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Briefing Report to  
Congressional Requesters

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January 1990

# PERSONS WITH DISABILITIES

## Reports on Costs of Accommodations





United States  
General Accounting Office  
Washington, D.C. 20548

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**Human Resources Division**

B-237003

January 4, 1990

The Honorable Bill McCollum  
House of Representatives

The Honorable Larry E. Craig  
House of Representatives

This briefing report responds to your requests for information on the potential cost of implementing the proposed Americans With Disabilities Act (ADA) of 1989 (S. 933 and H.R. 2273), particularly to the private sector. The ADA would prohibit discrimination based on disability against any qualified person in employment and in programs and activities operated by state governments. It would also prohibit discrimination based on disability in public accommodations and services, public transportation, and telecommunications relay services.<sup>1</sup>

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## Background

Federal law prohibits federal contractors and recipients of federal assistance from discriminating against persons with disabilities. The Rehabilitation Act of 1973 (section 503) requires government contractors with contracts greater than \$2,500 to take affirmative action to hire persons with disabilities.<sup>2</sup> Section 504 of the act prohibits excluding persons with disabilities solely because of their disabilities from federal programs or activities receiving federal financial assistance. The proposed ADA would extend the prohibitions of discrimination to private sector employment, state and local governments not receiving federal assistance, public transit and telephone services, and many private businesses or entities used by the general public. Also, the ADA would incorporate the enforcement provisions of the Rehabilitation Act of 1973, the Civil Rights Act of 1964, and the Fair Housing Act of 1968.<sup>3</sup>

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<sup>1</sup>Telecommunications relay services let persons with hearing and speech impairments use telephones or radios in ways that are functionally equivalent to the ways unimpaired people use them.

<sup>2</sup>Throughout this report, we use persons with disabilities to refer to those with mental or physical disabilities or handicaps within the meaning of the Rehabilitation Act of 1973.

<sup>3</sup>The Civil Rights Act of 1964 bans discrimination on the basis of race, color, religion, or national origin in public accommodations and programs receiving federal assistance, and in employment, also on the basis of sex. The Fair Housing Act of 1968 prohibits discrimination in the sale or rental of housing other than single family houses sold or rented by owners, or in the case of a small landlord (one who owns and resides in a property that is occupied by not more than three families).

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on buildings, 1 on employment, 3 on transportation, and 1 on telecommunications (see app. II).

Only certain specific building types are covered in the seven reports on building accessibility,<sup>5</sup> discussed in app. III. For example, they variously estimate costs of making accessible vocational schools; colleges, elementary, and secondary schools; a mixture of residential buildings and office buildings; and a library.

The impact of section 504 of the Rehabilitation Act of 1973, which is limited to recipients of federal assistance, is the subject of the three reports on school building accessibility. They provide no current information on the extent to which modifications have been completed to comply with section 504 nor on additional schools that may require modifications to comply with the ADA. The three reports use different methodologies to derive their cost estimates. In two reports, the assumptions differ on the amount of space needing modification and the type of modifications needed. A third report does not fully discuss its assumptions. This latter report estimates the cost of making 45 percent and 100 percent of all buildings first-floor-accessible. However, it does not fully explain its derivation of the cost estimates, and bases these estimates on information from only four colleges. Such a small sample may not be representative of the universe to which it is projected.

The other four reports on building accessibility differ widely in what they examine. For example, one looks at a federal office building, another at Pennsylvania vocational schools. A third examines apartment buildings, a town hall, and a convention hall. Two of the reports compare the costs of initially designing buildings to provide accessibility for persons with disabilities with the costs of renovating already completed buildings. Not surprisingly, they conclude that the former is less expensive.

All four reports have limitations. One points out that its use of new construction cost estimating manuals to determine renovation cost is questionable. A second does not give the date of the cost data it uses, and a third does not state how it estimates costs. The last relies on information from only one state government's department of insurance, which may or may not be representative.

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<sup>5</sup>Building accessibility means how easy it is for persons with disabilities to get to, enter, and use a facility. This includes appropriate entrances, exits, doorways, rest rooms, and elevators. Making buildings accessible can involve providing curb cuts, ramped entrances, braille markings, and the like.

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Please call me on (202) 275-1655 if you or your staff have any questions about it. Other major contributors to the report are listed in appendix VII.



Linda G. Morra  
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**Abbreviations**

ADA	Americans With Disabilities Act
ANSI	American National Standards Institute
CBO	Congressional Budget Office
DOT	Department of Transportation
FCC	Federal Communications Commission
HEW	Department of Health, Education, and Welfare
HUD	Department of Housing and Urban Development
TDD	Telecommunications Devices for the Deaf
UFAS	Uniform Federal Accessibility Standards

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**Appendix I**  
**Private Industry and Interest Groups and**  
**Government Agencies Contacted for Study**

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Department of Labor, Employment Standards Administration  
Department of Transportation  
Federal Communications Commission  
Internal Revenue Service  
Office of Technology Assessment  
President's Commission on Employment of the Handicapped  
Small Business Administration

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# Costs of Making Buildings Accessible to Persons With Disabilities: Brief Descriptions of Seven Reports

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These reports on building accessibility costs, identified through our literature search and contacts with various organizations, were published between 1975 and 1979. Our comments on each report are included.

