Planning Guidelines for Coordinated Agency Transportation Services

April 1980

REISSUED VERSION

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PLANNING GUIDELINES FOR COORDINATED AGENCY TRANSPORTATION SERVICES

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INTRODUCTION

Planning Guidelines for Coordinated Agency Transportation Services is the first report in a two-part series which provides guidance for the identification and assessment of coordination concepts that are feasible for a local community. The second volume, *Implementation Guidelines,* describes the process by which an identified conceptual approach is turned into an operating system.

The goal of transportation coordination is a more responsive, efficient, and reliable transportation system, developed through the cooperative use of transportation resources in the local community. These two guidances tell how to plan and implement coordination activities in any environment—rural, small cities, or metropolitan centers. While the focus of these guidances is primarily on human service agency transportation services and the benefits of coordination for them, there is also an emphasis on the coordination of agency transportation with public and private transportation providers.

Coordination can result in more efficient use of existing agency transportation resources and can lead to cost savings, increased use of transportation services, and greater program reliability. Coordination can also help create a link between local agencies and build a more effective transportation structure, one that can put future funding to its most effective use.

Planning Guidelines describes the concept of coordination, its potential benefits to the human service agency network and the community, and its applications in a variety of community settings. Chapter 1 describes the basis for coordination planning within the present community transportation structure. Chapters 2 and 3 describe coordination approaches that can correct an array of potential deficiencies, including the following:

- Operations of vehicles by numerous agencies, resulting in inefficient utilization of vehicles
- Inability of agencies to secure adequate transportation services for their clients at a reasonable cost
- Critical need to provide transportation services to persons unable to use existing public transit
- Disparities in rates charged and/or quality of service for similar transportation services.

With this background, Chapter 4 describes the coordination planning approach, which is based on an analysis of current conditions and an assessment of coordination potential. Using simple measures of vehicle use, client need, and total cost, a framework is presented for determining a practical community approach to coordination. The coordination approach that results from this assessment will subsequently serve as the basis for a system design plan.

Finally, Chapter 5 describes the coordination planning process in urban and nonurban settings, dealing with institutional arrangements, community organizations, and the regulatory environment.

It is likely that many communities have considered coordinating various transportation services for similar reasons but have been uncertain about the best way to approach and plan for coordination. It is hoped that these guidelines will provide any interested community with the background and tools required to develop a coordinated program in a comprehensive and rational manner.

TRANSPORTATION COORDINATION: THE BASIC IDEA

During the past decade, there has been a tremendous growth in the number of human service programs being offered by local agencies. These programs are generally the result of special federal or state grants aimed at helping specific population groups. Because the success of these programs is highly dependent upon transportation, you may also have noticed a corresponding growth in the number of agency transportation services, as each agency does what it can to solve the needs of its own clients.

These agency transportation services have evolved into a significant resource, particularly in the following locations:

- Rural and small urban areas where no public transportation exists
- Urban areas where public transit exists but is unusable by persons with special needs.

In such situations, the collective experience of various agency transportation services forms a valuable resource for shaping a system that is responsive to the mobility needs of vulnerable population groups.

Transportation coordination is a cooperative arrangement between transportation providers and organizations needing transportation aimed at realizing increased benefits through the joint operation and/or administration of one or more transportation related functions.

The basic idea of transportation coordination is quite simple. Alternative approaches are based upon the fact that virtually all communities have both providers and purchasers of transportation services. Transportation providers may include public transit systems, private taxi companies, and human service agency-operated transportation systems. Transportation purchasers include the general public, agencies, local governments and other organizations that purchase transportation for the people they serve. In planning for coordination, one is looking for ways that providers and purchasers can work together to make the best use of vehicles, people, and all other community resources that go into providing transportation.

There are indentified benefits that can be realized through coordination:

1. *Eliminating Duplication of Transportation Services.* In many instances you will find two or more providers operating vehicles in the same neighborhood. By working together the providers can find ways to pick up all of their passengers without using so many vehicles and drivers. This saves money, time, and fuel.
2. *Making Better Use of Underutilized Equipment, Expertise, Facilities, or Other Resources.* Providers may have equipment, such as a vehicle or a maintenance facility, that is not fully utilized. By sharing that resource with appropriate reimbursement, cooperating providers can reduce their overall costs.
3. *Matching Transportation Providers with Transportation Purchasers.* In any area with many transportation providers there are bound to be variations in the cost and quality of service. Through the sharing of information and working out of service agreements, purchasers will be able to identify providers who best meet their needs for transportation at the right combination of service quality and cost.
4. *Taking Advantage of Volume Purchasing Power.* Providers can work together to get better prices on volume purchases of items ranging from gasoline to office supplies. These cost savings translate directly into reduced costs for transportation services.

By taking advantage of coordination in any of these ways, a community may realize a number of benefits and achieve improvements in local transportation services. These benefits include the following:

- Higher quality, more reliable transportation service
- Increased transportation service to agency programs
- Reduced costs for the transportation provided
- Improved allocation of staff time
- The ability to provide more trips
- Increased community influence

In addition, transportation coordination can be the first step in improved and coordinated relations in other human service program areas as well.

The benefits of coordination can be substantial. Although each community may not obtain all of the benefits listed above, the benefits that will accrue in the long run make investigation of the concept worthwhile.

TRANSPORTATION COORDINATION: A DESCRIPTION

Transportation coordination can be implemented in any setting. All it requires is a small number of agencies interested in the concept, staff time to study and analyze the present transportation system, and a willingness to enter into cooperative arrangements.

There is no "proper" number of participating organizations for a coordination program, and in fact you can begin with only two or three agencies wishing to cooperate with each other to address a common need. As a result, coordination can occur in the most rural areas or in major metropolitan areas, with some variations, of course.

Obviously, major urban/metropolitan and small urban/rural environments have quite different characteristics for coordination. In a major urban or metropolitan center, one is likely to find a vast array of human service agency programs. In addition, urban public transportation operators will often provide "special efforts," including demand-responsive services to elderly and handicapped persons. Also, urban taxi companies and other private specialized transport services may provide many client trips through HEW reimbursement programs. As a result, the coordination effort of an urban/metropolitan area will occur in a complex, resource-rich environment. In such a situation, the potentials for coordination are great, but the process itself may be difficult. In urban areas, it is most appropriate to work out the coordination planning process through the Metropolitan Planning Organization (MPO), a governmental body designated to provide transportation policy and planning for all transportation services in the urbanized area. The MPO will be aware of and/or involved in the human services planning/funding process, which will help the entire coordination planning process. By working with the MPO, agencies can develop appropriate approaches to the transportation alternatives and the coordination planning process.

Coordination can be equally effective in a small urban or rural area, where transportation resources are usually less numerous. There may or may not be a public transit operator, which in turn may or may not provide specialized services for elderly or handicapped persons. Taxi services and special user group transport services are less prevalent, reflecting the smaller populations in these areas. As the population size is reduced, the number of human service agencies providing transportation is also reduced. In short, the small urban and rural areas have a less complex set of transportation resources.

In 1978, Congress enacted a formula grant program providing nonurbanized areas federal operating and capital transit assistance. Commonly referred to as Section 18, this program contains provisions encouraging greater coordination in rural areas. It also provides funds for coordination planning.

Coordination can occur anywhere that human service agencies and other local providers are willing to work together to develop a framework and approach to their common transportation difficulties. All that is required is a recognition of the existing problems with the transportation delivery system and a recognition that each provider and purchaser stands to benefit from coordination improvements.

It should be noted that not all of the participants in the coordination planning process will derive the same benefits if a coordination project goes ahead. In some cases, a needs assessment would show that some agencies will not derive any direct benefits from coordination and, therefore, should continue to operate or purchase transportation as they have done in the past.

Transportation coordination can take many forms, depending upon the situation for which it is intended. The following discussion introduces the program components of a transportation service and some of the situations in which coordination concepts may be applied.

The management of any transportation service by a provider can be divided into three areas: *vehicle operations, maintenance,* and *administration.* Within each area a specific set of key functions is performed:

- *Vehicle Operations.* Functions related to carrying passengers: accepting trip requests, routing, scheduling, and dispatching vehicles.
- *Maintenance.* Functions related to taking care of vehicles (keeping them in proper condition): storage, routine and preventive maintenance, major repairs, and maintenance-related purchasing.
- *Administration.* Functions necessary to support vehicle operations and maintenance: supervision, information and referral, billing and accountability, record keeping, planning and marketing, driver training, and purchasing.

Because each provider carries out these same functions, local transportation systems commonly have a good deal of operations and maintenance overlap and duplication of administrative functions. A number of illustrations can help demonstrate these points, as well as the role that coordination can play. These situations also illustrate the active roles that purchasers can assume in a coordination program.

Figure 1 shows a typical operating situation. Two separate agencies have riders to be picked up in the same general area at approximately the same time. Each agency responds by dispatching its own vehicle. By working together, these two agencies could use *ride sharing,* a technique designed to increase the utilization of vehicle time. In ride sharing, the two agencies would send only one vehicle to pick up all

the riders for both agencies. Thus, the same number of trips would be made, but the agencies would pay for less driver time and reduced mileage-related costs. Under the proper conditions, ride sharing will provide substantial savings of agency resources. For example, Project Respond, in Fayetteville, Arkansas, has been placing 12-15 clients per day on vehicles of existing rural transportation providers. In the past, either these persons would have been denied trips, or Project Respond would have had to increase its transportation resources to meet those needs.

A second technique aimed at improving the efficient use of vehicle resources is vehicle *time sharing,* shown in Figure 2. Agency X uses its vehicle in the morning to make rider pick-ups and again in the afternoon to take them home. In the interim period the vehicle is idle. Under the time-sharing technique, Agency X allows its vehicle to be used by other agencies under a cost-reimbursement plan. Depending on the terms of the plan, the vehicle may be made available with or without a driver.

Both ride sharing and time sharing are applicable in most situations. Their use depends in a large part upon local agency transportation conditions, including client locations, time of trips, and vehicle availability. These techniques provide benefits to purchasers, who can make use of space available through ride sharing or take advantage of idle vehicle time through time sharing. The concepts of ride sharing and time sharing are implemented through the use of two coordinated operations management approaches, an *operations clearinghouse* and *central dispatching,* which are fully described in the next section.

Each operator with vehicles must maintain those vehicles. Consequently, each operator must either have a garage and mechanics available or else purchase these services. In a typical community, there will be a range of maintenance services and arrangements with a wide variety of costs and skills inherent in their programs. Coordination of the programs involves bringing these skills and resources together to create better overall maintenance for all of the providers and more reliable service for the passengers.

In order to provide effective service, each provider has a number of administrative functions to perform. Each agency must make certain key purchases, such as gasoline, insurance, and office supplies. Without coordination, each goes into the marketplace separately to make the best deal available. But if the agencies combine their purchases, their purchasing power will increase, which may result in dramatic cost savings. For example, joint insurance purchasing in Oregon is saving member agencies of the Oregon Special Services Association (OSSA) between 43

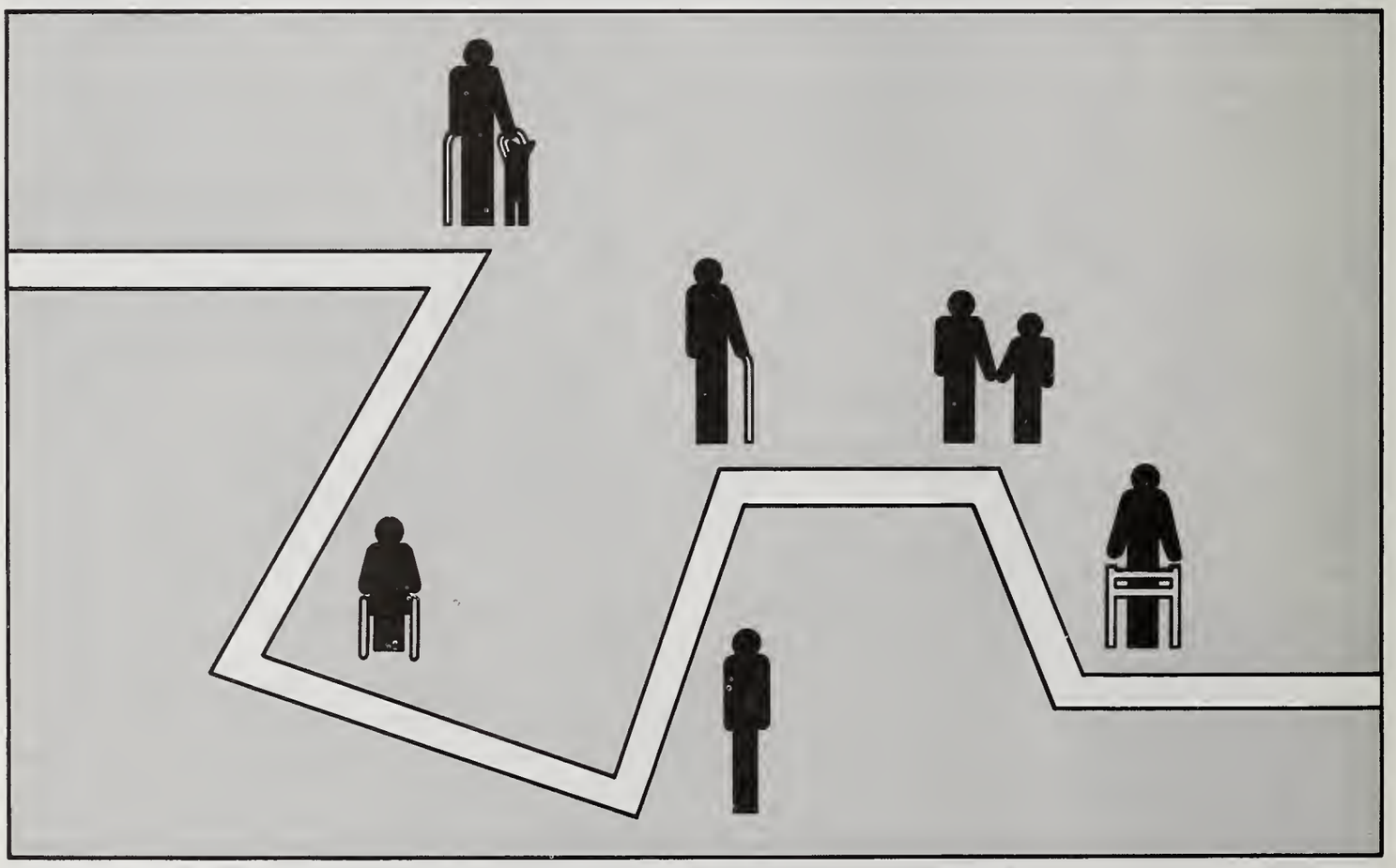


FIG 1. Ride-Sharing.

