES

In placing current issues in perspective, it is helpful to identify key reports and papers that document the state of the art. The general background reports provide information on the nature of rural travel as well as actual examples of how rural travel needs have been met, including both successful and unsuccessful operations. Papers by Brown, Noble, and Burkhardt provide a starting point for detailed consideration of record keeping and evaluation (1).

Major contributions to the state of the art of record keeping and evaluation can be expected from two current federal programs—the Federal Highway Administration (FHWA) section 147 demonstration program and the U.S. Department of Health, Education, and Welfare (HEW) transportation demonstration program on coordination of existing services. The U.S. General Accounting Office (GAO) report shows how funding of transportation programs by federal agencies can affect reporting and accounting requirements (2).

A number of states now provide operating assistance for rural transit systems. Detailed information on record keeping and evaluation required by each state can best be obtained by writing to the respective states.

The record-keeping and evaluation systems used by successful individual rural transit systems are also of interest. Documentation of particularly successful section 147 demonstration program projects may be available in the future. A computerized record-keeping system is used in the Progress for People System (Human Resource Agency) in Decatur, Tennessee. Another innovative system is the Older Adults Transportation System (OATS) in Missouri. Peter Schauer of OATS said that the program is considering the use of a credit card system to reduce the data-processing load. Developments at OATS can be followed by subscribing to the OATS Wheel; this publication includes the monthly schedule for OATS vans as well as items of general interest on rural transportation (3). The Out-County Dial-A-Ride system in Washtenaw County (Ann Arbor), Michigan, has recently begun serving the general public in addition to the elderly and the handicapped. The rural system could be integrated into the computerized scheduling and dispatching system of the Ann Arbor Dial-A-Ride system; however, at this point, with only six or seven buses in operation the flexibility of manual scheduling and record keeping is still preferred.

A number of Transportation Research Board (TRB) publications are relevant to system evaluation questions. The TRB literature includes several special reports on paratransit. Formal technical discussions of evaluation methodologies are presented in texts by Hutchinson and Stopher (4, 5). Lockwood and Wagner discuss approaches to system evaluation in the context of transportation system management that are directly applicable to the the evaluation of rural transportation systems (6).

RECORD KEEPING ISSUES

Record keeping is not an end in itself. Rather it is a means of determining how well the goals and objectives of the transit system are being met. Basic goals of most transit systems are to maximize the level of service and the number of people served and to minimize the cost of the service. Thus, data collection procedures should provide measures of the level of service, passengers served, and costs. Because costs are obtained from standard cost-accounting procedures, the primary concern here will be with measures of level of service and passengers served.

Given the focus on level-of-service measures, a number of record-keeping issues can be raised as questions:

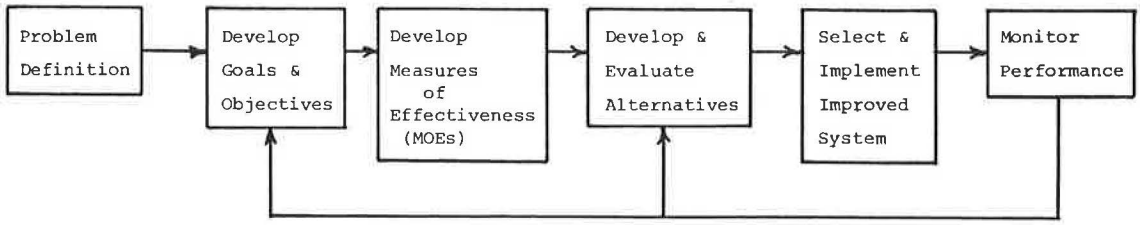
1. What specific data should be collected and what is the best method to collect it?
2. At what level should the data be aggregated?
3. Do the type and amount of data collected depend on whether or not the system is in a demonstration phase?
4. How can the cost-effectiveness of data collection be measured and under what conditions will computerized data processing be cost-effective?
5. Is there a need for uniformity in the amount and type of data collected? If so, should the uniformity be statewide, nationwide, or funding-agency-wide?
6. How does the type of operation—fixed-route versus demand-responsive—and the primary target group—elderly, handicapped, or the general public—affect the data collection requirements?

Data Availability

In order to address record-keeping issues intelligently, it is necessary to identify the level of service and passenger data that can easily be collected at minimal cost and what data would require significant additional effort. For fixed-route systems, only the number of passengers by route and trip (round trip or one-way) is readily available. The number of passengers may not even be counted but computed from fare-box revenues and the average fare per passenger. If passenger characteristics, such as senior citizen status, can be readily identified through a pass system, drivers can record the data; however, additional data, such as origins and destinations, would be time consuming and costly to collect.

For demand-responsive systems, much more data can easily be collected because of the individual contact made with each passenger. The dispatcher can easily

Figure 1. Steps in methodology of system evaluation.



record trip characteristics such as purpose, origin and destination, time of day, and type—standing order, day prior reservation, or on demand—and passenger characteristics, such as student, elderly, handicapped, or wheelchair user. If eligible users are assigned a user number, additional passenger characteristics can be easily obtained for each trip.

Data-processing requirements are minimized if the dispatcher tabulates the basic data manually as the requests for service are processed. The result is one-way frequency distributions for each data item. If the system is not radio equipped, however, tabulations made directly from the driver's log sheets may be more accurate and efficient.

Data Collection

In general, the basic passenger and trip data that can easily be collected as part of normal system operation are adequate for system evaluation. The most common measures of system performance are cost per passenger and passengers per revenue kilometer (fixed-route systems) or passengers per vehicle hour (demand-responsive systems). These can easily be computed from basic passenger and operating data.

Passenger data for fixed-route systems may be supplemented periodically by small sample surveys of passenger socioeconomic and travel characteristics. Such information would be particularly important in evaluating lines with low productivity.

The primary need for passenger and trip data beyond that available as a part of normal system operation is to meet the accountability requirements of various funding agencies. Many rural transportation systems are currently funded through a variety of social service agency programs. From the point of view of the social service agency, its transportation funds are budgeted to get its own clients to social services. The agency cannot easily justify providing transportation to individuals who are not its clients. Thus, the transportation system operator may be required to allocate costs to various users on a passenger-kilometer or passenger-trip basis. Because, in general, such detailed data are not required by the transportation system operator, the full costs of such record keeping could legitimately be charged to the social service funding agencies. Data collection requirements are further complicated by the lack of uniform reporting requirements among the various federally funded programs that have transportation components.

Impact of Federal Operating Subsidy

The importance of developing specialized record-keeping systems to meet social service funding agency reporting requirements may be significantly reduced by the availability of rural transit operating subsidies under consideration by the U.S. Congress. Under a general operating subsidy program only the simple passenger record that measures system performance will be needed.

Rural transit operators, however, should not become complacent. The proposed subsidy level of $75 to $150 million is modest compared to an estimated $300 million in FY 1976 allocated in federal programs that provide transportation of people in support of program goals (2). The $300 million is for both urban and rural areas, but excludes expenditures by the U.S. Department of Transportation. The nature of the problems that may be encountered in a gradual transition from social-service-funded transportation programs to transit operations that look more like conventional urban transit authorities needs to be explored.

EVALUATION

Evaluation is treated here as a topic separate from record keeping because evaluation of alternatives that involve more than simple incremental changes to the existing system is a separate activity. The records needed to monitor the daily performance of the transit system provide a starting point for evaluation; however, additional data will generally be required for input to the evaluation process. Monitoring of system performance measures, such as passengers per kilometer or passengers per vehicle hour, will identify problem areas. Additional information will then be needed to determine what the problem is and how effective various alternatives might be in solving the problem. Evaluation of alternatives is also important when a new system is being planned. In this case, records become available only after operation is begun.

The development of effective evaluation procedures is particularly important at this stage in the development of rural public transportation. Evaluation procedures are being applied to determine the effectiveness of the large number of demonstration projects currently in operation around the nation under the section 147 demonstration program and several state programs. Evaluation procedures will also be needed in developing the many new systems that will be feasible when federal operating assistance becomes available.

A general systems approach to the evaluation of rural public transportation systems is shown in Figure 1. The systems approach applies equally well to the development of an entirely new system. The goals and objectives for the transit system follow directly from the definition of the problem. For example, in 1972 the development of a rural health demonstration program in Pennsylvania was limited by a lack of transportation available to potential clients. Thus, one goal of the resulting rural transportation demonstration projects sponsored by the Pennsylvania Department of Agriculture was to provide rural residents with access to participating health care centers. Various measures of effectiveness (MOE) could be developed to provide quantitative estimates of how well alternative transportation systems would meet the overall project goals and objectives. For example, one MOE would be the percentage of eligible residents who are provided service within

0.8 km (0.5 mile) of their home. For a demand-responsive system, this might be 100 percent, but for a fixed-route system only 40 percent. Criteria for developing good MOEs have been developed by Lockwood and Wagner in the context of transportation system management (TSM) planning (6). Research on MOEs for TSM planning is currently being funded by the Federal Highway Administration. Some of this research may be transferable to the evaluation of rural public transportation systems, but additional research on MOEs that are directly relevant to rural systems is needed.

The heart of the evaluation process is the methodology used for the actual evaluation of alternatives. In general, one alternative will not be clearly superior across the entire set of objectives and MOEs. Instead, one alternative will be more costly, provide a higher level of service, and benefit one user group more than other user groups; another alternative will provide a different set of costs, benefits, and user impacts. The selection of the best alternative, then, involves making trade-offs based on the evaluator's concept of what is an equitable balance among the costs, benefits, and impacts.

Many different evaluation methodologies have been described in the transportation literature, including objective weighting methods, rating and ranking methods, and cost-benefit analysis. The primary limitation of these approaches is that the information on trade-offs and impacts is obscured in a total score. The implicit assumption of these techniques is that the distribution of impacts does not matter; the total net benefit or total score should be the decision criterion.

A more appropriate evaluation methodology is the trade-off or balance sheet method (6). In the balance sheet method a matrix is developed in which the alternatives are arrayed against the objectives and related MOEs. The cells of the matrix, then, give the values of the MOEs for each alternative. All of the relevant information on level of service, costs, and impacts is presented. Each analyst reviews the data and reaches an aggregate judgment based on his or her own concept of an equitable distribution. No attempt is made to compute total scores for the alternatives.

Once the best system is selected and implemented, system performance must be monitored. For a demonstration project many of the same MOEs used in evaluation of alternatives can be monitored. Given more limited resources only a few key MOEs may be monitored. The results of the monitoring program are fed back to reassess the system goals and objectives and to reevaluate the alternatives.

SERVICE STANDARDS

The general systems approach to evaluation is also applicable to the evaluation of regular transit system operations. The MOEs are replaced by service standards and the scope of possible alternatives may be limited, but the overall approach is the same.

Most urban and rural transit systems lack a formal performance evaluation procedure. Decisions on line extensions or cutbacks, headway changes, or changes in operating mode are generally based on ill-defined rules of thumb and often made in response to political pressure. A notable exception is the Massachusetts Bay Transportation Authority (MBTA) in Boston. The MBTA has recently formulated service goals and objectives, service standards, and a formal process for continuing performance evaluation and analysis (7). The Ann Arbor Transportation Authority in Michigan, which operates citywide dial-a-ride service, also has developed formal service standards (8).

Service standards and monitoring of system standards should also be instituted for rural systems. Considering the range of local conditions and needs, uniform standards set by federal or state agencies are not appropriate; however, guidelines that could serve as models for local operators can and should be developed. Such guidelines could be developed and implemented as part of the FHWA section 147 demonstration program and various state demonstration programs.

CONCLUSIONS

Efficient record-keeping and evaluation systems are needed to improve the performance of existing rural public transportation systems and the new systems that will be feasible when federal operating subsidies become available. Progress in developing improved record-keeping and evaluation systems can be expected as the result of FHWA's section 147 demonstration program, HEW's demonstration program on coordination of existing services, and the Mid-Continent Federal Regional Council's work on developing a unified reporting system. One appropriate role for federal agencies at this point is to analyze, document, and disseminate the results of the demonstration programs and other studies in a timely fashion. At the same time, state and local agencies and governments need to develop the institutional mechanisms and the technical staff that will be required to implement improved record-keeping and evaluation systems. State departments of transportation in particular should be developing training programs so that field personnel can begin to give technical support to local transportation providers. As rural public transportation systems mature, service standards and programs for monitoring of the standards will be needed in order to provide the most cost-effective service.

