

ity-limited (handicapped) persons--was already a topic at the 1980 European Transportation Minister's Conference.

REFERENCES

1. W. Brög. Transport and the Challenge of Structural Change: Passenger Transport-Mobility and Lifestyle, Sociological Aspects. Presented at 8th International Symposium on Theory and Practice in Transport Economics, Istanbul, Sept. 1979.
2. "Social Service" Transport: Transport for Elderly and Handicapped Persons. European Conference of Ministers of Transport, Center of Economic Research, Paris, Round Table 51, Feb. 1980.
3. Forschung Stadtverkehr. Ministry of Transportation, Bonn, Federal Republic of Germany, Special Ed., No. 23, Feb. 1978.
4. Besondere Wohnformen und Gemeinschaftseinrichtungen. Ministry for Architecture and City Planning, Bonn, Federal Republic of Germany, No. 01.062, 1979, pp. 77+.
5. W. Brög and B. Mettler-Meibom. Better Planning for the Transportation Disadvantaged. Presented at World Conference on Transport Research, London, April 1980.
6. W. Brög. The Development of Criteria to Review and Assess the Results of Empirical Surveys from Methodological Point of View. Socialdata GmbH, Munich, 1978.
7. W. Brög. Ausgewählte Empirische Ergebnisse zur Fahrradnutzung in der Bundesrepublik Deutschland und Einige Methodische Anmerkungen zur Erhebung Entsprechender Verhaltensdaten. Presented at Velo/City, Bremen, Federal Republic of Germany, April 1980.
8. Verkehrsentwicklungsplan (VEP) Berlin. Untersuchung zum Non-Response Problem. Socialdata GmbH, Munich, 1979.
9. W. Brög and A.H. Meyburg. Nonresponse Problem in Travel Surveys: An Empirical Investigation. TRB, Transportation Research Record 775, 1980, pp. 34-38.
10. R. Höttler. Ausschöpfung von Stichproben und die Non-Response Problematik in Theorie und Praxis. Presented at 5th Workshop II/79 of German Transport Science Society, Grainau-Eibsee, Federal Republic of Germany, Nov. 1979.
11. Mobilität Behinderter Verkehrsteilnehmer: Pilotgruppe Pflegebedürftige. Socialdata GmbH, Munich, April 1980.
12. Socialdata GmbH. Anzahl und Situation zu Hause Lebender Pflegebedürftiger: Repräsentativdaten und Situationsgruppenanalyse. Ministry for Youth, Family, and Health, Bonn, Federal Republic of Germany, Vol. 80, 1980.
13. Anzahl und Situation zu Hause Lebender Pflegebedürftiger: 3rd Preliminary Report--Volume on Methods. Socialdata GmbH, Munich, April 1979.

Comparison of Two Brokerages: Lessons to Be Learned from Houston and Pittsburgh

SANDRA ROSENBLOOM AND DAVID WARREN

An examination is presented of two similar transportation systems that were designed to test two assumptions: (a) that transportation services can be provided to the elderly and the handicapped more effectively and efficiently when coordinated by a single agency than when provided by conventional, fragmented systems and (b) that specialized or paratransit services are the most appropriate way to meet the transportation needs of elderly and handicapped clients. The two communities involved are Houston, Texas, and Pittsburgh, Pennsylvania. Each community developed a brokerage system to deliver services to elderly and handicapped clients in its service area. The experiences of both systems with regard to costs, fares, ridership patterns, operational experiences, and goals and objectives are discussed. An examination of the important differences and similarities in the two systems and an evaluation of the important and transferable findings that follow from that examination are provided.

There are two complementary trends developing in the U.S. transportation planning community. The first is the serious consideration of coordinated approaches to the delivery of transportation services to elderly and handicapped travelers, particularly those who are clients of human- and social-service agencies. A related trend is the growing belief that it is more effective to provide accessible transportation services to the handicapped, not through physical modifications to existing transit fixed-route coaches but through the provision of specialized and responsive paratransit services.

These trends have been recognized by Congress but

in different ways. Some federal agencies, like the Administration on Aging, have specific congressional requirements that mandate coordination of all services provided. On the other hand, the U.S. Department of Transportation (DOT) currently mandates that transit systems must make their programs accessible to the handicapped by providing wheelchair lifts on fixed-route services rather than by providing paratransit services.

Two major regional transit authorities in very different parts of the country have taken remarkably similar actions to test two assumptions that have grown out of these complementary trends. The first assumption being tested is that coordinated approaches to transportation delivery are more efficient and effective than ad hoc, fragmented transportation services. The second assumption is that specialized services rather than accessible, fixed-route services are the most appropriate way to meet the needs of the elderly and the handicapped of a community. Both the Port Authority of Allegheny County (PAT) in Pittsburgh, Pennsylvania, and the Metropolitan Transit Authority (MTA) of Houston, Texas, have developed innovative and comprehensive ways of meeting the objectives embodied in these assumptions.

Of the two efforts, the Pittsburgh experience is by far the better known. The coordinated effort in

Pittsburgh is funded in part by an Urban Mass Transportation Administration (UMTA) Service and Methods Demonstration grant, and project activities are being monitored by the Transportation Systems Center of DOT. Thus, there are reports and published documentation of the experiences in Pittsburgh. However, to this date there has been no widespread documentation of the Houston experience.

We believe that information on the Houston experience will be most useful if it is presented in comparison with the Pittsburgh experience. In this way, the transportation planning community will be able to see what coordination experiences have general applicability and are potentially transferable.

This paper first discusses the operation and service characteristics of the Houston and Pittsburgh systems. It then describes any transferable conclusions that can be made about implementing large-scale coordinated services for the handicapped. Last, the paper describes what the experiences of the two cities tell us about the two basic assumptions underlying recent statutory and regulatory trends.