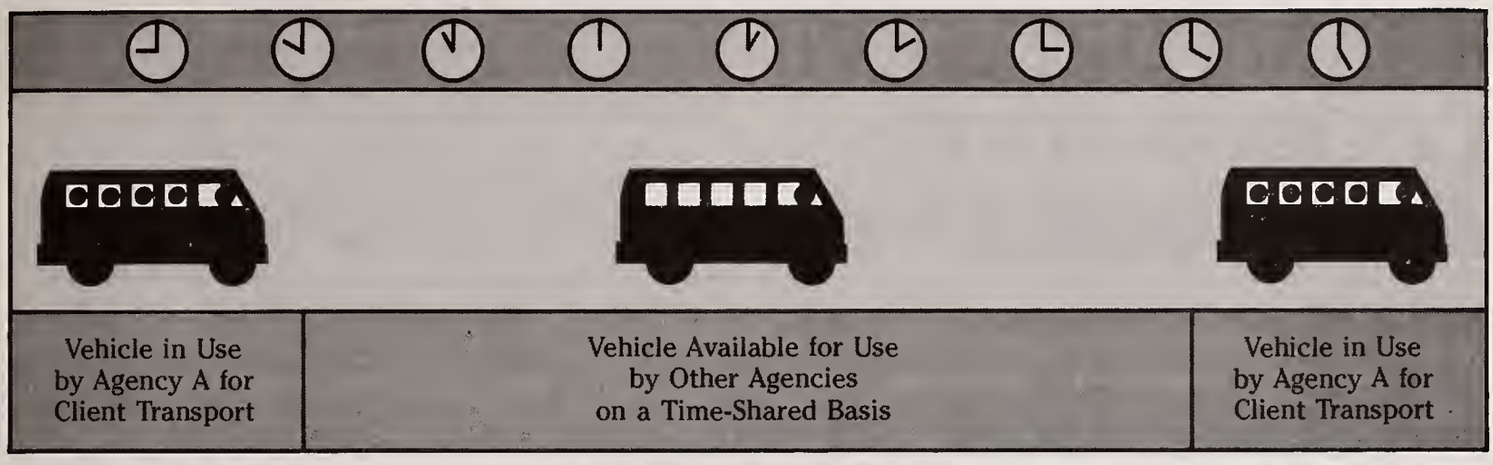


FIG 2. Time Sharing.

and 68 percent of their annual premium costs prior to coordination. Another example of administrative duplication is the cost of employee training. Each agency usually trains drivers and dispatchers to handle its own special transportation needs. These programs often include periodic refresher courses. Under a coordinated approach, each agency would pool its training resources into one program, which could be made uniform and more comprehensive through the use of common training elements.

The situations cited above demonstrate only a portion of the potential savings and service quality improvements that can be achieved through coordination. They are intended to illustrate what coordination can do through the elimination or reduction of duplication and waste. The coordination approaches that can be developed to address these problems are described more fully in Chapter 3.

TRANSPORTATION COORDINATION: APPROACHES

There are many ways in which coordination can take place. Each approach has certain effects on the three major areas of responsibility of a transportation provider: vehicle operations, maintenance, and administration. The relationship of these approaches to the activities of a transportation provider is shown in Figure 3.

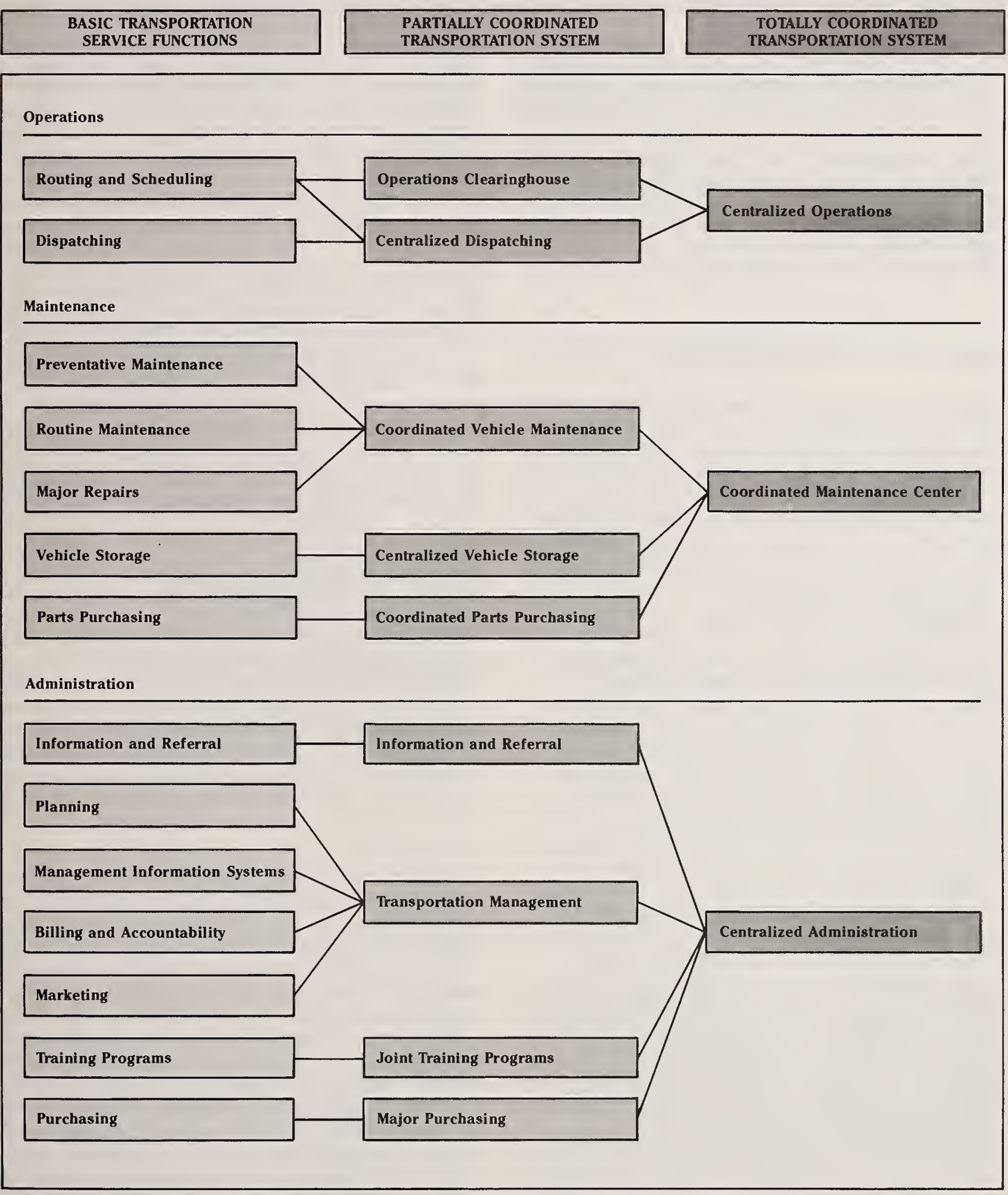


FIG 3. Relationship of Coordination Approaches to Provider Transportation Functions.

VEHICLE OPERATIONS COORDINATION

Vehicle operations, the group of activities necessary to transport passengers, is made up of two major activities: routing and scheduling, and dispatching.

- *Routing and scheduling* is defined as the process whereby trips are assigned in advance to specific vehicles such that route and time schedules can be developed before service is provided.
- *Dispatching* refers to the direct control of vehicle operations as the service is being provided.

These two activities are the bases for the two coordinated vehicle operations concepts: the *operations clearinghouse* and *central dispatching.*

Operations Clearinghouse

Many agency transportation operations provide services on an advance-request basis, with trip arrangements prescheduled, often on a recurring basis, one or more days before the trip takes place. This procedure makes it possible for the routing and scheduling of vehicles to be accomplished in advance. Thus, any agency that operates with prearranged or fixed routes and schedules will have this information available well before any trips are made. This information represents a resource that can be used to facilitate coordination.

The *operations clearinghouse* concept involves the development of a central information center for the planned vehicle operations of each participating agency. The routing and scheduling information collected by this center represents a detailed picture of all vehicle operations for each day, which can be updated whenever there is any change in planned patterns of operation. Participating agencies use the clearinghouse whenever they have a need to arrange transportation for one of their clients. The purchasing agency simply contacts the clearinghouse with the trip request. The clearinghouse makes a determination of available capacity or available vehicle time, and then makes arrangements for the actual trip. Service requests may be either *ride-shared* or *time-shared.* In either case the provider has agreed in advance to the use of its vehicle on a shared basis, under specific conditions with established reimbursement arrangements. The vehicle remains under the control of the provider.

FAYETTEVILLE, ARKANSAS:
OPERATIONS CLEARINGHOUSE

One example of an operations clearinghouse is being demonstrated in Fayetteville, Arkansas, as part of the HEW transportation coordination project. The clearinghouse project is operated by a private nonprofit agency. There are sixteen agencies participating in the project, representing a broad range of groups including children, elderly, developmentally disabled, and persons who are economically disadvantaged. Agencies needing transportation services call the clearinghouse at least one day in advance. The trip is arranged and confirmed by the clearinghouse. As a first choice an attempt is made to place the trip on a vehicle that is already scheduled to carry passengers (ride sharing). If that doesn't work the trip is placed on a vehicle that will be idle at the time (time sharing). There is an established charge to purchasing agencies on a per trip basis for use of the vehicle without a driver or with a driver. The purchasing agency is billed at the end of each month. A portion of the payment for transportation services is retained by the clearinghouse to help cover clearinghouse expenses.

Centralized Dispatching

The second major vehicle operations activity is dispatching, which is the control over the movement of vehicles in their daily operations. Even in a system where all trips are prescheduled, there is always a need for a dispatcher to be in contact with the drivers. This communication is necessary to make any adjustments in vehicle schedules or routes required as a result of vehicle breakdowns, weather, or last-minute changes in agency or client plans.

A coordinated transportation system may include *centralized dispatching,* whereby participating providers agree to have their vehicles controlled by a central dispatcher. The central dispatcher provides routing and scheduling services and dispatching aimed at obtaining maximum efficient use of the vehicles, while assuring that participating provider agencies can continue to serve all of their clients on a regular basis. The major advantage of centralized dispatching is that it allows for the rearranging of scheduled trips and the insertion of new trips on the same day of service. This flexibility makes it easier for purchasing agencies to arrange trips on short notice. Centralized dispatching also helps in situations where the time of a return trip is uncertain; rather than keeping a vehicle on standby to accom-

modate the return trip, the dispatcher can simply send a vehicle when the passenger is ready.

Centralized dispatching involves central control over the daily movements of provider agency vehicles. In all other respects the vehicles may remain under the control of the provider organization. The benefit to the provider agencies comes through reimbursement for the use of their vehicles on either a ride-sharing or a time-sharing basis. A private provider, such as a taxi operator, would be likely to participate only if he could provide the centralized dispatching service, thereby maintaining control over his own vehicles' movements. Any other form of participation would require assurances that any vehicles dedicated to the service would be able to operate profitably.

Centralized dispatching requires a considerable amount of planning and cooperation on the part of the involved agencies, but once it is in operation, the overall result is a more efficient use of vehicles, better back-up service potential, and increased capacity to serve more passenger trips.

While centralized dispatching offers advantages beyond the operations clearinghouse, the two approaches must be integrated to achieve maximum efficiency of vehicle operations. For agencies that are hesitant to yield control of their vehicles, a two-step progression, from an operations clearinghouse to centralized dispatching, may be the most acceptable approach to operations coordination. An operations clearinghouse and centralized dispatching are the major options for agencies that would like to coordinate their vehicle operations. Both innovations will involve ride sharing and time sharing as natural outcomes when the patterns of vehicle operations of participating agencies permit. It should be noted that organizations that purchase trips but have no vehicles of their own could be participating agencies in both coordination functions.

Billing and Accountability. Both the operations clearinghouse and centralized dispatching may be involved in billing and accountability. (Billing refers to the provider's billing of purchasers for the cost of transportation services provided. Accountability refers to the provider's keeping of records to show the purchaser the number of trips taken, when, and by whom.) The responsibility for billing and accountability may be delegated to the clearinghouse or dispatching center, or it may be retained by the provider agencies. If the provider agencies retain this responsibility, the clearinghouse/dispatching center must provide them with any required billing/accountability information.

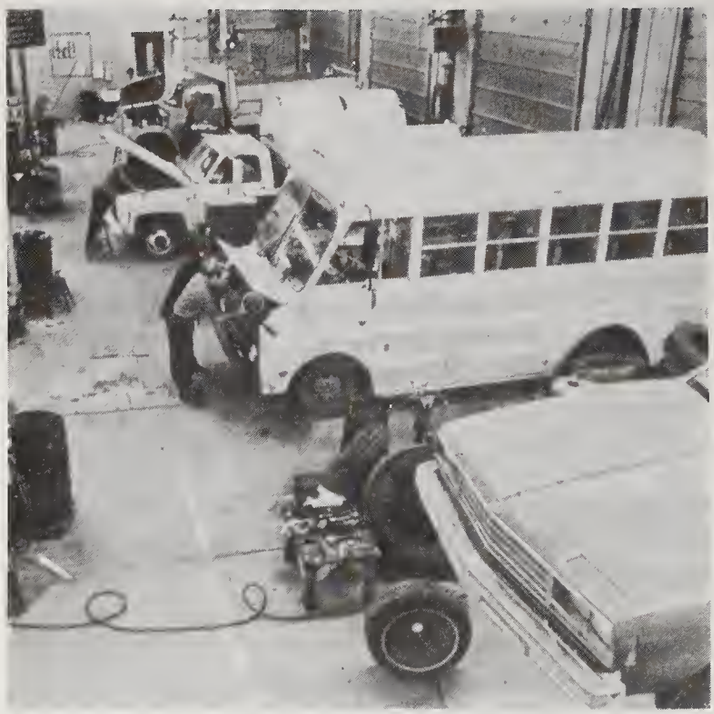
HOWARD COUNTY, MARYLAND: CENTRALIZED DISPATCHING

The Urban and Rural Transportation Alliance (URTA) in Howard County provides centralized dispatching to each of its participating agencies. Agency personnel submit client trip requests to the URTA dispatcher, including the day and time of the client's appointment and the client's address. The dispatcher integrates these requests into the vehicle schedules and notes the expected pick-up time for each client. The dispatcher then forwards a copy of the list to the agency, which in turn informs the client. Trips are provided on a contract basis to the agency, and no additional fee is charged.

MAINTENANCE COORDINATION

Transportation providers must have adequate facilities, skilled personnel, and readily available supply of parts to properly maintain their vehicles. They may either retain these skills and resources in their own maintenance shop, or contract with another agency or private garage for vehicle maintenance services. In either case, coordination approaches can be used to reduce maintenance costs and/or increase the performance reliability of agency vehicles and transportation services.

The three maintenance activities that can be coordinated are *vehicle maintenance, maintenance-related purchasing,* and *vehicle storage.* Since these activities can be performed independently, the coordination of one of them can be considered as a separate concept. In many instances it will be most practical to combine two or three of these activities; when all three are combined, the resultant system is called a *coordinated maintenance center.*



Coordinated Vehicle Maintenance

Actual maintenance of vehicles involves more labor and expense than parts purchasing or storage. By coordinating vehicle maintenance, providers may produce a volume of maintenance work that makes it feasible to either set up one central maintenance facility or obtain lower charges from existing maintenance facilities. Another possibility for coordination is the use of the maintenance facilities of a participating agency that can handle additional maintenance work.

Coordinated Parts Purchasing

The purchase of gasoline, diesel fuel, and vehicle parts is considered a separate maintenance activity. In most cases, when vehicle maintenance is being centralized it is advantageous to also centralize fuel and maintenance parts purchasing. However, coordinated purchasing is possible even without a centralized maintenance facility. Potential cost reductions and discounts through volume purchases make coordinated purchasing an attractive alternative in its own right.

Centralized Vehicle Storage

The storage of vehicles not currently in use is the third maintenance activity. Typically a transportation provider will try to maintain and store vehicles in the same facility from which he dispatches the vehicles. However, in some cases this may not be possible. In many situations the risk of vandalism makes it important to store vehicles in a secure area. For extreme cold weather conditions, vehicles should be stored inside a temperature-controlled building. If agency providers are paying high costs for storage space, or are dissatisfied with their current facilities, coordinated storage in a better facility may prove attractive, on either a cost or a vehicle-reliability basis. Of course, centralized storage will be useful only to those providers whose service areas are within a reasonable distance of the facility.