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Procedures and Experiences in Evaluation of Rural Highway Public Transportation Demonstration Program

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The Rural Highway Public Transportation Demonstration Program projects funded under section 147 of the Federal-Aid Highway Act of 1973 are being evaluated on the basis of an extensive reporting procedure. Three categories of information—statistical, narrative, and detailed passenger survey data—are being collected. Statistical data on project operating characteristics are collected monthly, and narrative reports are submitted each quarter, at the end of the first year, and as a final report. After Federal Highway Administration analysis, the monthly statistical data are summarized quarterly in computer-tabulation form and distributed back through the field offices and the states to the project personnel. One year (January-December 1977) of statistical data have been reported back to the projects by this mechanism. Peer groups have been established that contain projects that, based on population density and size of vehicle fleets, are similar. Although all projects are required to be able to meet the service needs of elderly and handicapped riders, some projects have been more successful than others. The predominant one-way trip purposes were work, shopping, and school and education. Data for the fourth quarter of 1977 showed that drivers' wages account for more than half of the operating costs. Eighty percent of the funding comes from federal sources, the states contribute 13 percent, and local and private agencies contribute 7 percent. The statistical-evaluation results were remarkably steady throughout 1977; no significant fluctuations were identified.

The evaluation of the Rural Highway Public Transportation Demonstration Program projects funded under section 147 of the Federal-Aid Highway Act of 1973 is based on an extensive reporting procedure. Computer-keyed data-collection forms are used to document the administrative and operating histories of the 2-year demonstration projects. Through this process, three categories of information—statistical, narrative, and detailed passenger survey data—are being collected and reported by the project staffs, transmitted through the states and the Federal Highway Administration (FHWA) field offices, and analyzed by FHWA staff.

EVALUATION REPORTING

Statistical data on project operating characteristics are collected monthly. Narrative reports are submitted that include a quarterly report, an annual narrative at the end of the first year, and a final report at the end of the demonstration period. These reports describe the progress of the project, and its management, problems, and solutions and all other relevant information. The survey of passengers is taken once during the life of each demonstration project at a time when ridership has stabilized and there is a high probability that a representative sample of operation exists.

After FHWA analysis, the monthly statistical data are summarized quarterly in computer-tabulation form and distributed through the FHWA field offices and the states to the project personnel.

Computer Tabulations

Statistical data for one year [or four quarters (January through December 1977)] of operations have been reported back to the projects by this mechanism. In the first quarter of 1977, statistics from eight projects were tabulated and, as expected, more and more projects were added as the year went on—the second quarter had 18, the third 26, and the fourth and latest 36. The processed data based on the last quarter of 1977 (October, November, and December) was the first to be separated into peer groups. Peer groups contain projects that, based on population density and size of vehicle fleets, are similar. Four major peer groups were established in this manner to include all the possible combinations of high and low density and high and low numbers of vehicles [where high-density projects have service-area densities of more than 19 persons/km^2 (50 persons/mile^2) and low-density projects have service-area densities of less than 19 persons/km^2 and high-number-of-vehicle projects operated more than four vehicles and low-number-of-vehicle projects operated four or fewer vehicles]. Three computer tabulations—trip statistics, cost and revenues, and performance measures—are provided for each project. Each tabulation has three headings for individual projects, peer groups, and national data comparisons. The national heading-line items contain data from all projects across the country that have reported usable data for that quarter. This format makes it possible for project personnel to compare their project-line-item averages, to possibly improve the efficiency of their internal management, or to contact, discuss, and exchange information with other rural transit managers who have projects in the same peer group or, for that matter, in other peer groups.

Evaluation Results

As described above, the most recent processed statistical data that have been distributed to the FHWA field offices, the states, and the project sponsors are based on the operating data reported to FHWA from the projects for the last quarter of 1977. The significant results and conclusions drawn from those data are described below.

Ridership

The number of passenger trips per quarter for this period ranged from a low of 365 (for a project that operates two vehicles) to a high of 53 347 (for a project that operates 31 vehicles). For the 36 projects, elderly riders made, on the average, 28 percent of the trips and handicapped riders made 19 percent of the trips. [The total percentage of elderly and handicapped riders is not the sum of these numbers (or 47) but somewhat lower because a person who is both elderly and handicapped is counted twice.] Although all projects are required to be able to meet the service needs of elderly and handicapped riders, some projects have been more successful than others.

If to-home trips are excluded, the predominant trip purposes were work, shopping, and school and education; these three made up about one-half of all trips, and the remainder includes trips to nutrition sites and for social and recreational, medical and dental, and other miscellaneous purposes. The results of the ridership survey are summarized below.

Parameter	Range	National Avg. (%)	Remarks
No. of passenger trips per quarter	365-55 347		
No. of elderly riders	0.0-85	28	
No. of handicapped riders	0.0-77	19	
Trip purpose			Work, shopping, and school and education

The 1972 study of transportation of the rural disadvantaged by Burkhardt (1) showed that the predominant trip purposes in the five states studied were also work, shopping, and school.

Costs and Revenues

Drivers' wages account for a little more than half the operating costs. Fuel, repairs, insurance, and dispatching are the other significant items and make up almost all of the remainder. Administrative costs, which are calculated separately, are predominant for supervisory labor (65 percent); office expenses (25 percent) are the other significant cost item in this category.

Operating revenue comes from a variety of sources, but the predominant ones are contracts (47 percent) and fares, passes, and contributions (48 percent). Revenues for the 36 projects averaged $0.52/passenger and covered about 17 percent of the operating and administrative costs.

Grants for the rural projects came from federal sources (80 percent), the states (13 percent), and local and private agencies (7 percent). These results are summarized below.

	Cause or Source			
	Predominant		Significant	
Parameter	Factor	Amount (%)	Factor	Amount (%)
Operating costs	Drivers' wages	50		
Administrative costs	Supervisory labor	65	Office expenses	25
Operating revenue	Contracts	47		
	Fares, passes, and contributions	48		
Grants	Federal funds	80	State funds	13
			Local and private funds	7

PERFORMANCE MEASURES

Performance or productivity measurements provide meaningful comparisons between projects and useful national rural transportation indicators. Several different performance measures (e.g., per vehicle travel, per vehicle time of service, per passenger trip, and per passenger travel) have been used to evaluate transit systems. All were used in these evaluations, and the results were compared with those of various other studies.

The average trip length found in these evaluations was 15.7 km (9.8 miles). This reflects the longer trips made on rural systems; on urban public transportation, the average work-trip length is 13.3 km (8.3 miles), and trip lengths for other purposes are lower.

The average vehicle capacity was 14.5, and the average amount of passenger travel per vehicle travel was only 2.1; thus, the load factors averaged 14.7 percent.

Operating cost measures varied considerably. Operating and administrative costs (i.e., all noncapital costs) averaged $3.16/passenger trip for the 36 projects. For comparison, Revis (2) has reported operating costs for van-type service for the transportation disadvantaged in rural areas that ranged from $3.50 to $7.50/passenger trip. For special services in urban areas, Revis estimated costs of $1.20 to $1.50/passenger trip. Operating costs per bus passenger for conventional urban transit averaged $0.54 in 1976 (3).

Operating costs (including administrative costs) averaged only $0.42/vehicle-km (0.68/vehicle mile) for the 36 projects. Costs reported by Revis (2) for rural projects were $0.31-0.43/vehicle-km ($0.50-$0.70/vehicle mile). Bruton and others in 1972 (4) reported similar costs for rural projects, i.e., $0.20-$0.37/vehicle-km ($0.33-$0.60/vehicle mile). McKelvey (5) has also reported similar costs. In 1976, operating costs for urban systems were $1.18/vehicle-km ($1.90/vehicle mile) (3). This reflects factors such as higher labor costs, lower speeds, and larger vehicles for urban operations.

For the 36 rural projects, operating costs averaged $0.20/passenger-km ($0.33/passenger mile). This is an important measure of performance but, unfortunately, few other programs or systems have collected similar information.

Fuel efficiency for the 36 projects averaged 7.4 passenger-km/L (17.1 passenger miles/gal), which divided by 2.1, gives 3.5 km/L (8.1 miles/gal). This is about as expected for a minibus or van (6) operating at an average speed of about 24 km/h (15 miles/h). Typical urban transit bus fuel efficiency is about 1.8 km/L (4.3 miles/gal) (7). These results are summarized in Table 1.

PEER-GROUP COMPARISON

Interestingly, there is a correlation between the operating data for the peer-group parameters and what all of us would intuitively think should be true. An analysis of the two parameters of population density and size of vehicle fleet for each of the groups indicates that, in higher density areas, operating and administrative costs tend to be lower, particularly for the larger vehicle fleets; the trip lengths, as expected, are shorter in the higher density areas and the shortest occur on projects that have the largest vehicle fleets; the number of work trips is noticeably higher in higher density areas.

REPORTING FORMS

As mentioned above, statistical information consisting of trip statistics, trip purposes, and costs and revenues are reported monthly by each project. The source document for the operating data (trip statistics and purposes) is the daily trip-sheet form that is filled out by the drivers at the end of each day. This is an optional form; i.e., its use is encouraged because it can supply all the data required by FHWA, but projects are also given the option of modifying the forms to suit their own individual operations. Many projects have taken this option, and it has worked out very well. From the daily trip forms, the project managers prepare monthly summaries of trip statistics and purposes and, from their cost-accounting records, they complete the FHWA cost-reporting (operating, administrative, and capital costs) and revenue (such items as fares, contracts, and contributions) forms. The information from these forms is used to make up

Table 1. Summary of performance measures.

Measure		Comparison		
Description	Value	Description	Value ($)	Reference
Trip length, km	15.7	Urban work-trip length, km	13.3	
Vehicle capacity, persons per vehicle	14.5			
Passenger travel per vehicle travel	2.1			
Load factor, %	14.7			
Noncapital cost, $/passenger trip	3.16	Rural operations for transportation disadvantaged, $/passenger trip	3.50-7.50	(2)
		Special services in urban areas, $/passenger trip	1.20-1.50	(2)
		Conventional urban transit, $/passenger trip (1976)	0.54	
Noncapital cost, $/vehicle-km	0.42	Rural operations for transportation disadvantaged, $/vehicle-km	0.31-0.43	(2)
		Rural projects, $/vehicle-km	0.20-0.37	(4)
		Rural projects	Similar	(5)
		Urban systems, $/vehicle-km	1.18	(3)
Operating cost, $/passenger-km	0.20			
Fuel efficiency, passenger-km/L	7.4			
Vehicle fuel efficiency, km/L	3.5	Urban bus fuel efficiency, km/L	1.8	(7)

Note: 1 km = 0.62 mile and 1 km/L = 2.4 miles/gal.

the computer tabulations. The computer is programmed to use an averaging technique to group similar projects and establish national quantities. It also performs mathematical functions such as division to calculate the performance measures.

RECORD KEEPING

Projects were selected based on information contained in proposals. Major areas that had to be addressed in these documents included planned routing and scheduling information, funding-source commitments and estimated budgets that identified line items for capital, administrative, and operating costs.

Once projects were given final approval by FHWA, the day-to-day details of the technical monitoring and contract administration were turned over to field offices. There is one FHWA division office in each state (they are all in the capital city of the state except the Iowa and Maryland offices, which are in Ames and Baltimore respectively).

From the viewpoint of FHWA, the organizational arrangement has generally worked well. Their local people are close to the scene for technical assistance, fund reimbursement, and field reviews. The strength of the local and state involvement has determined, in most cases, the role these local people have played. For example, state auditors have assisted project managers in establishing acceptable bookkeeping and record keeping systems. This is particularly important for federal auditing sanction of funds reimbursement.

The FHWA division office personnel did request that they be informed of project changes from the approved proposals. However, they were very flexible about this and, for the most part, evaluated only major changes (usually based on project and state recommendations) and left minor decisions for the projects to make.

The projects also sent monthly progress requests for payment through the states to the FHWA division offices, which have had full authority to approve the requests.

CONCLUSION

It is encouraging and reassuring that the results of the statistical evaluations were remarkably steady throughout 1977, and no significant fluctuations were identified.