BASIC BACKGROUND

Description of Transit Service Areas

Pittsburgh is the urban center of Allegheny County. Pittsburgh was a city of 442 139 in 1977, a 15 percent decrease in population since 1970. The population of the county was 1 493 272 in 1971, a 7 percent decrease since 1970. The regional transportation system, PAT, serves the entire county. PAT has no buses equipped with wheelchair lifts. Its last vehicle acquisition is thought to be the last non-wheelchair-equipped purchase by any transit property in the United States. The PAT service area is roughly 734 miles².

Houston is the urban center of Harris County. Houston is one of the largest cities in the United States, and its growth rate is seven times the national average. The 1979 city population is estimated at 1 737 000, and the population of the county is estimated at 2 460 000. The regional transit system serving Harris County and parts of adjoining counties is MTA, which was formed with voter approval in 1978. MTA is financed in part by a \$0.01 sales tax imposed in the region. The MTA service area is more than 1700 miles². It currently operates 355 peak-hour transit coaches, 326 of which have wheelchair lifts. However, no lift-equipped service is provided as a matter of MTA policy.

Brokerages

The coordinated paratransit services provided by both the Pittsburgh and Houston transit properties are "brokerages". Neither system owns or directly operates any of the vehicles that provide specialized services to handicapped individuals. Instead, both systems contract with existing community transportation providers, both profit and nonprofit, to provide services in the vehicles already owned by those agencies (although some agencies in each city have purchased additional vehicles to provide continuing contract services). In Pittsburgh, PAT has contracted with a private firm, ACCESS (a wholly owned subsidiary of Multisystems, Inc.), to act as a third-party broker; all contracts for service are with this organization and not directly with PAT. In Houston, MTA itself acts as the broker for the specialized service, Metrolift.

Both systems were conceived and organized in response to the UMTA Section 16 requirement (Urban Mass Transportation Act of 1964, as amended) that

transit properties make "special efforts", roughly equal to 5 percent of their operating assistance, to provide services to handicapped and elderly travelers. Both transit systems would like to continue the brokerages as their response to the UMTA Section 504 accessibility requirements (Rehabilitation Act of 1973, as amended).

Both agencies purchase service from providers through contracts based largely on a vehicle-hour charge. Both agencies, however, pay some taxi-meter charges occasionally. Each brokerage serves city or regional residents who meet certain eligibility criteria. Both systems also serve the possibly non-eligible clients of social- and human-service agencies that contract with the brokerage (Houston) or make advance billing arrangements (Pittsburgh). Both systems have negotiated varying rates for different agencies that purchase services for their clients. Both systems pay varying rates to the different transportation service providers with whom they contract. Houston never had any Section 13c (Urban Mass Transportation Act of 1964, as amended) labor protection difficulty. Pittsburgh did initially have difficulty.

COMPARATIVE SERVICE CHARACTERISTICS

There are great similarities in the general characteristics of the two systems. The following section compares and contrasts the specific ridership experiences and service and operation characteristics of the two systems.

Level of Service and Fares

The Houston Metrolift provides 24-h advance notice, curb-to-curb service for eligible riders five days per week. Eligible city riders pay a fare of \$0.50 or \$1.00, depending on trip length. Clients provided service because their agency has a contract with Metrolift do not pay any fare; their agencies are billed monthly. The rates charged for agency clients are negotiated separately with each agency; they currently range from \$0.50 to \$5.00/one-way passenger trip.

Metrolift has no formal trip-limitation policy. However, the system is at capacity for the busiest times of the day because routine and recurring trips, such as school, work, and medical (dialysis) trips, have effectively used all available capacity. Thus, occasional and demand-responsive trips often cannot be accommodated at the time originally requested. Users are then asked to reschedule these less routine trips to take advantage of available space. Some survey data indicate that 30 percent of all callers are never served at all because of this capacity problem.

Pittsburgh offers a much higher level of service at a higher user fare and a higher charge to contracting agencies than Houston. As in Houston, Pittsburgh agencies may purchase service for their possibly ineligible clients; these agencies, too, are billed monthly. ACCESS offers a door-to-door service seven days a week. The system has no capacity problem. All requested trips are accommodated--if not in the dedicated contract vehicles, then in full-fare taxis. Although ACCESS has relatively strict criteria for subsidy eligibility (discussed in the next section of this paper), there are no trip limitations once a user is certified as eligible (either subsidized or not).

ACCESS fares are computed from a zone-based fare schedule calculated to produce revenue equivalent to predicted costs. There are 195 zones in the ACCESS service area, and fares are based on the airline distance between the centers of the zones (some ad-

justments are made for geographic barriers, etc.). The minimum fare (even for an intrazone trip) is \$2.00; each additional zone is \$1.50/airline mile.

Those Pittsburgh citizens who qualify for the service but who are not traveling under the sponsorship of an agency are told what their fare will be when they call and describe their origins and destinations. Fares to the rider theoretically can range from \$2.00 to \$43.00/trip for unsubsidized passengers and from \$0.50 to \$10.00 for those subsidized directly by PAT. However, in September 1980 the average trip length was 5.5 miles; the average fare to the nonagency was between \$6.00 and \$7.00.

Service Arrangements

Houston

Metrolift currently contracts with one private transportation provider and three not-for-profit providers. MTA also contracts with the private provider, Yellow Cab, to receive all client calls and to provide dispatching and routing services for all four operators. A provider may be asked to serve any part of the large Houston region. However, all providers are scheduled to take advantage of their starting location.

The size of the vehicle fleet of the various providers differs, ranging from 2 vehicles for the not-for-profit operator to 20 vehicles for the contractor who provides transportation for local congregate meals for the elderly. Not all vehicles are lift-equipped or radio-equipped, which severely limits the way in which Metrolift can use them.

