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

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

REFERENCE

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

Coordination, Costs, and Contracting for Transportation Services

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

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

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

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

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

UNIFORM COST ACCOUNTS AND COST SHARING

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

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

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

Most special transportation projects encounter difficulties such as the following:

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

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

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

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

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

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

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

TRANSPORTATION COSTS AND SERVICES

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

Service Categories

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

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

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

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

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

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

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

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

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

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

Transportation Costs

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

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

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

Direct or Variable Costs

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

Operations

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

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

1. Salaries and wages for drivers and attendants;

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

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

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

Vehicle Servicing and Maintenance

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

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

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

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

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

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

Maintenance Support

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

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

Indirect or Fixed Costs

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

Administrative or General Costs

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

1. Salaries and wages of directors and senior staff

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

Taxes and Tolls

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

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

Finance

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

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

Noncash Contributions

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

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

Service Units

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

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

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

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

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

DATA COLLECTION RESPONSIBILITIES

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

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

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

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

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

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

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

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

COSTS AND UNITS OF SERVICE AND UMTA SECTION 15 SYSTEMS

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

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

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

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

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

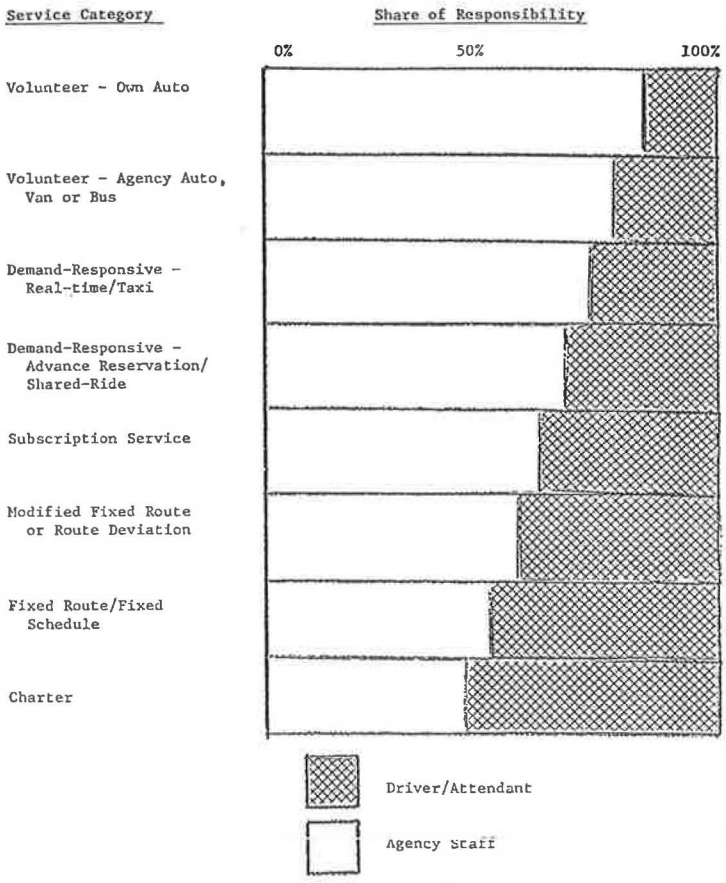

Figure 1. Allocation of responsibility for data collection for various categories of transportation service.

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

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

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

[a] At each passenger destination.

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

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

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

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

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

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

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

Section 15 Systems

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

Uniform Accounts

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

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

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

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

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

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

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

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

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

*Required functional categories.

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

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

COST ALLOCATION AND CONTRACTING

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

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

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

REFERENCES

1. Transportation for Older Americans. Institute of Public Administration, Washington, DC, April 1975.
2. Urban Mass Transportation Industry Uniform System of Accounts and Records and Reporting Systems. Arthur Anderson and Co. and Urban Mass Transportation Administration, U.S. Department of Transportation, Vols. 1-4, Jan. 1977; NTIS, Springfield, VA, PB 264 877 and 264 880.

Abridgment

Iowa's Approach to Transit Marketing

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

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

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

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

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