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Abridgment

Rural Highway Public Transportation Demonstration Program: Intergovernmental Relations

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The traditional role of the Federal Highway Administration (FHWA), formerly the Bureau of Public Roads, has been to administer a highway program. It has been responsible for the management of the federal-aid highway program. Since the early part of the century FHWA has worked closely with state highway agencies.

The Federal-Aid Highway Act of 1973 broadened FHWA's role into the area of public transportation, making certain highway funds available for public transportation capital expenditures and substituting transit projects for certain Interstate highway projects. The Federal-Aid Highway Act of 1973 also authorized the Rural Highway Public Transportation Demonstration Program. This program provided $24.65 million over a 2-year period to be used on transit projects intended to increase the mobility of rural residents to provide improved access to jobs, health care, education, social services, and recreation.

Known as the section 147 program, it was the first U.S. Department of Transportation (DOT) program to provide public transportation assistance (including operating expenditures) for the benefit of residents of the nonurban areas. It was also the first active involvement of FHWA in the administration of a transit assistance program. The regulations and management procedures were developed jointly with the Urban Mass Transportation Administration (UMTA). Project administration at the local level was performed by field offices, which worked through the state transportation agencies. Through the demonstration program FHWA also established close working relations with other federal agencies, such as the U.S. Department of Health, Education, and Welfare; the U.S. Department of Labor; the Community Services Administration; and the U.S. Department of Agriculture. Various means were explored to mesh the different programs these agencies have for providing services to rural residents. Working with these various funding sources has also brought FHWA into direct contact with groups such as area agencies on aging, economic opportunity, or community action; Indian tribes; and social service agency consortiums. Instead of dealing strictly with state highway engineers and planners, FHWA has learned to work with a great variety of very resourceful managers, such as interested citizens, antipoverty workers, retired senior citizens, former bus drivers, and transportation planners.

In addition to developing new and closer working relations with other federal agencies and local social service providers, FHWA called on the resources and expertise of the state transportation agencies to help administer the projects at the local level and to provide needed technical assistance. Activities in the Michigan program serve as an excellent example:

1. Technical assistance to applicants in development of a service plan. This includes the preparation of a detailed plan of operation, a budget, and the development and printing of a report document that served as an application. The state also assisted in the development of an operating organization;
2. Advertising and conduct of the public hearing on the project, including arrangements for a verbatim transcript;
3. Preparation of a contract between the state and the applicant agency, and assistance in development of local agreements necessary for multijurisdictional areas forming transportation authorities;
4. Assistance in developing vehicle specifications and purchase of vehicles through state purchase orders;
5. Assistance in hiring and training drivers, selecting and acquiring garage, maintenance, and dispatch facilities;
6. Assistance in conducting ridership surveys;
7. Financial assistance during and after the demonstration project;
8. Coordination with other state agencies to encourage their use of the transportation services provided by the project; and
9. Investigation of regulatory and statutory restraints that create barriers to the provision of public transportation services and development of legislative action to overcome these restraints.

Another example of state assistance is illustrated by the Suwannee Valley Transit Project in Florida. The Suwannee project was one of the 45 first-year projects selected for demonstration.

The original proposal called for consolidation of existing social service transportation under one umbrella and the addition of new routes and service areas. From the beginning, the project suffered from the image that it was for poor folks, since initial funding had come from the former Office of Economic Opportunity and the service was geared to serving the clients of the local community action agency. In order to accomplish the proposed expansion into a general public transportation system, support from the local county governments was a must. This was easier said than done. The commissioners of the three relatively poor counties served by the system worried about low ridership figures and potentially high deficits, especially since their budgets were already strained to the limits. Negotiations between the original project director and the counties were unsuccessful and the project director resigned after about 1 year of the demonstration period. It was at this time that the Florida Department of Transportation decided to intervene more actively and provided technical and financial assistance. This assistance took the following forms:

1. Evaluating and restructuring each service route—40 percent of the routes were either eliminated or service on them was reduced. This increased the system operating ratio (operating revenue/cost) from 0.24 to 0.40 without eliminating any essential services;
2. Establishing a vehicle maintenance program, training the project's mechanics, and providing backup (loan) vehicles. The state also made available, at nom-

inal monthly cost, a fully equipped maintenance facility, a radio-equipped maintenance truck, and a furnished office trailer;

3. The state district engineer, at the request of the county commissioners, agreed to join the six-member transit authority policy board;

4. Underwriting a portion of the system's net operating deficit as long as the funds were matched by the three counties;

5. Helping to set up proper record and bookkeeping procedures and prepare a realistic project budget. Over the last year, the budget has been within 2 percent of actual expenditures; and

6. Hiring and training a new project director, after getting the project back on its feet. The new director has gradually taken over the management of the project, with the state remaining available on an as-needed basis.

The efforts of these and the many other state and local groups have led to viable rural public transportation operations. The many new initiatives at the state level to provide ongoing funding assistance to these operations are also encouraging. But perhaps the most pleasing success of these projects is in providing for the needs of the transportation disadvantaged—be they young, old, handicapped, poor, or simply without ready access to automobiles.

Statistics are beginning to show improved economic efficiencies over time, to the point that several operations (especially those financially supported by state and local governments) look like they will be able to continue operations with little or no outside federal financial support. Several other equally worthy projects, which are supported to a lesser extent by local funds, are also providing cost-effective and needed service, but they have to rely more heavily on the one-shot section 147 funding for operating support.

As more and more projects approach the end of their demonstration life during this year and next, FHWA is hopeful that Congress will make available in timely fashion an ongoing program of rural and small urban transportation assistance. The demonstration program has shown the need for rural public transportation and has demonstrated a variety of ways to provide for that need at affordable costs. FHWA is committed to working closely with UMTA and the Secretary of Transportation to help implement the new program as quickly as possible after authorization by the Congress.

Morehead, Kentucky, School Bus Demonstration Project

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Recent public policy has demonstrated increased concern for the effectiveness of existing transportation systems as a cost-efficient alternative to major capital expenditures. One such program in Kentucky uses a single school bus to provide transit service in the community of Morehead. A 36-passenger school bus operates hourly along a 12.1-km (7.5-mile) route from 8:30 a.m. to 4:30 p.m. on weekdays and from 9:30 a.m. to 2:30 p.m. on Saturdays. Service is provided to Morehead State University, several public housing projects, the central business district, a principal manufacturing house, and the hospital. The one-way fare is $0.25. The Kentucky Department of Transportation, the Rowan County Board of Education, and the city of Morehead all share in the management of the project. Net operating costs during the 12-month demonstration period are shared between the department of transportation and the city of Morehead (75-25 percent, respectively). To date, farebox revenues have equaled 8.78 percent of the total operating costs. Initial patronage during the first 5 months of the demonstration program was low, increased drastically during severe winter weather, and moderated somewhat when warmer weather arrived. Weekday patronage averages 33.6 persons/d and Saturday patronage averages 16.8 persons/d.

Recent public policy has demonstrated concern for increasing the effectiveness of existing transportation systems as a cost-efficient alternative to major capital expenditures. Both the Traffic Operations Program to Increase Capacity and Safety (TOPICS) and the more recent transportation system management (TSM) emphasis are examples of federally directed programs of this nature. There are countless examples of specific projects initiated at the state or local level directed at achievement of this same objective. This paper describes one such program in Kentucky.

In early 1974 it became apparent to consumers of specialized transportation services that certain transportation demands were not being served and potential mechanisms to provide such service were not being utilized. The 1974 Kentucky General Assembly concurred and enacted a new section of the Kentucky statutes to permit the Kentucky Department of Human Resources to contract with a local board of education for the use of school buses to transport persons 62 years of age or older, persons who were physically or mentally handicapped, or other persons designated by the department of human resources during those periods when the vehicles were not needed for school-related transportation. The department of human resources was to use existing appropriations for costs incurred in provision of such service. The program was thus (a) the responsibility of the state human services agency, (b) programmatically and budgetarily permissive rather than mandatory, and (c) designed to be beneficial to a specifically defined client group.

Perhaps as a result of the absence of a specific legislative appropriation and the permissive rather than mandatory nature of the legislation, only two projects were proposed during the 2 years following legislative enactment. One project lasted only briefly in an urban area, and the other provided transportation services to a nutrition site in a mountainous rural county.

The 1976 Kentucky General Assembly reacted by enacting legislation that required implementation of some projects. Discretion regarding who constituted eligible beneficiaries of these services was transferred to the

Kentucky Department of Transportation, which now also assumed responsibility for financing such projects. Costs were to be borne by the department from existing appropriations. The program was then (a) the responsibility of the state transportation agency, (b) programmatically mandatory but budgetarily permissive, and (c) meant to be beneficial to a more broadly defined group of users.

The Kentucky Department of Transportation was thus faced with administrative responsibility for a program not initiated by the department. The department's first action was the development of a policy for program implementation. A school bus program had obvious consistencies with several facets of the department's policy.

1. The department's policy was that specialized transportation services designated for a certain market segment not be restricted only to that market segment. The language of the legislation appeared to have transferred the discretionary designation of eligible program beneficiaries from the department for human resources to the department of transportation, thus implying legislative intent that there be a broader base of program participants. The department declared a policy that the services to be provided by such a program were not to be client restricted.
2. The department did not and does not provide general public transportation operating assistance. Since the urban areas of the commonwealth (those with a population in excess of 50 000 persons) were well served by both general and specialized transit and paratransit services, any project using school buses would probably operate in an area not eligible for general federal operating assistance. Thus, for any demonstration project to continue beyond the demonstration period, local funds would be required to finance the inevitable difference between operating costs and fare revenues. Local funding was thus deemed a necessary requirement during the demonstration period. A local 25 percent share of the demonstration project costs, phased in increasing increments during the demonstration period, was required of project participants. Further, because of limited funds available and a desire that demonstration projects not be misinterpreted as the general provision of operating assistance, it was determined that demonstration projects were to have a defined time span of 12 months.
3. The legislation did not require nor did it allow the actual transfer of ownership of any piece of equipment from a school board to the department. Thus, any project would of necessity involve the use of equipment to which title would still be held by the school board. Therefore, any proposed project must carry the expressed endorsement of the particular school board concerned.

SITE SELECTION

Interest in possible participation in the program was expressed to the department before the legislation that transferred the program to the department of transportation had been signed into law. The first potential candidate for a demonstration project came from a community in the Appalachian foothills. An ongoing public transportation study by the department had identified a probable unsatisfied daily demand for public transportation of about 40 trips/d, a level that could potentially strain the capabilities of the single local taxi operator but could hardly justify large expenditures on capital equipment. The local school superintendent was the project's staunchest local supporter. The city had an ongoing program whereby a portion of the taxi fare for senior citizens was provided by the city, thus the city had a history of financial commitment to transportation service. This project was stopped short of implementation, however, when city officials, in reaction to objections from the local taxi operator, voted not to implement the program.

The department was first approached about a possible school bus demonstration project in Morehead when the school superintendent contacted the department of transportation during a review of the recently passed legislation. Subsequent discussions led to approval by the local school board and solicitation of the city council for support and funding. The local taxi operator was approached and indicated no feelings one way or another about the project. The city council authorized the funding. Certification to operate under a city bus certificate was obtained. On December 1, 1977, Morehead Area Transit (MAT) began operation.

There were several specific purposes of the project:

1. To see if administrative barriers, which apparently hampered development of an otherwise obvious solution to a problem set, could effectively be overcome;
2. To determine the level of demand for public transportation in Morehead that could be served by the demonstration project; and
3. To test the validity of demand estimation methodologies.

LOCAL ADMINISTRATIVE MECHANISMS

The three parties in the demonstration project (the Kentucky Department of Transportation, the Rowan County Board of Education, and the city of Morehead) have all shared in the management of the project. The department provides assistance in the areas of technical planning and transit management. The initial route; schedule; and promotional program, including newspaper and radio advertisement, schedule brochures, and posters, were the primary responsibility of the department. The department's project manager has maintained close contact with local authorities to provide additional management assistance as needed.

The superintendent's office of the Rowan County Board of Education has the major responsibility for the day-to-day operation of the demonstration project in Morehead. The school bus used in the demonstration project is fueled, stored, and maintained at the board of education's bus barn by school system employees. The driver was hired and trained by the board of education.