Metrolift currently provides more scheduled and fixed-route trips than demand-responsive trips. In order to accommodate the limitations imposed by non-radio-equipped vans, Metrolift preroutes and preschedules many provider's trips as much as a week in advance. These routes or itineraries can be changed up to the day before service, but the vehicles cannot be "dynamically" rerouted to take advantage of excess capacity while in operation. The inability to respond in "real time" explains in part why the system has to turn riders away or reschedule their trips.

In addition, Metrolift has a very high no-show record. The staff believes this rate could be lowered if all vehicles were equipped with radios. The MTA staff is urging all contractors to buy radios to lower the no-show rate and to increase overall system efficiency.

The large private taxi operator provides service in dedicated lift-equipped vehicles. The nonprofit providers technically only dedicate their vehicles for the time purchased from them by MTA. Earlier attempts to use regular-service taxis for at least semiambulatory passengers were not successful. Most taxi drivers in Houston are independents, not employees; they operate under the franchise given to a large company. Such independents cannot be obliged to serve contracted trips if more attractive trips are available. The only way Yellow Cab or most Houston taxi companies could guarantee service is to hire drivers as employees and use dedicated vehicles.

MTA purchases service from its contract providers on a vehicle-hour basis. Currently, the private operator, Yellow Cab, is paid \$12.36/vehicle-h and no maximum level is specified; backup service can be provided in regular taxis at the meter rate. (This service is provided only when a person with a scheduled trip has been missed, not to provide extra capacity.) The other providers are paid either \$12.00 or \$12.36/h, depending on when their contract was renegotiated; most have a minimum daily guarantee as to whether their vehicles are used or not.

All transportation providers or systems in the region were invited via a request for proposals (RFP) to propose service in the initial round of Metrolift contracting. This first RFP was relatively informal; the MTA staff worked with all interested bidders to assist them in estimating their ability to provide service and the costs they would incur in doing so. MTA was able to accept all interested bidders in its first RFP process. One large social-service system, however, was forced to cancel its contract after a few months of operation.

MTA plans to inaugurate a more vigorous bidding process in its next round of RFPs. In that phase, interested agencies will be required to submit and, if successful, adopt some standardized cost and ridership reporting forms.

Pittsburgh

ACCESS also requested agencies to bid on proposed services but in a different fashion. The county was divided into 31 bid sectors, and operators were requested to indicate interest in one or more of those sectors. Interested profit and nonprofit providers were requested to submit a statement of qualifications (RFQ) and to rank the sectors in which they wished to provide service. Then, finally, ACCESS began negotiations over costs.

This RFQ approach ensured that some of the small but active nonprofit providers would be able to bid for a manageable share of the ACCESS service. Like MTA, ACCESS was required to work with potential bidders before they submitted bids to ensure that those agencies understood their own cost patterns and their potential service capability.

ACCESS currently has seven contract providers or carriers, three taxi operators, and four not-for-profit carriers (this has changed over the past year). The intent was to have two types of carriers, those serving long-distance trips and those serving local trips. Actually, cooperative arrangements have been worked out to optimize the efficiency of the system. These arrangements gave the system the capability to handle a Yellow Cab strike (Yellow Cab carries 40 percent of all passengers) with only a 10 percent decrease in ridership.

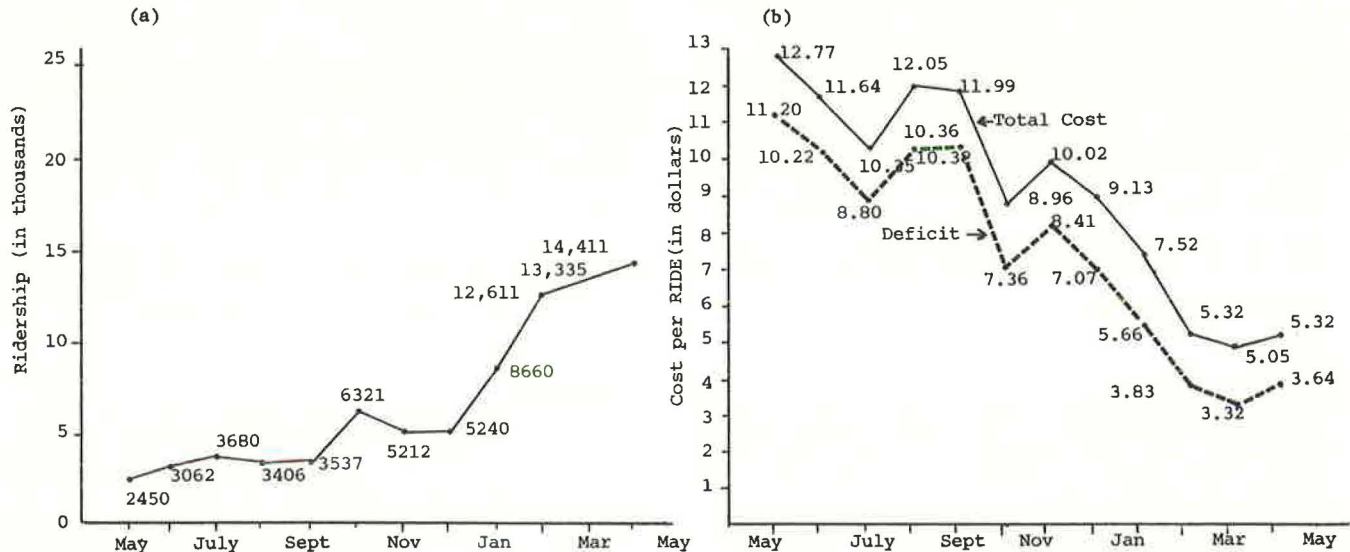
In Pittsburgh, because of the basic geographic breakdown, central dispatching services are not required. Non-agency-sponsored clients simply call the carriers in their respective areas (independent of the destination of their trip). Most individual or nonsponsored trips are directly scheduled by the rider with the appropriate carrier. If the individual does not know how to contact the appropriate provider, he or she can call the ACCESS office and the call will be properly transferred.

