Implementing the Telecommunications Provisions

Karen Peltz Strauss

EDITOR'S NOTE

One of the cornerstones of participation in the mainstream of American society is communication. The combination of a hearing or speech impairment and a society so notably dependent upon the telephone system for day-to-day living has generated tremendous frustration on the part of individuals with speech and hearing impairments. A significant potential market has thus been untapped by telephone companies and telephone-linked businesses. With the enactment of the Americans with Disabilities Act (ADA), political will has moved one step closer to supporting full utilization of available technology.

Karen Peltz Strauss holds that the establishment of nationwide relay service mandated by title IV will ensure that individuals with hearing and speech impairments have the opportunity to exercise the civil rights specified by the other sections of the ADA. Examining the state of the art in one of the more technical of the ADA mandates, Strauss concludes that approximately 40 states are well on their way to providing statewide relay services. Utilizing their experience will make compliance with the ADA a relatively easy job.

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lished numerous articles on the legal rights of persons who are deaf and hearing impaired.

More than 55 years ago, Congress set forth what has since become known as the "universal service" mandate, which stipulated that communication by wire or radio be made available to all Americans so far as is possible.[1] This congressional objective, originally pronounced in the Communications Act of 1934, may finally become a reality for deaf, hard-of-hearing, and speech-impaired individuals as a result of the enactment of the Americans with Disabilities Act (ADA). Title IV of the ADA requires all common carriers that provide intra- or interstate telephone service to offer dual party relay services for all local and long-distance telephone calls by July 26, 1993.[2] Relay services enable users of telecommunication devices for the deaf (TDDs) and other nonvoice terminal devices to communicate, through a third party, with users of conventional telephones. When fully implemented, title IV of the ADA should enable individuals who are deaf, hard-of-hearing, and speech impaired to overcome the isolation and dependence they have experienced without use of the telephone system. The establishment of nationwide relay services mandated by title IV will help to ensure that individuals with hearing and speech impairments have the opportunity to exercise the civil rights promised by the other sections of the ADA.

DEFINITIONS OF TDDs AND RELAY SERVICES

A TDD is a device with a keyboard, resembling a small typewriter, that is used to send and receive written messages over the telephone lines. TDDs typically have light-emitting diodes (LEDs) to display visually the messages transmitted and received, and sometimes have printers to record those messages on special paper. A TDD uses an acoustic coupler, into which one places the handset of a conventional telephone, or a computer modem connected to the telephone by direct coupling, to convert outgoing TDD impulses into acoustic tones and incoming acoustic tones into TDD impulses.[3] TDDs may also have a variety of optional features, including memory capability, rechargeable battery packs, and flashing light signalers to alert individuals to incoming calls.

TDDs enable deaf, hard-of-hearing, and speech-impaired individuals to use the telephone network to communicate with friends, employers, and business establishments that also have TDDs. Without relay services, however, TDD users generally cannot use the public-switched telephone network to access individuals who have conventional voice telephones. As a result, simple tasks, such as making a dinner reservation, arranging a job interview, or calling a plumber can mean long and arduous trips throughout town, or continued dependence on a friend or neighbor.

A dual party relay service currently enables persons who use TDDs or other nonvoice terminal devices to carry on near simultaneous conversations with persons who use conventional voice telephones. It accomplishes this task in the following manner: A TDD user calls the relay service, which is answered by a relay operator. The operator places the call, via voice, to the called party and then converts all TDD messages from the caller into voice and all voice messages from the called party into typed text for the TDD user. The same process can be performed in reverse, when the call is initiated by a hearing person.

WHERE WE ARE AT PRESENT

Although the ADA gives common carriers three years to establish nationwide relay operations, it is unlikely that common carriers in more than a handful of states will need or use all of that time to begin relay operations. Indeed, to a large extent, the mere introduction and movement of the ADA through Congress has already provided enough of an incentive for telephone companies and the states in which they are housed to develop a solid infrastructure of relay services throughout the United States. The facts are self-evident: only 17 states had formal statewide relay systems operating (with 6 additional states expecting operations to begin within the following year) as of May 1989, when the ADA was introduced in the 101st Congress.[4] By July 1990, when the ADA was signed into law, as many as 40 states either had statewide systems in place or concrete plans to have those systems begin operations within the next year and a-half (National Center for Law and the Deaf [NCLD] 1990). Many of these systems impose restrictions or suffer from blockage rates that will be unacceptable under the minimum

standards established by title IV. The ADA will now require increased funding to achieve "functionally equivalent" telephone service.

RELAY SERVICE STANDARDS REQUIRED BY TITLE IV

Title IV of the ADA is intended to further the goal of universal telephone service for deaf, hard-of-hearing, and speech-impaired individuals.[5] It requires common carriers to provide interstate and intrastate telephone relay services that are functionally equivalent to telephone services available to hearing persons. The ADA charges the Federal Communications Commission (FCC) with establishing minimum standards—to be met by all relay-service providers—that will define functional equivalence between dual party relay services and voice telephone services.[6] Some of these standards are delineated in the statute itself and others are articulated in committee reports.

STATUTORY REQUIREMENTS

Continuous Service. All relay services must operate 24 hours per day, 7 days a week.[7] Clearly, an essential aspect of functional equivalence is for deaf, hard-of-hearing, and speech-impaired individuals to have the telephone system available to them at all times.

No Content Restrictions. The ADA prohibits "relay operators from failing to fulfill the obligations of common carriers by refusing calls or limiting the length of [those] calls."[8] Just as a hearing person can use the telephone to communicate any message without limitation, so too does Congress intend relay users to have this right.

Many statewide relay programs have recognized the importance of relaying all calls regardless of content, and are therefore already in compliance with this relay specification. In Minnesota, for example, the relay contract requires that all calls, including those that are obscene or illegal, be relayed.[9] Similarly, the California, Delaware, New York, Pennsylvania, and Washington relay services forbid operators from passing judgment on the nature of any conversation or making decisions about whether such conversations should be relayed.[10]

Other states will likely need to revise their policies to come into compliance with this title IV requirement. In Arizona and Virginia, for example, operators are permitted to terminate calls and notify police authorities about calls that pertain to certain illegal activities.[11] Such a

policy appears to be in direct conflict with the ADA requirement. In regulations, the FCC should clarify that such content restrictions are prohibited by the ADA.