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## Transportation Options Evaluated for Persons With Disabilities

O'Neill, D. M., Discrimination Against Handicapped Persons; The Costs, Benefits and Economic Impact of Implementing Section 504 of the Rehabilitation Act of 1973 Covering Recipients of HEW Financial Assistance. Washington, D.C.: Department of Health, Education, and Welfare (HEW), May 4, 1977.

The report investigates employment practices, program accessibility, and elementary and secondary education in terms of implementing section 504 of the Rehabilitation Act of 1973 (p. i).<sup>1</sup> HEW's Office of Facilities, Engineering, and Property Management recommends estimating the cost of new barrier-free construction at one-half of 1 percent of total project costs (pp. 18-19). The report is a revised version of an impact statement published in the Federal Register on May 17, 1976.

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## Description of Cost Data

The report estimates the capital cost of altering existing higher education, elementary, and secondary education facilities by multiplying the estimated value of all buildings at the end of the school years 1974-75 (higher education) and 1973-74 (elementary and secondary education) by estimated cost factors (pp. 24 and 28).

The report multiplies the cost factor of .0056 by the estimated value of higher education buildings to estimate the cost of achieving accessibility. Here, accessibility is achieved at least cost by using reasonable alternatives to expensive renovation where possible.<sup>2</sup> The report uses cost factors of .0089 for renovation and .0018 and .0028 for making one-third to one-half of elementary and secondary school buildings first-floor-accessible (pp. 28-34).

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<sup>1</sup>Numbers in parenthesis refer to page numbers of the reports.

<sup>2</sup>For example, the stacks in the libraries of some universities have narrow halls and aisles and are located on upper floors of buildings built many years ago. Elevators are either nonexistent or of such tiny dimensions as to make access via a wheelchair impossible without extensive renovation. In this case, a reasonable alternative to renovation would be the assignment of personnel to supply individualized "stack searches" for persons with disabilities.

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**Appendix III  
Costs of Making Buildings Accessible to  
Persons With Disabilities: Brief Descriptions  
of Seven Reports**

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These include providing auxiliary aids, relocating classes or services, and maintaining structural modifications such as elevators (p. 5).

The study estimates costs for 3,083 colleges and universities (p. 15), 15,891 public school districts (p. 17), 4,755 postsecondary vocational schools (pp. 20 and 68), 7,271 hospitals (p. 20), 26,748 residential health facilities (p. 22), 7,002 outpatient health and other social service programs (pp. 23 and 91), 8,930 libraries (pp. 24, 98, and 99), and 76 welfare agencies (p. 24).

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**Cost Data**

The cost estimates (in millions of dollars) are:

- Structural modifications - \$1,200-1,500 (p. 5).
- One-time nonstructural costs - \$173 (p. 5).
- Annual continuing costs - \$152-198 (p. 5).
- New construction and renovation - \$25-43 (p. 5).

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**Comments**

Chapter 5 (pp. 139-148) cites limitations on the cost data from noncollege HEW recipients. These include: ignorance of section 504 requirements, overestimates of costs (pp. 139 and 140), incomplete plans for modifications (p. 142), and incomplete lists of recipients used for the survey (p. 147). The college and university questionnaire was based on one that has been administered repeatedly since 1968.

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**Colleges and  
Universities Surveyed  
as to Impact  
of New Legislation**

Wulfsberg, R. M., and R. J. Petersen, The Impact of Section 504 of the Rehabilitation Act of 1973 on American Colleges and Universities. Washington, D.C.: National Center for Education Statistics, HEW, June 1979.

The report details the results of a 1978 survey that studied modifications required to make colleges and universities accessible to people with mobility impairments (p. 3). Of 700 schools contacted, 607 responded.

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**Description of Cost Data**

Costs given for accessibility include such changes to the buildings as modified walkways, stairs, and entrances, but exclude costs for auxiliary aids and services, such as readers for the blind (p. 3). Costs incurred before September 15, 1978 (p. 3) are excluded.



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Description of Cost Data

The study compares costs to remove architectural barriers by alteration and initial construction (pp. 47 and 89). It says that the cost of accessibility is negligible when it is incorporated in the design phase. Furthermore, the study concludes that the cost of altering existing buildings is relatively small when compared to total construction cost (p. 87).

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Cost Data

Estimates obtained from government contractors of the costs of removing barriers by alteration versus original design are listed for selected buildings (p. 89), as follows:

- Navy - Petty officers club - \$10,800 vs. \$2,880
- Navy - Weapons engineering facility - \$282,000 vs. \$65,300
- HEW - Horizon House, Philadelphia, PA - \$11,130 vs. \$5,315
- HEW - Medical college - \$39,138 vs. \$10,853
- HUD - Germantown House, Philadelphia, PA - \$3,000 vs. \$500
- HUD - Compton Towers, Wilmington, DE - \$9,000 vs. \$500
- General Services Administration - Federal office building - \$16,605 vs. \$2,605

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Comments

The report does not state clearly how these cost estimates were obtained. Although issued on July 15, 1975, the report does not clarify the year of the cost data.

