How to Predict and Control Ridership for Community Transportation Systems

A Ridership Manual

Third Manual in a Series

February, 1982

Prepared for
U.S. Department of Transportation
Urban Mass Transportation Administration
Washington, D.C. 20590

CENTER FOR TRANSPORTATION RESEARCH
BUREAU OF ENGINEERING RESEARCH
THE UNIVERSITY OF TEXAS AT AUSTIN

Document is available to the U.S. public through the National Information Service, Springfield, Virginia 22161

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle	5. Report Date
How To Predict and Control Ridership for Community Transportation Systems; A Ridership Manual	Feb. 1982
	6. Performing Organization Code
	8. Performing Organization Report No.
7. Author(s) Dr. Sandra Rosenbloom	
9. Performing Organization Name and Address The Center for Transportation Research The University of Texas at Austin ECJ 2.6 Austin, Texas 78712	10. Work Unit No. (TRAIS)
	11. Contract or Grant No. DOT-TX-11-0013
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address Urban Mass Transportation Administration U.S. Department of Transportation Washington, D.C. 20590	Final Report
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This Manual is designed to assist social service agencies in predicting, and if desired, in controlling the ridership response to the provision of transportation services. The Manual introduces some simple ridership prediction tools and also explores the impact and implications of both formal and informal system restrictions on client travel behavior.

The Manual present ridership prediction methods for several types of agencies: community-wide providers with no currently affiliated clientele and several types of afencies with known and affiliated clientele. The Manual also shows agencies and transportation systems how they can use or modify existing client and trip restrictions to control ridership response to a new system with limited capacity, or to increase utlization on system with excess capacity, at least during certain times of the day.

This Manual is the third in a series of five. The series is designed to assist transportation providers to be more efficient and effective and to provide high quality transportation services.

17. Key Words	18. Distribution Statement
elderly and handicapped ridership prediction coordination social service agencies transportation systems	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified		68	

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Preface

This Manual is the third in a planned series of five manuals. The entire series is designed to assist human service agencies and community transportation operators to provide more efficient, more effective, and higher quality transportation services to their riders and clients.

Each Manual in the series will cover one specific topic of the many topics that concern such providers. By focusing on one issue or a closely related group of issues at a time, each Manual in the series will permit the user to follow one major theme without becoming too sidetracked by other important issues.

At the same time, each of the topics covered by the Manuals is related in an integral way to all the other topics. And each of the Manuals is designed to complement and build upon the others in the series.

A serious effort is being made to keep each Manual concise and to-the-point. Therefore, very little material from one Manual will be repeated in another Manual in the series; the reader will generally be referred to that Manual in which the primary discussion of a key topic appeared.

In addition, the Manuals have been kept more concise by not including detailed descriptions of real projects and the experiences of actual providers. Full references are made, however, to sources of further information.

The other Manuals in the series are

Manual One. Cost-Analysis for Social Service Agency Transportation Providers

Manual Two. How to Evaluate the Costs and Benefits of Participating in Coordinated Transportation Services

Manual Four. Contractual Arrangements for Coordinated Transportation Services; Performance and Assurance Contracting.

Manual Five. How to Make Your Transportation System More Efficient and Effective.

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Chapter One
What This Manual Will Do For You

INTRODUCTION

This Manual is designed to assist agencies in predicting, and if desired, in controlling the ridership response to the provision of transportation services. The Manual introduces some simple ridership prediction tools which give social service agencies a way to estimate the number of riders and the number of trips which will be taken on a new system or in a coordinated service arrangement.

The Manual also explores the implications of both formal and informal system restrictions. With an understanding of the impact of such restrictions, on client behavior agencies can vary administrative and service requirements to increase ridership, reorient ridership to less congested periods, or to decrease ridership.

The Manual can be used by agencies beginning new services, those already directly providing transportation services, or those buying transportation services from private or community providers.

THE RIDERSHIP METHODS INTRODUCED IN THIS MANUAL

This Manual is designed to help agencies predict or control their potential ridership based on heuristic analagous measures. That complicated term simply means that this Manual will use the actual, empirical ridership experiences of other systems to suggest the conditions under which similar agencies will probably encounter the same ridership response.

These analagous measures are not computer simulations; they do not even involve very complicated computations. These measures are designed to give agencies a general idea of the range of trips and trip types their clients will take.

This Manual deals in probabilities and ranges. The prediction methods are only designed to give agencies a rough idea of how many of their clients will

ride, if the community and the client have certain characteristics and the client is offered a certain level of service. These predictions are based on analyses of a large number of similarly situated agencies and community transportation providers.

The analyses on which these analagous measures are based were conducted under an UMTA University Research Grant; the full research is reported in Ref 4. Readers interested in the specific details of individual systems are referred to that reference.

The methods presented in this manual are based on simple calculations and investigations of the behavior of similarly situated systems. They are based in part on multiple regression analysis and in part on intuition guided by logic and experience.

The value of the methods is not that they are technically sophisticated but rather that they work. Using these methods we have been able to roughly estimate the ridership patterns of a number of systems. If you have doubts about these methods you can use them in a limited way to give your agency one idea of potential ridership.

We believe that the prediction tools presented in this Manual are appropriate to the skill level and available resources of most social and human service agencies, especially given the ever pressing need to get "service on the road."

The Manual augments these rough prediction tools by suggesting to agencies some ways that they can either totally limit ridership, or limit ridership at the beginning of a system or service while they monitor and evaluate initial response.

WHO CAN USE THE PREDICTION METHODS?

The ridership prediction measures described here are designed for use by three classes of social service agencies. The two major beneficiaries are:

- an agency providing or purchasing service for its own clients, where those clients are relatively homogeneous (e.g., the Lighthouse for the Blind).

- an agency providing or purchasing service for its own clients, where those clients represent a range of user groups (for example, a welfare department dealing with AFDC families, SSI recipients, the elderly and the handicapped).

The ridership prediction measures can also be used by:

- social service agencies in rural areas which are attempting to develop into rural public transportation providers, perhaps as DOT Section 18 funding recipients.

These measures may also be of some limited assistance to public transit operators who are implementing city-wide special transportation services for elderly or handicapped members of the general public.

These measures are the least useful for systems dealing with the general public because such systems know so little about the personal and financial characteristics of their potential riders. The measures described in this Manual are based on analogs to the observed travel behavior of certain types of clients in similar settings. Since specific client characteristics of the general population are not known for public transit systems, more specific measures cannot be used with as much chance of success.

RIDERSHIP LIMITATIONS AND CONTROL

Based on the experiences of many other systems this Manual suggests some of the unintended consequences of various administrative, service and operational conditions which an agency imposes on its clients. The Manual suggests how agencies can reformulate system requirements to deal with unacceptable demand patterns or to reduce demands, at least during capacity periods.

THE MESSAGES OF THIS MANUAL

Like all the manuals in the series, this Manual has several underlying themes. They are

- ridership tends to come from the neediest of your existing agency clients; an understanding of the characteristics of your current clients is essential to predicting demand;
- it is essential to understand your ridership patterns even if your system is well utilized; you should be sure that ridership patterns reflect your agency's objectives and goals about who is to receive service and for which trips;
- system administrative and operational restrictions on clients can potentially by detering ridership by those in need. An agency should institute the fewest number of restrictions consistent with its objectives and ridership experiences.

RIDERSHIP COMES FROM CURRENT CLIENTS

In most major studies, social service agencies and clients alike report that transportation is one of the most severe problems facing clients. Most social service agencies feel that transportation difficulties are the major factor deterring eligible users from becoming clients and preventing existing clients from using the primary social service more frequently.

Unfortunately, the data from most major studies do not show that providing transportation services alone has any measurable impact on service utilization. You may be astonished that anyone could claim that -- you know that your clients

have terrible problems. However, the fact is that most people are already taking those trips that they define as essential.

The evidence is that lack of transportation services may be one, but clearly not the only, factor preventing people from using medical and social services.

If you are concerned about increasing the utilization of your primary social or medical service you will do well to look at other service factors -- your outreach and information program, your intake procedure, client resistance, eligibility standards, etc.

The importance of these findings for this Manual is that you must look at your current clients to find your future riders, at least in the short-term.

Understanding Your Ridership Patterns

Even if your system is operating satisfactorily, it is very important that you understand who is using your transportation services, how often, and for what kinds of trips. You may find, as some systems have, that a few people ride a great many times or that your riders are all going shipping and not to the doctor.

Such patterns may be acceptable to you or they may not be. In a time of limited funding you may wish to focus your resources on other services or other clients. You should understand exactly how your transportation resources are being utilized so you can make those decisions.

If your system is not operating satisfactorily it is just as important that you understand your current ridership patterns. In order to restructure demand or reduce the demand to the limits of your capacity, you should know the characteristics of those demand patterns.

The Impact Of Your Restrictions

Most systems have some restrictions on which clients may use their system, how those clients will access the system, and how clients are certified as eligible. Each of these formal restrictions may be perfectly valid and within the scope of an agency's objectives. But such restrictions may cause confusion and uncertainty among potential clients andd referral agencies.

In addition the way in which a system actually operates de facto restrictions. For example, a system may be at capacity during certain hours of the day and have to refuse all new requests for service, no matter how meritorious. These informal restrictions can interact with formal restrictions to seriously deter ridership.

You need a certain number of regulations and requirements. Sometimes your funding source mandates that you impose certain reguirements. But the requirements that you impose should be the most generous which are consistent with your agency's oobjectives and which allow you to manage and control demand.

Elaborate and very formal restrictions are usually not necessary. Often such restrictions are instituted because they seem businesslike or efficient. You should try to understand what impact such restrictions have on your clients and whether yu desire those impacts. Sometimes you may have no choice, but when you do, you should utilize you choices.

THE ORGANIZATION OF THIS MANUAL

There are three Chapters in this Manual. Chapter Two presents ridership prediction methods for several types of agencies. Community-wide providers with no currently affiliated clientele are given some aggregate demand estimation techniques. Agencies which have a currently affiliated clientele for their primary social or human services are presented with a far more comprehensive ridership prediction methodology.

Chapter Three explains the impact on ridership response of both formal and informal trip restrictions. This Chapter in part explains why ridership response even from those adjudged needy may be less than assumed by some agencies. The Chapter also shows agencies and systems how they might use or modify existing client and trip restrictions to control ridership response to a new service, or to increase utilization of resources on a system with excess capacity.

Chapter Two

The Determinants of Ridership

WHAT THIS CHAPTER WILL DO FOR YOU

The ridership prediction measures presented in this Chapter are designed to give agencies and systems in several situations a rough estimate of the number of riders and the number of trips that will be demanded each month. The techniques discussed in this Chapter are most useful for smaller systems and individual agencies who have or are beginning transportation services for their existing clients or for community systems which will serve such agencies.

The techniques and prediction measures presented in this Chapter are based on observed uniformities and ridership patterns for similar systems across the United States. While individual systems vary significantly, and the communities in which such systems operate often show widely disparate characteristics, it is amazing how many common patterns have been seen. The ridership measures presented in this Chapter assume that most systems will also show these ridership patterns when services are implemented or changed.

However, because systems and communities are so different, the numbers derived from these prediction tools cannot be exact or accurate. They may be off from actual ridership numbers by as much as 30 percent.

Yet these tools give most agencies and systems a very good idea of the dimensions of the demand for the services which they will or do provide. Many operational and service decisions can be made with some degree of confidence using the numbers generated with these techniques.

THE BASIS OF THE PREDICTION TOOLS

The techniques presented here have been devised to convert observed ridership patterns into easy-to-use prediction methods. In order to do so, it was sometimes necessary to oversimplify certain relationships or to use easy-to-

measure variables as proxies for more complex or difficult to obtain measurements.

If observed relationships and patterns were not simplified when quantified, the techniques would call for agencies to possess a large amount of very detailed data and to spend a considerable amount of time in working out very simple estimates. The issues that have been simplified or aggregated with other issues should not have significant impact on the outcome of the prediction process.

Because certain relationships have been simplified or taken out of order, agencies cannot expect the technical process to represent a chronicle progression of events. The techniques represent a methodology constructed to provide the easiest way for agencies to use observed relationships in other similar system to predict their own ridership patterns.

The prediction techniques are and must be viewed as part of a technical, objective process. They do not represent normative decisions about who should or could ride. These techniques predict who will ride.

HOW TO USE THE TOOLS PRESENTED IN THIS CHAPTER

Because the tools and methods presented in this Chapter are technical and objective ones, they must be used exactly as stated for maximum effectiveness. When a technique which is illustrated in one of the Worksheets calls for the measurement of a certain variable, that measurement usually has certain relatively objective parameters.