Confidentiality. Somewhat related to the content issue is the question of the confidentiality of relayed calls. The ADA "prohibit[s] relay operators from disclosing the content of any relayed conversation and from keeping records of the content of any such conversation beyond the duration of the call."[12] Most, if not all, of the states that have established relay programs already adhere to a policy of assuring strict confidentiality of relayed communications. Some states, such as Pennsylvania, Delaware, and Minnesota, require relay operators to take a pledge of confidentiality before they can assume their operator duties. Moreover, Connecticut's relay law considers all relayed communications to be "privileged" and specifically prohibits relay operators from disclosing such communications "in any civil or criminal case or proceeding or in any legislative or administrative proceeding, unless the person making the confidential communication waives such privilege."[13]

Again, however, the practices of some state relay programs may not comply with the ADA's mandate of confidentiality. For example, Colorado legislation requires operators to preserve the confidentiality of all calls, except in such instances as would constitute a furtherance of a violation of law.[14] Similarly, in Texas, relay law is silent on this issue, but the state has a separate statute requiring any individual with knowledge of child-abuse practices to report such practices to the state. This has caused that state's provider—Sprint Services—to require its operators to report conversations containing information about child abuse.

The ADA is unequivocal in its requirement that calls be kept confidential. To the extent that it has such authority, the FCC should therefore prescribe rules to ensure the privileged status of all communications made through a relay service.[15] In the future, relay services may be automated through voice synthesis, speech-to-text, and other technologies. Until such time that these technologies replace relay operators, the operators should act as a transparent conduit between the relay parties.

Unaltered Messages. The ADA directs the FCC to "prohibit relay operators from intentionally altering a relayed conversation."[16] Initially, this means that relay operators may not interject any opinion or comment into a relayed conversation (Conlon-Mentkowski 1988). Most consumers of relay services wish to have their messages relayed verbatim. The only exception to this rule applies to deaf individuals who use American Sign Language (ASL)—a language that differs in grammar

and syntax from English. These individuals may want their messages interpreted into English for hearing people and may want English messages from those persons interpreted into ASL. Because, at times, either party may be unaware that the operator is able to perform the interpreting service, some experts in the field consider it a good practice to alert each party to the availability of this particular service.[17].

Charges Billed to Relay Users. Under the ADA, users of relay services will "pay rates no greater than the rates paid for functionally equivalent voice communication services with respect to such factors as the duration of the call, the time of day, and the distance from point of origination to point of termination."[18] In other words, the toll charges billed to relay users for long-distance calls must be equal to the charges that the users would have incurred had they made those calls directly, without any charges for routing by the relay system. Here, it is important to note that completion of a TDD call takes much longer than does a voice call. Relay services add even more time to the total length of the call. For this reason, some states and long-distance telephone companies offer TDD discounts on the toll charges of relayed telephone calls.[19] Although a toll discount is not required by the ADA, the FCC does have the option of mandating a reduced toll rate nationwide for relayed telephone calls.[20]

DIRECTIVES IN CONGRESSIONAL REPORTS

Equal Blockage Rates.[21] The repeated delays and busy signals that TDD users confront when attempting to access relay services remain their biggest grievance with these services. Congress recognized that a functionally equivalent relay service will be one in which the blockage rates are "no greater than standard industry blockage rates for voice telephone services," and Senate report language directs the FCC to issue a rule requiring that this standard be met by relay providers.[22] The California relay comes closest to this standard, allowing for a blockage rate of only .003 to .18 percent. New York and Delaware relays also approximate this objective by allowing for a 1 percent blockage rate, the same rate of blockage that voice users confront when trying to access operator assistance through the regular telephone dialing network (Taylor 1988).[23] With improvements in relay service, it is more than likely that equal blockage rates will become the standard of high-quality relay service in the future. By clarifying that equal blockage rates are a requirement of the functional equivalency mandate, FCC regulations would bring relay services one step closer to a telephone system that

provides access to deaf, hard-of-hearing, and speech-impaired persons equivalent to that enjoyed by the general population.

Qualified Operators. The Senate report and subsequent congressional statements on title IV direct the FCC to issue specific regulations requiring relay operators to "be sufficiently trained in the specialized communications needs of individuals with hearing and speech impairments, [and in] typing, grammar and spelling."[24] Indeed, given the unique nature of a relay operator's duties, some have urged the creation of a new job classification for these operators, one that would require semiprofessional skills and a salary commensurate with those skills (White 1990).

Most states with relay systems have, in fact, developed their own training programs. A review of the literature on this issue suggests that the following components can be included in an operator training program (Shapiro 1988):

- information about and sensitivity to the cultural and linguistic differences between the deaf, hard-of-hearing, and speech-impaired communities and the hearing community
- instruction on proper ethics and etiquette, covering issues of confidentiality and the use of varying inflections and tones of voice to convey TDD messages
- information on the mechanics of handling calls, including instruction on relay equipment and billing methods
- instruction on coping with difficult situations, including emotionally charged telephone calls[25]

A review of the various state training programs that already exist would enable the FCC to establish minimum guidelines for a comprehensive training program to meet the telecommunications needs of individuals with hearing and speech impairments nationwide.

Real-Time Transmission. The Senate Committee report directs relay providers to transmit relayed conversations simultaneously or in "real time."[26]

Choice of Long-Distance Carrier. The Senate Committee report directs relay providers to give their customers the opportunity to choose a long-distance carrier whenever possible.[27] To date, only a few states offer this option to relay users.[28]

THE EXPERIENCES OF STATE RELAY PROGRAMS

The experiences of the states that have operated relay systems should provide invaluable information to other states and to common carriers that will establish these systems. This section first examines the experiences of the existing state programs, placing special emphasis on relay costs, volume, and service restrictions, and then goes on to discuss some of the changes that will be needed to bring these systems into compliance with the ADA.

COSTS OF PROVIDING RELAY SERVICES

The costs of providing relay service appear high at a glance: anywhere from $4.00 to $9.00 per minute, with the average call lasting seven minutes. The experiences of states that have begun relay operations, however, have shown these costs to be quite small when distributed among all telephone subscribers.[29] Generally these charges range from 5 cents to 20 cents per month per telephone subscriber (NCLD 1990). In most states, a specified amount of money used to pay for relay services is added to the consumer's monthly telephone bill, sometimes printed as a separate item on the bill itself, and other times incorporated with normal operating expenses into the general telephone rates. Oftentimes, the specified sum of money pays not only for relay services, but for state TDD distribution programs as well.

The cost of starting up relay operations varies from state to state. Figures regarding these start-up costs were generally unavailable, in large part because of their proprietary nature. However, one estimate of $3 million as the potential start-up cost of interstate relay services was provided by the FCC in a prior proceeding on that subject.[30]

DEMAND FOR SERVICES

The demand for relay services in states that have initiated programs has been truly astonishing. The experience in California perhaps best exemplifies the unexpected growth that has taken place (Shapiro 1988). The California relay system was originally designed with the expectation that the service would receive 50,000 calls per month. However, in the first month alone, 87,511 calls were received. By December 1987, the end of the first year, the number of calls had increased by 205 percent, and by July 1988, some 19 months after the

system began operating, the California program was handling nearly 250,000 calls per month.