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Costs of Accessibility  
for Nine Buildings  
Estimated

Schroeder, S., and E. Steinfeld, The Estimated Cost of Accessible Buildings. Syracuse University; sponsored by HUD. Washington, D.C.: U.S. Government Printing Office, Apr. 1979.

The report assesses construction costs for redesigning new buildings and renovating existing buildings to make them accessible to persons with physical disabilities. Nine buildings are analyzed. They include a high-rise tower, garden apartments, a single-family house, a college dormitory, a convention hall, a public branch library, a town hall, a college classroom, and a retail shopping center. Eight of the buildings were located in Syracuse, North Syracuse, Clarkstown, or Glen Falls, New York; the ninth in Detroit, Michigan (pp. 141-142).

The authors conclude that it is much less expensive to design for accessibility than to renovate existing structures. From the data, the authors estimate that designing for accessibility generally adds from less than 1 to 15 percent to the cost of a new facility. Renovating existing buildings

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6. Divide the total cost of renovation and redesign for each building by the construction cost to give the percentage increase in cost to meet barrier-free design criteria.

Unit costs were obtained from reference estimating manuals, which project costs for new construction (pp. 4-5). The report notes that "The applicability of using [new construction cost] estimating manuals to determine construction costs for renovation work is of questionable validity ... [because] renovation costs may vary substantially from new construction costs depending on the specific project conditions, the quantities of materials required, and removal and demolition costs" (p. 5).

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**Costs of Modifying  
Vocational Schools for  
Handicapped  
Projected**

Associated Educational Consultants, Inc., Physical Accessibility of Public Supported Vocational Schools for Handicapped Students. Sponsored by HEW, National Institute of Education. Pittsburgh, PA.: 1978.

The report estimates costs of structural modifications to make Pennsylvania vocational programs accessible to the disabled under standards of the American National Standards Institute (pp. 1-3).

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**Description of Cost Data**

Costs are estimated for 78 area vocational technical schools, 12 high schools in Pittsburgh that offer vocational programs, and 15 community colleges that offer occupational education courses (pp. 2, 3, and 10). The year of the cost data is not clearly stated.

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**Cost Data**

Total estimated costs for structural modifications for vocational schools are \$1,228,903; for Pittsburgh high schools, \$834,550; and for community colleges, \$499,468. Total for all categories is \$2,562,921 (pp. 2, 3, 37, and 38).

The report summarizes costs for the following structural features: parking lots, walks, ramps, entrances and exits, doors and doorways, stairs and steps, rest rooms, water fountains, elevators, controls, identification, and warning signals (pp. 37-38).

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**Comments**

Teams of architects and educational consultants obtained data through on-site visits (p. 7). They pretested the data collection instrument at three area vocational schools (p. 5). The report presents nonrecurring

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# Costs of Employment Accommodations for Persons With Disabilities: Brief Description of One Report

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We located only one report on costs of employment accommodations for persons with disabilities.

Berkeley Planning Associates, A Study of Accommodations Provided to Handicapped Employees by Federal Contractors: Vol. I, Study Findings; Vol. II, Ten Case Studies. Sponsored by the Employment Standards Administration, Department of Labor. Berkeley, CA: June 17, 1982.

This is a study of job accommodations provided to employees with disabilities by federal contractors covered by section 503 of the Rehabilitation Act of 1973. The authors surveyed 2,000 contractors, of which 367 responded (pp. i and 7). They estimated that about 3.5 percent of the workers employed by the respondents had disabilities (p. ii and 16). Of the workers with disabilities, 22 percent received some form of accommodation, generally inexpensive (pp. 20 and 29).

Accommodations for individual workers included adapting the physical environment, providing transportation, special equipment or aids, or retraining or selective placement of the worker (pp. ii, 22, and 23). No particular type of accommodation dominated (p. ii). Among the most frequent accessibility modifications were parking, curb cuts, ramped entrances, and wheelchair access to work areas (pp. 26 and 27). The report does not state the year of cost data obtained.

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## Description of Cost Data

The report does not show total costs or costs of individual accommodations. It provides tables showing the percentage distribution of total costs of accommodations by accommodation and disability type (pp. 30 and 66).

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## Cost Data

Of the accommodations reported, 51 percent cost nothing and another 30 percent cost less than \$500, the study concluded. Only 8 percent of the workers received accommodations costing more than \$2,000 (pp. ii and 28).

The greatest costs incurred were on behalf of persons receiving audio-visual aids. The lowest costs were associated with relocating worksites; changing hours, work procedures, and task assignments; transferring the workers to a new job; and orienting coworkers (p. 31).