Coordinated Maintenance Center

A coordinated maintenance center ties together the three maintenance activities and enables participating agencies to purchase any one or more of these activities from a central facility. A coordinated maintenance center must be of adequate size and have sufficiently skilled staff to handle the anticipated maintenance volume. In addition to providing the three maintenance activities, a coordinated maintenance center can also offer a spare vehicle pool. Since most transportation providers have a certain number of spare vehicles, the storage and maintenance of these vehicles at the maintenance center would create a larger pool of spare vehicles. This pool could be used to the advantage of all participating providers by allowing time-shared use on a cost-reimbursement basis when providers' vehicles were being serviced or repaired.

GRAND RAPIDS, MICHIGAN,
AND FAYETTEVILLE, ARKANSAS:
COORDINATED MAINTENANCE PROGRAMS

The Grand Rapids Transit Authority (GRATA) demonstration project has developed a coordinated vehicle maintenance service that charges agencies a basic hourly rate for preventive and repair maintenance, plus the cost of parts. Parts are discounted at 40 percent off the regular retail price. GRATA provides regular vehicle inspection programs as an integral part of the maintenance service.

In Fayetteville, the demonstration project offers a parts-purchasing service and a centralized maintenance shop to participating agencies. In this case, the parts are discounted at 40-50 percent off the retail price to which agencies were previously accustomed. The repair work has variable rates; there is a set annual charge for the complete preventive maintenance program and for a number of regular repairs.

COORDINATION OF ADMINSTRATIVE FUNCTIONS

Every transportation provider has a number of administrative activities necessary for the management and operation of a transportation service. Some of these administrative activities can be coordinated between agencies in much the same way as vehicle operation and maintenance. In most cases, however, transportation administration is integrated into the overall administration of an agency's program, making it difficult to separate some activities for coordination. Nonetheless, there may be advantages to agencies in the coordination of such administrative activities as transportation supervision, information and referral, training, and major purchasing. Approaches to the coordination of these activities are described in the following sections.

Transportation Management

Transportation management comprises those responsibilities and activities aimed at ensuring that transportation is provided safely, reliably, and efficiently. Management responsibilities include the evaluation and supervision of dispatchers, drivers, and maintenance personnel; the handling of client complaints; and the supervision of all financial transactions related to transportation. Persons involved in transportation management should be highly experienced in transportation services. However, the transportation management function in a small agency is frequently provided by the agency director, whose expertise is likely to be in a primary human service program area such as health or vocational training rather than transportation.

A coordination approach to transportation management, in which one person or a management team is hired to supervise many individual agency transportation operations, requires the existence of one of the following two conditions:

(a) The transportation management requirements for all participating agencies can be met by one or more of the existing agency staff who have demonstrated capability in transportation supervision.

(b) A professional transportation manager or firm can be hired, on a permanent or interim basis, at a cost consistent with the benefit to each of the participating agencies.

The coordination of transportation management will lead to more efficient agency transportation operations as a result of using highly qualified personnel. However, a number of additional factors should be considered:

- Any individual or group managing a number of separate transportation operations must have the confidence of the participating agencies' administrators and must also be able to develop rapport with the drivers and dispatcher.
- The transportation manager must be able to respond rapidly to any serious problem that develops in any agency transportation system.
- Many small agencies may see no value in delegat-

ing supervisory responsibility for a fleet of only one, two, or three vehicles, especially if the agency director is able to control the transportation operation with little time or effort.

- Agency directors, particularly those in small agencies, may perceive a reduction in their responsibilities as an intrusion on their overall authority, even with an overloaded schedule.

The concept of transportation management coordination is obviously complicated and highly dependent upon individual agency attitudes. It will probably work best with larger agencies whose directors find their time devoted to transportation excessive in relation to other job demands. It is likely to be supported by directors who recognize that substantial gains in efficiency and performance could be achieved in their transportation operation. Transportation management coordination as a separate approach has not been tested.

Information and Referral

Agencies frequently spend a considerable amount of time on calls from individuals or other agencies requesting information on available services and eligibility requirements. When a large number of agencies exists in a community, there may be substantial duplication of effort in the providing of information, as well as confusion on the part of the individual seeking information.

Coordination in this case involves the creation of a central source of information and referral services for all agencies. Many human service agencies have already set up a form of centralized information and referral service, so that a prospective client will not be shunted from one agency to another looking for someone who can respond to his/her problem. If such a center already exists, the coordination of transportation information may already be in place, or it may take very little effort to incorporate such information.

In situations where a number of agencies are providing transportation services, it may be advantageous to establish an information and referral center for transportation alone. The center could also have information on public transit and private transportation providers to allow referrals to a broad range of providers. The transit information center of a public transit system could also serve as the source of information on agency transportation services.

An information and referral center would not make any arrangements for transportation. After being referred, an individual or agency would have to contact the transportation provider directly to arrange for a trip.

Training Programs

Another administrative function which lends itself to coordination is the training process used for persons who are involved with, and responsible for, transportation services. Training programs include safety, first-aid and life-saving techniques, and responsiveness and sensitivity training geared specifically to various client groups. By coordinating training programs, agencies can make more efficient use of training personnel and materials and take advantage of training not available to small groups (such as the Red Cross or the state police) or which is too expensive for an individual agency, such as national program opportunities to train the driver. Safety, first-aid and life-saving courses, of course, will be identical for all transportation programs, while sensitivity training programs may be tailored to the needs of specific agencies. Interesting benefits might emerge from a jointly prepared training program that covers approaches for dealing with a wide variety of passengers. This type of joint training might show concerned agencies that certain client types can share rides on the same vehicle because their sensitivity needs are similar. In this way, a coordinated training program might pave the way for some form of coordinated operations.

Major Purchases

The final area for coordination of administrative functions is that of major purchases. The principle of volume buying to achieve cost reduction applies to major purchases as well as to purchases of vehicle parts and gasoline. In order to be able to make cost-

effective joint purchases, the items being purchased must have some common characteristics. The items must also represent a major expense, since cost savings will be the only incentive for agencies to go through the effort of joint purchasing. Gasoline, as mentioned above, is a perfect example of an item with commonality for all transportation operations (assuming no one exclusively operates diesel-powered vehicles), and also represents a significant cost in any transportation operation. Provider agencies, such as public transit systems that deal only with transportation services are usually the best choice for leading coordination efforts in purchasing fuel or other vehicle-related supplies.

Two administrative cost items that are good candidates for joint purchasing are insurance and new vehicles. The general area of insurance includes vehicle insurance, general liability insurance, and all other forms of personnel insurance such as health and life insurance. Since the most expensive insurance is for vehicles, this should be an area for close examination. The advantage of including all forms of insurance in a joint purchase arrangement is the increased leverage resulting from the dollar volume of all the policies.

In addition to making coordinated insurance purchases, agencies can strive to obtain the lowest rates available. Since insurance companies are very concerned about the quality of the drivers and the condition of the vehicles they are insuring, the probability of obtaining the lowest possible rates is increased if agencies can show that they have good driver selection and training programs and provide regular preventive maintenance for their vehicles.

The process of coordinating insurance purchases is relatively straightforward; however, the details of insurance policies can be complicated. An insurance broker or a specialist firm that handles a number of agency accounts can usually provide the expertise required to develop and place the appropriate insurance protection.

Coordination of new vehicle purchases is more difficult than coordination of insurance purchases. Since the useful life span of the vehicles used by agencies may range from 3 to 5 years, there may be a large variation in the timing of new vehicle purchases. Moreover, if potential participants require different types of vehicles, there may be no clear advantage in a joint purchase arrangement. In any case, a large number of participating agencies is desirable to increase the chances of matching vehicle requirements and timing. If a group of transportation providers decide that they do want to coordinate new vehicle purchases, they may find a purchasing mechanism already in place, for the practice of purchasing a large number of vehicles is fairly common for state agencies, counties, and cities. As one example, a number of state transportation departments have purchased large numbers of vehicles under the Department of Transportation's Urban Mass Transportation Administration (UMTA)-sponsored 16(b)(2) program to provide capital equipment for private nonprofit agencies that transport elderly and handicapped persons. The existence of an established purchasing mechanism would simplify the coordination process considerably.

In addition to insurance and new vehicles, a number of other items can be considered for joint purchase if agency requirements are similar. Radio communications equipment is one such item. Office equipment and supplies are another. The joint purchase or lease of office facilities is also possible. A current trend in agency services coordination is the development of multiservice facilities designed to centralize the primary services of the participating agencies for the benefit of the client. The multiservice facility is a prime example of a coordinated approach to the purchase or leasing of facilities.

The ultimate benefit derived from the coordination of these types of purchases depends on the nature of individual agency operations. Standardization of office equipment and supplies and joint use of office space will not be easy if there are wide differences among agency programs and services. The coordination of office purchases and facilities will probably be difficult in the absence of other forms of coordinated activities.

THE STATE OF OREGON:
JOINT INSURANCE PURCHASING

A striking example of the savings realized through a well-planned coordinated insurance purchasing program is provided by the Oregon Special Services Association (OSSA), a statewide organization established to obtain insurance for providers of transportation. OSSA is a "loose federation" of social service agencies, with membership open to "any public agency or body, component or agent thereof, or other organizations (quasipublic or private) providing public services." Presently OSSA has 65 members, each with up to 10 vehicles. The organization negotiates all vehicle insurance as one package with a single insurance underwriter and also helps develop and monitor membership safety standards to provide assurance to the underwriter that risks are being minimized. OSSA reports reductions in agencies' premium costs ranging from 43 percent to 68 percent. With typical insurance costs ranging from $1000 to $5000 per vehicle year, these savings can obviously amount to a sizable sum.

TOTAL COORDINATION

Although the preceding discussion has focused on individual coordination concepts, strong linkages exist among these concepts that would allow them to be developed together. Such linkages can be seen, for example, between coordinated insurance purchasing and training programs, and between a centralized dispatching system and a coordinated information and referral service. The following section discusses some of the quantitative and qualitative evaluations that can be used to determine the potential benefits from a combination of coordination approaches. It is important to remember that coordination can be approached on an incremental basis over time; therefore, the initial coordination effort can be limited, based on the receptivity of the participants.

In considering a combination of coordination approaches, one option that merits special attention is that of a *totally coordinated operation.* The only practical way for total coordination to occur is through the establishment of a separate organization with complete responsibility for providing transportation services to all participating agencies. Under total coordination, all agencies that were transportation providers would become purchasers. All vehicles and drivers would be placed under the control of the central organization.

The separate organization that operates the totally coordinated system could be either an existing one or a newly formed one. An existing organization would have to have the ability to handle the volume of new transportation services in addition to its own business and would have to possess management depth and transportation experience. The types of organizations that could be considered include public transit operators, private transportation companies, and agencies that operate large transportation systems. However, any existing organization has a vested interest in its own operation, which raises potential problems for integrating a totally coordinated transportation system into an existing organization. A newly formed organization could avoid the problems inherent in an existing organization but would have its own set of problems, including those that accompany the start-up of any new organization. In either case, it is necessary to move into total coordination carefully because of the responsibilities involved and the need to ensure participating agencies the level of client transportation they are currently providing.

A totally coordinated system has to coordinate the billing and accountability functions for all participating agencies; therefore, it requires the development of a financial accounting system and a trip information system that will provide the data to fulfill billing and accountability needs. Since agencies are concerned with different client groups and have different federal and state funding sources, this task can become quite cumbersome. The experience of a number of totally coordinated systems around the country has demonstrated the difficulty of developing simple and equitable billing and accountability systems. Both the Department of Transportation (DOT) and HEW are seeking a resolution to this problem through federal and state-level cooperation and coordination. (For further discussion of coordinated billing and accountability, see the second volume of this handbook, *Implementation Guidelines for Coordinated Agency Transportation Services.)*

TRANSPORTATION COORDINATION: HOW TO DO IT

The development of a local coordination project requires data collection, data analysis, and decision making. The decision-making process involves two kinds of analysis: a quantitative analysis, using hard data and measurable quantities, and a qualitative analysis, using soft, nonquantifiable factors.

The quantitative analysis can be used to determine the *physical capacity* for coordination, based on measures of cost, vehicle use, and service duplication for each local agency. The result of this analysis is a set of alternatives for coordination among agencies.

The qualitative analysis can be used to evaluate the feasibility of coordination programs proposed on the basis of hard data. From this analysis, the proposals can be modified and translated into appropriate action, taking into account such factors as the amount of hard data available to perform the alternatives analysis, the number of agencies interested in coordination, and the degree of political involvement in the process. In general, if an area has many resources and an organized planning structure, data for the quantitative analysis should be readily available, and more benefits should be identified in the quantitative analysis. Also, with a larger number of potential participants, there should be greater payoffs for coordination. If coordination is being contemplated in a small urban area or a rural area where the resources are less plentiful, the hard analysis may not yield clear directions for the best course to pursue, and, as a result, the coordination process may rest more heavily upon nonquantifiable benefits.

The analysis presented in this section deals only with the general coordination planning approach and presents methods that can be applied in any area. The differences in the planning process necessitated by the varying quantity of local resources are presented in Chapter 5.

The analysis is directed at the three areas of the agency transportation network—vehicle operations, maintenance, and administration—that were discussed in Chapter 3.

VEHICLE OPERATIONS COORDINATION

The following analysis of vehicle operations is directed at two possible operations coordination concepts—the operations clearinghouse and central dispatching, both of which are designed to improve the efficiency of vehicle operations through cost savings and more productive vehicle use.

The analysis described here is intended to determine the physical potential for *ride sharing* and *time sharing,* which are the principal operating methods used in an operations clearinghouse or a central dispatching center. In general, this determination requires that (1) each provider's service is analyzed, by looking at the operations of each vehicle throughout the day and (2) the needs of each purchaser agency are analyzed, by looking at its requirements for vehicle usage at specific times of the day. These two factors can then be used, along with cost and ridership statistics, as the basis for performing a quantitative analysis of the potential benefits from operations coordination.

Following this analysis, qualitative analysis is used to help in the selection of a final program design. It is at this point that important organizational and management decisions are made, including who shall direct the project and whether to operate a clearinghouse or a central dispatching program.

Data Collection

Prior to beginning data collection, all agencies (both public and private) must be identified in your area, regardless of whether or not they provide transportation service. Agencies are usually identified from a number of sources, including:

- Planning/funding processes
- Social service directories
- Telephone directories

An examination of planning documents submitted under the various major funding programs can often provide specific and detailed information on local agencies providing transportation, as well as on vehicles, cost data, and service characteristics. These data can become the foundation for an inventory of agency transportation services. This information can then be supplemented by social service directories, which often list agencies outside of the federal funding process. In addition, telephone directories can be used to supplement and update information in social service directories, which may be a year or two old.

After a master list of agencies has been assembled, each agency is contacted to inform them of the coor-

Agency _____ Vehicle No. _____

	M	T	W	T	F	S	S
AM 6:00							
7:00							
8:00							
9:00							
10:00							
11:00							
PM 12:00							
1:00							
2:00							
3:00							
4:00							
5:00							
6:00							

FIG 4. Inventory of Vehicles and Passengers' Locations.

dination effort. A letter to every agency director, eliciting their agencies' interest, and inviting them to attend an informational meeting, is usually the most effective means of bringing agencies together. In some cases, telephone calls or screening surveys are used for this purpose, but this method is costly and time consuming and should be considered only if resources are available to undertake the effort.

Disseminating information to agencies concerning the various coordination models is typically handled at the informational meeting. Agencies are briefed on the models and the potential benefits that can be derived from each. At this point, those agencies that are interested in coordinating are classified as either provider or purchaser agencies. Those agencies will then be requested to provide data on their own operations or purchase needs.

The data requirements for vehicle operations coordination fall into three basic groupings: *vehicle and passenger location patterns, vehicle inventory data,* and *transportation cost data.* The requirements have been kept simple, stressing those pieces of information most readily available.