Other states, too, have experienced dramatic growth in relay volume over a very short period. In March 1987, the Arizona Relay Service started its relay operations with 10,000 calls per month. Currently, the service relays 37,500 per month (NCLD 1990).[31] Similarly, in Washington state, the number of calls received by the relay service increased by 2,000 in just a two-week period after the system began operations. Finally, approximately 42,000 calls were relayed by the New York relay system in January 1989, its first month of operation. By May 1990, 112,000 calls, representing a 167 percent increase, were relayed in New York (NCLD 1989; 1990). It is worth noting that call volumes in some of the state programs may have been even greater had funding restrictions not been placed on them.

There are various reasons for the tremendous growth in relay volume. Primarily, it is apparent that relay services are improving. In the past, limited volunteer relay services, operating on threadbare budgets, provided little incentive for TDD users to turn to them. However, the gradual reduction in blockage rates and improvements in relay-service quality in many of the states have prompted more individuals to utilize this mode of communication. As one telecommunications expert noted, the increased demand is attributed to "customer acceptance and satisfaction with the new service, coupled with the sudden freedom to place a call when needed, not only when . . . able to penetrate the busy signals or find an interpreter" (Heil 1988).

Second, the hearing population has come to use relay services more than they did when the services first became available. In Minnesota, for example, when the system first began operations in March 1989, approximately 98 percent of all calls were initiated by TDD users. By April 1990, only 82 percent of the calls in that state were TDD initiated, while 18 percent were initiated by voice telephone users.[32] Similarly, in California, as many as 20 to 25 percent of the calls are initiated by hearing callers (Heil 1988; Shapiro 1988).

STATE RESTRICTIONS

Although numerous states have begun efforts to provide relay services, many of the existing state programs impose restrictions on the number, length, and types of calls that they will relay. These restrictions have resulted in dependence, hardship, and frustration for deaf, hard-of-

hearing, and speech-impaired individuals. Insufficient funding is most often the reason for these restrictions. For example, until May of 1990, limited funding required the relay program in Kansas to accept calls only Monday through Friday, from 8 A.M. to 5 P.M., and no calls at all on state holidays (NCLD 1989). Kansas has since established a full service relay, and incorporates the costs of operating relay services with other normal operating expenses of the state's telephone companies (NCLD 1990).[33]

State appropriations of only $215,000 per year in Arkansas still require that state to limit its users to a period of 15 minutes per call and to disallow personal ("chatty") telephone calls. Massachusetts—another state that relies on state appropriations to fund its relay program—almost had to shut down its operations as a result of its inability to meet relay demand. Although that state's legislature had appropriated $680,000 for the year beginning July 1989, this amount enabled its relay program to handle only 60 to 65 percent of all incoming calls, and forced the program to place a 10-minute limit on personal calls and a 20-minute limit on business calls. Moreover, nonemergency calls in Massachusetts were permitted only between 7 A.M. and 11 P.M. Recent legislation in Massachusetts promises to bring a full service relay system to that state within the near future. Finally, New Hampshire, yet another state relying on state monies to support its relay system, limits the number of calls that may be relayed by any one person to five per day with a limit of 15 minutes per call (NCLD 1990).

Even when state programs do not impose specific restrictions, their residents who use relay services continue to suffer from far more delays and blockage rates than do voice telephone users. For example, during the first few months of the Washington state program in the latter part of 1989, 74 percent of all call requests were turned away.[34] As recently as April 1990, the coordinator of the Washington relay program estimated that the blockage rate in that state remained as high as 30 percent.[35]

COMPLIANCE WITH THE ADA

Although most states have some level of relay system in place, nearly all will need to make some changes in order to comply with ADA. In California, for example, 120 operator stations allow that many incoming calls to be handled at any one time, resulting in very few delays when trying to access California relay services. Consumers are generally

satisfied with the relay programs in New York and Alabama as well. However, neither California nor New York nor Alabama's relay programs accept interstate calls, a major restriction that precludes all of these programs from meeting the ADA's minimum requirements for relay services.

A handful of states that have not yet begun relay operations do promise to fulfill the ADA's objective of providing functionally equivalent services. Delaware, Georgia, Montana, Nebraska, and South Carolina all expect to begin 24-hour, 7-day-a-week relay operations in early 1991. None of these states has reported that their programs would impose any major restrictions on relay services (NCLD 1990). The relay services in Virginia and Texas, which also approach compliance with the ADA's specifications, may fall short of the Act's requirement of confidentiality. Finally, Kansas, which began operations in May 1990, will probably also comply with most of the ADA's minimum standards.[36]

The requirements of ADA's title IV will preempt the policies and practices of state programs to the extent that they fall short of meeting the minimum standards set forth in the ADA itself and the FCC's implementing regulations.

PRACTICAL CONSIDERATIONS FOR A RELAY SERVICE: TITLE IV REQUIREMENTS AND THE LESSONS OF EXPERIENCE

ESTABLISHMENT

Structure. Common carriers charged with providing relay services under the ADA are offered considerable flexibility in providing those services. A carrier may provide relay services "individually, through designees, through a competitively selected vendor, or in concert with other carriers."[37] For example, in New York, the 41 local telephone companies charged by the Public Service Commission with providing relay services to their customers joined together in a single contract with AT&T to have that company provide statewide relay services. In contrast, a single local exchange carrier in Michigan—Michigan Bell—recently agreed to provide relay services for that entire state. Other states, such as Utah and Oregon, have chosen nonprofit corporations for their service providers. Still others, like Kansas, have chosen one of the seven regional Bell companies to provide relay service.[38] Regardless of how common carriers choose to delegate the day-to-day operations of

their relay obligations, they remain ultimately responsible under the ADA for ensuring that those services are provided in accordance with the minimum standards set forth by the FCC.[39]

The ADA's requirement for relay services nationwide is already resulting in the establishment of regional relay centers. Several states have teamed efforts in a single relay system to reduce the overall costs of their facilities and administration. For example, Delaware and Pennsylvania will operate a single relay system, as will Maine and New York, Texas and Colorado, and Alabama and Tennessee. Regional centers make good sense for these and other states.

Many feel that integration of the newly required interstate relay services into the local relay network is preferable to the creation of one nationwide relay system. Long-distance calls are estimated to constitute only 5 to 10 percent of total call volume. For this reason, integrating these calls into existing local systems is likely to result in a cost savings in operator and equipment expenses. One expert has noted that there are two other advantages to having multiple relay centers. First, consumers can maintain better control and supervision over a local system. Second, the costs of relaying calls may be cheaper with less costly access lines compared with more expensive toll lines (Heil 1988).

Demographic Data. Experts who have been active in the establishment of relay systems have suggested that effective relay planning by a state or telephone company should begin with demographic data on the number and location of individuals with hearing and speech impairments and TDD users in a given state. The Senate report accompanying ADA notes that there are over 24 million deaf, hard-of-hearing, individuals and 2.8 million speech-impaired individuals in the United States.[40] Unfortunately, according to Gallaudet's Center for Assessment and Demographic Studies, estimates of the deaf, hard-of-hearing, population on state and local levels are not currently available (Hotchkiss 1989).