# Costs of Making Transit Systems Accessible to Persons With Disabilities: Brief Descriptions of Three Reports

We identified three reports on the cost of making transportation services accessible to persons with disabilities.

## Transportation Options for Persons With Disabilities Evaluated

U.S. Congressional Budget Office, Urban Transportation for Handicapped Persons: Alternative Federal Approaches. Washington, D.C.: Nov. 1979.

CBO evaluated three options for providing transportation services to disabled people living in urban areas of the United States (p. xii). A transit plan includes adding wheelchair lifts to buses, elevators in rail stations, and at least one wheelchair-adapted car per train. A taxi plan calls for small modifications to existing cabs and door-to-door public transportation for the severely disabled. An auto plan offers disabled people financial aid to buy modified cars, as well as door-to-door public transportation for those unable to drive cars (p. xii).

## Description of Cost Data

The report gives total capital and operating costs over the years 1980 to 2010 in 1979 dollars for each of the three plans for providing transportation services to persons with disabilities in urban areas (pp. 70 and 46).

The transit changes would serve about 7 percent of all persons with severe disabilities living in U.S. urban areas, the taxi plan 26 percent, and the auto plan 30 percent (p. xv).

## Cost Data

- Transit plan - \$6.8 billion
- Taxi plan - \$4.4 billion
- Auto plan - \$6.3 billion (p. 70)

## Comments

Each cost estimate is net of estimated fare revenue from passengers with disabilities (note a, table 17, p. 70). The report does not clearly explain the methodology used to generate these estimates. The corresponding gross cost estimates (table 10, p. 46) appear to have been obtained inappropriately by adding nonrecurring capital costs to recurring operating costs. The correct method for obtaining each estimate would have been to add each plan's estimated nonrecurring costs to the discounted present value of the stream of operating costs incurred through the life of the plan. Computed in this manner, the estimated total cost of each plan would be less than the amount reported (tables 10

**Appendix V**  
**Costs of Making Transit Systems Accessible**  
**to Persons With Disabilities: Brief**  
**Descriptions of Three Reports**

did not, however, require a specific percentage of buses to be lift-equipped.

**Table V.1: Annual Cost Estimates for Transportation System Modifications in Seven Cities**

Figures are in thousands

City	Current total program costs	Adjusted cost to meet section 504 implementing rules
Cleveland	\$3,900 <sup>a</sup>	\$3,119 <sup>a</sup>
Pittsburgh	2,793 <sup>b</sup>	2,698 <sup>b</sup>
Seattle	1,218	1,200
Kansas City, MO	1,079 <sup>b</sup>	555 <sup>b</sup>
Akron, OH	1,145	242
Hampton, VA	93 <sup>b</sup>	103 <sup>b</sup>
Brockton, MA	585 <sup>b</sup>	245 <sup>b</sup>

<sup>a</sup>1982 dollars

<sup>b</sup>1982-83 dollars

**Table V.2: Annual Costs of Transportation System Modifications in Average-Sized Cities**

Figures are in thousands of 1983 dollars

Population	Paratransit	User-side taxi	50% lift bus
Fewer than 250,000	\$247	\$92	\$35
250,000-500,000	393	126	160
500,000-1,000,000	515	155	300
Over 1,000,000	1,016	196	960

**Comments**

The report makes so many assumptions and adjustments (detailed in app. B) that extensive sensitivity analysis would be needed to assess the reported estimates. A consultant developed the second cost estimation method, an econometric model, which was not included in the report.

**Costs of Rail Transit Accessibility Evaluated**

U.S. Department of Transportation, An Evaluation of Making Rail Transit Systems Accessible to Handicapped Persons. Washington, D.C.: Jan. 1981.

Section 321 of the Surface Transportation Assistance Act of 1978 required this report. It concluded that the cost of making rail mass transportation accessible to persons with disabilities could not be accurately estimated at that time (p. 2). Estimates of costs to comply with parts of DOT's regulation under section 504 of the Rehabilitation Act of

# Costs of Making Telecommunications Accessible to Persons With Disabilities: Brief Description of One Report

We identified only one report on telecommunications accessibility cost in our literature search and from contacts with various organizations.

Federal Communications Commission, Order Completing Inquiry and Providing Further Notice of Proposed Rulemaking - FCC 89-242. Washington, D.C.: released July 27, 1989.

In this document, the FCC solicited comments on two proposed plans (pp. 3, 4, 16, 20, 21, and 47) presenting different options for the design, organization, operation, and funding of an interstate telecommunications relay system (pp. 17 and 21). Additionally, the FCC requested comments on cost estimates of different components (pp. 16 and 21).

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## Description of Cost Data

FCC's analysis uses the California intrastate relay system as a model (p. 15). FCC estimates startup and annual operating costs for systems with one and two relay centers (pp. 16, 21, and 23).

Using estimates provided by parties who commented on its earlier notice, the FCC estimates the cost of requiring 25 percent of public telephones to be equipped with amplified handsets (pp. 40 and 35).

The report presumably expresses costs in 1989 dollars, but does not explicitly state this.