An information center was set up in the superintendent's office to handle all inquiries about the system, including route and schedule information. Independent tabulations of daily revenue and ridership are kept. Monthly statements showing expenses and revenues are prepared by the superintendent's staff and forwarded to the department for payment.

The city of Morehead planning aide assists the department's project manager in securing and maintaining local support for the project. With the city's assistance, contacts were made with the Chamber of Commerce, Morehead State University, St. Clair Medical Center, various human service agencies, and local senior citizen groups. The city has also assisted in the evaluation of the system's performance, and informal ridership and community surveys.

SERVICE CHARACTERISTICS

Service began on Thursday, December 1, 1977. The vehicle chosen for use in the demonstration project was a new 36-passenger school bus, which the board of educa-

Table 1. System patronage.

Week of Operation		Days Operated	Ridership		
			Weekday	Saturday	Weekly Total
1	Dec. 3	3	49	18	67
2	Dec. 10	6	125	37	162
3	Dec. 17	6	73	22	95
4	Dec. 24	6	57	15	72
5	Dec. 31	5	35	1	36
6	Jan. 7	5	74	8	82
7	Jan. 14	5	106	25	131
8	Jan. 21	6	304	28	332
9	Jan. 28	6	209	17	226
10	Feb. 4	6	293	29	322
11	Feb. 11	6	228	26	254
12	Feb. 18	6	247	7	254
13	Feb. 25	6	167	20	187
14	March 4	6	235	20	255
15	March 11	6	255	6	261
16	March 18	6	89	10	99
17	March 25	6	137	11	148
18	April 1	6	168	17	185
19	April 8	6	165	15	180
20	April 15	6	174	6	180
21	April 22	6	139	13	152
22	April 29	6	153	8	161
23	May 6	6	177	27	204

Table 2. Costs of system operation.

Item	Actual 5-Month Cost ($)	Total (%)	Proportioned Monthly Cost ($)	Total (%)
Operators[a]	4 102.85	37.63	820.57	39.61
Secretary	1 000.00	9.17	200.00	9.65
Fringe benefits	306.93	2.82	61.39	2.96
Advertising	978.36	8.97	195.67	9.44
Insurance	932.00	8.55	77.67	3.75
Vehicle operation[b]	3 583.36	32.86	716.67	34.59
Total	10 903.50	100.00	2071.97	100.00

[a]$3.85/h plus time and one-half for overtime.
[b]Vehicle leased at 27.9 cents/km (45 cents/mile).

tion had planned to use only for after-hours, extra curricular events. Based on an analysis of socioeconomic data and a windshield survey of Morehead, a 12.1-km (7.5-mile) route was selected at the start of the project. Service was provided to Morehead State University, all the public housing projects, central business district, a principal manufacturing firm, and the hospital.

Service was provided on 1-h headways, from 8:30 a.m. to 4:30 p.m. on Monday through Friday and from 9:30 a.m. to 2:30 p.m. on Saturdays. Based on experiences in other communities similar to Morehead, a one-way fare of $0.25 was established.

Estimates of Potential Patronage

The potential number of system users was derived from assumed modal split factors for all trips made during the time the system was to be operational and for those trips for which the proposed routing served both trip origin and destination. Trip generation and trip distribution techniques were applied to Morehead demographic data on a zonal basis. Interzonal transfers that coincided with the location of the route and the proposed time of operation were then identified. A potential modal split capture by the transit system was estimated and applied to the subset of interzonal trips.

Trip generation equations were synthesized from data in a series of small urban areas in Kentucky, using stepwise multiple linear regression techniques. The resultant productions and attractions were distributed by the gravity model. A modal split factor of 1 percent was assumed. The result of this process was an estimate of 85 users/d on weekdays.

Initial Ridership Trends

Except for the first full week of operation, weekly patronage for the first 6 weeks of operation was discouragingly low. During the first week and a half, weekday ridership averaged 25 persons and patronage for the two Saturdays was 18 and 37 persons respectively (Table 1). For the next 4 weeks, the novelty of MAT seemed to disappear and with it the patrons. Weekday ridership averaged just over 13 persons/d and Saturday ridership averaged 11 persons/d. These results were especially discouraging since this was the period immediately prior to Christmas and a coupon for a free trip, redeemable at participating merchants, appeared in the newspaper.

Week seven of operation was marked by a weekly patronage level 60 percent higher than that of the previous week and 84 percent higher than that for the average of the previous 4 weeks. This increased patronage level occurred during the week that MAT experienced its only day of missed service during what was to be the worst winter in recorded history for the area.

During weeks 8 through 15, weekday ridership averaged 48 persons and Saturday ridership averaged 19 persons, increases of 269 and 73 percent respectively over the low 4 weeks in December.

This period coincided with the period of very severe winter weather. Thus, the weather succeeded where human efforts had failed—in getting patrons past the critical transition from potential rider to first-time rider. Another factor was the apparent success of promotional activities directed toward students at the university, since ridership increases coincided with the start of the spring semester.

The combined effects of student patrons and weather continued to be evident in weeks 16 through 23 of the project. (Week 23 ended May 6, 1978, and marks the end point of activity reported in this paper.) During week 16 (spring break for the university), weekday and Saturday ridership decreased by 62 and 47 percent respectively when compared to the average of the previous 8 weeks.

The remaining 7 weeks in the reporting period indicate that MAT has retained some but not all of its patronage. Weekday ridership during this period is 32 persons/d; this compares to figures of 48 during the bad weather and 18 before the bad weather. Saturday ridership remained more consistent throughout the demonstration period. During this last 7 weeks, Saturday ridership has averaged 14 persons; this compares to figures of 19 during the bad weather and 11 before the bad weather. Patronage from one Saturday to the next has shown the most variance without a predictability to the variation.

COST AND REVENUE

Costs for operation of the demonstration project have been calculated for the first 5 months of operation. This period corresponds to the first 22 weeks of operation shown in Table 1. These costs are shown in Table 2 in two forms: actual expenditures for the 5-month period and prorated monthly expenses. This latter reporting procedure allows proportionate incorporation of lump sum expenditures, such as payment of the annual insurance premium.

Examination of the latter two columns points out several facets where the demonstration project differs from more traditional transit systems. Personnel costs account for only slightly more than 52 percent of total

cost. This relatively low figure reflects the comparatively low total cost per hour of the operator ($4.41/h including benefits) and the absence from inclusion in these figures of administrative costs. A complete accounting for administrative costs would probably increase personnel costs to approximately 65 percent of system operating cost.

Advertising expenditures expressed as a percentage of the total operating cost are high. This is caused by higher than normal levels of expenditure at the outset of system operation. Subsequent expenditures for advertising are expected to approximate 5 percent of total system cost.

Revenue for the first 5 months of operation has been derived from only three sources: fare receipts, state funds, and local funds. As indicated previously, the local share of subsidy during the whole demonstration period was 25 percent, phased in increasing percentages quarterly. During the first quarter of the project the local share of needed subsidy was 0 percent; during the second quarter the local share was 10 percent.

During the first 5 months, fare revenue totaled $957.75 (8.78 percent of operating cost). Net public costs of $9945.75 were divided between the department of transportation ($9186.40) and the city ($759.35). Total cost was $2.84/passenger and net cost was $2.59/passenger.

COMMUNITY REACTION

The community of Morehead has reacted very positively to the project. The city and the school board have been active participants in spite of the fact that ridership levels have never reached predicted levels. This probably is a result of a feeling on the part of local Morehead officials that estimates by the department of transportation of potential users were too high. The school board assisted with the initial arrangements for use of the bus, provision of a driver, preparation of cost estimates, route planning, and several hours of staff time. The city became more involved as the project developed, coordinating the citizen involvement and advertising campaigns. Several other civic groups who have supported MAT are the Kentucky Bureau of Social Services, Morehead Housing Authority, the Morehead Chamber of Commerce, Rowan County Fiscal Court, St. Clair Medical Center, Morehead State University, the Bureau of Manpower Services, the Rowan County senior citizens, and the downtown merchants association.

At the beginning of the project, there were several perceived problems with the use of school buses as transit vehicles. These perceptions were based on both intuitive feelings and reported prior experiences and were concerned with the physical limitations of the vehicles, e.g., high steps, rough ride, and the absence of air conditioning.

Consumer research conducted during the early phases of the demonstration period showed that these initial perceptions of potential problems were essentially unfounded. Actual problems with the use of school buses have been more a matter of psychological rather than of physical limitations. School bus vehicles must, by law, have certain distinctive marking and lighting schemes. The purpose of these requirements are to visibly highlight the school bus vehicle as such, both to the user and to the motor vehicle operator. As a result, the school bus has become a readily identifiable element of the visual scenery. Habitual perceptions must be altered in order to enable potential patrons of the project to be psychologically comfortable using a school bus. In this project, candidate techniques for altering perceptions could not include permanent alterations of the required vehicle signing and marking.

MONITORING AND EVALUATING THE PROJECT

During January 1978, a survey of Morehead State University students was conducted as part of spring registration to make students familiar with MAT and also to get some ideas for additional service. As a result of that initial survey, a university trailer park 6.4 km (4 miles) from the campus was surveyed to determine the potential level of demand for transit service. In addition, meetings were scheduled with business groups and human service agency staffs to solicit support and potential patronage for the service.

An on-off survey, on-board survey, and a trail check were conducted during the 12 th week of service to get specific information on the system's performance.

A decision was then made to expand the service area and the hours of service. The service was extended to the university trailer park, service was started an hour earlier in the morning, and a portion of the route was reversed to better serve the hospital and other established trip patterns.

Another result of continued discussions with local agencies was two additional sources of ridership and revenue. Both the board of education and the Kentucky Bureau for Social Insurance have instituted a ticket system for trips on MAT. As part of a community education program, involving cooperative work experiences for high school students, the school system issues tickets to students to use on MAT for travel to work.

The Bureau for Social Insurance has started to issue tickets to clients eligible under Title XIX of the Social Security Act of 1974 for nonemergency transportation. MAT will be reimbursed monthly by each program at $0.25/ticket collected.

The Morehead City Council has reaffirmed its support for MAT by voting to continue the project and finance the city's share of net costs for another 6 months. (Although the project was scheduled for 12 months, the city had the option to cancel its participation and hence the project at the end of 6 or 9 months.)

During the next 6 months the Kentucky Department of Transportation will assist the community in further evaluations of MAT and the feelings of the community about MAT. As the demonstration period moves to a close, the community will face the decision of whether to continue MAT without state financial aid. The popularity of MAT and the willingness of the community to support the system will bear heavily on this decision.

In addition, a more in-depth evaluation of MAT ridership is planned to ascertain information about trip purpose, trip frequency, and whether the trip was generated by or modally shifted to MAT.

The results of this demonstration project will enable the department of transportation to better plan and administer future demonstration projects, which may or may not relate to the use of school buses. More importantly, however, the citizens of Morehead will know what a public transportation system can and cannot do in Morehead and whether this public service is worthy of local public financing.

Abridgment

Buying the Bus, or Lessons in Equipment Selection

Betty D. Revis, Institute of Public Administration, Washington, D.C.

At the Institute of Public Administration, keeping track of the transportation equipment market and the operating experience of transportation projects has been essential from a planning point of view in order to understand why projects thrive or fail, what the problems are, and how services may be made to function more effectively and productively. We have observed over time a tendency among project managers to criticize the quality and performance of available equipment, especially small vehicles. As planners, we have often joined the chorus. Transportation systems have been needed so urgently (especially in rural areas), so much has been invested in organizing them, funding has been so tenuous, and expectations have been so high that it has been discouraging to see vulnerable operations jeopardized by problems with equipment. Today, however, small systems are learning to live more successfully with the equipment that is available to them.

It is very clear that the perfect vehicle for special transportation services—one that is sturdy, low-maintenance, fuel-efficient, easy to handle, and accessible and comfortable for the elderly and disabled—will probably not rise full-blown from the drawing boards. The market for vehicles designed for fewer than 30 passengers (for special services) is simply too diverse in terms of cost and design requirements and too limited in volume to tempt manufacturers into making the necessary investments in design, retooling, and marketing. What we are getting are small incremental improvements to existing types of vehicles and auxiliary equipment. This is a process to which thoughtful and informed consumerism can make its contribution.