Moreover, accurate statistics on the numbers of individuals who are likely to use relay systems nationwide in the future is very difficult to ascertain. No formal study has yet been performed to ascertain the number of TDD owners throughout the country. However, only a small fraction of deaf and hard-of-hearing individuals has been estimated to own TDDs at present. In part, this may be due to the relatively high cost of a TDD—approximately $150—for individuals with low incomes. It may also be that, in the past, TDD users were severely limited in the calls they could make with their equipment. Without

relay systems in place, these individuals could only complete calls to other TDD users. The existence of relay centers should provide an incentive for other individuals to purchase TDDs in the future.

In addition, approximately 40 percent of individuals over the age of 75 have a hearing loss, compared with only 4 percent of individuals under the age of 44 (U.S. Congress 1986). Yet because these individuals often do not consider themselves to be part of the deaf population, they do not purchase equipment, like TDDs, to help with their hearing impairment, in spite of its probable usefulness to them. General availability of relay services may result in an increased demand from these individuals for services.

In any event, the use of estimates of the number of TDD owners to measure potential relay volume can be unreliable for a variety of reasons. First, several deaf, hard-of-hearing, and speech-impaired people, who each make numerous relay calls, may live in a single household, yet only own one TDD. Second, many non-hearing-impaired individuals and organizations own TDDs; yet these individuals may not use relay services. Finally, relay services are for the use of both hearing and deaf, hard-of-hearing, individuals. Therefore, a proper calculation of potential relay users must necessarily take into account members of the hearing population as well.

Information from states that have operated programs can, however, provide useful information for relay planners. General population size of a state already operating a program can offer some guidance to a state with a comparable population that plans to begin relay operations. In addition, some of the states that have operated programs have gathered a variety of data about their operations—including the number of calls relayed, average call holding times, percentage of busy signals, and information about calls queued, connected, or abandoned—broken down by minute, hour, or day (Shapiro 1988). It is important to note, however, that projections based on the volumes of calls handled by existing relay centers may be unreliable if the funding for those centers is limited in any way. As one expert explained, "Planners should understand that until the deaf users' calling rates match those of other residential telephone customers there is every reason to expect the volumes to expand rapidly" (Heil 1988).[41]

Funding. The ADA permits common carriers to recover the costs of providing relay service in any manner they wish, so long as users of the service pay rates no greater than the rates paid for the functionally equivalent service offered to the general population.[42] There are at least

three ways in which the costs of providing relay services have been recovered: state appropriations, surcharges, and integration into normal operating expenses (Ransom 1988). Each of these is considered below.

State Appropriations. Some states, such as Arkansas, Maryland, Massachusetts, New Hampshire, Virginia, and Wisconsin, have funded all or part of their programs with specific or general state appropriations (NCLD 1989; 1990). Typically, the funding in these states has been insufficient to meet the relay needs of their residents, resulting in restrictions on the service provided to those individuals. Moreover, appropriations in these states remain at the discretion of state legislatures. Relay users are placed in the unsettling position of not knowing if the relay services will continue from year to year, and if they do, with what restrictions.

Surcharge. Probably a majority of the states that currently have relay programs fund their programs with a monthly surcharge of anywhere from 3 to 20 cents on each subscriber access line (NCLD 1990). There are two kinds of relay surcharges. The first of these places a "ceiling" or a "cap" on the amount of surcharge that can be collected. Funding through a capped surcharge does not provide much more financial security than do state appropriations. States employing this mechanism have typically encountered difficulties in handling the increased relay expenses that accompany unexpected growth in call volume. The consequence has been severe funding crises, resulting in TDD relay users requesting increases in the surcharge cap from state legislatures. Continual requests of this nature may trigger complaints from general taxpayers, who might seek to cut back services in order to lower costs (Ransom 1988).

California's experiences illustrate best the drawbacks of a capped surcharge (Ransom 1988). At its inception in January 1987, the California relay program began with a 3-cent surcharge. As early as October 1987, it became clear that the DEAF Trust Fund administering the surcharge could not meet the cost of the program. To remedy the situation, the California Public Utility Commission authorized an emergency increase in the cap to 10 cents, to become effective on January 1, 1988, and expanded the surcharge to include private-line and WATS/800 telephone services. In July 1988, the Commission again had to raise the surcharge in order to meet relay expenses. This time, it ordered that .5 percent of all intrastate telephone charges be collected from October 1, 1988 to June 30, 1990 to support the relay. Currently,

.3 percent of each subscriber's total bill on tariffed intrastate services is collected for the California relay fund. During all these proceedings, relay users faced the continual threat that the California relay system would be shut down for lack of sufficient funding, leaving them without telephone access.[43]

The second type of surcharge is one that is flexible and can be adjusted, depending on the actual costs of the relay operations. Illinois is one state that started with a 3-cent cap and changed to this flexible surcharge (NCLD 1989; 1990). Mississippi's relay statute offers a good example of language providing for a flexible surcharge. There, the monthly maintenance surcharge on all residential and business local-exchange access facilities "shall be determined by the commission based upon the amount of funding necessary to accomplish the purposes of [the Mississippi] act and provide dual party telephone relay services on a continuous basis."[44]

Some experts have questioned whether any surcharge at all is cost-effective or equitable (Ransom 1988). At least one public-service commission has concluded that treatment of relay expenses as a distinct and separate item violates principles of traditional rate making.[45] States that use a surcharge typically allow recovery of relay costs on a dollar-by-dollar basis. But usual rate-making procedures offer no guarantee that the utility will make a full recovery of a particular expense. In this fashion, traditional rate-making proceedings provide an incentive for companies to undertake cost-containment measures, an incentive that is absent when the surcharge mechanism is adopted. In addition some states, such as Illinois, have created separate corporations to collect and administer the surcharge funds, thus adding administrative costs and a layer of bureaucracy to the system.

A final issue related to the surcharge funding mechanism is that often the surcharge appears on residential telephone bills as a distinct item. This highlights to the hearing public that they are paying for a "special" service.[46] For example, in California, a portion of each subscriber's bill is allocated for "Communication Devices Funds for the Deaf and Disabled," while in Montana, subscribers see "MT Telecommunications for the Handicapped" on their telephone bills. Singling out relay services in this fashion also causes these services to be an easy target for cutbacks. Both the House and Senate noted their disapproval of such labeling in the committee reports.[47]

Normal Operating Expenses. Many states have adopted the practice of treating the costs of providing relay services as part of the normal

operating expenses of providing general telephone service. The integration of the costs in this manner offers several advantages. First, it provides a flexible funding source for the relay operations, which can fluctuate with the costs of those operations. Second, this approach allows costs to be distributed across all rate-payers and allows recovery of these costs through normal rate-making proceedings. In this fashion, funding for relay services is treated like funding for other utilities by the state. Similar to water, gas, and electric, the costs of relay services are monitored by local commissions, and deaf, hard-of-hearing, and speech-impaired individuals can remain confident that these services will continue from day to day and year to year, regardless of demand (Taylor 1988). Calculating relay costs as an integrated part of overall operating expenses is likely to result in relay services being as available as telephone services are to the general population, thus meeting the test of functional equivalence.