When agency-sponsored clients travel, the sponsoring agency calls the central ACCESS office and the ACCESS staff notifies the appropriate carrier. Individuals whose fares are agency-sponsored are not allowed to call ACCESS or any of its carriers directly.

Contract carriers provide service in a mixture of dedicated and nondedicated vehicles. The ACCESS staff has been encouraging carriers to use regular vehicles not dedicated to the ACCESS service, but this is not always possible for lift-equipped providers.

ACCESS is billed by some carriers on a negotiated vehicle-hour basis and by some, but not all, taxi operators on the basis of full taxi-meter fares. Reimbursement rates differ markedly. In September 1980, the taxi contracts ranged from \$11.75 to \$13.50/vehicle-h. Nonprofit operators were charging ACCESS from \$10.08 to \$13.80/vehicle-h.

Figure 1. May 1980 Metrolift monthly progress report: (a) monthly ridership and (b) monthly total cost per ride and monthly deficit per ride.



Eligibility Requirements for Service and Ridership Patterns

Houston

All residents of the MTA service area who cannot use fixed-route transit for physical or functional reasons are eligible for the Metrolift service. They must submit some form of written proof of their disability (a doctor's note is sufficient) and an application to MTA; when their application is approved, they must purchase (at full price) a book of \$0.50/ride coupons. Drivers are not allowed to take money from riders.

Agencies may also purchase service for otherwise ineligible clients from MTA. Many people qualify for these agency-delivered services on the basis of other than physical disabilities; age, residence in certain geographic areas, and low income level are common criteria. But many of these criteria do not make them eligible for the MTA Metrolift service. However, MTA wanted to make it possible for agencies to purchase service for these clients from MTA.

Some agencies also purchase service for clients that are (or might be) eligible for Metrolift service. These agencies are often charged a higher cost per trip than the basic \$0.50 fare. These agencies do so in order to ensure reliable service and to help the brokerage grow. Technically, there is nothing to stop the agency from purchasing the same book of \$0.50 coupons available to all eligible clients and letting their clients ride for \$0.50. MTA has tried to establish its contract rates (at least in part) to encourage agencies to purchase service for clients rather than "dumping" them on the system for \$0.50/ride.

MTA has assumed the burden of subsidizing all transportation services delivered above a certain trip ceiling rate. MTA sales tax set-aside is used for this purpose. The ceiling rates are negotiated with each agency and involve such considerations as trip distance, trip time, trip densities, and client type. The single most important criterion is the available financial resources of the agency. Any trip costs above the ceiling rate are incurred by MTA and not by the provider.

These currently negotiated rates range from \$0.85/one-way trip for the area agency on aging to \$5.00/trip for the regional office of the state Department of Human Resources (DHR). The area agency

on aging requires service to congregate meal sites for its clients; these trips are many-to-one and can easily be scheduled. DHR requires medical trip service for its Medicaid recipients; these are usually demand-responsive, random trips and are not nearly so easy or inexpensive to serve.

The single most unique feature of the MTA "contractual" arrangements with agencies is that the same agency may both sell transportation services to Metrolift and buy transportation service from MTA. MTA is paying some agencies to carry their own clients (plus others) at a contractual charge (ceiling rate) lower than the cost the agency previously incurred in providing direct service! In addition, these agencies generally make money on the additional transportation service provision they sell to Metrolift. This unique arrangement has encouraged several reluctant agencies to participate.

Metrolift ridership has been growing steadily. In May 1979, the Metrolift program carried 2450 one-way passenger trips; by December of 1980, with about half of the congregate meal sites being provided transportation under contract to the area agency on aging, ridership had increased to 5240 one-way trips! Figure 1 shows the rapid increase in total ridership and how that increased ridership has led to a decreased per-passenger deficit.

This rapid growth in ridership has occurred for two reasons. The major reason is that Metrolift has been absorbing other agency programs through service contracts. The largest addition has been all the meal sites of the area agency on aging. The second major reason is that ridership with the various contract programs grew very slowly at first but is growing more rapidly now that system improvements have been made. The net result is an increase in ridership of more than 700 percent in the first year while the cost per rider to MTA has dropped almost 75 percent.

It should be noted that, because of its continued assured funding source and its determination to grow, MTA has made a vigorous effort to involve any potential participants. The MTA strategy has involved willingness to permit hesitant participants to incur a fairly large MTA subsidy per client trip.

Pittsburgh

All elderly and handicapped citizens in the ACCESS

service area are eligible for the service; however, only those citizens so disabled that they cannot use regular PAT service are eligible for the PAT subsidized fare. Individuals who wish to be certified for eligibility for this subsidy make an appointment with the Easter Seal Society, which is under contract to ACCESS to screen applicants. The association uses a mock-up of the front end of a regular transit coach; if an individual cannot mount the first step, he or she is certified as eligible for the subsidized fare. Approximately two-thirds of those so certified are in wheelchairs; the other third use walkers or other devices and are semi-ambulatory (note that certification patterns are not equivalent to ridership patterns). By October 1980, ACCESS had certified more than 1800 persons for the fare subsidy.

Those riders eligible for the PAT subsidy (a directed user-side subsidy) purchase a book of ride tickets or scrip for 25 percent of the face value. They use this discounted scrip to pay the full fare when they purchase a ride with ACCESS. ACCESS carriers and drivers are not permitted to take money from clients.

Some elderly and/or handicapped people are eligible to use ACCESS service without subsidy. The response has not been great. The travel rate of such individuals has been increasing slightly because there are some savings over full meter taxi fare for many trips. In January 1980, 200 unsubsidized, nonagency ACCESS trips were taken; that number grew to a little more than 300 in both the months of June (346) and July (326). (The actual number of individuals is not available.) PAT staff feel that that number is a seasonal high that will drop through the winter months. Preliminary surveys indicate that these riders are elderly travelers who are slightly "better off".