For instance, when the technique asks for the number of clients who are physically handicapped, the technique requires the number of people who have so severe a handicap that they must use a cane, a walker, or a wheelchair, or who cannot under any circumstances use regular transit service.

Such data specification does not imply that other people are not or should not be given transportation services. Rather the requirement represents the finding that there is a measurable and observable relationship between the number of seriously handicapped people in the client group and actual ridership response to the services provided.

A definition of the necessary variables required for use on each Worksheet will be given below. Here we make the point that it is very important to use exactly the parameters of the variable which are specified. Using a very specific and narrow measurement or delineation of a term to perform the calculations shown in this Chapter does not imply any policy position on your part. If you are required to give the number of severely handicapped clients who you currently have, it does not in any way imply that you cannot or should not be concerned about the needs of less handicapped but needy people.

In order to use these techniques to the fullest, you should begin by gathering all the data you have about your clients. Sometimes you may have to estimate or even guess. However, the techniques have been designed to operate with a minimum of information. The information sought is that which is usually, although not necessarily, available to most agencies.

WHO CAN USE THESE TECHNIQUES?

The ridership prediction techniques presented in this Chapter are based on observed relationships between client characteristics and ridership responses. Therefore, these techniques are most useful for agencies which already have a clientele for their primary social or human service, or those community transportation systems which will deal largely with such social agencies. These techniques are the least useful for agency services or transportation systems which will be offered on a community-wide basis to a large number of currently unaffiliated citizens.

In short these methods are most appropriate for use by agencies which already know some basic information about their current or potential clients. They are least useful for agencies which only know, for example, that they will serve all the elderly or handicapped or low income people in a city.

This Chapter will give some aggregate prediction tools for large community providers or agencies who will serve a currently unaffiliated client group. More detailed ridership estimates, however, are only possible for agencies who know more about their clients.

The prediction techniques are of two types:

- an aggregate ridership estimation technique for community-wide transportation providers with no currently affiliated clientele.
- a more detailed ridership estimation process for agencies with an existing clientele for their primary service

or

- a coordinated or brokered service which will deal largely with agencies with existing clienteles.
- Table one shows the methodologies presented in this Manual.
- Each prediction methodology has two parts:
- identification of the total number of potential riders from the universe of clients or potential clients.
- identification of the total number of daily or monthly one-way passenger trips that will be taken by the potential riders as a group.

Table One

Prediction Methods Appropriate for Various Types of Agencies

Type of Agency	Available Method of Demand Estimation	Shown in
1 Agency-serving community-wide elderly and handicapped population	To predict potential riders:	Fig. 1, text pp.
	Use of census or special planning data	
	To predict daily patronage:	
	Modified Wilbur Smith monograph	
Agencies with known clientele:		
2 Agencies providing transportation services to one client group for specific agency activities	To predict potential riders:	
	Use existing client numbers plus those known to have requested service	Fig. 2, text pp.
	To predict monthly patronage:	
	Use Simple Estimation Approach	
3 Agencies providing transportation services to one client group for a variety of services	To predict potential riders:	
	Break client data into usable categories	Worksheet One
	To predict monthly patronage:	
	Use observed relationships between client characteristics	Worksheet Two and Three

This Chapter will begin by describing the aggregate demand estimation techniques available to community-wide transportation providers or agencies. It will then explain, in great detail, the demand estimation methodology for agencies with information about their existing clientele. Included in the explanation will be the exact type of information needed, with precise definitions.

DEMAND ESTIMATION METHODOLOGY FOR COMMUNITY-WIDE PROVIDERS

This methodology is designed for use by community-wide transportation systems or for agencies with a potential community-wide clientele with unknown personal characteristics. The process is of two parts; first, an agency identifies the maximum number of potential riders in the community. Second, using a nomograph originally developed by Wilbur Smith and Associates, the agency can estimate the number of one-way passenger trips per day that will be taken.

IDENTIFYING THE POTENTIAL RIDERS

Most agencies in this group will serve the elderly or the handicapped or both. There is a great deal of aggregate data available on the number of elderly citizens in a city; these data are routinely available from the Census. In addition, there is Census data available on the number of low income people in a community.

Ascertaining physical handicaps is more difficult. The U.S. Department of Health and Human Services has conducted a National Health Study and from that survey they have prepared incidence rates for a wide variety of afflictions and handicapping conditions. These National Health Survey data are available at the SMSA level only, and only to SMSAs of over 200,00. Therefore, they are most useful to providers serving all or most of an SMSA.

The first step in using any of these data, or any community planning studies, is to make sure that the people you are counting in each group which you have an interest in serving are not duplicated in another group that you are counting. Many elderly people, for example, are both low income and handicapped. If you will be serving more than one group you cannot simply add the Census totals and the National Health Survey totals together to get the total number of potential clients. If you do, you will be seriously double (and triple) counting.

Serving One Group Only

If you will be serving only one type of client you can often use existing data to predict the total number of potential riders.

- All the elderly - use Census data which is available down to the Census tract level

- Only the low income elderly or only the low income - use Census data etc.

- Elderly who are handicapped - use local surveys, or an average incidence rate based on the National Health Survey, or the actual incidence rate for your SMSA from the National Health Survey

- People with a particular handicap - use the incidence from the National Health Survey

- All handicapped people - use a national average or the incidence rate for your SMSA from the National Health Survey

There are some general rules of thumb that you can follow if you do not have access to better data.

- all handicapped - approximately 5 percent of the urban population

- elderly who are handicapped - approximately 50 percent of the elderly are also handicapped

- elderly who are low income - approximately one-third of the elderly are very low income

You can use those estimates with either total Census population figures for your community, or the total elderly population figures from the Census to obtain fairly respectable estimates of the total number of potential riders in the groups which you wish to serve.

Serving Several Possibly Overlapping Groups

It is very common for community based transportation providers to identify their target group as all the elderly and handicapped in a community. Sometimes the target group are only the handicapped elderly and non-elderly handicapped. In either case, it is necessary to separately identify the handicapped and non-handicapped elderly, the non-elderly and elderly handicapped.

If no better data are available and no local planning agencies have done useful studies, there are some rough ways to estimate non-overlapping groups. First, identify, from Census data, the number of elderly people. Then identify the number of handicapped people in the community; use either the 5 percent population figure, or the actual incidence rate from the National Health Survey. To get the number of non-elderly handicapped, subtract one-half (50 percent) of the number of elderly from the total community figure for handicapped.

- Non-elderly handicapped = total handicapped population minus handicapped elderly population

- Total elderly and handicapped population = total handicapped population plus non-handicapped elderly

- Total handicapped population = 5 percent of the population or national or SMSA incidence rate from the National Health Survey

Income and handicapping conditions are far harder to disaggregate for the non-elderly. A very rough rule is that 50 percent of the non-elderly handicapped are low income.

IDENTIFYING THE NUMBER OF DAILY TRIPS

Once you have identified the total number of non-overlapping potential riders you can use the nomograph in Fig. 1 to estimate the total number of trips per day that will be made on the transportation system you provide at different fare levels.

The nomograph was originally developed by Wilbur Smith and Associates for the San Diego region based on the experiences of a number of paratransit systems serving the elderly and handicapped. The original numbers for the San Diego area have been changed to make them more responsive to the new findings presented in reference 4.

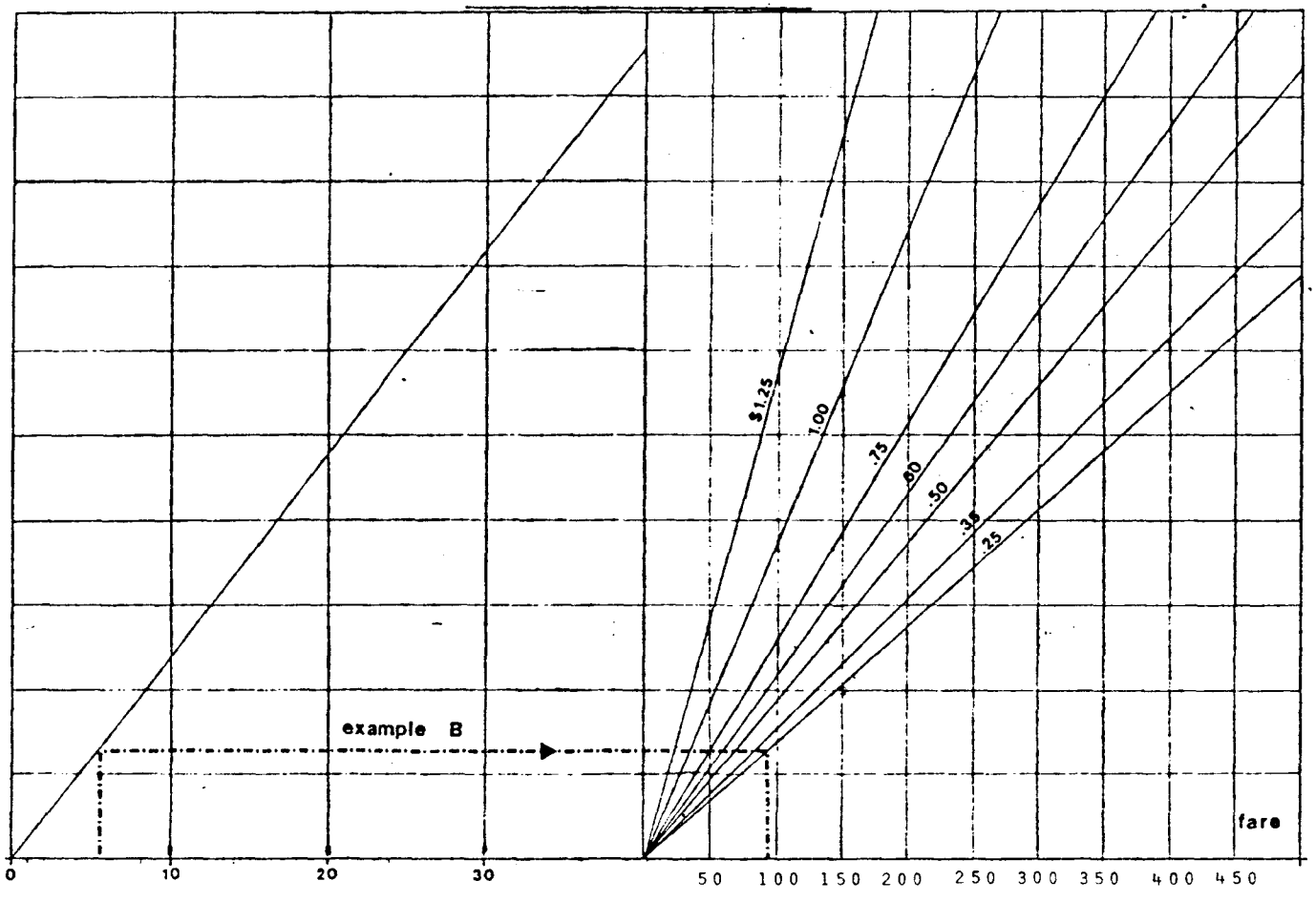
In order to use the nomograph, first find the number on the axis which is closest to the total number of potential people in your target group, and draw a line up from that axis to the diagonial line on the left of the nomograph. Once you hit the printed diagonial line, make a vertical line across the nomograph to the fare level you plan to charge for each trip. Once you hit the line representing the fare you will draw a line down again to the axis on the right of the nomograph. That represents the number of daily one-way trips that you should expect from your target population.

That number is an objective estimate; it does not represent the number of people who are in need of transportation or the number of people who should use your service. That number represents real world findings about the relationship between the number of people in the target population, the fares charged for transportation and the number of daily one-way trips.

Findings in the recent literature suggest that at fares below 50¢ there is no discernible differences in ridership totals. Using the nomograph you can select the 25¢ line for services that will be offered free; there has been no noticeable impact on ridership of either raising a free fare to 25¢ or lowering

Figure 1

Patronage Nomograph, Elderly and Handicapped



Source: Ref. 6.

a 25¢ fare to nothing. This probably means that even the poorest clients have 25¢ available.

Example: *How to estimate daily ridership for a service for the elderly and handicapped*

You are a community agency which has received a grant to purchase and operate vehicles to serve all the elderly and handicapped people in your community.

After examining the Census data and the incidence rates from the National Health Survey you find that there are 2,000 elderly people and 4,000 non-elderly handicapped people in your community, for a total target population of 6,000.

You use the nomograph in Fig. 1 to calculate daily ridership. You find the number 6,000 on the left axis and draw a line up to the horizontal line printed on the nomograph. You then draw a horizontal line over to 25¢ the fare you have decided to charge.

Next you draw a line down from the fare to the right-hand axis and find that you will have approximately 90 one-way trips per day demanded.

These sample lines are already drawn on Fig. 1 for illustration.