Even at this stage of development, equipment need not be the Achilles' heel of operations, particularly in rural areas, if careful attention is given to the matter. There are many positive steps that will make a real difference in equipping a system. Some of the most useful are described below.

LEARNING THE TERMINOLOGY

Every vehicle with at least four wheels, windows, and accommodations for group seating is called a bus by its manufacturer. Rural transportation planners and operators should learn early on what that three-letter word means.

To the operator of a large mass transit system, a bus is a rugged vehicle that is unitized in construction; that is, the body and chassis have been designed and built as an integrated unit. Components have been designed and refined to give the longest possible wear over the life of the vehicle with the least possible maintenance. The vehicles last as long as 15 years or more, and the initial costs, though high, are spread over a long life cycle.

Measured against this standard, the small vehicles with which special transportation services are concerned must be called "bus type" vehicles. They are either automotive in design (vans) or adaptations of body-chassis designs that serve broader commercial markets such as school transportation, light trucking or delivery, and recreation. In one or more important characteristics, such vehicles inevitably fall short of meeting the full requirements of a small operation for durability and passenger comfort. However, it is less useful for operators to understand that there is no ideal vehicle than it is to understand clearly what there is to choose between, what trade-offs between choices must be made, and which equipment characteristics most nearly meet the requirements of a particular service and area.

Table 1 gives a brief comparison of some of the characteristics of vehicle types that have 30-passenger capacities. It indicates, for example, that a system that requires a vehicle to transport about 10 passengers would need to choose between a van and a small-vehicle design on a light truck chassis. In comparative terms, the van would provide an easy-handling, automotive type of vehicle with limited interior space and poor accessibility characteristics. The operator would be able to draw on a wide labor pool (including volunteers) to drive such vehicles, but would have to weigh the space limitations of the vehicle and the time and extra equipment costs that would be necessary to handle the elderly and the handicapped. On the other hand, the truck chassis vehicle would provide more room than the van but would give a "hard" ride in terms of its stiff suspension; among other modifications, this might require better bus seats for an elderly clientele.

Within each of these categories of vehicle design, there is also very little standardization of chassis components or options. Each delivery is a fresh adventure, in effect, and the burden is on prospective purchasers to know what they want, what they are getting, and what the cost implications of the alternatives are. Again, in the case of a hypothetical decision to purchase a van with standard light-duty components, it would be advisable to carefully cost out the labor alternatives. If the service plan calls for trips of great length, which is likely in a rural area, vehicle kilometers traveled may be a more significant operating cost. In such a case, in terms of the long-run operation of the system, a greater capital investment in heavy-duty chassis components may be more advantageous than minimizing labor costs.

DEVELOPING INFORMATION RESOURCES

The most useful information for the rural transportation operator is the experience of other users with different types of vehicles and different modifications to standard types of equipment. However, there is no one clearinghouse or universal source for such information, so the operator must make an effort to go after it.

Federal, state, and local programs have put many vehicles on the road in rural areas in the past few years, so the rural operator has more sources to turn to for relevant information. The problem will probably not be who to ask but finding the staff time

Table 1. Selected characteristics of small vehicles (< 30 passengers).

Vehicle Class (by capacity)	Basic Cost[a]	Type of Chassis	Vehicle Length ÷ Width (cm)
Small (up to 16 passengers)			
Van (converted)	Low	Automotive	447 - 538 ÷ 200.5
Special body, light truck chassis	Low	Truck	533 - 710.6 ÷ 188 - 243.6
Unitized	High	Unitized	599 ÷ 212
Medium (15 to 30 passengers)			
Motor-home adaptations	Low	Custom	609 - 761 (approx.) ÷ 243.6
School bus	Low	Truck	Varies
Special body, truck chassis	Medium	Truck	634.5 - 710.6 (approx.) ÷ 228.4 - 243.6
Unitized	High	Unitized	766.5

Note: 1 cm = 0.39 in.

[a]There is a difference of $5000 or more between each category of costs.

Table 2. Vehicle specifications (1974).

Manufacturer	Vehicle Designation	Nominal Seating Capacity	Ramp or Lift Available	Vehicle Cost ($)	Outside Dimensions (cm)			Door Opening (cm)	Inside Headroom (cm)	Step Height (cm)		Aisle Width (cm)	Turning Radius (m)
					Length	Width	Height			Standard	Special		
Minibus	MDH-159-10	14	Yes	24 000	726	238.6	273	63.4	191.6	33	20	104	8.8
Mercedes-Benz	039D	16	No	14 500	599.5	204	287	49.5	172.6			45	6.1
Highway Products	TC 25	25	Yes	18 100	771.5	243.6	274	76	198	35.5	20	56	7.9
	TC 31	31	Yes	20 000	863	243.6	274	76	198	35.5	20	56	9.1
General Motors	TDH 3301A	33	No		888	243	307	76	199	34.5		51	8.7
J. B. E. Olson	D-100	17	No	18 600	617.5	243	274	61	197	35.5	30.4	38	
Unibus	MX3A	21	No		510	242	286	85	191	35.5	24	38	7.5
General Motors	Chevy Sparta	12	Yes	7 800					152		24	30.4	
Ford	Club wagon	11	Yes	5 000									
Volkswagen	Volkswagen bus	6	No	4 000	441.6	176.4	197.4					30.4	
Flxible	Flxette	23	Yes	19 500	648	228.4	266.5	61	190	35.5		40	7.6
Chrysler	Dodge Maxi-Royal	14	Yes	7 000	538								
General Motors	Chevy Deauville sportvan	11	Yes	4 500									

Note: 1 cm = 0.39 in, 1 m = 3.3 ft.

(always a scarce resource in a small system) to do the research. I would recommend to rural planners that as much time as possible be invested—perhaps by volunteers—in contacting state departments of transportation, federal managers of programs with a rural component, and especially other project managers in rural areas. Researchers should not hesitate to ask the marketing departments of manufacturers for references to purchasers of their equipment. The research itself requires no technical background, but some person in the rural transportation agency should become a resource on vehicle problems.

The following areas of information might be considered in such research:

1. Operating experience, including (a) recurring mechanical problems, (b) body or design defects, (c) ease of servicing, (d) safety hazards, (e) quality of the manufacturer's service organization, (f) warranty claim experience, and (g) availability of parts;
2. Passenger-related experience, including (a) access problems such as steps, doors, headroom, handholds, seats, and aisle width; (b) reactions to design characteristics; and (c) comfort-related items such as heating, ventilation, air conditioning, weatherproofing, visibility, seats, size and padding, floor covering, noise, lighting, and vibration; and
3. Driver experience, including (a) handling characteristics, (b) position and operation of controls, and (c) visibility.

There is no way other than "talking around" to get at this sort of information; what operators or planners are reluctant to publish about equipment problems they are frequently willing to discuss quite freely by telephone.

In addition to using the telephone, I recommend building a small library by sending for manufacturers' brochures on vehicles, level-change mechanisms (for operators who plan to serve wheelchair passengers), and communications equipment. It will help to prepare a simplified table of information to compare some of the specifications of different vehicles. Table 2, a typical example, includes information on nominal seating capacity, ramp or lift options, costs, dimensions, door openings, headroom, step heights, aisle width, and turning radius. One might also add information on such items as estimated vehicle life cycle, delivery time, air conditioning costs, fuel capacity, and average fuel consumption.

KNOWING REQUIREMENTS

One of the main thrusts of the project planning process is to develop information for use in evaluating equipment needs. Basically, data are required to make four major decisions in selecting equipment: the size, number, and type of vehicles needed and the accommodations required to meet the special needs of riders.

There is some indication that decisions on the size and number of vehicles are significantly simplified in most rural situations. In the matter of size, for example, there is likely to be grouping of ridership by advance reservation to achieve reasonable levels of operating efficiency. Passenger loads are, therefore, more predictable than they are in an urban operation. Destinations are also apt to be more consistent because services, facilities, and shopping opportunities tend to locate in the towns. The character of rural trips and the service planned will, therefore, usually indicate fairly clearly an optimal size for vehicles.

Deciding on the number of vehicles needed is also relatively simple in a rural context. Routes are fewer, distances greater, and budgets often smaller. In most cases, a vehicle will be dedicated to, and be able to serve, only one—or, at the most, two—long-distance routes in a day's operation. Fleet size is usually determined by the size of the service area, the level of service the budget permits, and backup vehicle requirements.

The emphasis on inputs to equipment selection from the planning process for a rural system is somewhat different from what it is for an urban system. The interest often shifts from mode selection and the scope of operations (because those factors may be determined very early by the nature of the area to be serviced) to site-specific and client-specific research. It is clearly important in terms of vehicle selection, for example, to have daily estimates of vehicle distance traveled and information on difficult terrain, to take into account fueling locations and the location of maintenance and service facilities, and to get information on the nearest dealerships for some types of equipment and for the availability and delivery of spare parts.

It can be presumed that a rural system will serve a high percentage of elderly passengers. Rural operators that work with small fleets need to get from the planning process an indication of the number and, if possible, the locations of the elderly and the handicapped and which equipment accommodations will be required to give them access to the vehicles and comfort and safety on the road. As Table 1 indicates, trade-offs between passenger comfort, operating economy, and durability must be made in vehicle selection in every vehicle size range.

One of the most important passenger-related factors to be examined during the planning stage is how many vehicles need to be equipped with a level-change mechanism to serve wheelchair passengers. Lifts or ramps are costly in terms of both overall budgeting and the amount of passenger space they absorb. To make reasonable judgments on such equipment, rural planners need to examine carefully not only the number of handicapped persons to be served but also their locations and categories of disability.

Will shopping trips be an important function of the system? Then package racks may be required. Is the area subject to extremes of temperature? Then extra heating and air conditioning may be essential to serve the frail elderly. The questions can clearly go on forever, but the point is that, even for a very small system, there are choices to be made on equipment, and the time to research and evaluate the alternatives is in the planning stage.

A major fly in the ointment is the length of time it takes to get delivery on many vehicles and the additional time required to get modifications completed. In our experience, there is always great local pressure to short-circuit the planning stage on equipment and get the orders placed. Such pressure should be resisted if possible so that the most important equipment-related problems get resolved on paper—not worked out at heavy cost in operations.

LEARNING FROM EXPERIENCE

Experienced operators of rural transportation systems make the following suggestions:

1. Before ordering equipment, check out all funding agency, federal, state, and local requirements that may relate to equipment, whether for safety or design characteristics.
2. Draw up careful specifications. Other systems will usually be willing to provide guidance.
3. Deal with conversion shops that are experienced in configuring standard vehicles for group transportation.
4. Get agreements in writing. Notify suppliers of defects in writing. Keep funding agencies informed.
5. Try to develop a uniform fleet. Identical equipment makes it possible to cannibalize parts when necessary and perhaps order some parts in bulk for discount and also cuts down on maintenance time.
6. Build a preventive maintenance schedule into system operations.
7. Keep in active touch with developments. What one learns can improve system equipment and operations and perhaps make a contribution to improving what is generally available.

Notice: The Transportation Research Board does not endorse products or manufacturers. Trade and manufacturers' names appear in this report because they are considered essential to its object.

Abridgment

Role of the Intercity Bus in Rural Public Transportation

Arthur D. Lewis, American Bus Association, Washington, D.C.

In the past, the attention of transportation planners has been focused primarily on transportation problems within urban areas—and on grandiose and expensive schemes such as Amtrak. Little has been done to solve the transportation crisis within rural America.

The American taxpayer is rebelling against costly and ineffective public policy, which leads to the proliferation of government-sponsored programs that have no discernible benefit to our citizens. It is time to step back and analyze where we are and where we are going in the formulation of national transportation policies. The story of the intercity bus industry is one of an important transportation system that has grown and prospered over the years without the aid of national transportation policy, without the interest of national transportation policy makers, and with resources provided

almost exclusively by the private sector. In fact, until recently there has not been a major government study of the intercity bus industry in this country since 1952.