In Pittsburgh, as in Houston, various agencies may purchase service from ACCESS for their own clients. ACCESS is not worried that agencies will "dump" clients onto the system because the eligibility requirements for subsidized fares are so stringent that many clients will not qualify. PAT staff feel that those clients who do qualify should be allowed to use ACCESS in preference to their agency transportation.

ACCESS has tried to be very flexible and responsive to the needs of agencies. An agency may have a formal contract for service (as does the area agency on aging) or simply an oral or written understanding that sets up a monthly charge account. Agency-sponsored trips are generally based on the same fare schedule used to compute all other trips; that schedule was designed to reflect shared-ride service characteristics. However, many trips are not shared-ride simply because demand patterns do not allow such grouping. Several agencies noted this phenomenon and asked for discounts when more than one of their clients rode together. To accommodate the objections of those agencies, discounts were allowed.

ACCESS discounts allow a certain percentage of savings over the computed fare for each agency client who rides with other agency clients. That percentage discount only continues to the point where that figure equals the vehicle-hour charge that ACCESS is paying to its contractor; at that point, the agency is simply charged the vehicle-hour charge as the fare for all clients. The procedure is designed to prove that ACCESS policy is that everyone, including agencies, should pay the full cost of transporting their clients.

Agency-sponsored trips have been growing as a percentage of total trips; as in Houston, the involvement of the area agency on aging substantially

Table 1. ACCESS ridership pattern.

Rider Category	One-Way Trips per Month	Percentage of Total Ridership
Certified ACCESS cardholders		
Wheelchair-bound	1970	27.4
Other	2227	31.0
Noncertified elderly and/or handicapped and agency clients		
Wheelchair-bound	900	12.5
Other	2097	29.1
Total	7197	

increased total ridership. Unlike the Houston agency, however, the Pittsburgh agency did not contract for its group transportation needs but rather for demand-responsive medical trips. Table 1 gives the ridership patterns of ACCESS during May 1980, before 5000 one-way passenger trips by the agency on aging were added. Since very few of these riders are in wheelchairs, the percentage of wheelchair-bound individuals should drop by almost a third. Figure 2 shows the impact of increased agency involvement on total ACCESS ridership but prior to the full involvement of the area agency on aging.

Costs

Both MTA and PAT hoped to make the transportation portion of the service self-sufficient; neither has realized that goal.

Houston

Overall, the Metrolift program currently returns about 25 percent of its direct transportation costs to MTA, although the deficit per passenger has been decreasing rapidly (as Figure 1b shows). In May 1979, the average deficit per one-way passenger trip was \$11.20; by November it had dropped to \$3.84. These costs do not, however, include the value of MTA staff time and resources devoted to the Metrolift service.

From May 1979 to May 1980, approximately \$750 000 was spent on delivery of contract service in the Metrolift program, including routing and scheduling. MTA staff and overhead committed to the program for this period of time cost approximately \$75 000, which brings the total annual cost to approximately \$825 000.

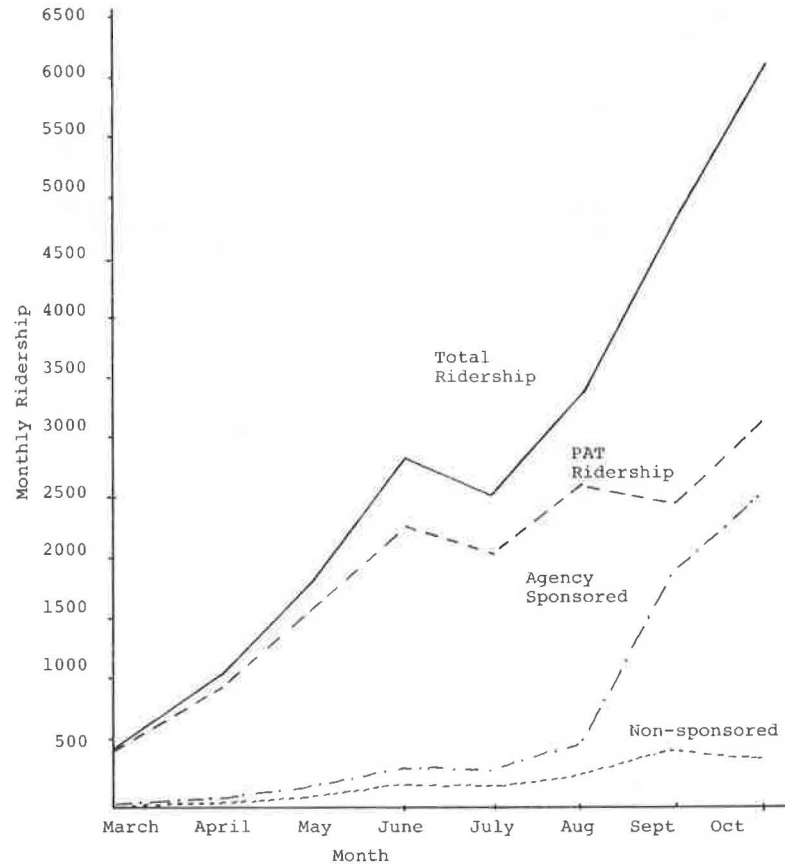
In Metrolift, the average revenue per passenger for the first year was roughly \$1.60. The staff expects that revenue per passenger will drop slightly as additional agencies are brought into the program. In general, most newer programs will pay lower negotiated ceiling rates. MTA will negotiate such rates again in part to encourage additional participation. In addition, as participation grows there will be increased eligibility overlap for any given client. Thus, agencies may start to purchase \$0.50 coupons for their clients if they are not given an advantageous fare.