DEMAND ESTIMATION METHODOLOGY FOR AGENCIES AND SYSTEMS WITH KNOWN CLIENTELE

Three kinds of agencies fall into this category. These agencies are:

- agencies which will provide transportation services to a specific clientele to allow them better access to one or several particular agency functions
- agencies or systems which will provide transportation to a specific client group to allow that group to access a variety of services and facilities
- community coordinated systems which will be providing transportation to agencies with existing clienteles, and perhaps some community-wide services.

Each will be discussed at length below, and they are summarized in Table One. The most detailed ridership prediction methodology is appropriate for the second and third types of agencies listed above.

AGENCIES PROVIDING TRANSPORTATION SERVICES TO THEIR OWN CLIENTS TO ACCESS SPECIFIC AGENCY SERVICES

Many agencies provide transportation services to allow clients to use their primary social or human service. Examples are United Cerebral Palsy providing transportation to clients for sheltered workshops or adult daycare, and senior citizen centers providing transportation to users of their clinics.

Most of these agencies believe that client usage of the primary service will increase significantly when transportation is provided. Discussed this very rarely happens. Certainly access to the primary service is facilitated and clients may be saving time and money after the implementation of transportation services. But with one exception, there have been no noticeable increases in the use of the primary agency service.

The one exception is congregate meal service. Agencies providing meal service experience some increased usage of their meal services when they provide transportation. This suggests that people will find some way to meet the most basic of their essential needs such as medical travel. They may defer less basic travel such as recreational and social trips unless provided with transportation services.

The process for estimating ridership demand is essentially the same as it was for the first agency considered in this Chapter although the techniques are different. First, potential ridership, that is the number of people who are potentially going to use the transportation services, is estimated. Then ridership totals, or the number of trips that will be made by those people, is estimated.

Estimating the Number of Potential Riders

Most agencies which fall into this group have an easy task in identifying their potential riders. Ridership comes almost exclusively from their current client load. In spite of the fact that some people who are not using the primary service may have transportation problems, there is no evidence that in urban areas providing transportation will cause them to use the service.

Some agencies have a certain client load and no resources to expand their services. Sheltered workshops and schools for the handicapped or the retarded are good examples. In these cases there may be people who need transportation to access the service but the question is not whether the agency can provide transportation but whether the agency could handle an increased case load if

they provided transportation to such people. For these agencies, the ridership numbers are already determined by the existing service resources.

Most agencies already know who needs transportation to access their service. Often these agencies feel that if they have one request from a person needing transportation there must be hundreds of similarly situated people. There is no evidence that this is true in urban areas.

In the cases where agencies have actual requests on record for service from people otherwise unable to use their primary service, these agencies should assume that those people are roughly the extent of unserved demand.

In short, even if your agency has a mandate to serve all the elderly or handicapped or blind people in the community, your potential ridership is rarely larger than your current client load. People who do not use your services may have transportation problems but they may also have other reasons they are not using your service.

Your potential ridership is roughly equivalent to your current affiliated clients and not the number of unaffiliated people in the community who are eligible for your primary services.

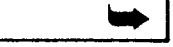
Example: *How to estimate the size of the potential ridership for an agency serving a specific clientele*

You are a senior citizens center providing a variety of services to all the eligible seniors in your urban neighborhood. You know from local planning studies that there are 3,400 eligible elderly people in your neighborhood.

You have some money available to provide transportation but it is not enough to purchase and maintain vans. Besides you don't really want the hassle of operating your own vehicles. A local community coordinates system offers to sell you transportation services for your clients.

About 400 people in your neighborhood currently use one or more of your services. Many staff people believe that if you provided transportation services many of the remaining 3,000 people in the neighborhood would both use the transportation services and your primary senior services.

You know, however, that all evidence shows that most, if not all of your potential ridership, will come from just the 400 people currently affiliated with your agency. However, you currently have on record the names of nine seniors, four of them in wheelchairs who want to use your services but have no transportation.



You do the rest of the ridership prediction analysis based on a potential ridership of 409.

Note that you will still have to go on to estimate the number of trips that will be made by those 409 people.

Agencies providing congregate meal services and those in rural areas would be justified in using slightly higher numbers. A good rule of thumb is that usage will increase, at the most by 20 percent, if your agency provides transportation to congregate meal services.

Example: *Predicting congregate meal potential ridership*

Approximately 800 people in your community are eligible for meal service. Your agency currently serves meals to 180 seniors on one congregate meal site at a local Church.

The Church offers to use their helping Hand Volunteer Program to provide transportation to needy seniors for travel to the congregate meal site. Of course, they want some idea of the number of trips and people that will be involved.

Your staff believes that a large number of people will start to use the meal facilities if provided with transportation. You know that this probably isn't so.

You predict your potential riders at 180 plus 20 percent

.20 X 180 = 36 + 180 = 216 potential riders

Again, you still need further calculations to estimate the number of trips that these riders will take.

Estimating the Number of Monthly Rides

Small agencies, those serving only one client group, and those providing very limited transportation services to one or a few facilities are the type of agencies considered in this section. Such agencies ought not to use very complex prediction methods.

More complex methods are available in the next section and may be reviewed. But they are probably more work than most small agencies in this group ought to consider. In addition, they may be no more accurate because they are geared to

estimating travel patterns for agencies with large and differentiated clienteles and those serving a number of different trip purposes.

There is a simple way to estimate the number of rides that will generally be taken by those in the potential ridership group. This approach work best for agencies who will provide relatively good transportation service to all those that qualify for the primary social service. The more restricted the eligibility for transportation service, the lower the ridership demand.

We assume that an agency's experience with average ridership patterns will conform to those of other agencies studied in the literature. Approximately one-third of all potential riders will never ride or will ride less than once per month; about fifty six percent will ride two to five times per month; about 11 percent will ride six to ten or more times per month.

To use these figures simply insert your potential ridership numbers in Figure 2. Of course, these numbers should be treated as estimates or ranges. In the example following, it would be wise to assume that the total number of monthly one-way passenger trips was anywhere in the range plus or minus 15 percent of the estimated total ridership.

Again, the approach shown in Fig. 2 assumes that everybody who is eligible for your primary social or human service is eligible also for the transportation services designed to facilitate access to the primary service. Note that the more trip and user restrictions which you impose on those seeking transportation services, the lower the total number of one-way passenger trips demanded.

DEMAND ESTIMATION METHODOLOGY FOR AGENCIES WITH A LARGE EXISTING CLIENTELE GENERALLY FOR A WIDE VARIETY OF TRIPS AND PURPOSES

The agencies considered above were those with an existing clientele who were only providing a very limited transportation service; to allow clients to use one or a few agency specific services.

The agencies which will be considered in this section have an existing and generally known clientele. However, they are of two different types.

First are agencies which wish to facilitate their clients' total mobility by providing as much transportation as possible, not limited to agency-specific services. Second are agencies which limit trip-making to agency specific services but who have a very large and extremely differentiated clientele. An example of the first kind of agency might be a Lighthouse for the Blind or an Area Aging Administration providing a variety of trips to its respective clients. An example of the second kind of agency might be a regional office of the State Welfare Department providing transportation services to a wide variety of Medicaid recipients but only for medical travel.

Figure 2
Simple Calculation of Ridership Demand

Potential Ridership _____ (a)

.33 X _____ (a) potential ridership

X 1 one-way trip per month = _____ (b)

.56 X _____ (a) potential ridership

X 3 one-way trips per month = _____ (c)

.11 X _____ (a) potential ridership

X 7 one-way trips per month = _____ (d)

Estimated Total Ridership (b + c + d) = _____

one-way trips per month

Sample

Figure 2
Simple Calculation of Ridership Demand

Potential Ridership 409 (a)

.33 X 409 (a) potential ridership
X 1 one-way trip per month = 135 (b)

.56 X 409 (a) potential ridership
X 3 one-way trips per month = 615 (c)

.11 X 409 (a) potential ridership
X 7 one-way trips per month = 489 (d)

Estimated Total Ridership (b + c + d) = 1239 one-way trips per month

In some sense the difference between the second kind of agency considered here and the agencies considered in the previous section is simply one of degree. If your agency falls somewhere in between you might wish to consider using the simplest method possible.

The process used in this section is the same as that used in the two proceeding sections although the techniques are again different. The prediction methods first estimate the number of potential riders, and then estimate the number of monthly trips that will be made by those riders.

IDENTIFYING POTENTIAL RIDERS

The first step in this process is gathering as much client specific data as possible. You will need data on some overlapping categories of clients. For example, you will need to know not only whether they are male or female but the age and handicapping condition of women and of men clients. If your data is computerized, these may be easily available.

Worksheet One is designed to help you gather together data on your clients in the form and format in which you later need it. If you have most of the required data but not all of it, you can estimate the missing numbers. You must be fairly objective about compiling these numbers. The following definitions are given for general guidance.

> low income - at or slightly above poverty level; other indices, such as SSI or welfare recipient, may be used if they are readily available

Note again that this definition does not in any way imply that you will only serve those so poor as to require public assistance. It only requires that you use those specified data in this methodology.

> physical handicap - someone so handicapped that a wheelchair, cane, or walker is required all or most of the time or the person even without aids is so disabled as to be unable to use public transit under any circumstances.

Note that this definition does not call for your opinion of the difficulty your clients have in getting around or in using public transit.

> mentally retarded - someone diagnosed and treated as retarded

Some of your clients may occasionally become disoriented or have fears which prevent them from getting around. This kind of condition should not be counted here. Again, you are entirely free to provide servidce to such people; just don't count them when you are asked for the number of mentally retarded people.

car not available - no car is ever at or available to the household in which the client lives

While this is a more subjective judgement, what you are asked for is not your opinion of whether anyone in the client's household ever wants to take him or her anywhere or whether the client is well-treated. The data requested are about the actual presence of a car in the household in which the client resides.

If you have very little of the required data, you have two choices. Your choice will depend on your resources, the size of your agency, and your objectives in doing a ridership demand analysis. If you are a relatively small agency, you can use the first simple prediction method in the preceding section to estimate your total ridership demand. You will have to use your existing affiliated clientele as the potential number of riders which may significantly overpredict the number of trips.

If this seems inappropriate and you have some resources, you can sample your clients as to the dimensions required by the technique. If you carefully conduct your sample on a genuinely random basis, you should be able to extrapolate from that sample to the total client population. You could then use the prediction methods described here.

Obtaining the necessary client data may well be the most expensive and time-consuming part of the prediction process. You will have to decide how badly you need fairly reliable ridership estimates. An irony is, of course, that smaller agencies may be able to more easily sample all their clients as to the needed client data, but larger agencies which cannot do so may really more require that kind of comprehensive data.

ESTIMATING MONTHLY RIDERSHIP

Once you have obtained client data in a satisfactory format, you can fit the appropriate numbers into Worksheets Two and Three to estimate the total number of riders and the total number of monthly trips that will be made by these riders.

Each of the Worksheets is shown blank and then filled in with numbers from a sample, hypothetical agency (loosely based on several agencies).