Vehicle and Passenger Location Patterns. Information about when and where a vehicle is located and how many passengers are being provided with service is by far the most important for assessing potentials for ride sharing and time sharing. Such information will eventually become the master vehicle locator log for either the operations clearinghouse or the central dispatching operation. This category of data is collected for both provider and purchaser agencies, but with significant differences.

Provider Agencies. The form used for collecting data on vehicles and passengers' locations is shown in Figure 4. This form, to be completed for every vehicle involved in coordination, collects data on the time periods that vehicles are used, the location of each vehicle, and the number of persons riding in each vehicle.

The first area for which data should be collected is that of temporal patterns (i.e., what is the vehicle doing during specific time periods of the day?). Before collecting these data, a base period is established to reflect the hours that most agencies in the

Agency: _____ Date: _____

Vehicle ID Number	Vehicle Type			Vehicle Mileage	Capacity		Special Equipment (Lift, etc.)	Condition
	Year	Make	Model		Passenger Seats	Wheelchair Spaces		

FIG 5. Vehicle Inventory Form.

area normally operate. The base period should cover a span of at least twelve hours (e.g., 6 a.m. to 6 p.m., 7 a.m. to 7 p.m.).

Provider vehicle time is allocated into four specific components that indicate how the vehicle is being utilized. These components are defined as follows:

- *Passenger Service Hours (PSH).* The actual hours when vehicles are being utilized to transport clients
- *Unutilized Vehicle Hours (UVH).* The hours when vehicles are not carrying passengers but a driver is on duty
- *Vehicle Hours (VH).* The sum total of passenger service hours and unutilized vehicle hours (VH = PSH + UVH)
- *Idle Hours (IDH).* The time when the vehicle is parked during the day and no driver is on duty to transport clients

The sum of the vehicle hours and the idle hours must equal the hours in the base period. Data on vehicle and passenger location patterns should be completed for every day of the week, even if the patterns do not change. This will allow the evaluator to perform a daily analysis of utilization for all vehicles.

After the vehicle and passenger location data are defined, passenger trip data can be inserted on the form. These data are an indication of the number of persons transported during a given period of passenger service hours.

- *Passenger Trip (PT).* Defined as a one-way trip; that is, one person traveling in one direction is one passenger trip; two people making a round trip are four one-way trips.

Passenger trip data will be obtained from either a dispatcher log, a driver log, or a routing form that indicates when and how many passengers are being transported. In addition, agencies must define the type of service that is being provided to their clients:

- *Group Service.* A service to bring individuals to one common destination, such as Head Start or sheltered workshop employment, usually on a regularly scheduled basis

- *Individual Service.* A service used to bring individuals to any destination for individual trip purposes, such as medical trips

Data on passenger trips will be useful for determining availability of seating for ride sharing.

The link to both the temporal and passenger trip data is the geographic data. The geographic data can be developed in two ways: first, by indicating a service area in which the vehicle operates, and second, by plotting a map of specific vehicle routes. In both cases, the geographic data must be associated with specific passenger service hours and vehicles. All the data collected under this category will be used to assess the potentials for ride sharing and time sharing. In addition, the data may prove that two providers can merge two routes into one, thus eliminating duplicate services.

Purchaser Agencies. Data collection for purchaser agencies' transportation needs is much simpler than that for the needs of provider agencies. The same data form (Figure 4) can be used. Agencies will simply indicate the time that trips are required, the number of passenger trips, and the destination of the trips. The purchaser agencies should also indicate if an accessible vehicle is required for clients. (An accessible vehicle is one which is adapted for use by mobility-limited clients.) This information will then be matched with provider information in the data analysis task.

Vehicle Inventory Data. Vehicle inventory data are obtained only from provider agencies. These data can be used for two purposes: operations coordination and maintenance coordination. Rather than create two separate forms, all necessary vehicle data should be collected on one form. Figure 5 presents a sample form for vehicle inventories. The information on vehicle type and mileage can be used for maintenance coordination, while all the other information is used for operations coordination. A brief description of each data entry is presented below.

- *Vehicle ID Number.* This is the identification number that each agency assigns to its vehicle(s). This ID number must be keyed to the ID number used for the collection of temporal and geographic pattern data.
- *Vehicle Type.* This information indicates the year the vehicle was manufactured, the manufacturer, and the specific model of the vehicle—for example: 1978 Dodge Tradesman 600.
- *Vehicle Mileage.* The actual odometer reading at the time of the inventory.
- *Capacity.* The number of passenger seats (including the driver's) and the number of wheelchair tie-down spaces. If there are jump seats over wheelchair tie-downs, this should also be noted.
- *Special Equipment.* This information refers to all equipment that has been added to the vehicle to assist the driver or passengers. The most typical types of special equipment are radios (specify if two-way mobile or CB), wheelchair lifts or ramps, raised roof, additional low front step, and safety warning lights.

As noted above, it is possible to use these data to determine seat availability for ride sharing and to match vehicles to clients who require wheelchair accessibility. For maintenance coordination, data regarding the age of the fleet and the mix of vehicles will indicate the amount of preventive maintenance required and the diversity of parts that may have to be ordered. In the area of administrative coordination, if the data indicate that the fleet is aging, the inventory can be used as a statement of need to support an application for new vehicle purchases.

Transportation Cost Data. The collection of transportation cost data is an attempt to identify all the costs required to support an agency's transportation program. These data should be collected in a format usable for both analysis and budget development purposes. Perhaps the simplest way to collect these data is to establish a chart of accounts that each agency can use to display its transportation-related cost items. Figure 6 presents a chart of accounts used for this purpose. The cost items presented in this table, which are derived from UMTA Section 15 reporting procedures, represent those most often cited by agencies. If further categorization of costs is required, Section 15 should be consulted.

Transportation costs are a part of an agency's total budget. When the costs of operating a coordinated system are analyzed, however, these costs fall into two categories: *avoidable costs* (those that will be transferred to the coordination project) and *unavoidable costs* (those that will be retained by the agency).

In the collection of these data, some agencies may feel that certain cost items (normally called "support" costs) are not associated with their transportation program. For example, an agency may feel that a bookkeeper's salary or office rental does not enter into the cost of transportation. In reality this is not true, because the bookkeeper is required to prepare monthly bills and to pay accounts, and some portion of the office space is required to support the operation of the transportation program. Thus, in order to estimate the true cost of transportation, each agency should be required to estimate the cost associated with these and other items. In addition, costs for volunteers or CETA employees must be identified in the data, with appropriate costs assigned to each item.

PROJECT OPERATIONS BUDGET FOR PROJECT (PROJECT NAME) FOR THE YEAR: _____ TO _____

COST CATEGORY	ANNUAL EXPENSE
VEHICLE OPERATIONS	
Driver salary	
Dispatcher salary	
Fringe benefits	
Fuel & oil	
Tubes & tires	
Vehicle insurance	
Vehicle depreciation	
Vehicle lease	
Vehicle license, registration, tax	
Vehicle storage facility rental	
MAINTENANCE	
Mechanic salary	
Mechanic aide salary	
Fringe benefits	
Maintenance service contract	
Materials & supplies (parts)	
Maintenance facility rental	
Equipment rental	
Utilities	
ADMINISTRATION	
Administrator salary	
Manager salary	
Secretary salary	
Bookkeeper salary	
Fringe benefits	
Materials & supplies	
Telephone	
Office rental	
Utilities	
Office equipment rental	
Purchase of transportation service	
Miscellaneous	
TOTAL EXPENSE	

FIG 6. Chart of Accounts.

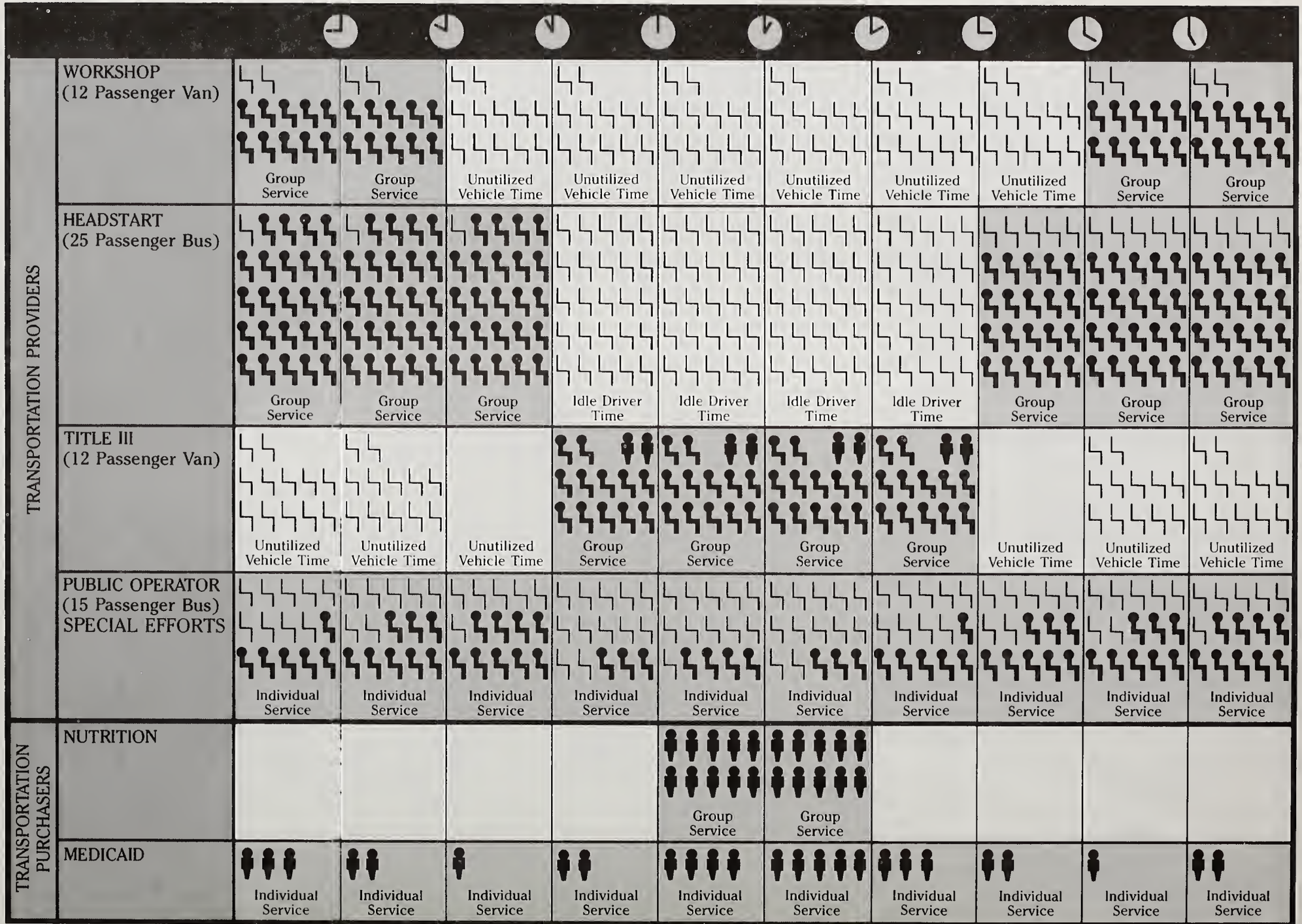


FIG 7. Transportation Resources and Needs.

The direct costs of transportation are more readily identified. These costs are usually found under the categories of vehicle operations and maintenance and can simply be identified and charted by the agency's bookkeeper.

As with all data collection, a consistent time frame should be established for reference purposes, and each agency should use the same time frame. In order to capture all cost information and to eliminate periods of high maintenance costs or insurance payments, the transportation cost data should be collected for a one year period. Cost data for agencies that operate their program for only a portion of a year (nine months, for example), should represent only that period. On the other hand, data from agencies that have just started transportation programs and have operated for less than a year should be factored up to represent the full operation period.

These cost data can then be converted into unit costs, such as cost per hour of service, cost per mile, or cost per trip, and be used in the coordination potential analysis.

Data Analysis

Data analysis for ride sharing/time sharing begins with a service comparison mapping, which shows the use of each participating agency's vehicles during a specified time period and the blocks of transportation time consumed for purchaser agencies. This mapping can be conducted for any time period agreed upon by the study participants; the time period chosen should reflect the typical usage of the vehicles in the local area so that the analysis will be as accurate as possible. Suggested time periods include a typical week, or perhaps one mapping for Monday, Wednesday, Friday and another for Tuesday and Thursday. Small variations that cannot be accurately depicted can be discussed and added into the analysis as it proceeds. This same procedure can be used to adjust for seasonal variation in program services.

Figure 7 is an example of such a mapping, which will be used throughout this section to describe the analysis methods. It shows each provider vehicle's time divided into three segments—idle hours, passenger service hours, and unutilized vehicle hours. Each block of passenger service hours also indicates how many trips were taken in that period. At the top of each column is the identification number of each vehicle and its capacity. The asterisk after each vehicle indicates those that are accessible to wheelchair users. Each block of purchased time indicates how many trips were made during that period. It is important to develop the time information in as much detail as possible so that the assessment process for vehicle operations coordination is accurate. In particular, it is important to differentiate between unutilized vehicle hours and passenger service hours.

This mapping, which is a visual presentation of local agency vehicle operations, should begin to suggest the shifts in use that could be made in order to increase efficiency. In some cases the mapping shows possible duplications in service; in other areas it shows available idle hours for purchase. It does not take into account the costs of service or location of service, which are pieces of the quantitative analysis that must be factored in before the alternatives can be estimated accurately.

Once the agency transportation system has been mapped, the analysis can continue, focusing on the issues discussed below.

Time Sharing. Figure 7 clearly demonstrates that there is idle time available for purchase. Since this is true, the first question is: Can the idle time be productively used by one of the purchaser agencies? When two of the agencies, Workshop and Nutrition, are isolated, it is clear that the Nutrition program can purchase time from the idle time of the Workshop.

Since the Nutrition program is currently purchasing transportation service from another provider, the only way this arrangement would be acceptable is if the billing rate is less than that currently paid by Nutrition. If the agency had been a new purchaser, then the availability of the service would make the arrangement acceptable. The vehicle made available should be as close to the Nutrition program as possible so that a minimum of time and effort (i.e., cost) is spent in getting to the clients and to the sites. If accessibility were required, this condition would also be satisfied under the arrangement.

Another provider can also use the idle vehicle time. In this case, instead of Nutrition buying time from the Workshop, Title III could purchase the time. As a result of that move, Title III would no longer have to be a provider and would no longer have to operate its vehicle. Again, the relative costs per hour of the two programs must be considered, as well as location.

Now, suppose that Title III did in fact contract for time with the Workshop. This does not leave out the Nutrition program, because it can purchase its time from Head Start, using unutilized vehicle hours. The use of unutilized hours is preferable for the coordinated system because it uses a resource that is available and incurring costs (i.e., the driver's salary). Unutilized hours represent not only unused vehicles, as in the case of idle time, but also unused drivers who are being paid nonetheless. Thus, unutilized vehicle time is even more inefficient than idle time. Another possible use of unutilized time would be to sell it to another provider.