OUTREACH AND EDUCATION

Outreach and education about relay services should inform potential consumers of the availability of relay services and how they can be accessed. Special efforts should be made to educate groups who can benefit from such services but who might otherwise not be acquainted with them, for example, elderly persons experiencing hearing losses and persons who are speech impaired, and to inform hearing persons about the existence of these relay services.

Outreach and education can be provided in a variety of ways. For example, the public commission in New York has ordered that information be placed in all local telephone directories and distributed in bill inserts to all telephone subscribers at least one time each year.[48] In Arizona, efforts are made to publicize the relay over local television shows, to appear before civic organizations, and to hold open houses and workshops on the availability and use of the relay.[49] Minnesota, borrowing an idea from Bell Canada, has printed up business cards with its relay name and logo, phone numbers, a slot for the relay user's name, and brief instructions on use of the service for relay users to distribute to business associates and other interested persons.[50] Finally, Oregon and Kansas each put together a brief videotape to be presented to various communities.[51]

In addition to general information about the relay service, specific information about relay service numbers should be readily available in

any given state to enable travelers who use relay services outside of their states to access these numbers easily. The importance of facilitating such access was noted in congressional consideration of title IV when one Congressman stated that an individual should be able to obtain this information "by calling a toll-free number, by checking local telephone directories, or by calling operator information numbers."[52]

MONITORING AND ENFORCEMENT

Careful monitoring and enforcement of the nationwide relay services envisioned by the ADA will ensure that relay services function effectively. There are three levels at which such monitoring and enforcement can take place: consumer, state, and federal. The role of each of these is discussed in the following section.

Consumer Involvement. Experience throughout the United States has revealed that involvement of relay consumers with hearing and speech impairments in both designing and monitoring local relay programs can contribute significantly to the effectiveness of those programs. Advisory committees created for this purpose—with representation from deaf, hard-of-hearing, and speech-impaired relay consumers, telephone companies, and other interested parties—have become the norm in states that have relay programs.[53] The Senate Committee report on the ADA recognized the "unique and specialized needs" of consumers, and directed the FCC to pay close attention to their input through the establishment of a formal advisory committee.[54]

Among the numerous responsibilities that an advisory committee can assume at the inception of a relay program are planning and establishing the relay system design; selecting the service provider; training operators; and conducting consumer outreach programs, publicity, and education. After a relay service has begun operations, an advisory group can assist in resolving problems, mediating disputes, and evaluating and monitoring the quality of relay performance (Heil 1988). Generally, the advisory committee can and has served the very useful function of providing an ongoing dialogue among the user community, the service provider, the utility commissions, and the local exchange carriers.

State Enforcement. The FCC has overall enforcement authority for title IV of the ADA. Nevertheless, any complaint about an intrastate relay service filed with the Commission may be referred back to the appropriate state commission if the state in which the complaint was

charged has been "certified" by the FCC.[55] To receive certification, a state's program and procedures must meet the FCC's minimum guidelines and standards for relay services and must provide adequate enforcement procedures and remedies to address violations of the Act.[56]

For states that have assumed responsibilty for the provision of relay services, aggressive monitoring will be necessary to ensure compliance. A number of approaches are available. In Minnesota, the state established a Civilian Review Board for the purpose of receiving complaints and grievances from the community.[57] Some states have developed a process that enables users to access a supervisor of the relay center while still on line with the relay operator.[58] States can also require tariffs to be filed with local public utility commissions so that relay consumers have the same procedural protection for disputes, including identical complaint and hearing procedures, as are provided for other telephone customers.

In order to avoid any potential conflicts of interest, many urge as well that a state entity not regularly involved with relay service be responsible for both formally evaluating relay services and acting on relay complaints. One hearing examiner in Delaware explained: "It is important that the [Public Service] Commission assume as independent and as objective a posture as feasible so that in the event that a complaint proceeding should arise concerning the provision of this telephone service, the Commission could act on any such complaint in an objective and impartial manner."[59]

FCC Enforcement. The FCC retains direct enforcement authority over relay services in all states that have not received certification. In addition, in cases where the FCC has referred a complaint back to a certified state, the Commission can still acquire jurisdiction over the complaint if (1) the state has not taken final action on the complaint within 180 days or within a shorter period if such period is prescribed by state regulations; or (2) the Commission revokes the state's certification.[60]

The ADA does not discuss the means by which the FCC is to determine, on a regular basis, whether or not a particular state program continues to merit certification. One way in which the FCC can accomplish this task would be for the Commission to gather data periodically from certified states on their program operations. Such data could include traffic studies detailing blockage rates, the number of calls in queue at given times, the average length of time those calls are in

queue, the average speed of relay answer, and other information relating to the operation and standards of the state relay system.[61]

OTHER RELAY FEATURES

There are several other features that a relay service can offer to its telephone subscribers:

Voice Pass-Through. Recent technology has brought a technology called "voice pass-through," also referred to as "voice bridge" or "voice carryover," to relay services. With this technology, deaf and hard-of-hearing individuals who typically use their voices are able to talk directly to the hearing party and have the hearing party's message typed back in text.[62] Similarly, with a technology called "hearing pass-through," relay callers who can hear need only use the operators to type what they cannot say.

The pass-through technologies have several advantages. First, they save time, and thereby reduce the overall costs of relaying a telephone call. Second, they increase privacy, in that systems using this technology typically do not allow relay operators to listen to that part of the spoken message that does not need to be relayed. Third, they tailor the functions that the relay service can provide to the needs of the consumer, allowing for increased independence for those persons wishing to send or receive messages without any assistance from the operator. Finally, the pass-through features are likely to increase the populations of individuals who can benefit from a relay service, but who might be reluctant to allow relay operators to convey their messages. For example, hard-of-hearing individuals and senior citizens who have lost their hearing later in life are two such groups who might otherwise feel hesitant about using relay services.