SOME CLOSING NOTES

The techniques described in this Chapter allow a number of different agencies to develop fairly competent ridership estimates. Not all systems will find these ridership estimates to be very accurate but the overwhelming percentage of agencies will find the numbers close enough to allow for sensible system planning. Using the data developed with these techniques agencies can make some

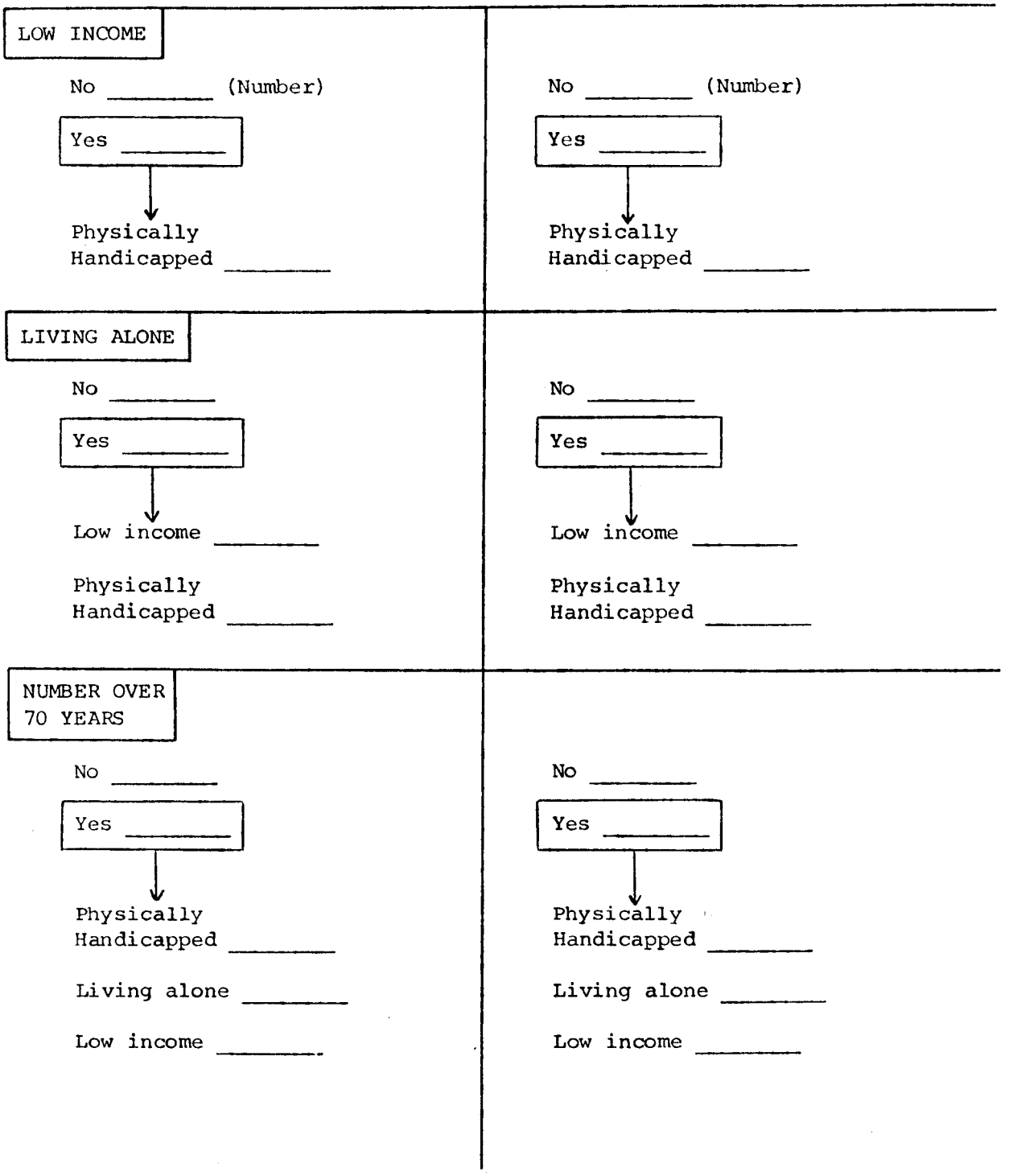
decisions about vehicle acquisition, participation in coordinated community systems, and purchase of service from other community providers.

Since these numbers, however, are only reasonable estimates, many systems will want to know how they might temper ridership while starting a new system lest the possible variation be too potentially dangerous for them. Moreover, some agencies will be disappointed with the low number of riders that are predicted for their systems and may wish to understand what they could do to increase ridership. Both these issues will be discussed in Chapter Three.

Worksheet One

Breaking Client Data into Visible Categories

SEX Number of Males _____	Number of Females _____
MENTALLY RETARDED No _____ (Number) Yes _____ Without driver's license or car available _____ Low income _____	No _____ (Number) Yes _____ Without car available _____ Low income _____
PHYSICALLY HANDICAPPED No _____ Yes _____ Without driver's license or car available _____ Low income _____ Lives alone _____ Over age 70 _____ Number in wheelchairs under age 60 _____	No _____ Yes _____ Without car available _____ Low income _____ Lives alone _____ Over age 70 _____ Number in wheelchairs under age 60 _____


LOW INCOME
No _____ (Number)
Yes _____
Physically Handicapped _____
No _____ (Number)
Yes _____
Physically Handicapped _____
LIVING ALONE
No _____
Yes _____
Low income _____
Physically Handicapped _____
No _____
Yes _____
Low income _____
Physically Handicapped _____
NUMBER OVER 70 YEARS
No _____
Yes _____
Physically Handicapped _____
Living alone _____
Low income _____
No _____
Yes _____
Physically Handicapped _____
Living alone _____
Low income _____

NUMBER WITH NO CAR AVAILABLE/NO DRIVER'S LICENSE	
No _____ (Number)	No _____ (Number)
Yes _____	Yes _____
↓	↓
Low income _____	Low income _____
Physically Handicapped _____	Physically Handicapped _____
Mentally Retarded _____	Mentally Retarded _____

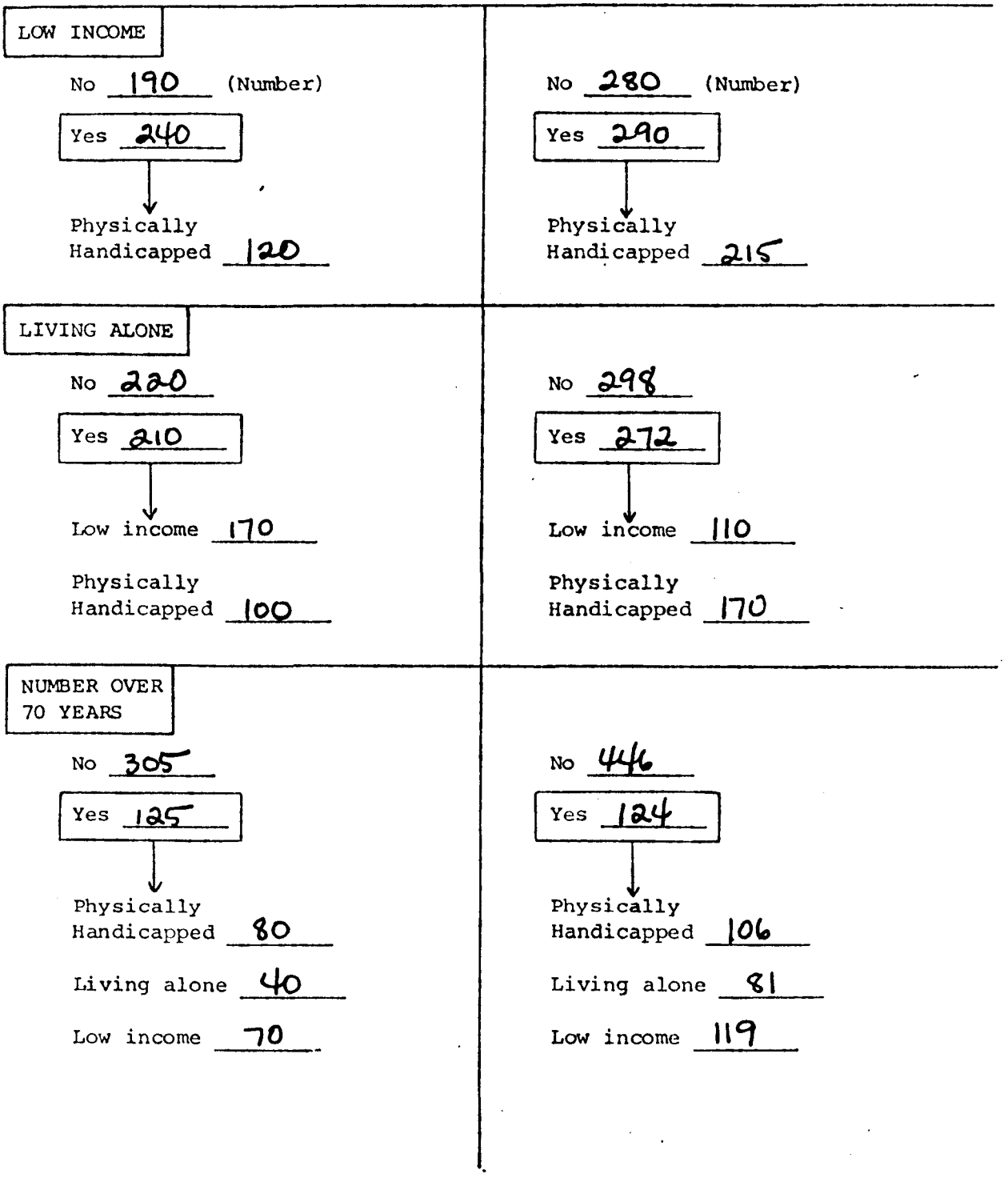
Sample

Worksheet One

Breaking Client Data into Visible Categories

Total Number of Current Clients 1,000

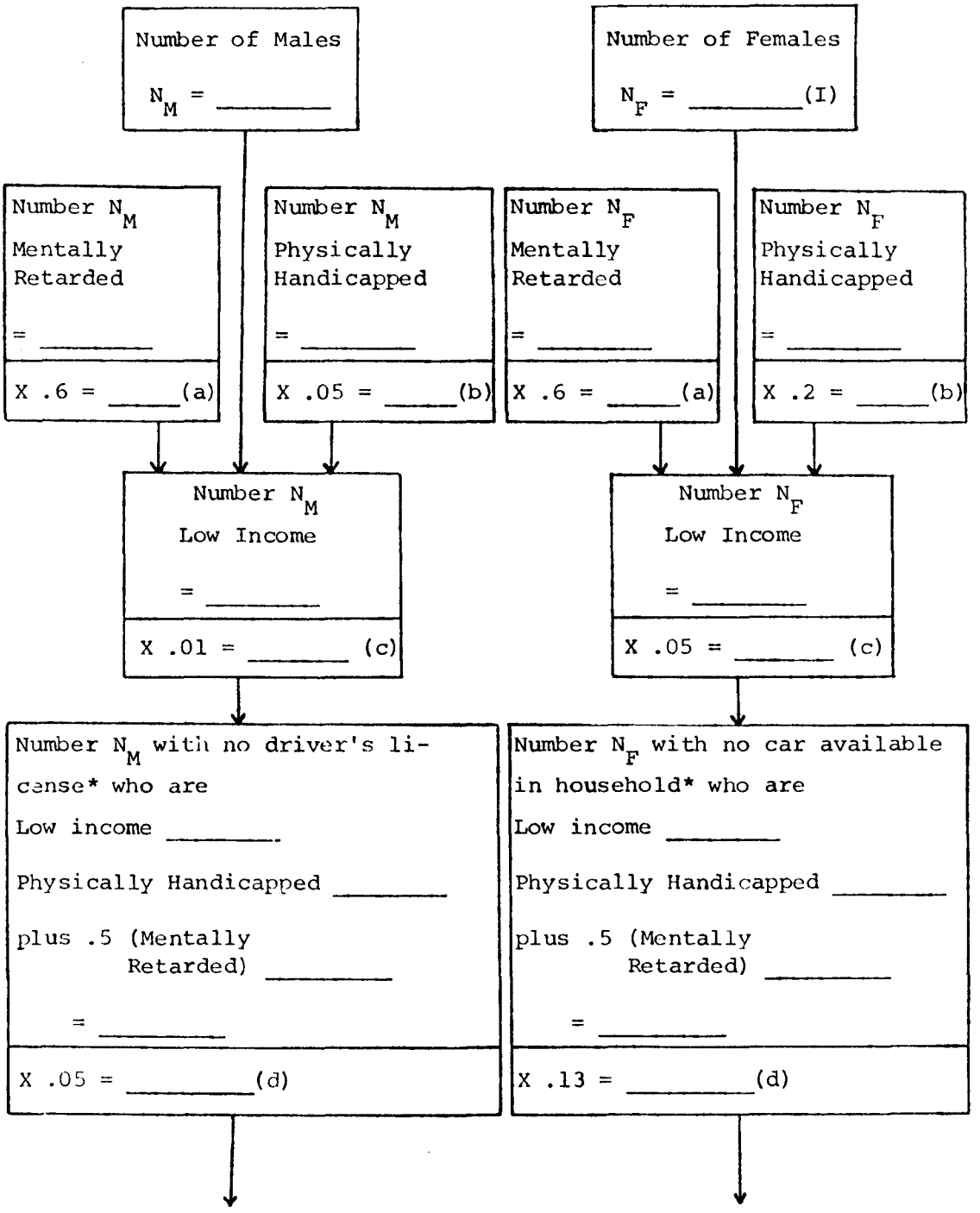
SEX	
Number of Males 430	Number of Females 570
MENTALLY RETARDED	
No 420 (Number)	No 563 (Number)
Yes 10	Yes 7
Without driver's license or car available 9	Without car available 7
Low income 9	Low income 7
PHYSICALLY HANDICAPPED	
No 230	No 290
Yes 200	Yes 280
Without driver's license or car available 75	Without car available 190
Low income 120	Low income 215
Lives alone 100	Lives alone 170
Over age 70 80	Over age 70 106
Number in wheelchairs under age 60 N.A.	Number in wheelchairs under age 60 N.A.