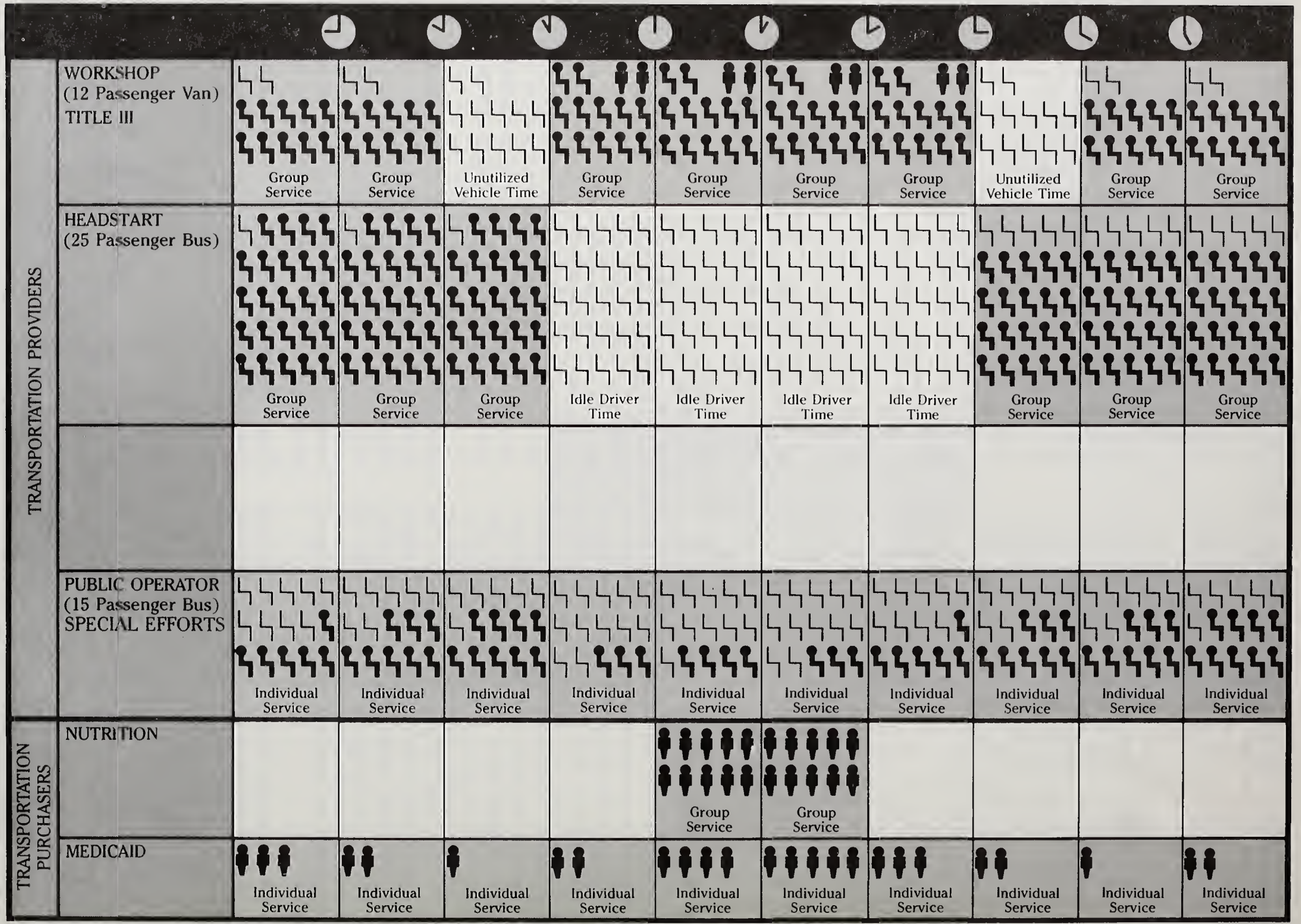


FIG. 8. Sample Agency Transportation After Time-Sharing.

Met Transport Need

Unmet Transport Need

Available Vehicle (or Seat)

Block Periods of Need (Met or unmet Needs)

Ride Sharing. The ride-sharing example begins with Figure 8, the coordinated system that resulted from time sharing. Ride sharing occurs during passenger service hours, by making use of any available seats or wheelchair spaces on a vehicle. Ride sharing can be instituted if it is possible for purchasers or other providers to share trips.

The first step in analyzing the feasibility of ride sharing is to locate the trips required by two agencies that are ride-sharing candidates. This can be accomplished most simply by using a map of the service area. If the specific trips to be ride-shared are regular recurring group or individual trips, new vehicle tours can be laid out using a transparent sheet over a map that shows trip origins and destinations.

New tours should be laid out to incorporate as many trips as possible into ride sharing. In constructing these new tours, several factors must be considered: minimizing vehicle mileage and travel time, and ensuring that specially adapted vehicles are available when required. Care must be taken to avoid having any passengers on the vehicle for an excessive length of time.

In general, purchaser trips should be considered first for ride sharing, because it is usually easier to modify vehicle routes than to merge two or more routes into a new vehicle tour.

Purchasers will be interested in placing riders on existing services, either to cut their present costs or because they need to provide new or increased service to their clients. Thus, the question becomes: Can any purchaser use the services of an existing provider to ride-share? Consider that the Special Efforts* service operates at an average productivity (passenger trip per vehicle hour) of 3.0, and at no time during the day are more than six seats occupied on the vehicle. The current Medicaid trips are required on a random basis throughout the day. Thus, it is feasible to place the Medicaid trips on the Special Efforts vehicle because there is sufficient capacity. The only question is whether the vehicle can pick up the passenger at the required time. Since both the vehicle and the trips are randomly scheduled, this situation will have to be examined on a daily basis, but it is more than likely that an adequate arrangement could be made.

Providers, for their part, will try to find vehicle trips that can be combined in order to reduce overall costs for drivers and vehicle use. If two vehicles are working at the same time and have similar locations

*Special Efforts is a term applied to services operated for the elderly and handicapped in conjunction with regular transit service as mandated by Section 16A of the Urban Mass Transportation Act.

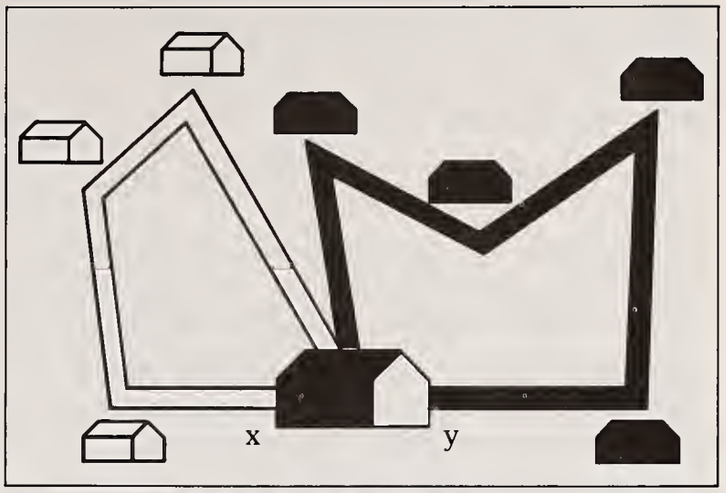


FIG 9a. Vehicle Tour Before Ride-Sharing.

and services, it may be possible to place all the riders on one vehicle.

A more limited form of ride sharing possible for two such agencies is shown in Fig 9. Suppose that the two vehicles operate on the routes shown. Thus, it is clear that some clients on the Workshop route (y) can be more easily picked up on the Head Start bus (x), saving vehicle miles and time.

It should be clear from this discussion that ride sharing is far more dependent on considerations of location, capacity, and service type than is time sharing. Accordingly, most coordinated systems will probably find it easier to develop time-sharing programs first and base the greater portion of the coordination effort upon them. Ride-sharing services can be developed gradually as agencies modify programs or develop greater understanding of the coordination process.

The operations analysis illustrated above, which includes vehicle and passengers' location patterns and vehicle inventory data, indicates that there is a strong potential for coordination through both ride sharing and time sharing. Now the analysis must

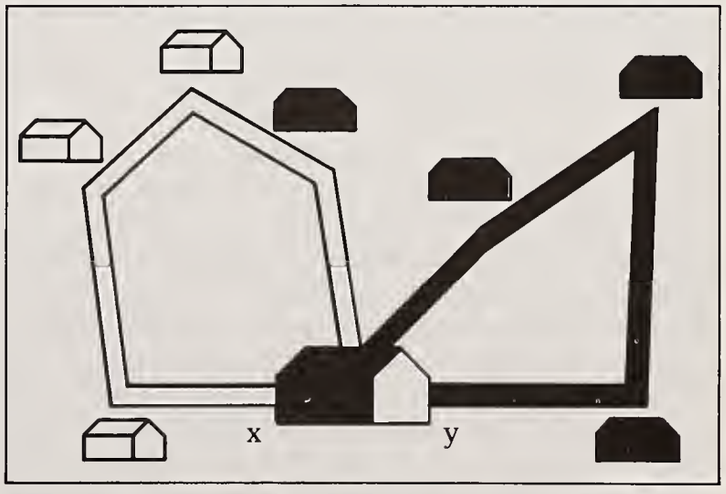


FIG 9b. Vehicle Tour After Ride-Sharing.

consider the cost of coordination before the quantitative assessment is complete. This analysis of financial impact must include three potential changes that may result from the coordination effort:

1. Provider agency becomes purchaser agency with a potential reduction in costs.
2. Provider agency increases revenue by expanding services to purchaser agency with the resulting reduction in the unit costs of service.
3. Purchaser agency either saves money from reduction in provider costs, or is able to purchase service that was previously unavailable.

To analyze any of these changes, the planner must be able to compare costs before coordination to estimated costs following coordination. To determine the costs under coordination, the planner must estimate the number of vehicle hours required for operations coordination, assign costs to all applicable items in the chart of accounts (Figure 6), and then estimate a total cost. The easiest method for evaluating this cost would be based on the potential service delivered (i.e., passenger trips) to each participating agency.

1. To analyze the first case, *providers who become purchasers,* the planner must first review the agency's cost and ridership data and determine the agency's present cost for providing a passenger trip. (This is often referred to as the *unit cost* and can be expressed as cost per trip, cost per vehicle hour, or cost per vehicle mile.) The second step is to take the agency's current cost data and divide the cost into two categories: *avoidable costs* (those that will be transferred over to the coordination project), and *unavoidable costs* (those that cannot be transferred to the coordination project and will continue to be borne by the agency). The third step is to calculate the agency's service cost under coordination using the agency's present ridership data. The difference between the agency's present *avoidable cost* and its *cost under coordination* is the *net savings* attributed to coordination. This savings is a benefit of coordination. Another benefit of coordination will be the additional trips that the agency may be able to purchase for its clients from the net savings.

2. The cost analysis for the second case, *providers who continue to provide service,* includes two elements. The first is an analysis of avoidable and unavoidable costs, which should be performed if the coordination program eliminates a transportation function, such as dispatching or a vehicle driver, from the requirements of the agency. This analysis is then coupled with the second element, which is an assessment of the unit cost that will result from either ride sharing or time sharing. To determine this unit cost, it is necessary to first determine the new ridership levels (number of trips) on agency vehicles and divide this number into the vehicle costs under coordination to realize a new unit cost per trip. This cost per trip multiplied by number of ride-shared and/or time-shared trips yields additional revenue for the provider agency, which is a benefit. The new cost per trip should be lower than that of the provider agency's current cost, resulting in another benefit: an opportunity for the agency to either provide more service to its clients under its present budget or further reduce its total transportation costs. Figure 10 presents an example that illustrates the first two cases.

3. The cost of coordinated services to *purchaser agencies,* the third case, is perhaps the simplest to assess. For an agency that currently purchases transportation, it is necessary to compare the cost of transportation under the present conditions and the cost under coordination. Obviously, a reduction in cost (for purchasing the same amount of service) is a benefit. Agencies that never purchased transportation service prior to coordination will not realize a monetary benefit. They benefit because they can now provide transportation service to their clients.

Figure 11 shows the final coordination program resulting from the potential analysis of our hypothetical setting, assuming cost savings and service capacity. It demonstrates who can share, where trips can be joined together, and where vehicle hours can be reduced. This coordination model, however, is based strictly on quantitative factors and must be subjected to a number of qualitative assessments before being considered for implementation.

Qualitative Analysis

Certain issues and questions regarding qualitative aspects are raised when a coordination concept is suggested on the basis of quantitative analysis. Because the issues and questions are complex, qualitative analysis should be conducted through open discussions with all agency participants present. In this way, procedures for dealing with the identified issues can be analyzed, and modifications usually can be made to accommodate all the participants. This is not an easy process; the issues are complex, and solutions may be difficult to negotiate. While this section of the analysis can give no definitive answers, it can point out some of the questions that will be raised locally. It is the answers to these questions, and the modifications that result, that will in the end determine the shape of the local coordination project. The major issues that should be addressed for vehicle operations coordination follow.

Vehicle Equipment. Time sharing and ride sharing involve the use of one agency's vehicles by another

1. CURRENT DATA:

Agency A: Provider agency will provide ride-sharing and time-sharing. Presently provides 10,000 annual passenger trips in 2000 vehicle hours at an annual cost of $30,000.

Agency B: Current provider; provides 2,000 annual trips at a cost of $10,000. Of the $10,000, $2,000 is unavoidable cost.

2. UNDER COORDINATION:

Agency A will accept all of *Agency B's* trips, but will have to increase its vehicle hours to 2,300 per year.

3. DETERMINE:

The cost feasibility to *Agency A* and *B*.

4. A. CURRENT COSTS:

Agency A:

$$\text{Cost/Trip} = \frac{\$30{,}000}{10{,}000 \text{ Trips}} = \$3.00/\text{Trip}$$

$$\text{Cost/Hour} = \frac{\$30{,}000}{2{,}000 \text{ Hours}} = \$15.00/\text{Hour}$$

Agency B:

$$\text{Cost/Trip} = \frac{\$10{,}000}{2{,}000 \text{ Trips}} = \$5.00/\text{Trip}$$

$$\text{Avoidable Cost/Trip} = \frac{\$10{,}000 - \$2{,}000}{2{,}000 \text{ Trips}} = \frac{\$8{,}000}{2{,}000 \text{ Trips}} = \$4.00/\text{Trip}$$

B. COSTS UNDER COORDINATION:

$$\text{Annual Cost} = (\text{Annual Vehicle Hours}) \times (\text{Cost/Hour}) = (2{,}300) \times (\$15) = \$34{,}500$$

$$\text{Cost/Trip} = \frac{\$34{,}500}{10{,}000 \text{ Trips} + 2{,}000 \text{ Trips}} = \frac{\$34{,}500}{12{,}000 \text{ Trips}} = \$2.88/\text{Trip}$$

C. "NET SAVINGS" UNDER COORDINATION:

Agency A: (Current Cost) − (Cost Under Coordination)

(10,000 Trips × $3.00/Trip) − (10,000 Trips × $2.88/Trip)

($30,000) − ($28,800) = $1,200

Additional Benefit:

New Trips *Agency A* can provide:

$$\frac{\$1{,}200}{\$2.88/\text{Trip}} = 415 \text{ Trips}$$

Agency B: (Avoidable Cost) − (Cost Under Coordination)

($8,000) − ($2,000 Trips × $2.88/Trip)

($8,000) − ($5,760) = $2,240

5. BENEFITS TO AGENCIES:

Agency A will reduce its unit cost from $3.00/Trip to $2.88/Trip. This is an annual savings of $1,200, which could be used to provide more trips.

Agency B will reduce its avoidable cost from $8,000/Year to $5,760/Year, for a savings of $2,240. Its unit cost is also reduced from $4.00/Trip to $2.88/Trip.

Vehicle Productivity will increase from 5.0 to 5.22.

FIG 10. Cost Analysis for Provider Agencies Who Become Purchaser Agencies-Applicable for Ride Sharing, Time Sharing, and Total Coordination.