Total revenues, however, are expected to increase, and costs per passenger are expected to drop as efficiency rises. The staff expects a revenue return to MTA of from 30 to 50 percent in the next stage of the program.

Pittsburgh

In September 1980, ACCESS incurred direct transportation costs of \$110 000 and administration costs (both PAT and ACCESS) of approximately \$23 000. In

Figure 2. ACCESS system ridership by agency.



that month, 12 162 one-way passenger trips were delivered (including 880 escort trips). Overall, ACCESS recovered approximately 60 percent of all direct transportation costs during September or 50 percent of total costs (including administration and overhead).

It is important to keep one point firmly in mind in discussing Pittsburgh's revenues and deficits per passenger. All ACCESS revenue figures include the already subsidized fares paid by PAT clients. Therefore, the kind of data on deficits or subsidy per passenger that would be comparable to Houston's (or any other city's) figures are not immediately available. In short, the full cost of the ACCESS system is not reflected in the system deficit figures presented above.

In September 1980, ACCESS revenue comprised almost \$45 000 in agency-paid fares or billings, \$1100 in unsubsidized (by PAT) redeemed scrip, and \$20 200 in redeemed PAT-subsidized scrip. Of that \$20 200, PAT paid ACCESS 75 percent or approximately \$15 000.

This arrangement was designed (a) to allow the brokerage to work at its highest efficiency without being compromised in the long run by the client-subsidy issue and (b) to allow PAT to give a directed, specific client subsidy without giving a system subsidy.

Like MTA, ACCESS average costs and deficits are dropping. Since September 1979, ACCESS has increased total revenue by an average of \$2.17/passenger trip (which in part reflects a fare increase) and total costs per trip were down \$1.20. In September 1980, average total revenue per passenger was \$5.88 (including PAT subsidies); average total cost per one-way passenger trip was \$11.82.

Operational Differences and Similarities

While there are many significant differences between the operational practices and the ridership experiences of both systems, there are some similarities that are important to note.

Similarities

Both systems made every attempt to involve a wide variety of local transportation providers. Both systems used a bid process to encourage the involvement of all potential transportation providers in the community; this was both a system objective and a sound political move. Both systems had to work with smaller, generally not-for-profit providers to help them see their potential strengths and weaknesses in the brokerage system. Both systems made some allowances for less sophisticated operators. The award of contracts met some nonefficiency criteria. In particular, both systems involved more costly nonprofit providers in order to gain the trust of the community and to prove that the quality of service was important to them.

Both systems were interested initially in the involvement of the area agency on aging; both systems had to wait for that involvement. In both systems, the participation of the agency has made a tremendous difference in the total cost and ridership pattern. The MTA rationale was very different from that of ACCESS, however. MTA wanted the area agency on aging to participate in order to fully and efficiently use the large vehicle fleet of agency subcontractors.

Both systems hoped to eventually break even, al-

though MTA started with a much greater "loss-leader" policy. ACCESS tried to determine its break-even point from the inception of the service.

Because both systems expect to break even eventually, at least for certain services, they both make special efforts to stress to clients what the full costs of transportation are. Although Metrolift invoices to contracting agencies only call for the negotiated ceiling rate, they also list the full costs of providing agency trips so that agencies can see how much subsidy is being provided to them by MTA.

Both systems have a fare policy that allows some predictability for riders and agencies, a very necessary condition for their agency participation. The two systems use different mechanisms to achieve this. MTA sets a flat fare for all trips, whether individual or agency sponsored (although not the same rate for each agency). The ACCESS fare structure allows individuals to know exactly what a trip will cost before the vehicle comes; agencies with recurrent trips can also know what their costs are.

Both systems operate on a noncash basis; both use driver's logs and scheduling manifests to do billing. Both generally pay on a vehicle-hour basis so that any rider payment device (scrip, tickets, etc.) is in essence "funny money" to the carriers or providers (although clearly not to individual clients).

Both systems found that there were difficulties with both private and public providers. Most non-profit providers did not have the experience or expertise to schedule trips, particularly under demand-responsive conditions. On the other hand, private market providers had drawbacks as well. As previously mentioned, Houston was forced to abandon the use of regular taxis because they were too unreliable; ACCESS has used regular-fare taxis, but some dedicated vehicles were required for lift-operated service. In neither community was there any expansion in the number or the solvency of for-profit providers (as some advocates of brokerages contend that there will be).

Both systems found that they had a core of regular riders traveling frequently. Probably more than 90 percent of Houston's ridership is composed of "regulars"; approximately 75 percent of the ACCESS ridership is "core" riders. Certainly such regular ridership alleviates the scheduling problem faced by some providers.

Both systems use the brokerage mechanism to directly and indirectly support the social service community. The Pittsburgh approach is more direct; for example, ACCESS contracts with Easter Seals to do eligibility screening and uses Goodwill, Inc., as printers. Houston permits certain agencies to continue small-scale transportation services by purchasing additional agency transportation services at a profit from those agencies. The profits that these Houston agencies make on contract services to Metrolift are in turn used to maintain the vans, etc., for the kinds of semiemergency or very personal transportation services currently not well provided by Metrolift. In both cases, these activities have helped to convince the agencies of the broker's genuine interest in the human service network and its clients.

Differences Between the Two Systems

The differences between the two systems also have some important implications. Because ACCESS has no capacity limitations, it can easily handle non-routine and random trips. This probably explains why more than 30 agencies have some form of billing arrangement with ACCESS whereas only 7 agencies currently contract with Metrolift. Metrolift is at

capacity; frequently, either nonscheduled trips must be moved to another time or the individual must wait two to three days to get on the system. It is not surprising that many agencies are not able or willing to use Metrolift for their clients with these limitations. Individual riders are similarly disadvantaged.