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## Cost Data for Relay System

Startup cost (in millions of dollars):

- 1 center - \$1.5
- 2 centers - \$3

Annual operating cost (in millions of dollars):

- 1 center - \$15
- 2 centers - \$30 (pp. 16, 21, and 23)

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## Cost Data for Amplified Handsets for Public Telephones

FCC reports that the cost to install amplified handsets to 25 percent of the phones of the companies commenting on this proposal exceeds \$16 million (pp. 40 and 35). Individual companies/users estimate costs (in millions of dollars) as follows:

- Ameritech Operating Companies - \$4.3

# Major Contributors to This Report

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**Appendix VI**  
**Costs of Making Telecommunications**  
**Accessible to Persons With Disabilities: Brief**  
**Description of One Report**

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- Bell Atlantic Telephone Companies - \$2.0
- New York Telephone - \$2.0
- New England Telephone - \$1.0 (p. 37)
- Pacific Bell - \$3.7 (p. 38)
- Southwestern Bell Telephone Company - \$4.86 (p. 38)

Ameritech estimates a cost of \$2.9 to convert its remaining convertible stations to be wheelchair-accessible (p. 42).

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## Comments

The FCC estimates the operating cost of a relay system to permit the deaf to use telephones by extrapolating the experience of California, which operates an intrastate network, the California relay system. Such apparatus is called "telecommunications devices for the deaf" (TDDs). The FCC assumes that the California TDD user population is, in terms of its calling habits, representative of the nation's TDD user population. Given this assumption, the FCC estimates the average monthly number of intrastate and interstate TDD calls to be 2,265,000 and the interstate component of this to be 271,800 (p. 16). In California, the average TDD call costs \$7.00 (p. 13). If this cost is applied to the estimated monthly number of interstate TDD calls, the estimated total operating cost of a national TDD relay system would be \$1,902,600 (\$7.00 X 271,800) per month or \$22,831,200 annually. FCC estimates the annual cost to be \$15 to \$30 million.

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**Appendix V**  
**Costs of Making Transit Systems Accessible**  
**to Persons With Disabilities: Brief**  
**Descriptions of Three Reports**

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1973 are included but not costs of interim and connector services, accessible bus systems, and other nonrail requirements (p. 6).

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**Description of Cost Data**

The study presents transit authority cost estimates to make urban rail transit systems in 10 areas accessible to persons with disabilities. The study estimates are in constant 1979 dollars over a 30-year period for rapid and commuter rail and 20 years for light rail (p. 9 and 10). They include cumulative sums of capital and operating costs incurred to make the systems accessible.

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**Cost Data**

The total cost estimates (in millions of dollars) for the 10 areas are:

- Boston - \$ 96.3
- Chicago - \$ 828.6
- Cleveland - \$ 40.6
- Detroit - \$7.1
- New Jersey - \$24.1
- New York - \$2,710.0
- Philadelphia - \$251.2
- Pittsburgh - \$15.3
- San Francisco - \$18.3
- Washington/Baltimore - \$10.3
- Total - \$4,201.8 (p. 11)

DOT's earlier estimate, developed at the time its section 504 regulation was issued, was \$1.1 billion (p. 2).

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**Comments**

The \$4.2 billion cost estimate is misleading. Instead of summing the projected annual costs, the study should have discounted each stream of annual costs back to a present value, in accordance with Office of Management and Budget Circular A-94. If computed according to the guidelines laid out in A-94, the estimated total cost would be less than \$4.2 billion. Aside from the issue of how to compute the estimated total cost, the accuracy of the estimates provided by the transit operators is questionable. Groups representing persons with disabilities and a group of extramural reviewers claimed that these estimates were, for a variety of reasons, overstated (pp. 14-19).

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and 17). Despite the report's assertion (n. 1, p. 47), costs of alternative options must be discounted to select the least costly option. Simply adding up each option's future annual costs assumes that the discount rate is zero. If one option has relatively near-term costs and low out-year costs, assuming a zero discount rate will bias the choice in favor of that option.

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## Cost Impact of DOT Rule on Transportation Services for the Disabled Calculated

U.S. Department of Transportation (DOT), Final Regulatory Impact Analysis — The Department of Transportation's Regulation Implementing Section 504 of the Rehabilitation Act of 1973 in the Urban Mass Transit Program. Washington, D.C.: Dec. 1985. (Rev. May 13, 1986.)

This report presents national and local cost estimates of compliance with the rules implementing section 504, in two ways. DOT estimates

- the cost to adjust existing services for disabled persons in seven selected cities to comply with the rule, and
- the annual costs of meeting the rule for transit systems in average-sized cities, using a computer model. The model is based on data from 53 Urban Mass Transit Administration funding recipients that provide special services to persons with disabilities.

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## Description of Cost Data

Costs cited for seven selected cities include all capital costs incurred since DOT's 1979 rule implementing section 504. The computer model estimates costs for averaged-sized cities for transit authority-operated transportation and taxi subsidies. Included in the taxi subsidy are costs for supplementary lift-equipped vehicle service for persons unable to use taxis (p. vii).