The intercity bus industry provides a unique and crucial service to rural America. The industry blankets the entire country and serves more than 15 000 cities and communities—over 14 000 of which have no alternative form of common carrier intercity transportation. Alternatively, airlines serve some 700 points, and Amtrak serves about 500 points. Thirty-one percent of the industry's traffic comes from rural areas and small communities. This compares to 18 percent for Amtrak and 12 percent for airlines. Only the private automobile provides a more pervasive rural service than the intercity bus.

This comprehensive service is provided by 1000 independent bus companies operating in every state and every region of the nation. These companies include Greyhound and Trailways, of course, but another essential characteristic is that the industry is composed of a large number of small carriers.

Fundamentally, the common carrier caters to the personal travel market, providing greater mobility to the less affluent, the handicapped, the elderly, and the young. In 1976 more than 340 million people rode the bus—more than the number of passengers on the nation's airlines and Amtrak combined.

With this contribution in service, its relatively low cost, high degree of safety, and great fuel efficiency, one might expect that the industry holds a secure position in the marketplace. Ironically, this is not the case today.

For the past year the American Bus Association has been discussing the problems of the intercity bus industry. The story has been pieced together from the accounts of the 450 bus operator members.

The Interstate Commerce Commission (ICC) recently released its comprehensive preliminary study on the intercity bus industry, prepared by the Bureau of Economics. This study basically substantiates the problems that the association and the industry have been outlining (1):

> General growth and prosperity of the industry has in recent years been dimmed by a shrinkage of passenger demand and certain reduced profitability, particularly on regular route passenger service.

As the industry has noted, one reason for this is the trend toward urbanization, which has reduced the population of rural communities where intercity bus service is the only form of common carrier transportation available. This has resulted, for more and more bus schedules in rural areas, in operating at very low load factors and at a loss. Again quoting (1):

> The bus passenger market is somewhat unusual compared to that of other common carrier modes. Bus passengers tend to be drawn from the low-income and nonprofessional occupational groups. The relatively young and the old, students, military personnel, and retirees are heavy users. Moreover a high proportion of trips taken are nonbusiness oriented and are for relatively short distances. . . . State financial assistance to bus service is relatively limited. However, a major effort in the state of Michigan to provide service demonstration subsidized programs in the state has resulted in the services being continued following the termination of subsidy.

Again, continuing with the ICC report (1):

> Difficulty in generating sufficient revenues to replace equipment under conditions of inflation and in upgrading or relocating terminals suggests the possibility of the need for policy revision.
>
> The fuel efficiency of the equipment and the flexibility of service also suggest that the bus has a potential beyond the traditional view. The subsidized experiments in Michigan indicate that demonstration programs may provide some incentive to consider options for social benefit. . . . It may well be that the bus industry deserves to be viewed with new respect for the special market it serves. Clearly, the industry is confronted with a number of concerns which deserve to be addressed.

In the conclusions and recommendations, the ICC report states (1):

> Government policy also needs to be considered in the light of current economic, environmental, energy, social, and other goals. Certainly the industry's position in serving the passenger (and freight) needs of the nation in the context of resources expended and the balance of federal support given to competitive services deserves to be reviewed.
>
> An industry and government analysis of the current and future role of bus transport might well result in the industry being viewed differently than it has been in the past. Clearly, the bus industry offers certain unique services not available from other carriers. It should be given the opportunity to operate in the framework of a balanced transportation policy so that as a healthy industry it may serve effectively.

Compare this examination of the intercity bus industry with the massive government involvement and support of Amtrak, totally irrespective of the impact of that system on the health and welfare of competing modes of common carrier transportation. Amtrak does not serve many rural communities, but it has had a detrimental impact in those areas nonetheless.

1. Only through subsidies has Amtrak been able to price its service at or below the prices charged for intercity bus transportation.
2. This subsidy-financed predatory competition has occurred on the more heavily traveled, profitable corridor routes, which has made it difficult for the intercity bus industry to cross-subsidize the many thinly traveled, rural routes, those with no alternative form of public intercity transportation.

In the past 8 years, almost 1800 rural communities have lost intercity bus service. In view of our energy problems today, can rural America afford to be totally dependent on the automobile?

The need for operating and capital assistance for transportation in rural areas cannot be ignored. For thousands of citizens, intercity bus service is essential in providing their only alternative to rural isolation. The intercity bus industry, and our nation's rural population, have a great deal in common. Both have been orphans in the nation's transportation policy planning.

The last U.S. Congress considered legislation that for the first time provides a potential remedy for the rural, intercity transportation crisis. The House Public Works Committee approved H.R.11733, the Highway and Mass Transit Bill. The bill contains a provision for specific designation of $50 million annually over 4 years to be used to subsidize operations for the initiation, improvement, or continuation of intercity bus service in small urban and rural areas. State and local authorities would determine the need for intercity bus service under the recommended program and would be responsible for applying for federal funds.

The rural subsidy program would be funded through the Urban Mass Transportation Administration, and subsidies could not exceed 50 percent of the net cost of the operating expense. In addition, private intercity operators were made eligible for participation in the $125 million annual program to provide local trans-

portation, which could be between communities, as well as within them, in rural areas.

In the Senate, the Senate Banking, Housing, and Urban Affairs Committee adopted S. 2441. It provides for the first time that the private intercity bus industry would be eligible for participation in the $100 million annual assistance program for rural and small urban areas.

Obviously, we have a long way to go as these provisions proceed through the legislative process. And eventually they will have to be reconciled in House-Senate conference.

Meanwhile, transportation planners should investigate the feasibility of using the potential of the 1000 or so private bus companies that are already operating in all regions of the nation in solving some intracommunity transportation problems on a subcontracting basis. The demand of the marketplace can no longer be the sole criterion for evaluation of the need to continue existing service, or for implemention of new service in rural communities. Indeed, there are private needs to be met that transcend the ability of the private sector to provide socially necessary service without outside assistance.

The ultimate beneficiaries will not be just the hundreds of intercity bus companies across the nation, but rather, they will be the 340 million passengers (31 percent of whom come from rural areas) who will be the ultimate recipients of improved transportation at the least cost to the American taxpayer.

REFERENCE

1. The Intercity Bus Industry: A Preliminary Study. Bureau of Economics, U.S. Interstate Commerce Commission, s/n 026-000-01112-4, May 1978.

Abridgment

Small Bus Market

Grovenor Grimes, Urban and Public Transportation, Michigan Department of State Highways and Transportation

The small bus market in America today is in a precarious position. Mercedes and Grumman have stopped making small buses (i.e., 10- to 25-passenger vehicles). General Motors will no longer produce motor homes, which have been used successfully as small buses. In the van conversion market, Travel Equipment Corporation and Recreational Industries are temporarily not manufacturing vans and TRAVCO has permanently stopped production. Argosy is considering ending production. This apparent unstable in-and-out phenomenon can be attributed to two major factors.

In relation to total U.S. production of automobiles, trucks, and vans, the small bus market is very small. Thus the major automobile manufacturers do not yet see this area as an economically sound market. All small bus manufacturing is, therefore, carried out by school bus and recreational vehicle companies by converting a van or by building on a truck or recreational vehicle chassis. Individually these companies cannot afford to do the research and engineering design necessary to produce a better bus. Although some improvements have been made (such as wider doors, improved lift technology, and some esthetic improvements), the small bus, in general,

1. Has excessive downtime because it is a converted, added-on, or built-up vehicle;
2. Has relatively short life expectancy [241 400 km (150 000 miles) at most]; and
3. Takes 4 to 6 months to be delivered.

Social issues combined with government standards also contribute to the instability of this market. The accessibility issue is a good example. Michigan took 1.5 years to decide which buses should be lift-equipped. While the Michigan legislature decided the issue, no new buses were purchased, which built a backlog of over 500 small buses alone. The legislation requires 100 percent lifts in line-haul buses and approval by the Michigan Department of State Highways and Transportation of an accessibility plan for demand-response buses. It is no wonder that manufacturers are uncertain as to the potential market when it is a feast or famine situation. Michigan is still unable to purchase a significant number of vehicles because capital funding is tied to the transportation package that has not passed the legislature and will not pass until after November 1978.

Given this context, how can the situation be improved to start moving toward that better bus? One can improve the purchasing process and make some short-term improvements in the life expectancy of the vehicle.

THE PURCHASING PROCESS

Some efforts are under way to use life-cycle costing (LCC) to evaluate bids. By determining a vehicle's total cost, including the initial capital costs and ongoing operating costs projected over the potential life of the vehicle, one can determine the real cost of the vehicle. The low bidder, therefore, may not be the low bidder on the capital cost of the bus. The obvious drawback is the need for good, sound operating data on the bidder's vehicles.

Road testing of the first vehicles off the line, combined with detailed final inspection, can be used to set a standard for the rest of the purchase order. Otherwise a lot of buses will be sent back to the factory or dealer. Quality control verification and regular visits to the factory are a must. Complete operating manuals and warranties for the chassis, body conversion, and accessory equipment, such as air conditioning or fare box, should be included. The location and reliability of manufacturer or dealer outlets are also critical. Quick service time is essential.

Specifications for the vehicle should be simple and concise. They should not include features that the manufacturer cannot supply or unnecessary frills (just one more item to break down). Tell the manufacturer about

specifications and problems. They can provide solutions within a limited range. The post supporting the lift, for example, may be a hazard in the bus interior. The specifications should not require removal of the posts but rather require adequate protective padding.

IMPROVEMENTS IN VEHICLE LIFE EXPECTANCY

Vehicles should be purchased with proper engine-drive-train combination to fit the operating mode of the bus. From day one, a uniform preventive maintenance program should be implemented and used. Vehicles should be stored inside, especially in cold climates. Cleaning should be regularly scheduled. The vehicle operating distances should be spread evenly across the fleet. At 193 000 to 241 000 km (120 000 to 150 000 miles), major rehabilitation should be considered in lieu of the purchase of a new bus. Rehabilitation must include engine, drive train, and brake systems.

Productive service runs should be maintained; buses that make empty runs should be eliminated or reduced. This will translate into longer life expectancy.

Good driving habits tend to erode the longer the individual is on the job. Pressure to hurry up from dispatchers and to make schedules also force unsafe operations. Jackrabbit starts and stops increase wear and tear on transmissions, tires, and brakes. Management observation and periodic retraining will keep this situation under control, lead to less down time, and increase the life of the vehicle.

Taxis and Subsidized Programs in Rural Areas

Richard V. Gallagher, International Taxicab Association, Washington, D.C.

The taxi industry in rural communities is undergoing scrutiny, especially as it relates to the transportation of special groups within a community—the elderly, handicapped, and others who do not have access to automobiles or to public transit. A major concern of the taxi operators is the survival of small taxi operations of 10 vehicles or fewer in communities with populations of 25 000 or less. This paper describes ongoing small-taxi programs in Lancaster County, Pennsylvania; Houston, Texas; and Indianapolis, Indiana. Possible solutions to the problems of the taxi operator in rural areas, such as direct subsidies, mergers with a centrally located operation, and support through social service agency transportation contracts are examined.

A number of positive actions have been taken to develop an expanding rural public passenger transportation system. There are decisions, however, that must be made to determine the future of rural public passenger transportation.

The bus industry has cited its service to some 15 000 communities, the vast majority of which have populations of 5000 or less. Intracity fixed-route bus service does not provide door-to-door service. Therefore, within each one of those communities the link between the bus stop and the ultimate destination must be provided by either public transportation or the private automobile. At present, most of these communities are served by an informal arrangement of small taxi companies or individual taxi operators. Some effort has been made by county authorities to develop a network of public transportation organizations within the rural communities. Decisions will have to be made about the feasibility of working through existing service arrangements or generating new ones.

Another major concern is whether or not a vast network of government-controlled (if not government-owned) transportation facilities should be developed in the rural communities. Except for studies by Gorman Gilbert and several others, no substantial base exists on which to judge whether or not the current needs of the community are being met.

The taxi industry in rural communities has only one advantage at the present time. It is an in-place service and one that has survived the economic reversals of the past 5 years. Therefore, it is assumed that, given an opportunity to compete in a free market, it will continue to survive in its existing form. However, if certain segments of the service are removed from the marketplace, the inefficiencies introduced will destroy the taxi operations. For example, if a 9:00 a.m. to 5:00 p.m. dial-a-ride service is established that absorbs the bulk of the daily business, then taxicabs will be expected to provide the off-hour service.