The two systems have different approaches to the subsidy question. PAT wishes the only subsidy to be the direct 75 percent share of the fare of eligible handicapped riders; PAT staff expects (and hopes) that the system itself will eventually break even in terms of revenue meeting all costs. MTA expects that all agencies purchasing service for noneligible clients will eventually pay the full cost of transporting those clients. However, MTA has more mixed expectations with regard to agency clients who might be eligible for Metrolift as city clients; in this case, MTA is willing to allow some sort of discounted fare. In fact, MTA staff has developed a number of different discount fares to agencies, none of which really reflects the cost of transporting their clients but rather the constraints under which the agencies operate. This approach is supported by the expectation of continuing financial assistance to Metrolift.

The different approaches to the subsidy question are complemented by the two agencies' different approaches to the eligibility question. It is extremely difficult to be certified as eligible for the PAT subsidy for ACCESS. It is extremely easy for an individual to be certified as eligible for Metrolift service, which is itself heavily subsidized. MTA is considering changing its eligibility requirements; if it does, changes may be made in its billing and overall subsidy policies.

TRANSFERABLE LESSONS

Stages of Development

An analysis of ACCESS and Metrolift and their growth and development patterns has implications for other areas. It appears that brokerages grow and develop in stages. The first stage of planned effort can be called the initial consolidation stage. It may be difficult to realize or to accurately measure savings at this stage because many variables are changing at the same time. During this period, program costs can increase for both agencies and individual providers because certain expenses are allocated to transportation provision for the first time.

When ridership levels off and the consolidation of funding programs has been accomplished, a second stage begins. This stage can be characterized by service refinement, in which service operations and accountability are improved. For Metrolift, the second stage consisted of developing computer-assisted routing and scheduling and the total automation of recordkeeping. Such capabilities provide management and evaluation tools that allow better contract monitoring and allow contractors to monitor individual drivers and vehicles. Agencies that purchase service are able to monitor overall service as well as the travel of individual clients.

The final stage in development may well be the further consolidation of providers and contracting agencies. In the first and second stages, contracting agencies are typically public agencies. This third stage of consolidation could involve smaller social but nonpublic agencies. Because these smaller agencies often work very closely with their clients, they must be convinced that a large system will be able to serve client needs as well as they could do it themselves. In the first and second stages, a brokerage effort may not be able to ensure

this. In the third stage, the system should provide a much higher level of service.

Fitting Agencies to Appropriate Development Stages

Since the brokerage system has distinct development stages, certain types of agencies fit better into the system at different stages. In the first stage, a participating agency should have a good knowledge of the cost of transportation services. This knowledge can be gained either through experience in contracting for transportation services or in providing it. Generally, the necessary level of sophistication will be available in agencies that operate more than four vans. Public agencies that have Title XIX (Social Security Act) Medicaid programs sometimes have this experience. Local Easter Seal Societies often are sophisticated enough to recognize the potential benefits, financial and other, of this arrangement.

The size and sophistication of the agency that participates in the first stage are important. First, agencies must expect and be able to weather service problems that will inevitably accompany coordination attempts. The agency must understand and expect problems and work to resolve them. Smaller agencies may not be able to accommodate such disruptions without losing their clients. As a result, they would have to pull out of the effort. Poor service to smaller agencies in the first stage would discredit the effort and possibly hamper consolidation in latter stages.

It is important, therefore, in the first stage to deal with large agencies that can afford some disruption. Ironically enough, those small agencies that complain the loudest about service disruption are often not very consistent at delivering transportation to their clients. But in the brokerage system they have someone else to blame.

Finally, good first-stage agencies are those better-financed programs from which the best financial return can be realized. These will traditionally be large public agencies, although some private agencies have such financial strength.

After service is refined and made more reliable in the second and third stages, more agencies can be accommodated, given some mutual advantages. It should be cautioned that all agency demand cannot be coordinated. Geography is an important consideration. If the agency's need for geographic coverage exceeds that of the brokerage system, that need may negate any benefit from coordination.

In addition to geography, client needs are sometimes incompatible with the service provided by the system. In Metrolift, the system provides essentially curb-to-curb transportation. While currently participating agencies find this acceptable, agencies that provide more personalized or door-to-door service must either modify their service objectives or continue to provide transportation themselves.

The concept of fitting appropriate agencies into the appropriate stage of brokerage development is not a restrictive approach. Certainly, attempts should be made to accommodate any agency that shows an interest in coordination. However, the more sophisticated, larger agencies will adapt more readily to a consolidated delivery system. Smaller agencies whose business practices have traditionally been weak will require more effort by the broker so that they can operate under the system.

Essential Components for Successful Implementation

The Houston and Pittsburgh experiences suggest that four essential components are necessary to develop a transportation brokerage program:

1. A lead agency to serve as a broker and "bankroll" the developmental costs,
2. An agency that assumes the broad responsibility for serving the transportation disadvantaged,
3. Highly motivated staff to "sell" the concept to selected appropriate agencies, and
4. Time.

The key role of the lead agency--(a) to bankroll the development of the brokerage and (b) during the first stage, when it may incur large deficits--is obvious from both the Pittsburgh and Houston experiences. Less obvious is how critical are the last two components--motivated staff and time.

Initially, there may be negative reactions to coordination and consolidation and it takes a great deal of staff time to "sell" the concept. The staff must plant the seeds of the concept and let the idea be internalized by the agency leaders on whom the effort depends. The staff must maintain high visibility through meetings, participation on committees, transportation brokerage seminars, etc.

The staff must also educate small, nonprofit providers in basic aspects of transportation such as cost accounting, preventive maintenance, insurance, purchasing, and training. Some of this can be accomplished by developing an information-sharing network to take advantage of the expertise already available in the community. It has been the experience of both ACCESS and MTA that the best way to develop a coordinated system is to work individually with potential participant agencies. This allows the agency and the system to define their needs and build a relationship based on trust. Again, such efforts require a considerable commitment of time and resources.