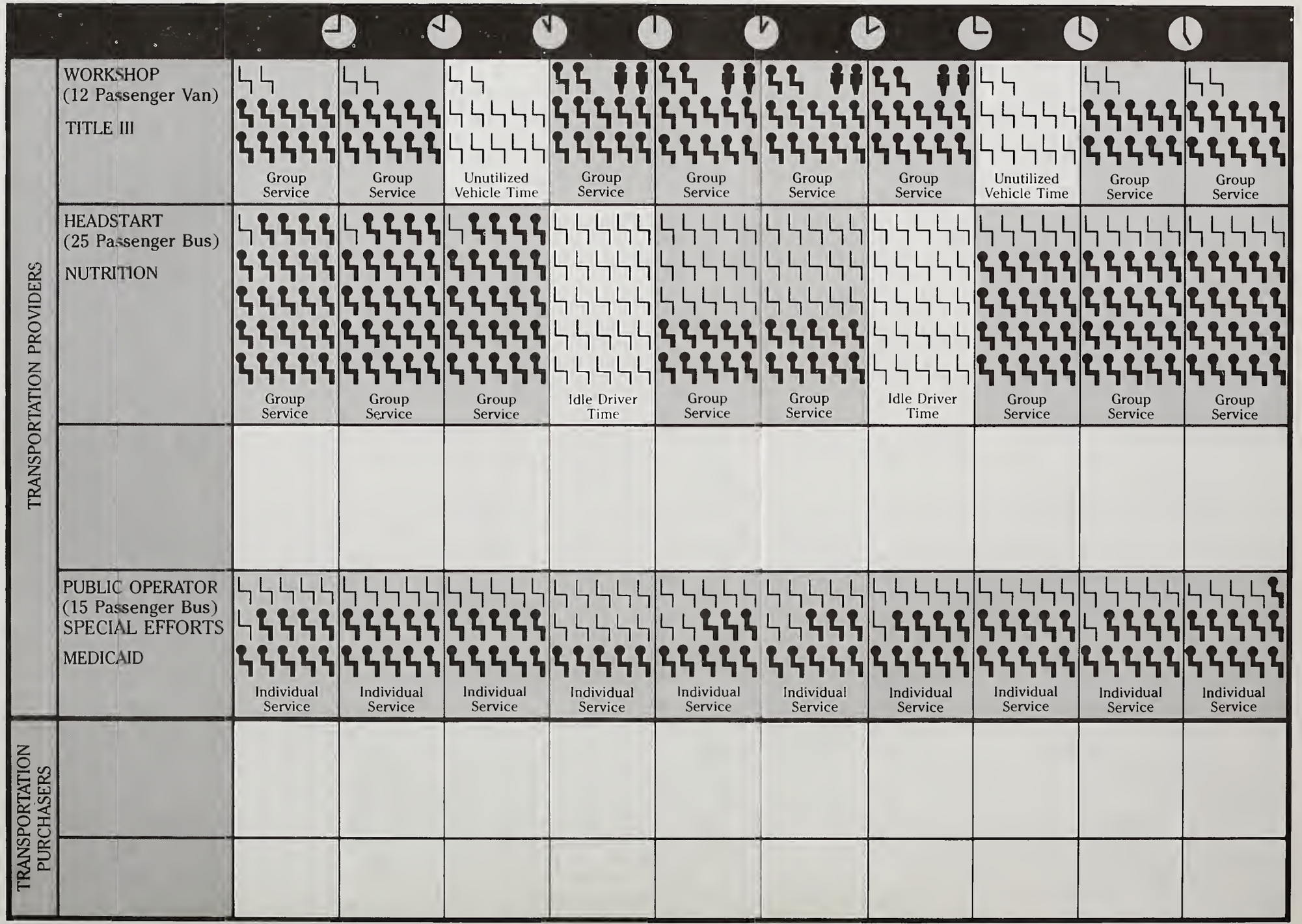


FIG 11. Sample Agency Transportation Network: Fully Coordinated Services.

Met Transport Need

Unmet Transport Need

Available Vehicle (or Seat)

Block Periods of Need (Met or unmet Needs)

agency's clients. Thus, it is essential that the vehicles to be used are adequately equipped for all parties concerned, or that such vehicles or equipment can be obtained. Adequate equipment means the availability of lifts or ramps for wheelchair users or perhaps seat belts for small children. Without these features, not all agencies will be able to join a coordination effort.

Client Mixing. A sensitive issue for many agencies is the mixing of their clients with those of other agencies. This is a very subjective area: for example, some agencies dealing with the elderly may not wish to have their clients ride with children, while another agency dealing with the elderly may view this as an excellent means of socialization. The point is that ride sharing, which involves client mixing, may not be suitable for some agencies, even though the physical capacity for such a program is possible. This element does not affect time sharing, since in that operation no client mixing is necessary. The possibility of client mixing should be discussed early in the planning process so that agencies can have an opportunity to consider it before the results of the analysis are developed and presented.

Another aspect of client mixing that should be addressed is the driver's ability to meet with the special needs of certain clients, such as wheelchair users, frail elderly, mentally retarded, disabled persons, etc. In most instances, this need can be met by arranging driver and passenger assistance/sensitivity training sessions, and using the expertise of the sponsoring agency personnel.

Service Compatibility. Service compatibility is an issue that was partially raised in the quantitative analysis but warrants further discussion here. Compatibility refers particularly to the handling of passengers and the amount of assistance provided by the driver. One agency may provide curb-to-curb services, with the driver assisting the passengers only in boarding and alighting the vehicle, while another may require door-through-door service, with assistance to and from a building. Such differences in service requirements may inhibit ride-sharing potentials, because they affect adversely both travel time and productivity. Again, early discussion of this topic will prevent problems in service delivery.

Reduced Vehicle Life. Time sharing will utilize vehicles more intensively, thus reducing their lifespan and availability to the provider agency. Thus, agencies that allow time sharing must be able to charge a reasonable cost that will cover the expenses incurred, including the accelerated depreciation caused by coordination. This is necessary to ensure that providers of time-sharing vehicles will not suffer a significant loss further down the road when they go to replace their vehicle.

Agency Cooperation. Are the agencies that participated in the initial analysis really interested in coordination now that they can see how it would occur? Do they understand and accept the degree of control they would have over the operation of their vehicles, and the degree they have to surrender? This is especially significant in discussing whether an operations clearinghouse or a central dispatching center would be more feasible. It also defines the interest that agencies have in using various organizational structures or in using total coordination.

With regard to the two operations coordination concepts, the operations clearinghouse does not require the same degree of centralization as central dispatching. Thus it is more palatable to those agencies wishing to retain a degree of control over their client transportation. However, it is not as efficient as a central dispatching operation. In general, an operations clearinghouse can implement time sharing more easily than ride sharing. Ride sharing, which requires direct contact with drivers and vehicles, lends itself better to central dispatching. Thus, when weighing the two forms of operations coordination, the degree to which ride sharing and time sharing will be used should be assessed, and compared to the agencies' willingness to participate.

The actual decision process for vehicle operations coordination is relatively simple, evolving from the discussions about time-sharing and ride-sharing potentials described above. In the cases where there are clear cost and service quality advantages to be gained through coordination, it is likely that the involved agencies will agree to proceed, unless they are unable to resolve some specific qualitative issues. When there are no clear or distinct advantages, each agency's decision will be dependent upon its perception of the future need for coordination or the possibility of working in another form of coordination. A final decision may depend on the coordination potentials in the other major functional areas—maintenance and administration.

The preceding questions outline many considerations that go well beyond cost and vehicle capacity analysis. In order to satisfy agencies' questions, the proposed program may have to be significantly modified. Once these issues are resolved, the coordination project should be fairly well defined and on the way towards implementation.

MAINTENANCE COORDINATION

The aim of maintenance coordination is to improve the quality of maintenance for each participating agency in a cost-effective manner. A joint maintenance program is likely to include vehicle maintenance and coordinated purchase of parts and supplies and could also include centralized storage of vehicles. (Joint storage can allow better scheduling of repair work and can create a pool of vehicles available for back-up purposes.) All three of these concepts—centralized maintenance work, centralized vehicle storage, and coordinated parts purchasing—should be considered in determining which combination is the most beneficial for each community.

Data Collection

In order to analyze the potential of these programs, the following data should be obtained from each interested agency.

Present Maintenance Arrangements. Because maintenance has several components, information must be collected in the following areas:

- Is the maintenance work done by agency employees, or is it done under contract to an outside garage or other agency shop?
- Are some vehicles still under warranty? If so, when will they come off the warranty?
- What is the maintenance cost? For an agency-run shop, this is the maintenance cost per hour, determined by adding the maintenance labor costs, parts, and cost of maintaining the facility (i.e., lease or rental cost, utilities) and dividing by the total number of maintenance hours produced. For a contract service, the cost can be given either as the contract rate or the total cost of maintenance for a one-year period. These data are obtained from the chart of accounts presented as Figure 6.
- What services are being provided? Maintenance consists of many services, including inspection and preventive maintenance (e.g., 3000, 6000, 9000 mile check-ups), minor repair work (e.g., engine valve job, new transmission), and body work.

Parts and Supplies Purchasing. Each interested agency must purchase parts and supplies to maintain its vehicles. Parts will be purchased directly from an auto parts distributor if the agency performs its own maintenance, or by a contractor if an outside garage is involved. Supplies include replaceable items such as gasoline, oil, tires, and batteries. The following information should be developed:

- List of required supplies
- Cost of supplies and parts
- Source of supplies and parts

Storage Facilities: It is important to collect the following data about existing storage facilities and practices:

- The location and capacity of storage areas
- Which agencies have secure storage areas, including indoor facilities, so that those with inadequate storage may be able to coordinate with them
- The cost of the storage area
- Whether any agency maintenance facilities have sufficient storage capacity to house all the agency vehicles that might be part of a joint maintenance agreement

Maintenance Shop Coordination

Having looked at the physical measurements required for a maintenance coordination decision—costs and the programs offered—the potential that exists for coordination can be discussed. This is a fairly straightforward process, since it is a function of cost savings and performance. The costs of the agencies that provide their own maintenance are compared to the services rendered. Three conditions must exist in order for there to be good potential for coordination:

- The agency that is to provide the coordinated maintenance must be able to accommodate the vehicle types used by other agencies. For example, an agency experienced only in working on vans might not be able to coordinate with another agency that owns a school bus.
- There must be adequate facilities to handle additional work.
- Maintenance facilities should be located reasonably close to the participating agencies.

If these conditions are met, each of the other agencies in the program can assess the maintenance services offered and determine whether they wish to develop contracts with this provider. Some agencies may wish to switch over their entire programs, others may wish only to purchase services they do not have at the present. Other possibilities for maintenance coordination are to seek out a new provider through a bidding process, or to pool agency re-

sources and open a centralized agency garage that would sell services to all of the participants.

Parts Purchasing Coordination

The coordination of parts and supplies purchases is a natural adjunct to the joint maintenance concept. However, it is also possible to create a centralized parts and supplies purchasing program without joint maintenance, to take advantage of cost savings through bulk purchases. Not all parts can be jointly ordered, and some major parts can be ordered only as needed. But stocks of items such as spark plugs, batteries, or tires could easily be bought in large units.

To consider parts and supplies purchasing, agencies need to develop a list of their needs and the costs that they are currently paying. Then the compatibility of the orders and the potential for bulk purchase can be investigated. The planner should also look into the possibility of joining a state, county, or municipal purchasing program, since many areas have such programs. Tax exemptions are usually available to local units of government on such items as gasoline, and a coordination program may be able to take advantage of this. Also, certain tax exemptions are offered to private nonprofit corporations.

Centralized Storage

Centralized storage is not necessary for coordinated maintenance, but it offers increased convenience and the potential for more reliable service. Centralized storage can have these advantages:

- It provides greater back-up vehicle availability.
- It provides a wider range of vehicle types for various service needs.
- It can allow the joint maintenance and servicing of vehicles: cleaning, washing, gasoline, oil, inspection, etc.

Centralizing storage facilities is a means of providing the best physical situation at a reasonable cost. Ideally, this means having all vehicles parked indoors in a safe location. The major disadvantage of the concept is that vehicles may not be easily accessible to all locations. In a rural area, central storage may necessitate long deadheading to a central facility thus making the concept too costly for agencies' benefit.

Analysis of the joint storage concept should, therefore, address the following questions:

- Is there any facility now being used by an agency that is large enough to house all of the participants' vehicles? If not, can a new facility be purchased, leased, or rented, or even borrowed or donated, that will provide indoor facilities and services at a price not exceeding the total cost now being paid by all the providers?
- Are there adequate services, including bus washers, fuel pumps, inspection areas, etc., for performing daily maintenance?
- Will the location create problems in coordinating maintenance or dispatching?

Each agency must study these questions and determine whether a joint storage facility can meet its needs.

Agency Maintenance Center

As mentioned at the beginning of this section, a complete agency maintenance center offering vehicle repairs, parts purchasing, and centralized storage may offer significant benefits for a coordination project.

To determine the benefits of such a facility for a local project, the planner should look at the data previously gathered for each of the three concepts and determine whether any single agency can provide a total maintenance center. If so, and if the agency can offer the right price, this approach offers an excellent way for the community to take advantage of all three concepts. The agency provider would handle all maintenance, parts, supplies purchasing, and storage. It would contract with each participant for services and then provide regular billings to them as work was done.

If there is no single agency able or willing to provide a centralized maintenance center, the planner should determine whether any outside contractors can provide such a service. Private garages, transportation companies, even local governments, should be identified and solicited for bids based on local requirements. If any of the bids received are attractive, the preparation of contracts and legal documents necessary to implement the project can be initiated.

Finally, if the participating agencies have the staffing and skills to provide a good maintenance shop and are only lacking in space for the storage facility, the possibility of renting, leasing, or purchasing a suitable facility should be considered, if it is less costly than present storage costs.

COORDINATED ADMINISTRATIVE FUNCTIONS

In Section 3 it was noted that four administrative functions lend themselves as individual coordination projects. Those administrative functions are:

- Management supervision
- Information and referral
- Training
- Joint purchasing

The objective of administrative coordination is to simplify the flow of information, reduce duplicative functions, and reduce the amount that each agency spends on transportation.

An analysis of the potential for administrative coordination should be based on the allocation of staff time to transportation administration, how that time is currently used by each agency, and how it could be allocated in a coordination program. For the first three areas listed above, information on hours spent, skills, and materials delivered must be obtained. If the overall staff time spent on transportation can be reduced then coordination will have a positive impact. The fourth administrative function, joint purchasing, is somewhat different, with savings resulting not so much from staff time savings as from cost savings through bulk purchases.

Management Supervision

In order to provide effective transportation services, each agency must have one person with management responsibilities to oversee day-to-day operations and long-term program development. Figure 12 shows generally how the program would function.

Before coordination, each agency executive director is responsible for supervising daily operations, preparing funding and budgeting programs, and handling any transportation problems. In the coordinated system, the transportation manager assumes these responsibilities, reporting to the executive directors with summary operating reports and with suggested programming improvements.

Depending upon the agency and the size of its transportation program, the person responsible for transportation services may be a part-time employee, a full-time nontransportation professional devoting a portion of time to transportation, a transportation manager with the requisite skills, or the executive director. Regardless of the individual's background, it is important that the person possess three qualities: the ability to manage multifaceted programs, the ability to work well with many people, and the ability to communicate effectively with agencies and local officials. Since not all agency transportation administrators are likely to possess these qualities, providing sound management may be the most effective administrative function of the coordinated transportation program.

To assess the potential for a coordinated management program, the planner should compile a list of staff hours devoted to transportation, and the cost of these hours. The time included should be only for those hours spent on administrative functions, and not on day-to-day dispatching, driving, etc., which would not be included in a coordinated management program. Once this information is gathered, an estimate of the avoidable and unavoidable costs of administration for all agencies is made, and the avoidable cost figure is compared to the cost estimate of a coordination manager.