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## Cost Data

Current cost figures shown in table V.1 are the total costs supporting existing service for elderly persons and persons with disabilities in the seven cities. Whether or not the service fully meets the criteria and eligibility of rules implementing section 504 is not a factor. The adjusted costs shown in the table are DOT's estimate of what it would cost each system to comply with all service criteria and the eligibility requirements.

The lift-bus costs shown in table V.2 assume 50-percent accessibility over a 6-year phase-in period and a 20-percent spare ratio. The DOT rule

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**Appendix IV  
Costs of Employment Accommodations for  
Persons With Disabilities: Brief Description  
of One Report**

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**Comments**

The survey included only employed persons with disabilities. Persons with disabilities not in the labor force may require more or less costly accommodations. Employers may tend not to hire persons with disabilities who require more costly accommodations.

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**Appendix III  
Costs of Making Buildings Accessible to  
Persons With Disabilities: Brief Descriptions  
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cost estimates for "... the most practical method resulting in the least cost ... The advice of the architects and printed information by the North Carolina Department of Insurance, Special Office for the Handicapped, were used as sources for determining costs of needed structural changes" (p. 8).

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**Making Workplaces  
Accessible to the  
Handicapped:  
Cost Estimates**

William Cochran Associates, P.C., The Cost of Accessibility : A Report on the Costs of Making Places of Employment Accessible for Handicapped People. Prepared for Mainstream, Inc. Washington, D.C.: Mar. 1976.

After surveying the cost of making a wide assortment of 34 different commercial and industrial workplaces accessible, the authors conclude that workplaces can be made accessible without spending large sums of money. Surveys were done in the 6 months prior to March 1976 (pp. 2 and 6).

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**Description of Cost Data**

The average cost of making all 34 facilities accessible was less than \$.01 per square foot. To make the 29 smaller facilities (less than 1 million square feet) accessible, the average cost was less than \$.05 per square foot (p. 6).

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**Cost Data**

The total cost of accessibility for 28,190,000 square feet of facilities surveyed is \$264,865 (p. 5). Some specific examples of accessibility costs include:

- 1,000-square-foot office - \$1,655
- 100,000 square feet of 10 retail stores - \$5,000
- 131,000 square feet of offices - \$23,970
- 257,000-square-foot warehouse - \$7,745
- 600,000-square-foot hospital - \$11,125
- 11,261,000-square-foot petrochemical complex - \$10,750 (p. 5)

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**Comments**

The contractor generated the cost estimates by making on-site inspections of potential barriers. The report does not explain how the contractor derived the estimates to remove barriers.

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**Appendix III  
Costs of Making Buildings Accessible to  
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of Seven Reports**

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increases costs over original construction costs up to 21 percent (pp. 141 and 142).

Costs were estimated to conform to a 1978 proposed standard (A117.1) of the American National Standards Institute (p. 141 and forward).

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**Cost Data**

The report estimates renovation versus redesign costs, as follows:

- High-rise multifamily tower - \$60,894 vs. \$14,639<sup>3</sup>
- Garden apartments - \$42,385 vs. \$5,269<sup>3</sup>
- Single-family house - \$3,085 vs. \$436
- College dormitory - \$17,641 vs. \$4,562<sup>3</sup>
- Convention hall - \$108,810 vs. \$14,116
- Public library - \$8,338 vs. \$777 (no elevator)
- Town hall - \$2,304 vs. \$774<sup>4</sup>
- College classroom - \$10,690 vs. \$2,708<sup>4</sup>
- Shopping center - \$4,068 vs. \$127 (p. 142 and 150)

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**Comments**

The study's estimates for original design and renovation are in 1975 dollars. The methodology involved the following steps (pp. 3 and 4):

1. Select and review building plans and specifications;
2. Obtain data on construction cost and adjust to 1975 costs based on a 20-city average;
3. Identify architectural barriers in existing plans;
4. Develop design solutions to identified barriers;
5. Use the in-place unit cost method<sup>5</sup> to estimate the cost of renovation versus changed original design, and then select the least expensive design alternative for both design and renovation; and

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<sup>3</sup>For adapting 10 percent of structures' units.

<sup>4</sup>With certain waivers. For example, requirements for specific numbers of plumbing fixtures based on occupancies might be waived so that two nonaccessible toilet seats can be combined to make one accessible stall.

<sup>5</sup>In the in-place unit method of cost estimating, unit costs are the total cost of all materials and labor, including allowances for location, time, overhead, and profit.



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**Appendix III  
Costs of Making Buildings Accessible to  
Persons With Disabilities: Brief Descriptions  
of Seven Reports**

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The authors used standard costs based on average labor and material costs as of January 1, 1979, unless an institution had a firm cost estimate for a required modification (p. 42).

Cost estimates are based on the survey's finding that about 40 percent of college and university space was then accessible to the disabled, but 75 percent was needed for compliance (p. xi).