LOW INCOME
No 190 (Number)
Yes 240
Physically Handicapped 120
No 280 (Number)
Yes 290
Physically Handicapped 215
LIVING ALONE
No 220
Yes 210
Low income 170
Physically Handicapped 100
No 298
Yes 272
Low income 110
Physically Handicapped 170
NUMBER OVER 70 YEARS
No 305
Yes 125
Physically Handicapped 80
Living alone 40
Low income 70
No 446
Yes 124
Physically Handicapped 106
Living alone 81
Low income 119

NUMBER WITH NO CAR AVAILABLE/NO DRIVER'S LICENSE	
No 270 (Number)	No 359 (Number)
Yes 160	Yes 211
Low income 140	Low income 174
Physically Handicapped 75	Physically Handicapped 190
Mentally Retarded 9	Mentally Retarded 7

Worksheet Two

Simple Calculation of Ridership Demand



Number who are living alone who are Low income _____ Physically Handicapped _____ = _____	Number who are living who are Low income _____ Physically Handicapped _____ = _____
X .06 = _____(e)	X .12 = _____(e)
Number over 70 who are Low income _____ Physically Handicapped _____ Living alone _____ = _____	Number over 70 who are Low income _____ Physically Handicapped _____ Living alone _____ = _____
X .08 = _____(f)	X .14 = _____(f)

Add:	(a) _____	Add:	(a) _____
	(b) _____		(b) _____
	(c) _____		(c) _____
	(d) _____		(d) _____
	(e) _____		(e) _____
	(f) _____		(f) _____
Total Male Riders _____		Total Female Riders _____	

Total Riders = _____

*It is preferable to use no driver's license data for men, no car available in household for women. The two types of data can be interchanged if the appropriate datum is not available.

Sample

Worksheet Two

Simple Calculation of Ridership Demand

Total Number of Potential Riders, N = _____

Number of Males
N_M = 430

Number of Females
N_F = 570 (I)

Number N_M Mentally Retarded
= 10
X .6 = 6 (a)

Number N_M Physically Handicapped
= 200
X .05 = 10 (b)

Number N_F Mentally Retarded
= 7
X .6 = 4.2 (a)

Number N_F Physically Handicapped
= 280
X .2 = 56 (b)

Number N_M Low Income
= 240
X .01 = 2.4 (c)

Number N_F Low Income
= 290
X .05 = 14.5 (c)

Number N_M with no driver's license* who are
Low income 140
Physically Handicapped 75
plus .5 (Mentally Retarded) 5
= 220
X .05 = 11 (d)

Number N_F with no car available in household* who are
Low income 174
Physically Handicapped 190
plus .5 (Mentally Retarded) 3.5
= 367.5
X .13 = 47.7 (d)

Number who are living alone who are	Number who are living who are
Low income 170	Low income 110
Physically Handicapped 100	Physically Handicapped 170
= 270	= 280
X .06 = 16.2 (e)	X .12 = 33.6 (e)
Number over 70 who are	Number over 70 who are
Low income 70	Low income 119
Physically Handicapped 80	Physically Handicapped 106
Living alone 40	Living alone 81
= 190	= 306
X .08 = _____ (f)	X .14 = 42.8 (f)

Add:			Add:	
	(a)	.6		(a) 4.2
	(b)	10.0		(b) 56.0
	(c)	2.4		(c) 14.5
	(d)	11.0		(d) 47.7
	(e)	16.2		(e) 33.6
	(f)	15.2		(f) 42.8

Total Male Riders 60.8

Total Female Riders 198.8

Total Riders = 259.6

*It is preferable to use no driver's license data for men, no car available in household for women. The two types of data can be interchanged if the appropriate datum is not available.

Worksheet Three

How to Calculate Total Monthly Tripmaking

1. Total Number of Riders (from Worksheet Two) _____ (a)

---

2. Multiply (a) by .47 = _____ (b)

   Multiply (b) by 1.1 = _____ (I)

---

3. Multiply (a) by .40 = _____ (c)

   Multiply (c) by 2.7 = _____ (II)

---

4. Multiply (a) by .13 = _____ (d)

   Multiply (d) by 6.9 = _____ (III)

Subtotal I, II, III = _____ (IV)

5. If mentally retarded people make up more than 15 percent of your current clients,

   Multiply Subtotal IV by .2 = _____ (e)

---

6. If physically handicapped people under 60 in wheelchairs make up more than 25 percent of your current clientele, and you will allow most trip-making (see Worksheet One)

   Multiply Subtotal IV by .2 = _____ (f)

---

7. If you are planning to serve congregate meal sites for the elderly, and those over 62 make up more than 40 percent of your current clientele

   Multiply Subtotal IV by .24 = _____ (g)

Sample

Worksheet Three

How to Calculate Total Monthly Tripmaking

(Round-Off All Numbers)

1. Total Number of Riders (from Worksheet Two) 260 (a)

---

2. Multiply (a) by .47 = 122 (b)

   Multiply (b) by 1.1 = 134 (I)

---

3. Multiply (a) by .40 = 104 (c)

   Multiply (c) by 2.7 = 281 (II)

---

4. Multiply (a) by .13 = 34 (d)

   Multiply (d) by 6.9 = 235 (III)

Subtotal I, II, III = 650 (IV)

5. If mentally retarded people make up more than 15 percent of your current clients,

   Multiply Subtotal IV by .2 = N.A. (e)

---

6. If physically handicapped people under 60 in wheelchairs make up more than 25 percent of your current clientele, and you will allow most trip-making (see Worksheet One)

   Multiply Subtotal IV by .2 = N.A. (f)

---

7. If you are planning to serve congregate meal sites for the elderly, and those over 62 make up more than 40 percent of your current clientele

   Multiply Subtotal IV by .24 = 156 (g)

Total Number of Monthly One-Way Passenger Trips,

Add Subtotal IV _____

and (e) _____

(f) _____

(g) _____

= _____

one-way passenger trips

Total Number of Monthly One-Way Passenger Trips,

Add Subtotal IV 650

and (e) N.A.

(f) N.A.

(g) 156

= 806

one-way passenger trips

Chapter Three

Understanding and Controlling Ridership Responses

THE NEED TO EXAMINE YOUR RIDERSHIP PATTERNS

Systems currently providing transportaiton services should make a serious effort to understand the characteristics of their ridership patterns and their clients travel behavior. Unless an agency has unlimited resources it is important to be sure that each system is providing the desired service to the clients most in need.

As agencies examine their service patterns they should ask the following questions:

Are we serving all of the people we wish to serve?

Are we serving the most needy with the limited resources available?

Are we serving people in the most cost-effective way?

Are we serving people for which we don't wish to use resources?

Are services being utilized in the way we want them to be?

In order to answer such questions an agency must have a good idea of what objectives and goals it has for its transportation services. The fifth manual in this series gives agencies assistance in assessing their current ridership patterns.

Such an examination can reveal that an agency service is not being well utilized or not utilized by the neediest people. This can happen, you should note, even if the system is at capacity all or most of the day. It is not common for just a few clients to account for a majority of all trips.

Systems with strained capacity, even serving deserving clients, should consider whether restrictions on ridership might be appropriate. Given limited resources, such systems might want to be sure that certain "target groups" are receiving service first, or that many clients are being transported rather than a few many times.

In short, ridership patterns may reveal

- an underutilized system, most or part of the day
- a system at capacity serving the wrong or low priority clients
- a system at capacity all or part of the day serving priority clients but facing demand from other clients

Underutilized Systems

If your system is not at capacity and you find that client usage is less than expected, you may be puzzled. You must recognize however, that no matter how needy your clients are, they make transportation decisions like everyone else, although they often operate with greater constraints.

Elderly, handicapped, and disadvantaged travellers want to choose those travel modes that serve them best for any given trip at any given time. "Independence" for such travellers may not mean totally abandoning the rides given by friends and relatives; it may mean having the ability to "choose" when to use agency transportation services, when to use the city bus, and when to ask a relative for a ride. The empirical evidence on this point is overwhelming; most clients of social service agency transportation systems use a variety of travel modes, going back and forth among them.

Three important points about client travel behavior stand out in all the empirical studies of transportation services provided to these clients. They are:

- Few clients have absolutely no available transportation options; they will use their options, no matter how inconvenient or expensive to make trips that <u>they</u> define as essential.
- Disadvantaged travellers, like everyone else, try to retain as much freedom and flexibility in their travel choices as they possibly can; independence for such travellers often means having a choice.
- Disadvantaged travellers, when given the choice, will choose that travel mode for any trip which maximizes their satisfaction.

The most important message of these findings is that if you are going to augment your clients' transportation options, you must understand what they want, what they will use, and how they will choose between and among the modes available. You cannot assume that you "know" that clients will always choose agency transportation services because you know how needy they are. Only by understanding how your clients make transportation choices can you formulate effective policy.

Your agency will have to consider whethr it can afford to provide transportation services convenient enough for your clients to use frequently. Perhaps there are more cost-effective ways to provide services to the few riders who are using the system rather than operating an entire transportation system.

Agencies with underutilized capacity should consider the following:

- the services provided may simply not be as attractive as the other choices available to clients, at least on a regular basis
- clients may have many problems and many reasons for not traveling, so that providing transportation is not much help
- system restrictions and requirements may be confusing to clients, keeping down utilization

Only the last of these issues can be discussed in this Manual.

Systems at Capacity serving non-priority clients

Systems who are at capacity all or part of the day may find that they are carrying clients not traditionally considered to be needy. Perhaps a few clients account for a large percentage of all trips or perhaps most trips are for social purposes and not to doctors or social service agencies. Such systems should question 1) whether such usage patterns are consistent with their goals for their transportation system and 2) why those clients considered more needy are not using the system.

Such systems should consider that ridership restrictions may be serving as a dual-edged sword. Such restrictions may be burdensome enough to discourage the truly disadvantaged while not stopping those who wish to make social trips. Perhaps the system opertes in such a way that it creates de facto trip restrictions in the hours when people need to go to doctors or to clinic appointments. For example, if the system is at capacity during the morning peak hours and has to turn people away, perhaps only people who can travel during the middle of the day will be able to travel.

Systems at capacity with less than desired ridership patterns are probably in the most difficult situation. They must try to impose the fewest number of

restrictions so as not to confuse the truly needy. At the same time they should consider imposing restrictions on those types of trips which they do not wish to serve. This Chapter will attempt to suggest how system characteristics and restrictions can be used to meet both goals.

Systems At Capacity

Systems with constrained capacity or new systems with a prediction of capacity utilization, may want to think about instituting ridership restrictions. Systems with existing restrictions might want to rethink those restrictions. This Chapter is designed to help that process.

Systems at capacity might also want to examine their operational and service characteristics to see if better management might overcome some capacity problems. Again the fifth manual in this series might be a help.

What This Chapter Will Do

This Chapter is designed to assist agencies with underutilized capacity to increase service use by changing possibly negative service or trip restrictions. The Chapter is also designed to help agencies with excess capacity to remove or restructure system requirements to better manage client demands.

In order to understand how to use trip and user restrictions effectively, you must understand how they work and how they are perceived by your clients. This Chapter will examine the most common restrictions and address

- the objectives or benefits sought by each restriction
- the potential administrative costs or resources consumed by each restriction
- possible client perceptions of and reactions to these restrictions
- ways to restructure restrictions to increase system use or to reduce or redistribute system use

In the following sections, formal and informal or de-facto service restrictions which tend to reduce ridership will be discussed. This discussion will be followed by a discussion of how transportation providers can use their knowledge of the impact of various client and trip requirementss to increase, or decrease or reschedule ridership.

This Chapter makes the point that every client, trip, or service restriction that an agency imposes, for whatever reason, is likely to have some unintended impact on ridership. Multiple restrictions tend to create confusion over who is

eligible for service. Such confusion may deter genuinely eligible people from trying to use the service.

Agencies should impose service and user restrictions which are consistent with their statutory mandates or their own goals and objectives. But agencies must always understand what they may be giving up to gain their objectives.

The imposition of ridership restrictions implies a trade-off. The trade-off is between the operational benefits agencies gain from imposing those restrictions and the operational costs they may also incur in imposing them. That trade-off should be a conscious one; agencies should understand what they gain and what they lose.

Many individually harmless restrictions together can impose a "chilling effect" on ridership by eligible clients. A single restriction which itself only deters the ridership it was meant to, may combine with other harmless restrictions to create a lengthy list of eligibility criteria. This may so confuse eligible clients that they do not think that they can use the transportation system.

Once agencies understand how formal and informal trip restrictions actually work, they can use those restrictions more effectively and with more precision. Agencies can use such restrictions more selectively to gain short-term purposes, like re-shifting travel on a system which is at capacity only during certain times of the day. Agencies can also use such restrictions for long-term purposes like encouraging more travel by certain clients who have not used the system as much as was hoped for.