Foreign-Language Relay Services. In its report on ADA, the House noted that in some American communities, there are substantial populations for whom English is a second language.[63] The report urged common carriers in these areas to provide relay services in the predominant language of these communities. Indeed, this has already been required in Arizona and Texas where Spanish-speaking operators are available to relay calls.[64]

Recorded Messages. Questions have been raised about the ability of relay operators to transmit prerecorded messages. The Senate committee report addresses this issue as follows:

> The Committee recognizes that it may be technically impossible today to relay recorded messages in their entirety because TDDs can only transmit messages at a given speed. In these situations, a hearing or speech impaired individual should be given the option to have the message summarized.[65]

The manner in which prerecorded messages can best be conveyed to TDD users remains unresolved. One answer may be to require telephone companies to research new technology to provide this accommodation. At least one such technology may, in fact, already be in the making.[66] Where the information contained through these telephone services is otherwise provided to users of conventional telephones, the universal service obligation dictates that it should be made available to TDD users as well.

Time-Saving Technology. Efforts to develop technology that will result in savings in the time needed to relay calls is underway. One such technology allows software to detect TDD signals before a call to a relay service has been answered by an operator.[67] This eliminates the need to answer telephone calls by voice, and then switch to a TDD format if a TDD user is on the line. The software automatically transfers the TDD call to a TDD or computer at the relay center, reducing the number of seconds needed to answer a TDD call.

Second, some companies have begun experimenting with a technology called automatic-call set-up. With this technology, a computer at the relay center makes initial inquiries to the calling party regarding the number to be called, identifying information, and an initial message to the called party. An operator only comes on the line after this information has been obtained, thereby saving costly operator time.

RELATIONSHIP OF TITLE IV TO OTHER ADA TITLES

REASONABLE ACCOMMODATION

Although title IV sets forth the ADA's requirements for relay services, other sections of the ADA will require employers, places of public accommodation, and state and local governments to provide reasonable accommodations that ensure telephone access for deaf, hard-of-hearing, and speech-impaired individuals. For example, the covered entity may need to acquire one or more TDDs itself for calls made to or

from its facilities. The entity may also be required to ensure that access to relay services is available to deaf, hard-of-hearing, and speech-impaired employees, customers, and clients. The requirements of title IV thus will have far-reaching effects for hearing-impaired and speech-impaired persons seeking to participate in the benefits and services promised under the other titles of the ADA.

Two examples can best illustrate this point. Title I of the ADA prohibits employment discrimination on the basis of disability. In the past, a deaf or speech-impaired individual may have been rejected for an employment position that included, as one of its essential functions, the making of periodic telephone calls. With the nationwide relay system in place, denial of employment to a deaf or speech-impaired individual that is based solely on the inability to use conventional telephone services would likely amount to discrimination under the ADA. Similarly, title III prohibits disability discrimination by hotels and other privately owned places of public accommodation. In the past, a hotel may not have had a TDD to accept telephone reservations from deaf and speech-impaired persons. This same hotel may now be required to familiarize its employees with relay services to enable these employees to efficiently process reservations made by deaf, hard-of-hearing, and speech-impaired consumers through a relay system.

911 SERVICES

On occasion, a relay operator may need to connect a call from a TDD user to an emergency telephone 911 service. However, relay services cannot be expected to handle calls involving serious emergencies on a regular basis. Relay operators are not sufficiently trained in handling emergency calls. Furthermore, the seconds saved in calling a 911 number directly, compared to having the call routed through a relay service, can mean the difference between life and death. The House committee report and the Conference report on the ADA directs state and local governments to provide direct access by TDDs—in both the Baudot and ASCII formats—to police, fire, ambulance, and other emergency telephone services.[68]

THE FUTURE

ASCII VERSUS BAUDOT

Two formats can be used by TDDs to transmit messages across telephone lines. The first of these, the Baudot format, was developed around the time of the invention of the telephone itself and had been considered the international standard for telegraphic communication until the 1950s (Jensema 1988). Capable of transmitting only 32 characters, however, the Baudot code could not survive the need for more sophisticated computer functions that came with the following decades.

In 1968, the rapid growth of computers led the federal government to adopt the American Standard Code for Information Interchange (ASCII) as the nationwide standard for computer transmissions (Jensema 1988). ASCII allows the transmission of anywhere from 128 to 256 characters, and permits the transmission of messages at a speed many times faster than Baudot (Starr 1989).

Another advantage to the ASCII mode is that it allows individuals using TDDs to interrupt each other's conversation. TDDs using the Baudot mode employ the "half-duplex" mode of operation, which means that when one individual is sending a message, the receiving party cannot send any messages until the first person stops keying. In contrast, most computer communication using the ASCII code allows for communication to take place in both directions simultaneously (Jensema 1988; Steel 1989). This saves both time and aggravation for the Baudot user, who is sometimes forced to wait long periods of time receiving information from the other party that he or she might not need.

Many believe that the sophisticated features offered by the ASCII format are reason enough to gradually eliminate TDDs that depend on the Baudot code. Adoption of the ASCII code for all TDDs, they say, would enable TDD users in the future to become fully integrated into a general telephone system that, over time, is becoming increasingly computerized.

The reality, however, is that, at the present time, the vast majority of TDD users use TDDs that operate in the Baudot format. The House Committee on Energy and Commerce recognized this fact, and, in order to ensure that *all* TDD users have access to the relay services

required by the ADA, directed the FCC to require access by nonvoice terminal devices operating in both the Baudot and ASCII formats.[69]

DISTRIBUTION OF TDDS

Relay services can only serve consumers whose telephones are equipped with TDDs or computers. Yet many deaf and speech-impaired individuals do not own their own TDDs; nor do they have computers that will permit telephone transmissions in the ASCII mode. One reason for this may be the high cost of TDDs and computers compared with the cost of conventional telephones. TDDs start at approximately $150 and can go as high as $650. Computers, of course, can be even more expensive, going as high as several thousands of dollars.

States have begun to address this problem by implementing distribution programs through which TDDs are provided either free of cost or at discounted rates to residents with hearing or speech impairments. Such programs exist in approximately 25 states and consumers have mobilized efforts in a few other states to establish additional programs. The demand for these programs will likely grow as deaf, hard-of-hearing, and speech-impaired people realize that, through relay services, they are now able to put their TDDs to far greater use than was previously possible.

The future is likely to bring increased acquisition of TDDs and other nonvoice terminals by businesses as well. As individuals with hearing and speech impairments become more integrated into the telecommunications system, more businesses are likely to find themselves regular recipients of relayed calls. Purchase of a TDD or terminals by these businesses will reduce the load of relay centers and, consequently, overall telecommunication costs.

FUTURE TECHNOLOGIES

Although the ADA mandates relay services as the means to achieve telecommunications access for individuals with hearing and speech impairments in the immediate future, Congress recognized that improved technology may one day require that other, superior services be available to achieve universal access for such persons:

> Although the Committee notes that relay systems represent the current state-of-the-art, this legislation is not intended to discourage innovation regarding telecommunications services to individ-

> uals with hearing and speech impairments. The hearing-and speech-impaired communities should be allowed to benefit from advancing technology. As such, the provisions of this section do not seek to entrench current technology but rather to allow for new, more advanced, and more efficient technology.[70]

FUTURE RESERACH

Implementation of title IV presents several opportunities for research. First, demographic research should be conducted to improve our current knowledge about the number of persons with hearing and speech impairments, particularly by state and locality. Accurate demographic data can assist in planning for the expansion of relay services and in assessing the extent to which the services are being utilized.