A suggested method of dealing with the problem of transportation in rural America was contained in a report issued by the U.S. Senate Committee on Agriculture and Forestry (1). The report used the term "jitneys" to describe what most transportation officials consider as paratransit services. The word "jitneys" is often misused because of its original concept. Before the advent of mobile-radio communications, jitneys concentrated in the areas of major passenger traffic generation and did in fact gain the passengers who would normally take fixed-route vehicles. From today's perspective, we are looking at radio-equipped vehicles that would use route deviations and give door-to-door service. This is a level of service above the fixed-bus route but a step below a shared-ride taxi.

The study noted that individual entrepreneurs in rural areas and especially the smaller cities could be given incentives to establish a jitney-type service. These incentives might include the repeal of antijitney laws in localities where taxi and bus service are deemed inadequate or nonexistent; technical and legal assistance for startup; lower license fees; and cooperative purchase of insurance.

Some of the conclusions contained in Taxi User Characteristics in Small and Medium Size Cities (2) indicate what is actually happening in small communities:

1. Given the nonexistent or inadequate transit service in many small cities, the large proportion of taxi

users indicates that many of them are also taxi-dependent.

2. Use of taxis is largely for trips for which no alternative travel mode is available or feasible.

3. Taxi users in the early part of a month were found to be older, poorer, or more likely to use taxis for nonessential trips. This conclusion suggests that taxi-dependent persons ration their use of this transportation mode later in the month.

4. Taxi use and operations clearly differ in large and small cities. For example, in small cities taxis are more available and operators have fewer market restrictions placed on them.

5. Few taxi users (about 20 percent) in cities where transit is available ever use transit.

SMALL TAXI OPERATIONS

In the past 2 years, the major concern of the taxi industry has been the survival of small taxi operations (10 vehicles or less) in communities with populations of under 25 000. Evidence to date, based on conditions in the industry, indicates a failure rate of about 12 percent per year in this category.

Changing economic conditions, beginning with the energy crisis of 1973, have had a severe financial impact on small taxi operations in communities of 25 000 persons or less. In small taxi operations—where the margin of profit was minimal—the hours of work for the owners were long, they were unable to increase productivity, and operators were forced to seek rate increases. The spiraling prices of fuel, parts, automobiles, and operating costs created an unstable condition.

The taxicab operator in a small community very often is the owner of another business. It may be a service station or a general store that provides taxi service to the community on a demand basis. Dispatching occurs from the other business, and drivers may be retirees within the community available by a telephone call. Sufficient demand does not exist to maintain a full-time service. In the past, such an arrangement provided additional revenue for the operator's main business and employment for individuals who were not seeking a full-time work schedule. When costs outstripped revenues, many small operations simply ceased business. Records of the International Taxicab Association show that 60 percent of the more than 1000 operations that ceased between the years 1974 and 1976 consisted of 10 vehicles or less. It is difficult to determine whether services have been replaced in these communities, or whether a lower level of service has been generated by independent drivers. However, from past experience in collecting information about new company formations, it appears that there have been relatively few entries into the taxi industry in these communities in the past several years.

In view of the declining number of operations by taxi companies, is the system still of significant size to be retained as a segment of rural transportation? Taxi operations in nonurbanized areas and in rural communities must be cost efficient if they are to remain in business. It appears, therefore, that some coordination effort must occur to maintain taxi service. A number of programs are under way and offer opportunities to provide a viable rural transportation system.

Cross subsidization of taxi services and agencies purchasing services for the elderly and handicapped is a possibility. The best method of achieving this goal is a user-side subsidy controlled and directed by the funding agency. The Danville, Illinois, program is well known to transportation providers (3). Taxis would continue to operate in their present modes using either exclusive-ride or shared-ride services to the general public.

An often misunderstood and widely controversial concept has been developed by the U.S. Department of Transportation proclaiming that exclusive-ride taxis are not paratransit and therefore are ineligible for participation in funding programs. However, to date, there have been no funding grants or shared-ride taxicab programs except for the demonstration projects. The fallacy is that exclusive-ride taxis can function in a dual mode, providing services demanded by the customer at two levels of fare that would partly subsidize contractual arrangements with agencies.

The taxi industry as a private provider of services recognizes that the only incentive a public agency has to contract with a taxi company is the sufficient service the taxi operator provides to meet the comfort and convenience demands of the passenger. Also, the service is cost-effective to the agency.

CURRENT PROJECTS

Several projects that are currently under way provide possibilities for social service agencies and government funding agencies to consider.

Lancaster County, Pennsylvania, has established a nonprofit corporation to coordinate all transportation on a countywide level. The Lancaster Integrated Specialized Transportation System (LISTS) is the result of a study conducted in 1976 by the county planning commission. The program calls for the utilization of taxis and buses to provide services to the elderly and handicapped. The objective was to coordinate and integrate all transportation from the member agencies to the member carriers in a cost-effective manner.

The cost, client eligibility, and the mode of transportation are determined by the agency. The taxi company uses a system of comparing metered rates and flat rate per one-way trip. The variance between the metered rates and the flat-rate trip are analyzed monthly. The flat rate provided for shared rides, thus resulting in greater use of the vehicle. The flat rate per one-way trip was established at $1.10. Based on the two methods of calculation each month, the lower total is the actual billing to the agency. The agency determines eligibility by an interview with the client. The number of trips is determined on need in relation to the priorities established. The order of priorities are medical transportation to or from any medical facility, or for prescription drugs; social service appointments such as transportation to or from an appointment at a clinic or therapeutic facility; transportation to or from food stores; other, or special, transportation to or from any location as determined by the agency. The mode of transportation is selected by the agency. Clients physically and mentally able to use public bus systems are provided with bus tickets. Those unable to use buses or with conflicting schedules are eligible for taxi tickets. The tickets are issued for a 6-month period and, at the end of the 6 months, the client is called in for an interview to determine if transportation service is adequate.

Four types of services were developed:

1. Local rural transportation to or from any destination within a small town, village, or urban area not requiring bus service;
2. Transportation to or from community action centers or the Office of the Aging multipurpose centers and usually furnished to groups requiring a 9- to 15-passenger vehicle;
3. Bus-feeder service to or from selected bus stops when a client is normally unable to use the bus due to living beyond walking distance (this service transports rural clients to bus terminal points in smaller towns); and

4. Direct-line transportation to or from smaller towns, villages, and rural areas direct to city and urban areas (transportation is furnished to clients who are physically or mentally handicapped and cannot use public buses; transportation is scheduled at set times that the clients are requested to use so as to decrease the possibilities of transporting them on an exclusive-ride basis).

The program is presently working in two sectors of the county and cost figures are 57 percent lower per one-way trip than prior services. Complaints number 2-3/1000 client-trips, and approximately 80 percent of the complaints are due to the fact that clients do not understand the system.

In 1977, the Houston Yellow Cab Company was awarded a major contract to provide transportation for Title XIX welfare recipients to and from medical providers. The contract was formerly operated by social service agencies and represented a significant departure from previous policies in Texas.

The service area includes ten counties surrounding Houston. Services are available from 8:00 a.m. to 5:00 p.m., Monday through Friday, in Harris County (in which Houston is located) and is available 3 days a week in outlying counties. Harris County accounts for over 2000 trips per month. All trips are routed and assigned to special drivers. Plans are prescheduled and serviced by designated vans.

A program, developed independently of government agencies, has been started by Richard Hunt, president of Yellow Cab of Indianapolis, Indiana. Hunt, recognizing the need for special services for elderly and handicapped, applied for and received a certificate of public convenience and necessity to operate motor vehicles as interstate common carriers. Hunt investigated the need for special service and received support from representatives of the elderly and handicapped groups in the metropolitan Indianapolis area. He became aware of the necessity to provide service in several counties and is expanding his fleet to eventually have 15 vans equipped with hydraulic wheelchair lifts and with a capacity of ten passengers, including two wheelchair passengers, plus the driver. Hunt stated that his intention was to provide an outreach program into the county for individuals who have limited transportation opportunities. Special contractual arrangements are being made with several agencies.

CONCLUSIONS

There appears to be considerable opportunity for using taxis in rural communities. This is true provided the taxi company is of sufficient size and resources to undertake a very complex system of planning, participation, negotiation and contractual arrangements and to purchase specialized equipment. Because the small taxi companies that are operating in rural communities do not have this capacity, they must receive special consideration if they are to be an important part of the rural transportation program.

The majority of the small taxi operators lack the sophistication to engage in prolonged contract negotiations and to discuss the various options available under government programs. They need a simple, straightforward approach and would most likely be receptive to a user-side subsidy. The small company is usually unable to develop and maintain complex accounting and statistical records both in terms of available labor and costs.

It would appear that the agencies desiring to render transportation services in rural communities have an opportunity to establish the performance standards they desire in passenger transportation and the levels of service that must be maintained. Simple guidelines issued to the private providers of service outlining their responsibilities, obligations, and benefits can encourage taxi participation within the transportation network. Undue complications, prolonged negotiations, and delays in implementing programs will result in the inability of small taxi companies to participate.

The ability of the taxi industry to deliver transportation to social service agencies is well established in many major cities. Programs involving taxicab operations are in place in Houston, Texas; Oklahoma City, Oklahoma; Danville, Illinois; Mongomery, Alabama; Akron, Ohio; Wilmington, Delaware; Cleveland, Ohio; Rochester, New York; Westport, Connecticut; Ann Arbor, Michigan; and 15 California cities. Most of the programs have been restricted to the cities because the sources of funds have been local or demonstration projects. In some cases, several taxi companies are participating in the projects.

The report, Social Service Agency Transportation Services (4), supports the taxi industry's position that it can deliver transportation services at less cost than most social service agencies. Current industry statistics report the operating cost of a taxi at 29 cents/km (43.5 cents/mile). Total costs, including overhead and general and administrative expenses, are estimated at 40 cents/km (60 cents/mile) on a national average. The cost per kilometer is the most realistic approach to delivering service to rural areas. There simply is not a sufficient data base on which to establish an hourly rate per vehicle. If the costs are attractive to social service agencies, then it is appropriate to contact small taxi operations.

The taxi association is concerned about taxi operations in rural communities. Support of these operations through social service transportation contracts may well be the key to their survival. The alternative is probably direct subsidies, or mergers of small companies with a viable operation concentrated in one central community and delivering limited services to perimeter communities.

At this time, it is too early to judge the impact of rural transportation programs on taxis. It is the industry's hope that participation in government programs will protect this valuable transportation resource in our small communities.

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Using Taxis to Serve the Elderly and Handicapped

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Three user-side subsidy demonstration projects funded by the Urban Mass Transportation Administration are described, along with an evaluation of six locally sponsored subsidized taxi programs in the San Francisco Bay area. Although these programs are not located in decidedly rural areas, the techniques and methods employed are applicable to the provision of services to the elderly and handicapped living in rural and small-town communities. The study concluded, for example, that subsidized taxi service is especially well suited to low-volume, scattered demand as in smaller communities; that taxi operators are willing to participate in subsidized programs to transport the elderly and handicapped; and that user-subsidized taxi service is a workable, economically viable transportation mode for the elderly and handicapped.

Taxis are by no means newcomers to the area of service to the elderly and handicapped, although the mass transportation field has been slow to recognize the extensive role that taxis play or the potential they offer. Taxis have been either the first choice or the only choice for many elderly and handicapped who do not have access to automobiles.

A national survey of the urban transportation handicapped population recently published by the Urban Mass Transportation Administration (UMTA) (1) reveals some specific facts relating to taxi use and accessibility. Taxis are the most accessible form of public transportation for this group with fewer barriers identified in relation to this mode than with the bus or subway. Only a small proportion (7 percent) of transportation-handicapped people are not able to use taxis at all; 30 percent can use taxis as much as they like. In contrast to the mass transit modes, the key problem with taxi use is affordability. Sixty percent of the transportation-handicapped identify this as a problem. Thirteen percent of transportation-handicapped people use taxis in an average month, generating 7 million taxi trips per month for an average of seven trips per month per user. In this study, a transportation-handicapped person was defined as someone who, because of a specific problem or incapacity, including age, experiences more difficulty using public transportation than a person without a problem and who is not homebound. Given the federal requirement to provide service to the elderly and handicapped, the common response by public transit operators has been to institute demand-responsive minibus systems, usually at a fairly high cost per trip. In an effort to find a range of workable techniques for meeting the mobility requirements of the elderly and handicapped, UMTA has been testing and evaluating several demonstration projects involving the use of taxis. Although there are many special projects across the country involving taxis for this purpose, one of the significant aspects of the UMTA demonstration is that for the first time it has been possible to collect considerable data and to make some fairly extensive analyses of costs, trip rates, and characteristics of users and nonusers.