THE IMPLICATIONS OF COMMON FORMAL RESTRICTIONS

Most systems which either provide transportation services directly to their clients or those purchasing services for their clients from other providers have certain formal restrictions and requirements. Some of these restrictions are designed to ensure that only those clients who have the greatest need, or those who are considered eligible by the funding source or by the agency itself are transported. Other formal restrictions are designed to ensure that the system operates efficiently and effectively.

The most common formal trip restrictions fall into the following four categories

- Personal or client related restrictions
- Administrative requirements
- Service requirements

- Trip and service restrictions

Each of these categories will be discussed below, in terms of their intended and often unintended impact on ridrship.

PERSONAL OR CLIENT RELATED RESTRICTIONS

Age

Age is often a criterion of service. But the federal and state programs which fund services for the elderly often have different cut-offs for eligibility. Multiple age standards cause confusion for the client,for social workers, and referral services dealing with the elderly, and for a transportation system itself. If your agency has a firm rule accompanying its funding, you will have to follow that rule to be reimbursed. You should recognize, however, that multiple eligibility standards may create enough confusion to deter people really in need from seeking your services.

Income

Income standards are another common way of limiting service. Yet, in many ways this is both a difficult and perhaps needless restriction. Some agencies have statutory mandates that only low-income people can be served; such funding sources usually carefully define that term. Again, where this is the requirement of a funding source it must be honored.

However, if income requirements have been implemented in order to meet local system objectives, agencies might wish to re-think this criterion. First, it is not always easy or pleasant to ask people about their income. People genuinely in need may be too embarassed to admit to their income. Others may lie and it will be difficult to check on the veracity of their statements.

An agency can use common and easily verifiable income standards like requiring riders to qualify for public income assistance (SSI or SSDI) or for Medicaid. But these are very low income levels. There are many people in need of transportation services who have incomes above that level. To limit service to those who meet tests for public assistance only for the purpose of having an easy-to-use income standard is not a good idea.

Many agencies limit ridership by income because they wish to assure themselves that only the very neediest people will ride. Yet, the literature has shown an interesting phenomenon; even on systems with no income restrictions, riders were almost always the very neediest and those with the lowest income anyway. In other words, there is some self-selection in potential ridership response to agency transportation services.

It might be worthwhile for agencies to consider the trade-off between the objectives sought by instituting an income-test for service, and the administrative problems inherent in assessing that criterion.

Physical or Mental Handicap

Many agencies restrict ridership to those people with physical or mental handicaps which interfere with their ability to move around. Special transportation services run by transit systems tend to be far more restrictive in their definition of a handicap. Many agencies in the human service network often look upon any handicap as a sufficient reason to offer transportation assistance. How an agency defines a handicap worthy of transportation assistance is usually its own perogative. But these differing definitions do have an impact on ridership. The more a system requires that a handicap must prevent clients from using available public transit to receive transportation services, the fewer the people who will be considered eligible.

Agencies might also wish to consider if physical handicaps impact different kinds of trips in differeny ways. An elderly person who could easily use public transit for a social visit may have greater difficulty in using it for grocery shopping. And the bus may be totally inappropriate for medical trips.

In addition, the way an agency or system determines if a client has an eligible handicap, however that is defined, can have a profound impact on ridership. If a system allows the clients to define their own handicap, or even allows a doctor or another social service agency to determine the existence of an eligible handicap, a greater number of people will be certified as eligible.

Individual clients, of course, have a vested interest in claiming the requisite handicap. This is often because they perceive themselves as having transportation difficulties and not because they believe that they are "cheating."

A transportation system can do a two-part screening process. The first part would be the preliminary acceptance of the eligibility certification of the clients themselves, or doctors, or other human service agencies. The next step would be to observe the client after he or she has used the system and decide if the client indeed met eligibility criteria. It is, however, sometimes more difficult to de-certify riders once they have used the system.

The larger a transportation system or service is and the more riders that must be accommodated, the more important it is to have firm and well-accepted guidelines about the kind of handicap(s) that will qualify for service. These guidelines should accurately reflect the system's goals and objectives about whom it wishes to serve. Also required is a selection or evaluation process that ensures that those guidelines are enforced equally.

Such an approach gives all clients a real sense of fairness and nonarbitrary action. It also gives the system or agency a way to ensure that its objectives and goals are being met.

One Particular Handicap or Condition

Some agencies are designed to provide assistance to people with only certain disabilities or diseases. The Lighthouse for the Blind, Easter Seals, the American Cancer Society, all are examples of the type of agency which uses certain conditions as the eligibility criterion. Where these restrictions are consistent with the purposes of the organization, they are entirely appropriate.

Such agenices should be cautioned, however, about setting up small underutilized transportation systems designed to meet the needs of only a few clients. Such agencies might be good candidates for community coordination efforts.

Geographic Boundaries

Some agencies limit service to those people or clients living within a certain neighborhood or catchment area. This is often entirely consistent with the objectives of the organization and of its statutory mandate. If, however, all the agency's transportation resources are not fully utilized it might wish to consider expanding the boundaries of that service area, or removing slowly other trip restrictions.

ADMINISTRATIVE REQUIREMENTS

Most agencies have a number of requirements or procedures which eligible clients must complete before they can start using the transportation system. Among the most common are:

- filling out and mailing in eligibility screening forms
- the requirement of a formal screening process
- the requirement to buy books of tickets prior to travelling
- the requirement to have a photo- or other I.D. card made

These types of requirements have two major impacts on ridership; 1) they discourage potential riders and 2) they are a burden for the clients of most agencies.

Delays Discourage Potential Riders

Many people only seek transportation assistance when they really need it. If they are told that they cannot ride because they have not been certified as eligible or because they have no tickets or I.D. card, they may simply look elsewhere and not return again to the system.

Some people will go ahead with the certification process and some people will even buy tickets and never use them. Many systems have found that a large number of people register for their service who never use it. There are a number of possible explanations for this phenomenon. In some cases, people were registered by their social worker or doctor and so the registration meant nothing to them.

In some cases, the better organized clients become registered. However, perhaps because they were better organized, they found themselves alternatives. In other cases, by the time the I.D. card or tickets came, the client was no longer interested or perhaps had simply decided not to travel. Several systems have found that up to 40 percent of their paid tickets were never used.

Needy clients do not always understand why they cannot travel immediately. Several systems found that clients and even case workers at other agencies misinterpreted the initial refusal as a final decision that the client was not eligible for transportation. In other instances, case workers refused to refer clients to a system because they could not get transportation immediately.

Many agencies require registration and pre-payment on tickets in order to get an idea of their potential ridership. This is often as important a reason for registration as meeting the agency objective that only certain people be served.

Agencies do have some alternatives which will not seriously compromise perfectly acceptable system objectives. One option is to allow a person to be served once, or even for as long as the certification procedure takes, if s/he passes some preliminary screening test over the phone. The person or the worker referring the person must be told as clearly as possible that if the data given cannot be verified, etc., the client will lose the right to travel on the system.

If a pre-payment scheme is in effect, there is an additional problem. This could be overcome by giving or selling senior citizen centers, information and referral agencies, etc., a small number of tickets which they would be empowered to use, with agency approval, in such a situation.

People of Limited Means Cannot Expend Resources Prior to Need

Systems which require people to travel to a screening interview, or to get the necessary I.D. picture taken, or especially to pay in advance for books of tickets, place a great burden on some clients. Clients with transportation difficulties cannot easily get to agencies for screening appointments or pictures. Clients with financial problems may not have the money to pay for a book of tickets in advance. Or even if they could find the cash they may be unwilling to commit themselves for future trips or for services which they have not yet sampled.

Some of the difficulties relative to the screening process could be handled by the two-part process described in an earlier section of this Chapter. That process implies that you believe a client, or his or her doctor or case worker until you or your drivers see evidence to the contrary.

Systems might wish to rethink any administrative or financial arrangements which appear to deter ridership by otherwise eligible people. Such requirements may guarantee that only those who are slightly more mobile and well-off can access the transportation services offered. Those less well-off may never even try to use the services because the administrative requirements are such a burden.

SERVICE REQUIREMENTS

Advance Notice - Initial Pickup

The single most common trip restriction imposed on clients of agencies providing transportation services is the requirement that the client must call the provider anywhere from 12 hours to one week before the transportation service will be needed. Probably the most common advance notice is 24 hours. There are agencies which impose only a 12-hour requirement while others impose a 48-hour notice.

The major purpose of asking for advance notice is to help a system organize its routes most efficiently and with a minimum of last minute furor. In rural areas and in communities where densities are very low, providers may wish to have a long lead time in order to combine trips for various agencies or to combine scattered trips to one major destination, like a big hospital.

Like almost everything else discussed in this Chapter, however advance notice requirements have their costs and their benefits. Sometimes a system has chosen the advance lead time which is most convenient for itself and not necessarily the clients. But advance reservation requirements deter ridership. The longer your reservation requirement, the less clients will think of your system as a viable option for certain trips. A very long lead time, generally anything over 24 hours, probably causes many clients to think of your system as a last resort only.

All but the most disabled client has some transportation options open. Moreover, most clients like to keep some flexibility in their travel choices. Like everyone else, they may be deterred by a long-advance time reservation requirement which requires them to make a choice so long before travel. In addition, genuinely needy people may have made previous arrangements which have fallen through at the last minute. Or they may have just decided to make a doctor's or other appointment.

Some systems deal wth last minute contingencies by saying that emergencies will be accommodated. Hoever, certain clients may have needs which are not genuinely "an emergency" but are worthy of attention. Moreover, some systems

have found that enterprising clients can generate a large of emergencies in order to get around the advance notice requirement.

How much is this a problem? The answer depends on two things: the size and complexity of your system and the kind of clients or trips that you are serving.

If yours is a very small system, and you know most of your clients, you probably can deal with every situation as it arises. Clients probably know that if they really need transportation and they haven't met the time deadline, that you can usually help them. If that situation changes, however, because you join a coordinated system or because the client load grows, you may wish to reassess the impact of the advance notice requirement on your clients.

The second important variable is the kind of client or trip which you are carrying. If you are providing medical transportation only to severely disabled people, the advance notice requirement probably is not deterring this kind of traveller or that kind of trip-making. But perhaps, you are serving the elderly, whom you hope to encourage to get out more and mix in the community. Such advance notice requirements may have a chilling impact on their willingness to use your system or even to travel at all.

The important question is, of course, how much advance do you <u>really</u> need? Often a system picks a certain time because it sounds reasonable or other nearby systems use that figure. The selection often has little to do with the actual operational needs of the system.

Why not work backwards? By what time in the day before travel do you need to know the names and addresses of all clients travelling? How long does it take you to make up a driver manifest or list people to be picked up? When do the drivers receive the next day's manifests? If the drivers pick up their routes each morning and it takes you about one hour to make up that routing, you probably could receive calls as late as 3:00 or 4:00 pm of the day before travel. There would be no need for even a 24-hour notice.

<u>Example</u>: *An operational change designed to reduce reservation lead time*

You currently provide medical, shopping, and recreational trips for eligible seniors. You purchase these sevices through the local community coordinated system. Because you wish to control your clients' trip-making, and because you wish to make sure that only eligible clients travel, you require the seniors to call your agency and <u>not</u> the coordinated system. Once you have checked the client's eligibility, you prepare a list of clients and someone either calls it in, or drives over with it to the coordinated system.

Because of the time delays involved, you must require your clients to call in 48 hours ahead of time so you will have time to check their eligibility.

You have heard from a number of clients and from case workers that the 48-hour notice is really working a hardship on certain people. The community system tells you that a significant number of your clients are not there to be picked up when a vehicle shows up; either they forgot or they had arranged for another ride.

You figure out that if you only screened each client once, you could allow them to call the coordinated system directly to arrange their travel. The coordinated system agrees to check the clients identification and to screen trip purposes to match your criteria.

Now clients can call the system directly up to twelve hours before travelling. The clients are happier and the coordinated system says that most of your clients are ready to be picked up when they should be. You cannot detect any sign of misuse or ineligible users but you can do spot checks occasionally.

The example above also illustrates a problem common to many advance notice systems; the longer the advance requirement the higher the no-show and late cancellation rate. No-shows and cancellations can ruin a well-laid out vehicle itinerary and system schedule.

The longer the time interval between the time the reservation is made and the time of the actual pick-up, the more opportunity there is for slippages of memory or intention. Apparently people simply forget either their need to travel or the trip reservation itself. Sometimes they arrange other transportation in the interim, or they only reserved a space in case they felt like going somewhere or their usual ride didn't show up.

These occurrences are not trivial; in some systems monitored in the literature, no-show rates were as high as twenty percent. No-shows are even more debilitating in the rural systems which tend to have the longest advance reservation requirement; imagine going twenty or thirty miles to pick up someone who isn't there or forgot a vehicle was coming. It is wise, therefore, to consider how much efficiency a system is gaining by instituting an advance reservation requirement and then substract the losses due to the need to reschedule cancellations and no-shows.