The successful development of a brokerage program requires strong community participation, especially by public and private human service agencies. The human service sector is a complex network of agencies interconnected through an array of funding programs, personal relations, and a common desire to help people. Overcoming initial resistance also requires the commitment of personnel resources and perhaps an initial "loss-leader" fare policy.

HOW WELL THE TWO SYSTEMS MET THEIR OBJECTIVES

Both Houston and Pittsburgh were in part testing two different and important assumptions currently held in the transportation planning community. To what extent does the experience of either system uphold those assumptions?

Cost-Effectiveness of Coordination

An examination of both cities shows that coordinated transportation systems can provide better, and in some cases cheaper, services than the ad hoc systems in existence previously. Almost all of the agencies that buy transportation services from either ACCESS or Metrolift incur lower costs than they incurred or would have incurred without these systems. On the other hand, in both cases lowered costs may be the result of sizable subsidies from state, local, and federal sources to cover any system deficits. It is not clear that the actual coordination efforts undertaken by both systems are currently bringing down operating costs. In addition, the "extra" overhead generated by special project staff and consultants is considerable. This may be because both systems are only in the first stage of development, where losses are natural.

"Breaking even", however, is not necessarily a measure of cost-effectiveness. It may be that certain types of transportation for the elderly and the

handicapped simply cannot be provided so that total system costs are equivalent to revenues. The more important question, which has yet to be answered, is whether a coordination mechanism, which itself initially requires the expenditure of additional resources, in the long run either lowers the cost or increases the quality of most transportation services delivered in a community. The staffs of both Metrolift and ACCESS believe this question will eventually be answered in the affirmative.

It does appear that most agencies in both cities are receiving better service for their clients than they did before. In addition, many agencies find it easier to deal with the broker than to deal with local transportation providers directly or to own vans and provide services themselves. However, there is some self-selection involved; in both communities, agencies that already provided or received high levels or even satisfactory levels of transportation services were far less likely to purchase service from the broker. Both systems may well have attracted those agencies that were already very unhappy with their current arrangements.

Appropriateness of Specialized Services as Response to Needs of Handicapped and Elderly

Neither Pittsburgh nor Houston has provided fixed-route, accessible bus service with which to compare the specialized services provided. Yet both cities have experienced fairly high ridership among a variety of both the handicapped and the elderly. In general, the handicapped groups in both cities are pleased enough with this service not to expect fixed-route, accessible service; in Houston there has been little demand that the city actually

operate the lifts on its 326 lift-equipped buses. In addition to meeting the needs each week of a larger number of travelers than have ever been accommodated by the accessibility features on any fixed-route, accessible service, both of these specialized services, delivered through a brokerage, are meeting the needs of ever more financially strapped social- and human-welfare agencies.

It is not clear whether the specialized systems in Houston and Pittsburgh are a more appropriate response; it is clear that they are meeting the real transportation needs of a large number of citizens. There are some complaints, difficulties, and problems, but the citizens of each community seem relatively committed to the idea of specialized transit service delivered to the elderly and the handicapped through a broker. That community support seems to be the ultimate test of the appropriateness of a service.

ACKNOWLEDGMENT

Some of the data and information presented in this paper were gathered in part under a research grant from the Office of University Research of UMTA. That agency bears no responsibility for the views stated here.

Data on the Pittsburgh ACCESS system were obtained from an on-site visit, from ACCESS and PAT staff, and from published and unpublished documents. Gratitude and appreciation are extended to Bill Millar, Tom Letky, Ervin Roszner, and David Alschuler, who were generous with their time and insights but who also bear no responsibility for the opinions stated here or for the use to which their data were put.

Charging Human Service Agencies for Public Transportation Services in Rural Areas

JOHN COLLURA, JAPHET H. NKONGE, DALE F. COPE, AND AYODELE MOBOLURIN

Seven procedures that could be used to charge human service agencies for public transportation services in rural areas are presented and evaluated. These procedures consist of two general types: (a) population based and (b) use based. A population-based procedure charges each agency on the basis of the number of clients, whereas use-based procedures charge agencies according to the amount of service consumed in terms of passenger trips, passenger miles, vehicle hours, and/or vehicle miles. The procedures are evaluated in terms of their ability to satisfy objectives of simplicity, cost, efficiency, and equity as well as their applicability to different types of public transportation services (i.e., shared-ride versus exclusive-ride services). In addition, the constraints of funding sources, the demands of accountability, and costing methods are examined. This presentation of the procedures will be of importance to public transportation providers and administrators of human service agencies who are negotiating contracts for the provision of public transportation services to agency clients. The evaluation of the procedures will be useful in determining the most appropriate procedure for use in particular circumstances. Finally, it is expected that the presentation and evaluation of procedures will aid in the task of simplifying and standardizing accounting, reporting, and billing methods for use in rural public transportation programs as mandated in the White House Rural Development Initiatives of June 1979.

One of the major actions to improve local rural public transportation outlined in the White House Rural

Development Initiatives of June 1979 was to "improve the delivery and effectiveness of local transportation programs through better coordination and simplification of administrative procedures" (1). Under the terms of this mandate, a task force composed of representatives from the then U.S. Department of Health, Education, and Welfare; the U.S. Department of Transportation; the Office of Management and Budget; and seven of the states was to be established to develop simplified and standardized accounting, reporting, and billing procedures for use in social service/public transportation programs (1). These directives, together with the impetus toward coordination of social-service-agency transportation services embodied in Federal Highway Administration (FHWA) Section 18 guidelines (Urban Mass Transportation Act of 1964, as amended), have increased the incentive for agencies to ensure that the transportation provided to their clients is efficient and service effective.

Administrators of human service agencies who are interested in purchasing transportation services