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-