Second, effectiveness and efficiency research should be undertaken to evaluate the relay service provided, with direction for improvements. The following are some questions this research could address: How many deaf, hard-of-hearing, and speech-impaired individuals are using the relay system? Why are some who could benefit from using the system not using it? By state, what are the statistics on call volumes, call blockage, waiting periods, and busy time periods? Are relay operators competent and available in adequate supply? What effective cost-recovery procedures have been utilized? Are consumers satisfied?

Finally, research in advancing the TDD and relay system technology should be a part of the general telecommunications research agenda. Relay system technology should keep pace with general telecommunications advances. In addition, research targeted specifically to improving the relay system itself should be continued. For example, research on new technologies that will permit reciprocal conversion of typed TDD and voice messages should be encouraged. This sort of technology, in the long run, will result in more efficient and cost-effective relay services.

CONCLUSION

Approximately 40 states are well on the way to providing statewide relay services. Common carriers in states that do not have relay programs can avail themselves of the wealth of knowledge acquired by these various states. Compliance with the ADA will be relatively easy

when these companies learn about the past successes and failures of programs and incorporate those lessons in developing their programs. The FCC will also benefit from a careful review of the states' experiences as they develop regulations for title IV.

The experiences of relay systems in recent years lead to the following recommendations for implementing title IV.

- First, dual-party relay service should be fully integrated into the existing telecommunications network. This will help to ensure equal access for relay users and enable new technologies that offer improved benefits and services within the general telephone network to be available to relay users as well.
- Second, adequate funds should be available to ensure a high quality of relay services. This is best accomplished by integrating the costs of providing relay services as a part of the normal operating expenses of the telephone system. With this approach to funding, arbitrary curtailments and limitations of relay services can be avoided.
- Third, consumers should be involved in designing and monitoring relay systems that will result in more effective services.
- Fourth, efforts to educate both potential users of the relay system and businesses and the general public about the purposes and functions of relay services should be made to facilitate widespread use and acceptance of these services.
- Fifth, comprehensive monitoring of relay services, on the consumer, state, and federal levels, combined with the provision of effective grievance procedures, should be conducted to maintain a level of relay services that is functionally equivalent to general telephone services.
- Finally, aggressive and relevant research efforts should be performed to facilitate the development of a more effective and satisfying relay system.

The benefits that title IV's requirement for relay services will bring are undisputed. Integration of deaf, hard-of-hearing, and speech-impaired individuals into the telecommunications network will bring these individuals increased freedom, independence, and privacy. These individuals will be able to use the telephone to easily access businesses, colleagues, friends, and relatives, something that hearing individuals have taken for granted for approximately more than half a century. It is

hoped that relay services will assist in expanding job responsibilities and opportunities for deaf, hard-of-hearing, and speech-impaired employees as well. The benefit will not only be to employees with hearing and speech impairments, but to businesses as well because they will have a wider pool of qualified persons from which to select their employees. Finally, relay services will stimulate and promote economic development by expanding markets for goods and services to the 27 million individuals with hearing and speech and impairments.

NOTES

1. The specific language of the Communications Act of 1934 directs the Federal Communications Commission ("FCC" or "Commission") "to make available, so far as possible, *to all the people of the United States* a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges. " 47 U.S.C. §151 (emphasis added).
2. 47 U.S.C. §225(a) and (c).
3. National Information Center on Deafness. *What are TDDs?* Washington: Gallaudet University. (Pamphlet)
4. The 17 states were Alabama, Arizona, Arkansas, California, Connecticut, Hawaii, Kansas, Massachusetts, Minnesota, New Hampshire, New York, Oklahoma, Oregon, Utah, Vermont, Virginia, and Wisconsin (NCLD 1989). Many other privately operated relay systems also existed by this time. In one survey, conducted by the Teleconsumer Hotline in the early part of 1987 through the spring of 1988, evidence of over 300 relay services was gathered (Baquis 1988).
5. S. Rep. No. 116, 101st Cong., 1st Sess. 77–78 (1989) (S. Rep.) Indeed, the language of the ADA itself incorporates the exact language of the universal service mandate. 47 U.S.C. §225(b)(1).
6. 47 U.S.C. §225(d); S. Rep at 81; H.R. Rep No. 485, Part 4, 101st Cong., 2d Sess. 66 (1990)(H.R. Rep.)
7. 47 U.S.C. 225 (d)(1)(C).
8. 47 U.S.C. §225(d)(1)(E).
9. R. Yaeger, 1990: Remarks at TDI Conference 121, Telecommunications for the Deaf, Inc. Relay Subcommittee, Tempe, Arizona 93 F, April 4; 42–44, April 5.
10. See generally, TDI Conference proceedings; P. Shapiro, Remarks during panel discussion: Relay Service Operations, Speech to Text Conference (Sept. 1988), reprinted in GRI Monograph Series B, No. 2, 114 (Operations Panel). Pennsylvania's request for a proposal setting forth the terms of its relay service further relieves relay operators from any criminal liability that might otherwise result from processing these calls. Pennsylvania RFP 10 §II (D)(2).
11. C. Foy (Arizona Relay Service) and B. Sofinski (Virginia Relay Service), 1990: Remarks at TDI Conference 158, April 4.