Local agencies that have programs large enough to require the employment of an agency transportation manager may not be interested in participating in a coordination program. It is possible, though, that the transportation manager of such an agency may have extra time that would allow him/her to serve as the coordinated service manager; this possibility should be carefully examined. If no current agency manager is available to undertake the position, then a capable person from outside the agencies must be found.

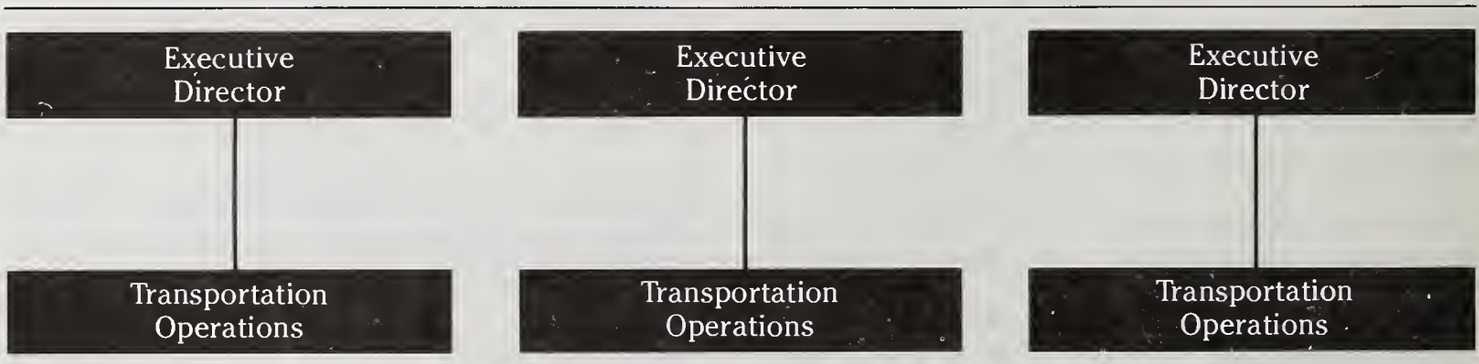


FIG 12a. Management Supervision Before Coordination.

Conceivably, the developer of a coordination program would acquire, through the groundwork activities, the skills and expertise needed for the position of coordinated transportation manager, and could then free those currently doing transportation administration to do other tasks suited to their skills. In addressing these benefits, the planner should consider the changes in responsibilities that would occur and the position that the transportation coordinator would assume in the agency.

Information and Referral

Many agencies have an information and referral system to help clients or prospective clients find programs for which they are eligible. To make better use of the transportation system, a centralized information, referral, and dissemination program can be developed. Information and referral systems can be established in two basic ways: by merging existing services, or by establishing a new service. Merging existing systems utilizes agency resources in a more cost-effective and efficient manner. It also allows agencies that previously did not offer the service to enter the program, and it allows other agencies to drop their information and referral functions. The establishment of a new information and referral service is more costly than merging services, because it means obtaining new telephones, office space, and an individual's time to operate the program. One agency, however, may decide to take on the program itself by assigning an individual to perform the function for all agencies, thus adding only marginal costs to the operation of the service.

To decide whether the information and referral concept has potential for a given area, an inventory of the amount of staff time and the avoidable and unavoidable costs they are putting into information and referral services should be made. A cost structure for the service is compared to the avoidable costs to develop an idea of the differences. The benefits to clients must also be addressed in the decision of whether to implement information and referral coordination.

Information and referral is a very simple coordination approach to initiate. It is a good way to develop awareness on the part of agencies that are wary of coordination. A simple adjunct to the telephone center, and one that can be very effective, is a published booklet listing all agency services. Many communities already have developed an agency services information booklet. A service listing booklet should include all transportation services and allow for the updating of information on a regular basis.

Training

Agencies providing transportation often have a variety of training programs for their drivers, dispatchers, and call takers. Some of these programs are given by agency personnel, based upon agency procedures, while others are given by outside agencies such as the Red Cross or the Heart Association. It is possible for these programs, whether given on an ad hoc basis as new employees are hired or on a regular "refresher" basis, to be coordinated among agencies. Coordinated training can allow agencies to exchange ideas and develop better training programs. Depending upon the resources and staffing available, programs can be coordinated so that employees of various agencies can participate at one time.

In work for the Department of Health, Education, and Welfare, and the Department of Transportation, the University of Tennessee has examined driver training and identified seven basic skill areas:[1]

1. *General driving skills.* The ability to maneuver a vehicle under varying conditions.
2. *Accident avoidance skills.* Defensive driving.
3. *Passenger assistance skills.* Helping passengers to reach, to board, and to leave a vehicle with special

[1]Davis, Frank, "Selecting and Training Drivers for Human Service Agencies (Employees, Volunteers, and Contractors)" DRAFT., Transportation Service Research Center, University of Tennessee, Knoxville, Tennessee, November 1979.

FIG 12b. Management Supervision After Coordination.

regard to individual needs.

4. *Human relations skills.* Being sensitive to emotional conditions of patients and being able to make the trip more than just a ride.
5. *Emergency first aid skills.* Administering first aid in emergency situations prior to the arrival of medical assistance.
6. *Non-medical emergencies.* Understanding safety and standard operating procedures with regard to vehicle breakdowns or other major service delays.
7. *Basic transportation operation skills.* Being knowledgeable about basic organizational operating procedures and service measurements.

This training is specifically aimed at the vehicle operator but other training programs and packages have been developed for other employees of coordinated transportation operations. For the most part, agency training programs occur on an ad hoc basis, since new people are hired at irregular intervals. As a result, most individuals doing training do so only as an adjunct to regular work, so that agencies would not be able to eliminate a position if training were coordinated. However, coordinated programs could offer the benefits of shared information and experiences.

Coordinated training would also be a logical addition to any coordination project involving vehicle operations. A coordinated training program could ensure proper handling of all clients from the agencies, adequate bookkeeping and record keeping, and overall a more reliable service.

Coordinated Major Purchasing

The coordination of major purchases may produce significant cost savings, accrued through the cost discounts sometimes given for bulk purchases, or by individual agencies' switching to less costly suppliers. The benefits of joint purchasing are easy to calculate, since they are almost always based solely upon cost information. There are two key purchases that lend themselves to this concept: vehicle insurance and new vehicles. These purchases were described fully in Chapter 3; an analysis of their potential in a coordinated purchasing program is described below.

Insurance.* Vehicle insurance may vary greatly from agency to agency. While some of this variation can be ascribed to vehicle seating capacities and the terms of the policy (liability limits, collision coverage, etc.), much of it may be due to the terms offered by different insurance companies. Significant savings are also possible when agencies jointly purchase insurance. Each policy will have an annual premium cost, which can be converted into an annual cost per vehicle. Then, by taking into account the different coverage limits and average vehicle seating capacity for each agency, they can assess which of the policies seem to have the most favorable terms. Once this activity is concluded, a comprehensive set of insurance specifications can be developed that is satisfactory to all agencies. The policy specifications can then be submitted through a broker or agent to all insurance companies that are interested in the business. The lowest rates submitted can then be compared to the present premiums paid by all agencies in order to make a decision about coordinated vehicle insurance.

The process is fairly straightforward. However, because of the nature of insurance underwriting, it is impossible to predict whether a better rate can be achieved through the procedure.

There are a number of factors that may help agencies achieve better rates, including the following:

- Volume purchasing seems to offer a potential for reduced rates, although this is by no means certain.
- It may be advantageous to approach a new insurance agency or a broker who is not currently doing business with local agencies but who is recommended by other agencies.
- Good driver hiring procedures and training programs may induce the insurance company to reduce rates. Thus, driver training programs may have important cost benefits and are encouraged.
- It may be advantageous for agencies to use their other insurances—health, life, or property—as leverage.

Shopping around is the key to the insurance question. Once specifications are agreed upon and drawn up, it is relatively simple and cost-free to solicit bids from different insurance companies.

Vehicle Purchasing. Vehicle purchases are a high-cost item for agencies but are essential for starting operations, maintaining current services, or expanding services. The purchase of vehicles may be subsidized through DOT, HEW, or other federal agency

*For further information on insurance and social service agencies, see the three-volume series prepared by HEW/Human Development Services Transportation Initiative: *Proceedings White House Workshop on Transportation Insurance* (January 1979); *New Insurance Programs for Human Service Transportation Providers, Technical Advisory No. 1* (August 1979); *National Work Plan to Resolve the Transportation Insurance Problems* (August 1979).

grant programs, but even with these subsidies, agencies must obtain match monies, which usually range from $2,000 to $3,000 per vehicle for 15-passenger vans. Through coordinated vehicle purchasing, agencies will be able to receive a reduced purchase price. It should be understood, though, that the reduced purchase price will level off at some point; it won't matter then whether the purchase is for 5, 10, or even 20 vehicles, because the price cannot be reduced beyond that point. Also, coordinated purchasing can work only for purchases of the same make and model vehicle.

Using the data from the Vehicle Inventory (Figure 5), a vehicle profile can be developed, which can be used to define a vehicle replacement schedule. In addition to this information, vehicles that may be required for expanded services should be included in the replacement schedule. Constructing a replacement schedule over time (perhaps three or four years) will ensure that the average fleet age is low, and that purchases are evenly distributed. This last point is critical, because it is easier to generate a small amount of matching funds every year than to generate a large amount in any one year.

To implement this type of coordination, it is necessary to develop a set of vehicle specifications to enable dealers and manufacturers to bid on the contract to provide the equipment. Prior to finalizing the specifications, all agencies should agree on which type of vehicle would best suit their needs and what special equipment is required. Some states have special purchasing programs, from which agencies can obtain their vehicles at reduced prices; in effect, the state has taken the volume purchase system one step further, coordinating purchasing on a statewide basis. Thus, a check of the state transportation department is worthwhile when seeking to purchase vehicles.

Once all these issues have been resolved, bids are let and a contract is awarded to the lowest responsible bidder.

Coordinated purchasing is a method for lowering the price that each individual agency must pay for its vehicles. Besides this price advantage, the agencies participating are also standardizing their fleets, which they may find to be a long-term benefit of maintenance coordination. As added benefits, state and federal agencies may review the agency's funding more favorably because it is coordinated among agencies; local governments and private organizations may provide match monies more readily because of the coordinated purchase; and agencies may be able to pool their own funds to attain the required levels of match.

TOTAL COORDINATION

The decision to implement total coordination is very different from the decision to implement individual coordination concepts, because it involves a substantial role change for existing agency transportation providers.

Under total coordination, providers transfer the responsibility for transportation to the coordination program and become purchasers or resource shareholders of that system. Existing purchaser agencies are not affected to the same degree; to them, total coordination is a matter of switching from their existing provider to the new provider. Some providers may view the transfer of responsibilities negatively, not wishing to relinquish control. In actual practice, an agency that has transferred its existing vehicles to a totally coordinated system should always have the option of withdrawing from the system and getting the vehicles back. Such considerations should be part of a contractual agreement between the agency and the coordinated transportation system. The agreement should contain specific provisions on rates for transporting agency clients, guarantees of service levels and quality, and conditions for contract termination by either party.

An incentive for agencies to join a totally coordinated system is the possibility for more cost-effective and/or more reliable, high-quality service. The decision on total coordination will, therefore, depend upon the consideration of the data collected for the vehicle operations, maintenance, and administrative coordination analyses.

The chart of accounts listed in Figure 6 will help in establishing a budget for a totally coordinated system. Using the chart of accounts as a guide, it will be possible to come up with a total dollar amount for the development and operation of the system. The purpose of the budget estimate is to provide a basis for a cost feasibility analysis. The cost feasibility analysis will follow from those previously discussed under each of the individual coordination models.

A public transit or private taxi or bus company may be interested in operating the totally coordinated system as an extension of their own operations. Hopefully, they will have been participating in the coordination planning process from the beginning. As part of that process, each provider should be encouraged to submit a proposal to operate the system. If there is only one major provider interested, a simple negotiation process could be used to establish the cost of the service, with the basis for this being the totally coordinated system requirements as defined above. If there is more than one provider interested in bidding to operate the totally coordinated system, it will probably be necessary to go through a more formal process of competitive bidding to establish the lowest cost operator.

Finally, it may by desirable to set up a new, private nonprofit organization for total coordination. The decision to do this or to use an existing provider will be based upon the relative costs, but also upon a number of nonquantitative considerations.

Starting a new organization will require a great deal of lead time; that is, time to build an organization structure, develop the forms and accounting systems, and hire a competent director and staff. It also will involve a number of costs—such as negotiating agreements, insurance policies, and establishing facilities—that are difficult to estimate but that must be incorporated into the overall cost structure. On the positive side, a new organization can be attuned solely to providing coordinated services and will not have to manage any outside operations. Its board of directors can be made up of representatives of the participating agencies, who will thus retain policy control over the operation.

In summary, deciding upon the organization to run the total coordination system will require a number of cost and policy decisions on behalf of those agencies interested in pursuing this concept. But overall, in the right situation and with proper management, this coordination concept can better streamline agency operations.

TRANSPORTATION COORDINATION: IN YOUR LOCAL COMMUNITY

Given adequate local interest and initiative, a coordination project can be developed in your community. The coordination planning process is described in Chapter 4. This section describes how the process varies according to local conditions, using the urban and rural environments as models. Although there are significant variations even within these two major settings, this approach will help to define many of the major considerations that will be a part of your local coordination planning process.

THE URBAN TRANSPORTATION ENVIRONMENT

The urban transportation environment generally has many resources in both the planning and operations of services. If you are located in a major urban area, your major task in this setting is to manage a coordination program effectively, with the participation of many actors and taking advantage of existing resources.

The Metropolitan Planning Organization

In planning, the urban transportation environment is dominated by the Metropolitan Planning Organization (MPO (Fig 13)), which is responsible for policy and the allocation of Federal Highway Administration (FHWA) and Urban Mass Transportation Administration (UMTA) funds. The MPO includes in its structure most local, regional, and state agencies concerned with transportation, as well as a number of nontransportation agencies and citizen participants. It creates transportation policy by coordinating the transportation programs of all local transit operators and planning agencies and by bringing local public officials together in an open forum. The work program of the MPO required to form local transportation policy is centered around three elements, which are prepared annually: a unified planning work program, a transportation system management element, and a transportation improvement program.

Policy. The Prospectus establishes a multi-year framework in which the unified planning work program (UPWP) is accomplished. The Prospectus includes a summary of the planning program, discussing important local issues, the status and expected accomplishments for each element of the plan, and a description of the functional responsibilities of each participating agency.

The UPWP annually describes all transportation planning activities anticipated in the local area within the next one-or-two-year period regardless of funding sources, and documents all planning assistance provided through Section 8 of the Urban Mass Transportation Act and through the Highway Planning and Research or Public Law funds allocated through the FHWA.

Planning. The Transportation Plan consists of a Transportation Systems Management element (TSM) and a long-range element.

TSM provides for the short-range transportation needs of the urbanized area by making efficient use of existing transportation resources and providing for the movement of people in an efficient manner. It identifies traffic engineering, public transportation, regulatory, pricing, management, operational and other improvements to the urban transportation system, not including new transportation facilities or major changes in existing facilities.

The long-range element provides for the long-range transportation needs of the urbanized area and identifies new transportation policies and transportation facilities or major changes to existing facilities to be implemented. It is also consistent with the area's comprehensive long-range land use plan and urban development objectives. The time frame is generally upwards of ten years.

Programming. The urban transportation planning process includes the development of a Transportation Improvement Program (TIP) including an Annual Element (AE).

The TIP is a staged, multi-year program of transportation improvement projects consistent with the transportation plan described above. It identifies transportation improvements recommended for advancement during the program period, indicates priorities, groups improvements into staging periods, includes realistic estimates of total costs and revenues for the program period, and describes how the projects were chosen from the transportation plan.