Changing advance reservation requirements is not the only way to address the problem of no-shows or last minute cancellations. You could revoke the travel rights of someone who did either more than once. You could call people on the

morning they were to travel to remind them of their reservation or check their interest.

Advance Notice - Trip Return

Systems differ significantly in the way they handle the return part of a two-part trip reservation. Some systems require the traveller to make a definite return time reservation at the same time the original pick-up appointment is made. Other systems handle the return portion of a reserved trip on a demand-responsive or partially demand-responsive basis.

The more convenient the entire trip is for a client, the more likely he or she is to use the service. If a client is travelling for social or recreational purposes, return trip restrictions of any type may make little difference. A social visit can be programmed to end at a set time or the person can wait for an hour or so to be picked up by the system. However, many other trips cannot be so neatly programmed; many clients cannot predict when a therapy or doctor's appointment will end. Moreover, they may not feel like waiting one or two hours to be picked up after a medical appointment or even after they have finished shopping.

Again, the size of your system and the type of travellers and trips which you serve are the key issues. They determine how you handle the return portion of a reserved trip. This in turn will impact different clients in different ways.

TRIP REQUIREMENTS

Many agencies limit their clients' trip-making by giving priority to certain trips or prohibiting other trips. Agencies generally have two reasons behind these types of restrictions. First, some agencies have made a policy decision to marshal their limited resources and expend them on providing only the most essential of trips made by their clients. Common examples are medical, work, and school trips.

Second, many agencies limit trip-making by trip type or even a certain number of trips per month in order to control and regulate the demand on their systems. Fearful that they will be inundated by their clients if they allow all trips, they restrict service in order to keep the demand to a "manageable" level.

Both of these underlying reasons for restricting trips are sound. But how effective they are in providing the services really needed by their clients can vary greatly.

Most agencies dealing with the elderly, for example, limit aided trip-making to medical trips. However, the elderly often have transportation generally available for medical travel; often they are far more in need of shopping or

even social and recreational travel. This may explain in part why some systems show a number of people who ride very infrequently; the clients often have the necessary transportation for medical trips. They only use the system on the few occasions when they cannot find a ride.

If your agency is limiting transportation because you believe that only a certain type of trip is extremely difficult for your clients, you might wish to assess exactly what your ridership patterns are. Are you sure that your clients don't perhaps have a greater need for other kinds of trips? So many kinds of activities are tied in with the well-being of most clients.

If your agency is limiting travel in order to keep demand to a manageable level, you still must question whether you are effectively using your available resources. If you have any capacity at all during your service day, you might wish to lessen trip-restrictions during those times in order to increase the passenger volume on your system.

Example: *Changing trip restrictions to encourage efficiency*

You are a small agency which operates three mini-buses in a special community development area; all residents of the area are eligible for your services but they are only allowed to make work or medical trips. Currently your system is at capacity from 7:30 to 9:00 am and again from 4:30 to about 6:00 pm.

You decide to remove some of the trip restrictions; you now allow shopping and personal business trips (e.g., going to a social security office or buying food stamps) but only from 9:00 am to 4:00 pm.

Ridership immediately goes up but you still have excess capacity between noon and 4:00 pm. You now decide to remove all trip restrictions during the 9 to 4 period. Although daily ridership fluctuates, you generally use all your existing capacity. You occasionally have to ask someone to re-schedule a trip during that period because you have no room but you rarely have to refuse service entirely.

Some systems restrict the number of trips a client may make using the transportation service provided. This type of restriction is especially common when an agency is purchasing from another provider. This, too, is an effective way to control ridership but it may not be necessary. Many systems who instituted such numerical restrictions found that none or few of their clients came close to taking the maximum number of trips.

Of course, there is always the potential for abuse; there is always a client who will use the system for many trips which could have been made without the system. But these few clients can be handled on an individual basis; they can be called and advised that their behavior is not appropriate. This may be a more effective way than instituting administrative requirements which affect everyone and consume scarce resources.

THE FULL IMPLICATIONS OF YOUR AGENCY'S FORMAL TRIP RESTRICTIONS

Figure 3 summarizes the advantages and disadvantages of the most commonly used methods of formally restricting client trip and travel behavior. All of the requirements suffer from the same problem. While they may restrict service in the way that you intended, they have the capability to impact ridership and your clients in ways that you did not intend.

To summarize Fig. 3, the problems with most formal restrictions are that they

- require a great deal of information processing on the part of the client and referral agencies
- may not address the real transportation problems of the clients in question
- may require substantial administrative time and resources for very small returns
- may lead to an underutilization of your available resources and capacity

The Need To Think Through Your Administrative Requirements

Most administrative requirements and restrictions are set without full consideration of their implications. Often agency personnel, trying to be efficient, attempt to construct a sensible business-like process. Sometimes such a formal process is out of proportion to the size of the system and not responsive to the needs of the clients.

It is not uncommon for agencies to establish lengthy screening processes and multiple trip restrictions just to prevent cheating or abuse by one or two clients. These processes often have adverse effects on other clients. It is useful to consider if these recalcitrant clients could be dealt with in some simpler manner which did not have so many ramifications.

Figure 3
Possible Impacts of Common Formal Trip Restrictions

	Objective	Possible Impacts
Personal or Client-Related • Age • Income • Residence Area • Travel Destination	• to meet legislative or funding requirements • to meet agency objectives • to serve the neediest clients only	• can be confusing to clients and referral agencies • can be too restrictive to serve the needs of clients • screening process required can be complicated and burdensome • screening process can require considerable staff resources • your system may be underutilized
Administrative Requirements • Formal Registration and Certification Process	• to serve neediest clients only • to obtain estimates of nature and quantity of demand • to facilitate trip-reservation process	• reduces system's ability to respond immediately to client needs • can be confusing to clients and referral agencies • can be undue burden on client to understand eligibility criteria • process requires considerable staff resources

	Objective	Possible Impacts
Administrative Requirements (Continued) • Prepayment Requirements	• all of above • to ease cashflow problems	• can be undue financial burden
Service Requirements • Advance Notice • Client Contact Requirements	• to facilitate grouping and efficient use use of existing resources • to predict demand • to allow screening trips for eligibility • to prevent"cheating"	• may not be consonant with travel needs of genuinely needy clients • may deter ridership • encourages no-shows and late cancellations • may legthen process beyond what is necessary for actual operational needs of the system
Trip Requirements • Kinds of Trips Allowable • Times Trips May Be Taken • Number of Trips Allowed Per Client	• to ensure only needy travellers are using system • to ensure that only essential trips are taken • to control demand to match with with existing capacity • to favor certain client trips	• may not be consonant with travel needs of genuinely needy clients • may be confusing to clients and referral agencies • may lead to excess capacity during certain periods • may create need for complicate screening process which requires staff resources

Lastly, many trip restrictions appear to constrain demand below capacity. If a system is serving more clients than it can handle, service restrictions are one way to reduce that demand to manageable proportions. But any system with excess capacity should question whether its restrictions are necessary, at least for the entire service day. Moreover even systems at capacity should consider if their requirements are affecting their desired ridership patterns.

After carefully examining your procedures, your may wish to keep existing restrictions. Perhaps, in spite of their drawbacks, they are the best available way to meet most of your objectives. But such an assessment requires

- that you understand and formulate your service objectives clearly
- that you are sure that the restrictions or requirements that you have instituted actually serve your objectives, and do so in the most efficient way

INFORMAL OR DE FACTO TRIP RESTRICTIONS

The way that you actually operate your transportation system can have a profound but not immediately obvious impact on your clients. It does not matter if you have no formal trip restrictions, for example, if your system is so busy during certain times of the day that certain clients cannot be served. A number of de facto trip restrictions can grow up out of the way that your system delivers transportation services.

TIME AND CAPACITY CONSTRAINTS

Many systems have peak periods; these peaks vary with the nature of clients and trips being served by the system. Many systems have their peak period in the middle of the day. Such systems often serve seniors going to congregate meal sites, clients who are finishing morning appointments, and other clients who are travelling to afternoon appointments. Other systems have morning and evening peaks because they provide work trips for the handicapped or sheltered workshop or school trips.

If a system is at capacity during its peaks, it will have to either refuse a new client or ask the client to reschedule the trip. Simply being asked to rearrange travel preferences may inhibit ridership by certain clients. Additionally, certain trips and appointments cannot be changed so the client will not be served at all for that trip. Once having been refused the client may never return to the system. (Sometimes the client will not understand the reason for the refusal and may feel that s/he is ineligible for service.)

Systems at capacity during certain times of the day are effectively instituting restrictions against the kind of trips that would usually be taken then.

Systems at capacity during the morning and evening peaks are effectively refusing most work and school trips. This is so even if some of those trips are already being taken and even if that type of trip is an allowable one.

Many systems have informal waiting lists for congested time periods. It is possible for a client to go through a lengthy certification and registration process and then be told that there still is a considerable wait to access the transportation service. Certainly such delays inhibit all but the neediest rider or those that have the resources to be able to wait.

Such informal trip restrictions create all the same problems for travellers that formal restrictions do but they also create even more. They cast doubt on the viability of the system for both clients and other agencies. Most people prefer certainty over ambiguity; it is disheartening not to know whether a system for which you are eligible will indeed provide you with transportation service when you need it.

Making Informal Constraints Into Formal Ones

One option is to actually make the informal restrictions into formal ones so they can be known in advance and thus reduce some client uncertainty. If work and school trips have utilized all existing capacity during the morning and evening peaks you might announce that those kind of trips will require two or three weeks advance notice. You might also announce, however, that other trips taken during the 10:00 am to 3:00 pm time period only require a 12-hour wait.

The purpose of such a strategy is two-fold. By showing an understanding of the limitations of your system you let your clients and the community know that the refusal and rescheduling problem is a capacity problem and not poor management. This may increase their confidence in your system and their willingness to wait or to reschedule trips.

Additionally, such a strategy may increase your overall capacity during the times when you have extra space available. Clients making shopping or medical or social trips may look to your system because they know it is generally available for those purposes in the middle of the day. If you do not institute such formal restrictions, clients may continue to be confused and in doubt about why they were refused service. Other agency personnel may not refer people to your system because of the uncertainty involved.

> Example: *Structuring trip restrictions by time of day; a new system*
>
> You are beginning a new coordinated system which involves the clients of several community agencies and a fleet of eight vehicles. You wish to offer a wide range of trips but wish to give priority to work and school trips.

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You establish the following formal trip restrictions:

- Work or school trips only between 7:00 and 9:00 am and between 4:00 and 6:00 pm.
- Medical trips given preference at all other times.
- Shopping and social trips will be accommodated if space is available.

You make it very clear that there are occasionally openings in the morning and evening peaks; if so, medical trips will be accommodated then. When people call in for medical trips and there is a peak period opening, you make very sure that they understand that they were lucky to find an opening; the rule is that medical trips will only be accommodated in the off-peak.

While some clients and agencies are a little confused about the restrictions, most clients understand the times that service is available. They also understand that occasionally there is a chance that they can get service in the peak-period. Because your rules are clear and relatively unambiguous, they have more faith in the system.

Later, if you do not experience full capacity during the peaks you can relax the first trip restrictions and announce that medical trips will also be accepted then. This will depend, of course, on the kind of clients that you serve and their trip patterns.

Example: *Re-establishing trip priorities in an on-going system*

You run a community coordinated system which has twelve vehicles. It is entirely at capacity for the morning peak hour with work, school, and medical dialysis trips. Technically your system has no formal trip restrictions but because of this capacity problem over one-third of all clients who call your system are totally refused service.

When you examine the kinds of clients being refused service you find that many of them are people who need a great deal of trip assistance. However, when they cannot get service the first or second time they ask, they never call you again.

You reprint all your system information and promotional literature and you hold a series of community seminars to announce that from now on there will be the following trip restrictions for new trips and new clients:

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- Work, school, or recurring medical trips only between 7:00 and 9:30 am.

- Medical trips given priority at all other times.

- Social, recreational, and personal business travel on a space-available basis.

You also announce that there can be a three-week waiting period to be allowed to receive recurrent, daily, or subscription service (like work, school, and dialysis).

These formal restrictions match closely what your system intake and screening people were doing on an ad hoc basis anyway. Instead of saying that certain trips are allowable but never letting a client make them, as you did before, you now tell the client that certain trips are of lower priority and may not be accommodated.

There is some initial resentment and confusion. Clients who used to be allowed to go shopping whenever they felt like it will be unhappy. Certain agencies may not understand your new restrictions and may misinterpret them to the clients. However, after awhile the new rules are understood and they appear to be consistently enforced.