These taxi demonstrations are in the category of user-side subsidy. The term user-side subsidy denotes that the subsidy involved goes directly to the consumer of transportation services, rather than the traditional method of providing a systemwide subsidy to an operator. For example, tickets can be purchased by the consumer at a discounted rate, used in payment for transportation service, and redeemed by the provider at face value. Thus, the user receives a reduction in out-of-pocket costs for each trip, while the supplier receives the standard fare. The revenue received is only for trips actually taken. The user also has the flexibility to patronize the provider that he or she feels gives the best service. User-side subsidies involving taxis are an alternative approach with some potentially significant benefits. These benefits include the following:

1. Lower overall costs because only trips provided are paid for, and taxis generally have lower operating costs than demand-responsive services operated by transit authorities;
2. Ability to utilize an already in-place provider mode that is generally available;
3. Support and bolstering of existing private taxi operations, many of whom have marginal profits to begin with, particularly outside of major metropolitan areas;
4. The flexibility to easily control the amount of subsidy devoted to the program by adjusting either the discount rate per trip, the number of trips allowed per individual in a given period, or by redefining the eligible population; and
5. Avoidance of having to contract with a single provider at the risk of driving competition out.

ONGOING DEMONSTRATION PROGRAMS

Following is a brief description of three user-side subsidy demonstrations funded by UMTA, and an evaluation by Crain and Associates of six locally sponsored subsidized taxi programs in the San Francisco Bay area (2, 3). Unfortunately, these sites are not in exclusively rural areas and they do not involve the long distances that people in rural areas often must travel. Many of the basic techniques and findings, however, are still applicable to small towns and rural areas. User-side demonstrations are ongoing in Danville, Illinois; Kinston, North Carolina; and Montgomery, Alabama. A fourth is soon to start in Lawrence, Massachusetts. The first two sites have taxi service but no public transit systems. Montgomery has both taxi operations and a fixed-route transit system. Program participants use the taxi services in the same manner as the general population by calling and requesting a trip. No advance notice is required. The subsidy rate to the user for these programs has ranged from 50 to 75 percent of the actual taxi fare.

Consistent with UMTA's emerging paratransit policy, taxis must permit shared rides in order to participate in UMTA-funded user-side subsidy projects. Thus, the driver may deviate from the direct route to a destination to pick up another rider who is going in the same general direction. This would be done only when two trip requests were easily combined and would not require prescheduling of trips or adjustment of desired trip times in order to share the trip with another user.

Two types of subsidy mechanisms are being tried: books of tickets purchased by the user in advance at a discounted rate and used as needed; and the voucher, or charge, slip. Charge slips are maintained by the taxi

driver and signed by the certified user, who then pays cash for the discounted value of the trip. With both methods, the taxi operator submits the tickets or charge slips to the city and is reimbursed. These two mechanisms are being evaluated from the standpoint of expense and simplicity of administration, potential for fraud or misuse on the part of both users and taxi operators, and overall program control.

Another intent of these programs is to find out more about the travel characteristics and travel demand of the target group, when a low-cost, relatively unlimited supply of high-level service was made available. Therefore, participant eligibility was established for anyone age 65 or over and handicapped persons of any age. A $20 ceiling was set on the amount of subsidy available to each individual per month, but there were no restraints on trip purpose, distance, or time.

The locally sponsored subsidized taxi programs that have been evaluated are in six San Francisco Bay area locations—San Leandro, Santa Clara County, Sunnyvale, Palo Alto, Lafayette, and Fremont. Typically, these projects have more restrictions than the UMTA demonstrations, either in terms of eligible target population or service constraints. Some projects require low income and some form of mobility impairment in addition to age, and there are also requirements in terms of geographic limitations. In some cases only specific trip purposes are eligible and advance reservation must be made for service. Three of the California programs are being supported by American Automobile Association funds, two city councils have committed general funds to the programs, and one community is using its revenue-sharing funds.

CONCLUSIONS

Although all the programs vary in terms of site characteristics and other variables, they share common features that make this a promising method of providing transportation for elderly and handicapped. The following conclusions have been drawn from the experience with these projects:

1. User-subsidized taxi service is a workable, economically viable mode of providing transportation to the elderly and handicapped. The already in-place service capability means there is little or no front-end capital investment required. Start-up problems tend to be minimal.
2. Subsidized taxi service is especially well suited to low-volume, scattered demand, which can exist in small communities.
3. Because taxi service is an existing, familiar form of transportation, it requires minimal consumer education or training. Elderly and handicapped clients seem to experience no major problems in using the service, and are quite capable of managing complex payment systems involving scrip, voucher sheets, reorder forms, and the like.
4. Concerns that the programs would trigger extremely high levels of demand have proved to be unfounded. On the average, 20-40 percent of the eligible target population register to use the service, but a much smaller percentage is actually using the service on a regular basis. There seems to be a small segment that relies heavily on the service, while the great majority of those eligible have alternative modes available and use the program occasionally or as a backup.
5. Taxi operators appear ready and willing to participate in arrangements with local governments, social service agencies, and other funding providers in order to offer taxi service to elderly and handicapped people. Although such a service often creates additional paperwork for the taxi provider, the administrative burdens were felt to be tolerable by the taxi companies. In general, they felt that their business was enhanced by such programs, and they are willing to absorb the extra administrative burden without raising prices. It was noted that companies and drivers should be thoroughly informed in advance of their record-keeping responsibilities.
6. Workable financial arrangements are possible. Most companies are willing to accept an arrangement involving reimbursement for taxi services delivered, if the reimbursement can be made promptly without aggravating their cash-flow situation.
7. The administrative cost to the sponsor of supporting user-subsidized taxi services seemed to increase the cost per passenger trip by approximately 15-20 percent. In most programs the administrative problems were minor. Detailed record keeping is essential, however, for good budgetary control of the program. Sponsoring agencies should also ensure that their records are adequate for audit by their funding agency.
8. To date, no significant group or shared riding has been occurring. Although the UMTA demonstrations require that participating taxi operators offer a shared-ride option and shared riding is encouraged by the California projects, there is still little incentive for group trips on the part of the provider and the rider. Because this would serve to lower the total cost per passenger trip, attention needs to be given to developing effective ways to aggregate demand and accomplish more shared riding.
9. None of the systems studied have a total capability to serve the handicapped. That is, none can serve people who cannot use a conventional taxi vehicle. One solution to this might be the purchase of a special wheelchair-accessible vehicle, which could be operated along with the regular taxi fleet.

In relation to these last two points, experience in Portland, Oregon, is interesting. The transit authority operates a lift-equipped minibus demand-responsive service for the handicapped. It contracts out some of the trips that do not require special vehicles and that may involve longer than usual distances to a local taxi operator. The per-trip cost in doing this is significantly less than transit-company provided service and also frees the buses to provide higher volume service.

The user-side subsidy concept has also been tried on a statewide basis in West Virginia as part of its TRIP program. The state welfare department makes available to all low-income elderly and handicapped persons an $8.00 book of trip tickets monthly, for which the client pays approximately $1.00. Approximately 90 percent of the existing public and private providers have volunteered to participate in the program through the acceptance of TRIP tickets. This includes city bus systems, intercity buses, Amtrak, and taxi operations. Taxis, however, remain the primary mode on which the target group uses its TRIP tickets. An overall summary evaluation of the TRIP program is expected within the next year. This will describe both the operation of the ticket system on a statewide basis and the efforts at provider development in the rural areas of the state.

In summary, the experience using taxis to serve the elderly and handicapped in these cases has been quite positive. It is clear that taxis represent a mode we cannot afford to ignore as innovative transportation solutions are developed. More work particularly needs to be done in the areas of brokering services and integrating funds from various sources into subsidy programs.

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Abridgment

Identifying and Serving the Elderly and Handicapped in Rural Areas

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Transportation of the elderly and handicapped is supplementary to the main objectives of urban transit but fundamental to rural public transit. In urban areas, the major purpose of public transportation is to provide journey-to-work travel along corridors of high-density residential population to a central area of intensive employment. Beneficial side effects are produced, such as reduced rush-hour traffic congestion in central areas by the substitution of transit for automobile travel and increased accessibility to specific locations for purposes of high-density urban development. The same scale of effects is not possible (and not necessarily desirable) for rural public transportation.

Conventional mass transit for journey-to-work travel is not feasible in rural areas because places of employment are widely dispersed and residences of workers are even more widely scattered. Experience shows that the rural transportation-disadvantaged commonly use carpools and other shared-ride concepts for journey-to-work between several residences and individual places of employment. Job-centered van pools for employees of a single industrial plant or business enterprise are a good possibility for rural public transportation. School-bus-sized operations with fixed-route service from each passenger's home to a single place of employment might work if enough employees could be persuaded to ride. These are even more useful models for effective transportation of the elderly and handicapped in rural areas.

Given that the focus of rural public transportation is on the elderly and handicapped, it is necessary to identify the elderly and handicapped. Not all rural elderly and handicapped are transportation disadvantaged. However, those without access to an automobile are probably disadvantaged.

In 1974, 18 percent of the households in nonmetropolitan areas did not own an automobile, compared with 25 percent in metropolitan areas (1). Even more dramatically, almost 40 percent of households whose head of family was over age 65 owned no automobile, but fewer than 20 percent of all other households owned no vehicle. The relative transportation disadvantage of elderly households is compounded by the high incidence of such households in rural areas. Fully 21 percent of all households in rural areas have a head of family who is over age 65; as many as 27 percent of households in areas under 2500 population are headed by elderly persons (2).

Unlike the data on the elderly, no definitive data exist on handicapped individuals. It is believed that the incidence of automobile availability in households of handicapped people is probably greater for handicapped persons than for elderly people. Those handicapped persons without access to an automobile are individuals who need to be identified.

Local social service and welfare agency data can provide the necessary details of this primary target group. Data on hospitals, clinics, and senior citizens are available to offer specific information on the physical, economic, and other characteristics of their clients. Detailed address data will help

Table 1. Illustrative list of data sources.

Agency or Institution	Residential Address	Economic Data	Social Data	Health Data	Trip Frequency	Ongoing Transport Services
Social service agency	X	X	X	X	X	X
Health center	X		X	X	X	X
Neighborhood center	X		X		X	X
Senior citizen housing	X		X		X	X
Senior citizen center	X		X		X	X
Hospital and clinic	X	X	X	X	X	X
Vocational center	X	X	X	X	X	X
Rehabilitation center	X	X	X	X	X	X
Employment center	X	X			X	X
Reduced-fare card (transit authority)	X	X				X
Private organization (Red Cross, Easter Seals)	X		X		X	X

determine travel requirements by origin and destination, may contain historical trend information of trips, and can provide an important source for surveying potential system users. Table 1 is an illustrative list of some of the agencies that can be canvassed and the information they may provide.

In addition to addresses and other information maintained by these organizations, supplementary data can be obtained from direct survey of the primary target group. Interviews of elderly and handicapped individuals will determine whether they own automobiles and to what extent they need public transportation. A very efficient, and less costly, method of identification is to correlate elderly and handicapped social service clients' names with automobile registrations and operator's license holders to find those who do not own or operate vehicles. This will identify the most fundamental target group for rural public transportation of the elderly and handicapped. Special effort may be necessary to implement this efficient method of identification, working with the state department of highways or transportation to achieve the cooperation of the motor vehicles bureau.

Undoubtedly, there will be other rural inhabitants besides the elderly and handicapped who do not own automobiles, who could benefit from rural public transportation, including those who are not social service clients and may own automobiles but prefer not to drive. Also, the very young, who cannot operate vehicles, and others who would desire to use public transportation could be identified. It may be preferable to identify the fundamental client group of elderly and handicapped households who do not have private vehicles available, and then, as system capacity is developed, permit self-identification of supplementary passenger groups.

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