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**Cost Data**

Costs of achieving accessibility are estimated at \$0.47 per usable square foot for private institutions in the United States, and \$0.34 for public institutions in the United States. Usable area excludes custodial, circulation, mechanical, and structural areas (p. 5). These costs average \$151,100 for private institutions and \$216,200 for public ones (p. 5).

Costs of renovation increase with building age and campus size (p. xi). The total cost estimates are \$245 million for 1,620 private institutions and \$316 million for 1,463 public institutions (p. 5).

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**Comments**

The study derived nonrecurring costs by (p. 41) constructing a stratified random sample of 700 schools and conducting a mail survey through a network of state agencies. In a second stage, specially trained state personnel made on-site audits of 138 of the 607 (p. 61) responding institutions. The audit data supplemented the data obtained in the mail survey. The mail survey instrument used first was based on another instrument that had been administered repeatedly since 1968. That fact, plus the use of a sound sample design (p. 43), lends credence to the report's cost estimates.

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**Costs of Remediating  
Architectural Barriers  
in Federally Financed  
Buildings Reviewed**

GAO, Further Action Needed To Make All Public Buildings Accessible To The Physically Handicapped (GAO/FPCD-75-166, July 15, 1975).

The report reviewed implementation of the Architectural Barriers Act of 1968 to ensure that federally financed public buildings were designed and constructed to be accessible to persons with disabilities (letter and pp. 2-5).

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**Appendix III  
Costs of Making Buildings Accessible to  
Persons With Disabilities: Brief Descriptions  
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**Cost Data**

Using reasonable alternatives to renovation, the specific cost estimates are:

- For making 45 percent of higher education buildings first-floor-accessible, \$117.4 million (p. 31), and for one-third of existing elementary and secondary school buildings, \$182 million (p. 34);
- For making 100 percent of higher education buildings first-floor-accessible, \$261 million, and for one-half of existing elementary and secondary school facilities, \$238 million (p. 34).

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**Comments**

The report does not discuss why the cost factors .0056 and .0089 were chosen, other than to say that they "... were built up from information we obtained from four colleges that had done surveys to determine the cost of making their buildings accessible" (p. 24). The report's cost estimates depend critically upon the choice of the cost factor. The reasonableness of these cost estimates is not clear without knowing if the four colleges are representative of all higher education facilities.

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**Costs for HEW-Funded  
Schools, Health and  
Social Services,  
Libraries Projected**

Lawrence Johnson & Associates, Inc., Preliminary Exploratory Economic Analysis of the Impact of Section 504 Program Accessibility Requirements, an Interim Evaluation of Section 504 Implementation. Prepared for HEW. Washington, D.C.: Aug. 15, 1979.

The report estimates costs to institutions receiving HEW funds for complying with regulations for implementing section 504. It uses data from a postcard survey of 7,662 recipient schools, health, and social service institutions other than colleges and universities, and a questionnaire survey of 700 colleges and universities. Usable responses to the postcard survey came from 2,619 institutions and to the questionnaire survey from 570 colleges and universities (pp. 113 and 116). The survey results form the basis for national cost estimates (pp. 111, 113, and 117). The study team obtained additional cost data mostly by telephone (p. 120) from a subsample of 360 of these respondents (pp. 111 and 137). HEW supplied lists of recipient institutions other than colleges and universities (p. 112), and the National Center for Education Statistics supplied the data on colleges and universities (p. 117).

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**Description of Cost Data**

Structural modification costs use 1978 prices for modifications. The report gives estimates in 1979 dollars of annual continuing costs (p. 3).

# Scope of Reports on Costs of Accommodating Persons With Disabilities

Type of accommodation	Facility or service affected	Report source <sup>a</sup>	Year
Building accessibility	Higher education, elementary, and secondary schools	O'Neill	1977
	HEW-funded educational, medical, and social service institutions (includes costs of aids, relocation of services, and maintenance)	Johnson and associates	1979
	Colleges and universities	Wulfsberg and Petersen	1979
	Federal office building, medical college, two apartments, engineering facility, and officers' club	GAO	1975
	High-rise and garden apartments, single house, college dormitory, public library, town hall, shopping center, and classroom	Schroeder and Seinfeld	1979
	Institutions in Pennsylvania offering vocational education	Associated Educational Consultants	1978
	Workplaces (34)	Cochrane Associates	1976
Employment	Federal contractors (367)	Berkeley Planning Associates	1982
Transportation systems	Urban rail, bus, auto, and taxi	Congressional Budget Office (CBO)	1979
	Mass, paratransit, <sup>b</sup> and taxi	Department of Transportation (DOT)	1985
	Urban rail transit in 10 areas	DOT	1981
Telecommunications	Interstate telecommunication relay system, including service characteristics, user charges, amplified handsets, and wheelchair access to public telephones	FCC	1989

<sup>a</sup>Refer to apps. III through VI at the end of this report for complete sources.

<sup>b</sup>Paratransit generally refers to special transportation services provided for people unable to use public systems. Examples would be door-to-door, dial-a-ride bus, and van service for elderly persons and persons with disabilities.