Clients and agencies can make plans based on the way your system really operates. Needy people requiring recurrent or subscription service sign up with your system and wait patiently for an opeining in the peak-period. Other clients do not always use your system but they do consider it as one of their options.

It is, of course, much more difficult, and more disruptive to the clients, to change restrictions and requirements after they have been in effect for some time. Such changes may cause hard feelings and can cause certain agencies or clients to drop your system out of their choice set. But the benefits to your system, and to most clients, of instituting realistic trip restrictions, which conform to the way the system really operates, are much higher than any losses.

THE FULL IMPLICATIONS OF YOUR AGENCY'S INFORMAL TRIP RESTRICTIONS

The de facto restrictions and limitations which arise out of the operations of your system impact ridership response in many the same ways as formal restrictions. They can confuse riders and agencies dealing with potential riders. Such restrictions can cause clients to lose faith in a system and to use it only as a last resort.

The more constraints placed upon the client by the way a system operates, the less attractive that system becomes to all but the neediest clients. The less reliable and dependable a system is, the less likely that even the neediest clients will be able to use it; a missed medical appointment is of no use to anyone.

Informal requirements have a way of interacting with formal trip restrictions to intensify both impacts. That is, often the advance reservation requirement, the formal screening process, the priority ranking of trips, etc., combine with late arrivals, long on-board riding times, and limited hours of operation to produce a service that no one will use for essential trips and only the very neediest will use for social and recreational travel.

Above all, informal restrictions give people a negative impression of the system in question. Clients and other agencies can understand formal trip requirements, even if they do not agree with them or occasionally become confused by them. The kind of de facto restrictions imposed by a system often seem arbitrary, unfair, and sloppy. In many cases it would be much wiser to turn de facto regulations into formal, written restrictions which could be identified and dealt with ahead of time by most clients.

HOW TO USE RIDERHSIP CONTROLS AND REQUIREMENTS TO MEET YOUR OBJECTIVES

It is important to know what goals and objectives you have for your system. You can then attempt to develop the best way to achieve those objectives within your resources and other constraints. The first step for any agency or system is to decide exactly what it hopes to achieve with its system and then set guidelines that are designed to meet those goals.

Some systems set rules and regulations because they sounded sensible or because other systems were doing so. But requirements and regulations that have served others well may not be good for you or your clients.

A serious problem is the tendency of many agencies to overregulate; to develop extensive and very limiting rules and regulations. Sometimes such rules may be required by a funding source. However, if they are not, it is wisest to start with simple rules, and implement new and increased regulation only as needed. Complicated and complex processes take staff time and resources and often require considerable initiative and commitment on the part of the client. Such commitments from both the agency and the client are often out of proportion to the size of the system and its needs.

A few systems are on the other end of the spectrum; they develop no rules or regulations until the situation is totally out of hand. Then once clients and other referral agencies are used to certain standards, the system is forced to lay down new and more complicated guidelines. Disenchantment and often chaos can result.

In general, a system should implement the fewest trip and user restrictions possible to meet its system objectives. Since absolute certainty about rider response is not always possible, a system should be flexible and willing to consider necessary changes in its restrictions and requirements.

Figure 4 shows the most common system objectives and the type of regulations and restrictions that agencies commonly implement in order to meet those objectives. Figure 4 also shows under what conditions those particular restrictions are most likely to achieve the desired results. Lastly, Fig. 4 summarizes the possible side-effects or negative impacts of the imposition of such restrictions.

Two conditions will determine exactly how a system's objectives could be met. The first is whether the agency is directly providing transportation service in its own vehicles or purchasing those services from another provider. The second is whether the service or system is an on-going one with existing regulations or a planned system about to be implemented.

Each of these situations will be briefly discussed below. Each discussion assumes that an agency has taken the necessary first step of specifying exactly what its objectives are in providing transportation services to its clients and, moreover, what operational conditions it seeks from implementing user or trip restrictions.

A NEW SYSTEM

New systems are often the most concerned about client demand overpowering the system's capabilities. Yet the methods developed in Chapter Two are based on the empirical evidence that most systems experienced ridership only from their existing clientele and that only the most needy of those clients rode with any frequency. The smaller your system is, the more likely it is that you know how many clients you currently have, how many regular users there are of your service, and how many are so needy that they can realistically be said to have no other options.

Only large social agencies or community-wide providers who are or will be serving a vast array of different clients with very different needs and handicaps should consider implementing a wide range of trip and user restrictions. Even then these restrictions should be geared to the objectives of the system as well as to the need to manage the demand for service.

Example: *Setting restrictions consistent with agency objectives*

A system serving elderly and handicapped residents of your community is just getting started. The Board of Directors wants to encourage all eligible people to use the system to increase their overall mobility and participation in community events.

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However, the system will only have 9 vehicles and you are afraid that the demand may well exceed the system's capacity. One staff person suggests that you should limit service to work and medical trips. However, you decide that those trips might be too restrictive; the people you will be serving need grocery, social, and recreational travel too.

You institute a work and medical trip restriction for the morning and afternoon peak and allow all trip purposes for the remainder of the service day.

You have two back-up plans. If demand should exceed capacity, you will impose further restrictions. If, however, there is still excess capacity in the peak-period, you will remove the medical and work trips restrictions. You announce these contingencies to all relevant agencies.

Example: *Setting restrictions consistent with agency objectives another approach*

Your new community system will be serving all the elderly citizens of the community. You believe that these people have difficulty getting to doctor's appointments and that those are the most essential trips. However, you recognize that many elderly people often have some rides; moreover, they often need a variety of trip purposes.

Your Board feels that providing your service may allow an elderly person to free up some of his or her other travel options for other trips. The Board feels that elderly citizens ought to be allowed maximum flexibility to make their own travel choices within the capacity constraints of the service.

Since you do not expect to notice a strong peaking phenomenon, you decide to allow unlimited trip-making as to purpose but only allow each client five roundtrips per month. They can choose how to "spend" those trips.

If you still have excess capacity after the system has been in operation, you can remove the restriction entirely or increase the number of trips allowed.

You decide not to impose any other eligibility criteria than those that people must be 62 years of age and live in the community. Although you believe that the neediest people ought to be served, you know that all evidence shows that only the neediest people will use your system with any frequency.

Figure 4
Options Available to Meet System Objectives

System Objective	System Options to Meet Objectives	Most Appropriate Conditions for Each Option	Possible Negative Side-Effects
To serve essential and needed trips	• limit trip-making to essential trips	• limited capacity all day	• possibility of unused capacity
	• limit trip-making during certain portions of the day only	• limited capacity during certain peaks	• possibly confusing to clients and other agencies
	• institute strict eligibility and screening process	• very limited capacity • large existing clientele with varying needs and handicaps	• can take a long time and deter ridership • can be confusing • requires staff resources
	• institute long advance reservation requirement	• long average trips in low density areas • frequent trips to or from the same facility • would facilitate grouping	

System Objective	System Options to Meet Objectives	Most Appropriate Conditions for Each Option	Possible Negative Side-Effects
To serve only neediest clients	• institute lengthy formal screening process	• capacity very limited • large existing clientele of varying needs and handicaps • information on clients readily available	• can be confusing to clients and referral agencies • may be unnecessary • length and complexity of process may deter genuinely needy
To increase access to particular agency service or facility	• limit trip-making to agency service	• very limited capacity • service is greatest transportation need of clients	• may be too limited to be of use to needy clients • clients already using service may just shift modes
To reduce peak-period demands on system	• limit trip-making to certain kinds of trips during peaks	• system at capacity during peaks • there is a natural separation of trips by time of day	• may be confusing to clients • may be difficult to enforce • must prevent some clients from what they are currently doing • can create unhappiness on an existing system without such restrictions • will prevent some genuinely needed travel

System Objective	System Options to Meet Objectives	Most Appropriate Conditions for Each Option	Possible Negative Side-Effects
To facilitate grouping and more effective use of existing capacity	• limit trip-making to certain kinds of trips during certain times of day • remove all or most trip restrictions	• there is or appears to be a natural separation of trips by time of day • system is operating inefficiently because of widely disparate trips occurring together • excess capacity all or most of the service day	• may be confusing to clients • may be difficult to enforce • can create unhappiness on an existing system • will prevent some genuinely needed travel • less needy clients may ride more frequently • excess demand may arise
To reduce excess trip-making by a few individuals	• institute numerical trip restrictions	• excess use by individuals has been detected • travel cannot be controlled by screening process	• can affect many clients • may be least cost-effective solutions

System Objective	System Options to Meet Objectives	Most Appropriate Conditions for Each Option	Possible Negative Side-Effects
To temper ridership demand on a new service	• limit trip-making to essential trips	• unknown demand patterns	• changing restrictions later can be confusing
	• limit trip-making to certain trips during certain times	• large clientele with varying needs and handicaps	• may not be consistent with other system objectives
	• institute numerical trip restrictions		
	• require prepayment schemes	• unknown demand patterns	• may be beyond client's ability
		• system has cashflow problems	• may deter ridership
		• useful way to monitor ridership	

It is possible to impose a great variety of restrictions which might be very effective at managing demand. But these restrictions might well conflict with other system or agency goals. Of course, such conflicts are sometimes inevitable given limited system resources. But if certain restrictions do conflict with important system objectives, it is very important to see if they are really necessary.

Any restriction which reduces demand below capacity is suspect. If you are running a vehicle fleet, you should want to use that fleet to the greatest extent possible. This will lower your average trip costs.

The economics of running your own system dictate certain ways to achieve efficiency and effectiveness. If you are not happy with the ways that are necessary to increase the utilization of the capacity of your fleet, you should question whether you ought to be directly providing transportation services.

If you are not easy with the idea of providing social or recreational travel or service to people simply changing mode on an existing trip, you should question whether you ought to be operating your own fleet. You may be a very good candidate to buy services from community providers or coordinated systems for just the required trips which meet your agency goals.

In these days of increasing austerity, you should not and may not be allowed to use resources less than optimally. If you have excess capacity and you are unwilling to do what is necessary to use it, you should think strongly about alternative ways to meet your clients' travel needs.

EXISTING SYSTEMS

Existing systems should consider changing their current trip restrictions if they are underutilized for any part of the day, or if they have unmet demand at certain periods of the day. Such systems should implement restrictions on travel for congested periods and lessen or remove restrictions for uncongested periods.

Existing systems have some "public relations" problems because changing current requirements can make existing riders and referral agencies very unhappy. Changing restrictions can cause confusion in and even resentment on the part of some clients. Therefore, systems ought to think through very carefully the changes which are implemented so they will not have to be re-done again in the near future.

If your system is unhappy with the idea of restricting trip-making during congested peaks, you should consider buying additional or back-up service from other community providers or from a coordinated system. Note, however, that it is very unwise to continue to allow congestion during peak-periods to create service refusals, especially if these refusals are random in nature.

Again, if an existing system has excess capacity it should do something to use it. If a system is unhappy with the idea of allowing unrestricted trip-making or less needy clients to ride in order to fill up the vehicles, it should consider whether other community options are available to serve the transportation needs of its clients.

AGENCIES PURCHASING SERVICE

Agencies purchasing service should have two concerns; their own role in the screening and reservation process, and the impact on their clients of the way the provider delivers service.

Earlier sections have suggested that lengthy screening and review processes are more common with agencies purchasing service. Such processes can have serious negative impacts on perfectly eligible clients. If any agency's ridership pattern is different than expected or lower than expected it can be due to the constraints and hardships imposed by the screening process.

Even if ridership is not different than expected, an agency should still question whether its screening or reservation process is working a hardship on its clients. Even if changing the process means that other ridership constraints would have to be imposed, an agency ought to be fully conscious and in control of the impact of its own requirements.

For example, many systems have found that their most frequent passengers were active and well-to-do seniors taking advantage of the system to leave their cars at home. Restrictive screening and advance reservation processes often determine ridership by the least active and most in need; these are the kind of people who are often confused by such processes. If your agency faced an excess demand, which people would you want to impact with your requirements?

If an agency's ridership pattern is different than expected, the agency should also consider what impact the formal and informal requirements of the provider are having on the eligible clients. If the provider has a lengthy advance reservation requirement, this may be affecting ridership by agency clients. If the provider requires the rider to be ready several hours before possible pick-up, this too could deter ridership.

An agency purchasing service should check with the provider to see what the on-time record of the system is, how often it fails to show up at all, what the average on-board ride time is, and if there are any other service characteristics which might be affecting rider response. To the extent that unsatisfactory conditions can be changed, an agency should ask for those conditions to be changed.

SUMMARY

Most systems and agencies have far more control over ridership response and total demand than they think. It is important, however, that ridership restric-

tions be imposed only with full understanding of what they might and could do and with complete acceptance of their impact on system objectives.