12. 47 U.S.C. §225(d)(1)(F).
13. Conn. Gen. Stat. Ann. §52–146m (West 1990 Cum Pkt Pt.).
14. Colo. Rev. Stat. §40–17–101 (1989).
15. Although the FCC has clear authority to supersede state *relay* laws that do not guarantee confidentiality, it is not as clear that the Commission's preemptive authority extends to state laws, such as the Texas law requiring disclosure of information about child abuse, that do not otherwise deal with the subject of relay services. Additional legal research is needed on this issue.
16. 47 U.S.C. §225(d)(1)(G).
17. See generally C. Foy (Arizona Relay Service), J. Cassell (Oregon Relay Service), and J. Ferrill (New York Relay Service) 1990: Remarks at TDI Conference 114–120, 153–154, April 4.
18. 47 U.S.C. §(d)(1)(D).
19. Alabama, Connecticut, and New York are three such states that provide a TDD discount for relayed calls (NCLD 1990).
20. Indeed, the Senate Committee on Labor and Human Resources, in reporting on the ADA, commended those states that have offered TDD discounts. S. Rep. at 82.
21. A blockage rate is defined as the number of calls receiving busy signals when trying to access the relay service.
22. S. Rep. at 81.
23. See rules and regulations of the Delaware PSC governing DPRS IV (3) (Del. PSC rules). This means that 1 out of every 100 calls would not be able to access the relay system.
24. S. Rep. at 81; 136 Cong. Rec. H2434 (daily ed. May 17, 1990), Statement of Congressman Luken.
25. In Minnesota, for example, the relay provider is currently establishing a training program in which individuals working on suicide and rape-crisis hotlines will instruct operators on the best way to handle these calls until they are relayed to the hotlines. R. Yaeger, 1990: Remarks at TDI Conference 126–127, April 4.
26. S. Rep. at 81. This compares with earlier message relay services that accepted messages from calling parties and relayed them to the called party at a later time.
27. S. Rep. at 81. Indeed this would be consistent with the divestiture of AT&T as required by the Modified Final Judgment issued in 1982, which resulted in providing users of conventional telephones with this freedom of choice. *United States v. American Telephone and Telegraph Co.*, 552 F. Supp. 1311 (D.D.C. 1982).
28. Three such states are Kansas, Delaware, and Pennsylvania.
29. Approximately 50 percent of the costs of a relayed call are estimated to be for operator wages. In addition, because a relayed call takes longer to complete than does a voice-to-voice call, the equipment costs per call are higher for relayed calls, in that these costs are distributed over fewer calls (Hurst 1988).
30. In the Matter of Access to Telecommunications Equipment and Services by the Hearing Impaired and Other Disabled Persons, *Order Completing Inquiry and Providing Further Notice of Proposed Rulemaking*, CC Dkt No. 87–124 (July

21, 1989) 21. The FCC also estimated the costs of operating two interstate relay centers to be $30 million. It is not clear how the FCC arrived at these figures.

31. S. Brackney, 1988: Remarks during Financing Panel discussion: Financing Models in State Programs, Speech to Text Conference, September. Reprinted in *GRI Monograph Serices B* 2:77.
32. R. Yaeger (Minnesota Relay Service), 1990: Remarks at TDI Conference 56–57, April 5.
33. See also Kan. Stat. Ann §75–5393(B)(10).
34. P. Hughes (Washington Relay Service), 1990: Remarks at the TDI Conference 93, April 4.
35. P. Hughes, 1990: Remarks at TDI Conference 42, April 5.
36. Of the states discussed in this section, Delaware, Kansas, and Texas will, however, only allow outgoing, but not incoming interstate calls. It is not known whether the other state programs listed will impose this restriction.
37. 47 U.S.C. §225(c).
38. The information about Kansas and the preceding states is drawn from the NCLD Summaries (NCLD 1989; 1990).
39. 47 U.S.C. §225(c); H.R. Rep. at 66.
40. S. Rep. at 77.
41. One source estimated the number of calls that each American makes per year to be 1,128, or three per day. (Department of Human Services, Oklahoma City 1986. TDDs: Their Place in the Community).
42. 47 U.S.C. §225(d)(1(D).
43. Arizona's relay service had similar experiences. Although the surcharge for that state started at .2 percent of the base charge per customer line, it has since been raised by the Arizona legislatures two times, to bring the surcharge to its current cap of .8 percent (Ransom 1988); S. Brackney, Financing Panel at 76.
44. H.B. No. 648/S.B. No. 2331(4)(1). Texas and Pennsylvania are two other states that allow their commissions to raise the surcharge whenever necessary to support the relay.
45. Delaware PSC Regulation Docket No. 24, Hearing Examiner's Interim Report 13 (Jan. 11, 1990) (Del. Rep.).
46. See, e.g., Del. Rep. at 15.
47. H.R. Rep. at 68; S. Rep. at 83.
48. See memorandum from New York Consumer Services Division & Communications Division to the New York Public Service Commission: New York memo, April 5, 1988 at 13.
49. M.B. Meenan (Arizona Relay Service), 1990: Remarks at TDI Conference 65–67, April 5.
50. R. Yaeger, 1990: Remarks at TDI Conference 73–74, April 5.
51. J. Cassell, 1990: Remarks at TDI Conference 76, April 5.
52. 136 Cong. Rec. H2635 (daily ed. May 22, 1990), statement of Congressman Bonoir. See 136 Cong. Rec. H2434 (daily ed. May 17, 1990), Colloquy between Congressman Hoyer and Congressman Luken.
53. Maine, Illinois, Michigan, Mississippi, Montana, Nebraska, New York, Oregon, South Carolina, Utah, Washington, and Wisconsin are among the states that have established or plan to establish advisory committees (NCLD 1990).

Alabama, Delaware, Pennsylvania, Texas, and Virginia also have advisory boards and require a majority of those boards to consist of relay consumers who have speech or hearing impairments. See generally R. Yaeger, 1990: Remarks at TDI Conference 96, April 4.

54. S. Rep. at 81.
55. 47 U.S.C. §225(g)(1).
56. 47 U.S.C. §225(f). However, the FCC cannot refuse to certify a state program based on the funding method chosen by the state. 47 U.S.C.§225(f)(3).
57. R. Yaeger, 1990: Remarks at TDI COnference 74, April 5.
58. See, e.g., Del. PSC Rules, §VI (2).
59. Delaware PSC Regulation Docket No. 24, Hearing Examiner's Report 7 (February 8, 1990).
60. 47 U.S.C. §225(g)(2)(A) & (B).
61. See, e.g., Pennsylvania RFP 11 Sec. II(E), listing the various records and reports that must be submitted by the Pennsylvania relay service provider on the operation of its system. In Texas, the relay provider must also report regularly to the local public utility commission.
62. According to one source, as of two years ago, more than 40 percent of all calls relayed in Norway use voice pass-through. (K. Lindberg: Remarks during Operations Panel at 114.) In America, this technology is already in place in Washington and will be required in Texas, Delaware and Virginia.
63. H.R. Rep. at 66.
64. See Meenan, 1990: Remarks at TDI Conference 26, April 5. Moreover, in the Teleconsumer Hotline survey, as many as 15 percent of the relay centers surveyed provided Spanish-speaking relay operators. See Baquis 1988 at 28.
65. S. Rep. at 82. Similarly, the inability to control the speed of a recorded message prompted the New York Commission to explicitly exclude "900" numbers, weather, and other recorded announcements from the relay service. New York memo at 6. See note 48, supra.
66. See Interactive Telephone Voice Response Systems News, in *Off Hook* 2 (1), official publication of DIRAD Technologies, Inc., which alleges that a new DiRAD TDD System enables TDD users to access and retrieve information by telephone that is otherwise transmitted only through a prerecorded voice.
67. Meenan, 1990: Remarks at TDI Conference 51, April 5.
68. H.R. Rep. No. 485, Part 2, 101st Cong., 2d Sess. 84–85 (1990); Conf. Rep. 596, 101st Cong., 2d Sess. 67–68 (1990).
69. H. R. Rep. at 66–67.
70. S. Rep. at 78.

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