The annual element is a list of transportation improvement projects proposed for implementation during the first program year of the TIP. It describes

POLICY STAGE	1. The Prospectus 2. Unified Planning Work Program
PLANNING STAGE	3. The Transportation Plan • Long Range Element • Transportation System Management Element (TSM)
PROGRAMMING STAGE	4. Transportation Improvement Program (TIP) 5. Annual Element of TIP
IMPLEMENTATION STAGE	6. Transportation Improvements

FIG 13. Metropolitan Planning Organization: Work Program Elements.

the project, the total cost estimated, the proposed sources of federal and nonfederal funds, and identifies the recipient and state and local agencies responsible for carrying out the project.

Transition Plan for Implementing Section 504

In addition to annually completing the above work programs, the MPO also meets a number of additional requirements, one of which is to develop a *transition plan* according to the UMTA requirements for implementing Section 504 of the Rehabilitation Act of 1973.

The UMTA rule published in the Federal Register on May 31, 1979 (Vol. 44, No. 106, p. 31442 and following) implements Section 504, which provides that "no otherwise qualified handicapped individual shall, solely by reason of his handicap, be excluded from the participation in, be derived the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." The rule requires DOT recipients to make their existing and future facilities and programs accessible to handicapped persons so that they can effectively use these facilities and programs. *Program accessibility* is defined as follows:

(1) The system is accessible to handicapped persons who can use steps.

(2) The system when viewed in its entirety is accessible to wheelchair users. With respect to vehicles, this requirement means that at least one-half of the peak hour buses must be accessible and accessible buses must be used before inaccessible buses during off-peak hours.

Program accessibility not involving major structural changes (e.g., equipping buses with lifts) must be reached within 3 years. Where structural changes are required, a system has up to 10 years to become accessible. If a recipient needs more than 3 years to make a program accessible, it must provide *interim accessible services* until program accessibility is reached.

The transition plan indicates how program accessibility will be achieved, including any interim accessible services required during the implementation period. It must include planning efforts to coordinate all special services, whether or not program accessibility is reached in the first three years, and must continue after program accessibility is achieved.

Recipients, working through the MPO, shall use their best efforts to coordinate and use effectively all available special services and programs in the community. Recipients in non-urbanized areas are generally subject to the requirements of this paragraph concerning special efforts in programming and implementation. (Federal Register, May 31,1979 p. 31479)

In urban areas, the transition plan will be developed under the direction of the MPO in cooperation with state and local officials and operators of publicly owned mass transportation services. In nonurban areas, it will be done under the direction of local elected officials in cooperation with transit operators and the state; and in both cases, substantial community participation is required.

Agency coordination, though not a requirement of the regulations, may be a reasonable alternative for use in the interim accessible services requirement, and UMTA has a commitment to facilitate such coordination through close cooperation with other federal agencies.

The MPO will be a critical actor in the metropolitan area coordination process, since it possesses a planning staff, data resources, and existing programs upon which agencies can draw. The MPO performs many studies that often overlap agency transportation concerns. Furthermore, federal policy has placed increasing emphasis on transportation coor-

dination and paratransit, and has placed the responsibility for these developments on the MPO. Thus, agencies that are interested in coordination and that have begun intial dialogue among themselves would do well to contact the MPO. In fact, an agency's coordination planning effort could quite possibly be a planning study funded in the UPWP using MPO resources.

Human Service Agency Planning/Funding Process

An understanding of the planning/funding process that local human service agencies must go through on an annual basis is a critical element for anyone involved in coordination planning. The planning/funding process can be defined as the annual planning, budgetary, accountability, and auditing procedures that a local agency must comply with in order to ensure continual funding. In most cases, local agencies are required to specify in their grant applications and planning documents the type of transportation service they will provide. The local plans must be consistent with, and integrated into, overall area or state plans for the delivery of services. Since local agencies are evaluated and audited on the basis of their stated objectives in the local plans, they are not in a position to immediately change local procedures to conform to a particular coordination approach. Agencies must be given adequate time to negotiate any required changes with their appropriate state and federal funding sources. An early awareness and involvement of the major federally sponsored human service programs is extremely important in achieving coordination in an efficient and timely manner.

A GAO report* listed major federal funding sources. These programs are found in various forms in every state and major urban area, and are most important to coordination because they generally have the resources and flexibility that are required to implement coordinated services. Funding and flexibility are particularly important for an effort as ambitious as total coordination.

Transportation Operations

While the MPO is the dominant single force in urban public transportation planning, the public transportation operating environment in urban areas usually comprises a number of resources, including the following:

- *Public transportation authority or public transit operator.* The public bus operator usually provides fixed-route services. In addition, the operator may also have been responsible for the "special efforts services" and may in fact have a demand-responsive system that could be included in the coordination plan. The operator may also have to consider working with the agency system to develop interim accessible services leading to program accessibility.
- *Taxi companies.* There are generally a number of taxicab companies, some of whom provide accessible services. These companies are providers for a number of client trips, often receiving reimbursements from the agencies.
- *Wheelchair user transport services.* These nonemergency ambulance services often have contracts with health and human service agencies to carry clients of those agencies. They provide specialized accessible services not often available from other operators.
- *Human service agency transportation systems.* Public and private nonprofit human service agencies may have substantial fleets of vans and small buses used for their individual agency programs, or may contract out as purchasers to any of the other transportation providers, including other agencies. Generally, a large number of such services can be found in a major urban area.

Urban areas do not lack for opportunities in the area of transportation coordination; in fact, the problem inherent in the planning process is not finding potential participants but managing a program with a vast array of possibilities. You will often find a large number of agencies with programs and a large base of data to draw upon. The key to your success will be your management of the planning program. The MPO, with its experience in transportation planning, and its knowledge of the local transportation network, should be involved as a key actor in your approach.

Managing the Coordination Planning Analysis in the Urban Environment

Agency coordination can begin in several ways. You can get one or two local agency directors together to talk about and identify common problems. Several agencies can hold a meeting to discuss their programs and look at common problems. The MPO

*GAO Report CED-77-119, October 17, 1977. "Hindrances to Coordinating Transportation of People Participating in Federally Funded Grant Programs." (Appendix II).

might initiate the planning process, based on the requirements of its transportation planning program, and then contact agencies to participate. In any case, starting and developing an interest in coordination is simply a matter of recognizing that a problem exists. Then, given local interest and initiative, you can begin to develop the process.

The first step in the planning process should be to hold a joint meeting between interested agencies and the MPO staff director or knowledgeable personnel. The MPO will have information regarding existing programs in transportation and can determine whether it can provide assistance, either with UPWP planning funds or with staff time. Furthermore, as transportation professionals, the MPO director and staff can suggest avenues of study, potential for use in the transition planning effort, and ways to organize the program. If the MPO resources are available, the study can be conducted jointly; if not, you can undertake the project yourself using these guidelines and available staff resources and any technical assistance and data available from the MPO. A meeting with the MPO should include consideration of the following issues:

- The work that has been done and the resources that are available
- Potential UPWP support and staff time
- A work program approach for involving other agencies

Once these steps are taken, you should contact all local human service agencies providing or purchasing transportation services. These programs represent the full range of possible participants in the coordination plan. Contact with these agencies should be based on a screening survey of some type, conducted either by telephone or mail. Major providers and purchasers of transportation that you know about should be contacted directly for the purposes of involving them in the formulation of the program. The purpose of the screening survey is to find out what transportation programs are available and which agencies are interested in pursuing coordination.

Following the screening survey, a meeting can be held with all those who showed an interest in coordination. At this meeting you can discuss your collective perceptions of the transportation problem, the coordination concepts available, the planning process, and the additional information you will need. You cannot expect to involve all the agencies with transportation programs, but this should not deter you from continuing. At a later date, other agencies may become interested; if so, you should encourage them to participate. Also, at a later date, you may expand service to individuals who are not agency-affiliated but require special services.

Once you have developed a group of agencies willing to participate, your next step is to gather the actual quantitative data required to perform the analysis of coordination potentials. Some agencies will have the data available, but many more will be able to produce it only with your assistance. Those agencies that cannot produce data for the potentials analysis can be handled in two ways: they may be temporarily eliminated from the planning effort and then reintroduced during implementation; or they may be given intensive (and potentially costly and time-consuming) assistance in gathering the data. These measures are necessitated by the fact that the potentials analysis requires accurate data on the hours and costs of operations.

Once collected, the data can be used to analyze the potentials for various forms of coordination, using the approach outlined in Chapter 4. You can then sit down with all the agencies and discuss the qualitative issues affecting the decisions, a process that may take a good deal of time and bargaining, but one that should produce some definitive final designs.

Summary of the Management of Coordination in Urban Areas

The coordination planning process in urban areas should not suffer from a lack of data or participants, but it may suffer from a lack of clear direction and from confusion. The following considerations should be kept in mind in coordination planning:

- Good data may not exist for some agencies in the form needed. It may be necessary to spend more time and effort than expected to assist agencies in gathering data. If an agency does not take an active role in helping to gather or convert data, this may indicate that the agency's interest, and eventual participation, is marginal.
- Because there are many agencies in urban areas, the planning process may become confusing—if so, your plan should first accommodate those major providers/purchasers having the most potential for coordination and only afterward be expanded to take in other interested agencies.
- Your planning program should be coordinated with public transit special efforts projects if possible.
- Try to create a program that takes advantage of all the significant potentials for benefits identified.
- Don't be too rigid in narrowing the range of options in an area of coordination. More agencies will join with both forms of operational coordination offered (operations clearinghouse and central

dispatching), then give strong consideration to this possibility. Do not rule out the possibility of offering a full range of coordination options so that agencies can select the ones they like best. This is one way of inducing participation on an incremental basis, with the expectation that a higher level of participation may occur over the long term.

- Where there is strong potential in only one coordination area, then aim at starting in only that area, adding others as they make sense on cost and organizational grounds.
- By all means, be realistic. It may be necessary for you to begin with only a few agencies and then gradually expand. Patience and realistic goals are essential.
- Finally, remember that this is only the beginning. Once a program decision is reached, you must begin to wrestle with the implementation issues necessary to realize it.

In summary, the coordination planning process in urban areas must be a cooperative effort among local human service agencies and planning officials. If it is to be successful, the effort will consume a great deal of your time, patience, and resources, even before the service is ever implemented.

THE RURAL TRANSPORTATION ENVIRONMENT

If you are located in a rural area, you may find that there are fewer transportation resources available. There are generally few regular public transportation operators and fewer transportation planning resources in rural areas.

Historically, there have not been many rural public transportation systems offering a high level of local service. The services available to the general public consisted mostly of private intercity bus operators, who generally operated local service on a very limited basis. In the mid-1970s with the initiation of FHWA Section 147 rural transportation demonstration programs, this situation began to change in many communities. It will continue to change due to the passage of Section 313 of the Surface Transportation Assistance Act of 1978, which added Section 18 to the Urban Mass Transportation Act of 1964.

Section 18, entitled Formula Grant Programs for Areas Other Than Urbanized, marks the coming of age of rural public transportation. Administered by FHWA and UMTA through state designated agencies, this program moves rural transit out of the research and demonstration phase. By providing capital and operating assistance, Section 18 should improve existing rural operations and provide the incentive for new services.

The project-supporting information required of a Section 18 applicant must include a description of the efforts made to coordinate with other transportation providers, both public and private, with particular emphasis on human service agencies; a description of these efforts, and a description of funds used in previous years for transportation and the means taken to coordinate these resources. Section 18 and its legislative history contain a clear mandate for coordination. There is also an elderly and handicapped transportation requirement to provide reasonable services for those populations as part of the program. The Section 18 funds are allocated to state agencies and are available to local public bodies and agencies thereof, nonprofit organizations, and public transportation operators providing general public transportation services. To capitalize upon these funds, rural counties and human service agencies have two options:

- If there already is a public transportation operator, Section 18 funds may be available to the operator if the above requirements are met. There are built-in incentives for the operator to provide coordination assistance, which can take the form of planning assistance followed by some kind of coordination agreement between providers. You may be able to take advantage of the professional transportation services available, such as dispatching, maintenance, and administration; at the same time, the transit operator may be able to provide better special services and meet the general needs of the rural area more efficiently.
- If there is no public transit operator available, the potential exists for an agency operation to assume this role and to apply for the Section 18 funds. This may require expanding an agency transportation system beyond agency program use, which may require a more long-term scheme. However, agency coordination will provide the first step towards having a local transit operation serving the most severely transportation-disadvantaged groups.

Section 18 has increased the incentive for agency coordination. It re-emphasizes the need for providing more passenger trips for clients to reach agency programs, and to do so with existing resources. Also, rural counties, as sponsors of many major programs, often have a direct interest in the human service agency network. For example, many counties sponsor offices for the aging and departments of social services and are thus directly involved in the activities and funding of such programs. Thus, the local officials should have an incentive for improving effective transportation to provide more programs and should take a leading role in your coordination process. You should speak with these officials at the outset and seek their assistance in the planning and implementation effort.

Managing the Coordination Planning Analysis in the Rural Environment

As far as the actual planning effort is concerned, rural areas offer fewer local planning resources. Technical assistance may be forthcoming in rural areas from one of the following:

- The existing Section 18 provider
- Regional planning agencies
- Economic development districts
- County government
- State department of transportation

The Section 18 provider, who is required to make coordination efforts a part of that program, may be the most promising source of technical assistance. The coordinated planning effort will then likely be the result of cooperative efforts between local human service agencies and this provider.

The planning process itself is similar to that required in an urban area, although it will be simplified by fewer participants. Your first step should be to obtain the names of all human service agencies with transportation programs or an interest in transportation for their clients. You may contact these persons by telephone and invite them to a general meeting to discuss the concepts of coordination and the potential benefits thereof. You may also contact county officials to elicit their help; as noted above, the county may wish to take an active role if it is already a sponsor for some of the agencies.

At the meeting you should brief the attendees on the concept of coordination, the proposed approach to the problem, and some of the benefits that may be possible. The concepts of ride sharing and time sharing should be introduced to familiarize agencies with the workings of coordination.

After the meeting, those agencies interested in pursuing coordination should be provided with a list of the data required to perform the analysis shown in the previous section. These quantitative data will be the basis for an initial look at the potential for coordination.

Coordination planners should not be discouraged if the small numbers of agencies with transportation resources seems to preclude coordination on the basis of efficiency. Remember that the nonquantifiable benefits may be very significant, especially the Section 18 incentive, and perhaps this alone can be the spark to create a coordination plan.

CONCLUSION

Coordination can be beneficial for local agency transportation services. Planned properly, it can result in more transportation for agency dollars, more efficient use of vehicles, and a more reliable and safe transportation service for agency clients. The planning guidelines detailed above have explained what improvements can be realistically expected from coordination, and how these improvements can be acheived through a coordinated planning effort at the local level.

Coordination is a negotiated process, bringing together those agencies with common transportation problems to discuss coordination solutions. It is not a simple process. But by following these guidelines, and exercising common sense, a coordination solution tailored to local needs can be developed.

The planning process is likely to produce evidence that a number of agencies in your local community will not benefit from any approach to coordination. This is not a cause for concern or disappointment. A realistic approach to the long-term development of a successful coordination project should be based on dealing with those agencies who are convinced, on the basis of the planning analysis, that there are significant benefits.

Developing a solution on paper is, of course, far different from putting it into operation. Implementation of the plan will require a number of additional steps. The steps required for implementation include developing financial reporting systems, bookkeeping procedures, negotiation agreements and contracts, and developing operating procedures. As with the planning process, these steps will take time and negotiation among the agencies participating in the program.

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