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# Private Industry and Interest Groups and Government Agencies Contacted for Study

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## Private Industry

American Bus Association  
American Hotel/Motel Association  
American Institute of Architects  
American Retail Federation  
American Society for Personnel Administration  
American Telephone and Telegraph Company  
Barrier Free Environments  
Bell South Corporation  
Building Owners and Managers Association International  
Chamber of Commerce  
Champion International  
J.C. Penney  
McGuinness & Williams  
MCI Communications Corporation  
National Association of Broadcasters  
National Association of Manufacturers  
National Association of Theater Owners  
National Federation of Independent Business  
National Restaurant Association  
Parks/Recreation Association  
Washington Business Group on Health

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## Disability Interest Groups

American Foundation for the Blind  
Association for Retarded Citizens, National Disability Council  
Disability Rights Education and Defense Fund  
Eastern Paralyzed Veterans  
National Alliance of the Mentally Ill  
National Center for Law and the Deaf  
National Disability Action Center  
National Foundation for the Study of Employment Policy  
Paralyzed Veterans of America  
The Easter Seal Society for Disabled Children and Adults, Inc.  
Trace Center, University of Wisconsin  
United Cerebral Palsy

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## Government Agencies

Architectural and Transportation Barriers Compliance Board  
Congressional Research Service  
Council of Economic Advisors  
Department of Commerce  
Department of Education  
Department of Housing and Urban Development (HUD)

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Only one report addresses the cost of making accommodations to facilitate employment of persons with disabilities. It is limited to accommodations made by 367 federal contractors to comply with section 503 of the Rehabilitation Act of 1973. Employment accommodations possible or required today may differ due to changes in technology. The report estimated that 51 percent of the accommodations made cost nothing, 30 percent cost less than \$500, and only 8 percent cost more than \$2,000. (See app. IV for a brief description of this report.)

We identified three reports on transportation system accessibility. One covers 10 geographic areas and includes transit operators' cost estimates, which were disputed by groups representing persons with disabilities and a group of extramural reviewers.<sup>6</sup> Another does not fully explain its methodology and appears to inappropriately combine non-recurring capital costs with recurring operating costs in its computation of gross costs over 30 years. The third report on transportation accessibility makes so many adjustments and assumptions that assessing the reported estimates would take extensive sensitivity analysis. (See app. V for brief descriptions of these three reports.)

The single report on telecommunications (described in app. VI) is a notice of proposed rulemaking by the Federal Communications Commission (FCC) pursuant to the Telecommunications Accessibility Enhancement Act of 1988. It concerns telephone and other telecommunications accessibility by persons with hearing and speech impairments. The notice requests comment on cost estimates to establish a nationwide interstate telephone relay system based on California's intrastate relay system.

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We are sending copies of this briefing report to other congressional committees, federal agencies and commissions, and other interested parties.

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<sup>6</sup>The report concluded that accurately estimating the cost of making rail systems accessible was not possible at that time.

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## Objectives, Scope, and Methodology

As agreed with your respective offices, we concentrated our work on identifying and reviewing published reports on the costs of removing or avoiding architectural, transportation, employment, and communication barriers to persons with disabilities and did not develop our own estimates of the cost of implementing the proposed law.

We reviewed literature published from 1975 to the present to identify pertinent reports. In addition, we contacted organizations representing the general business community and construction, transportation, and communication industries; groups representing persons with disabilities; and cognizant federal agencies and commissions. Our purpose was to determine whether they had studied the proposed ADA and/or knew of earlier studies on the costs of removing or avoiding architectural, transportation, employment, and communication barriers to disabled people. (App. I lists our contacts.) In reviewing the reports we identified, we evaluated the soundness of the assumptions and procedures they used to estimate costs. We did not contact the authors of the reports for additional information. Our work was performed between July and October 1989. This report elaborates on information we discussed with your offices in a briefing on August 28, 1989.

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## Results

We identified 12 reports that estimate costs of accommodating persons with disabilities by removing or avoiding architectural, employment, transportation, or communication barriers. But these reports are only marginally useful in evaluating the costs of implementing the ADA. In addition to being outdated, the reports apply only to the cost of avoiding or removing selected barriers to accessibility by persons with disabilities in selected situations. In some cases, the studies use questionable or unexplained methodologies.

The accommodations the reports deal with were seen as needed by the reports' authors at the time the studies were done and under the accessibility standards and with technology then available.<sup>4</sup> Dating mostly from the 1970s or early 1980s, the reports contain cost data from those years or earlier. None of the reports estimate the cost impacts of implementing the ADA or any of its major provisions. Of the 12 reports, 7 focus

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<sup>4</sup>Many of the reports estimate the impact of implementing regulations under sections 503 and 504 of The Rehabilitation Act of 1973 and the use of American National Standards Institute (ANSI) standards proposed or in effect then. These standards were ANSI standard A117.1, "American National Standard for Buildings and Facilities—Providing Accessibility and Usability for Physically Handicapped People," and the Uniform Federal Accessibility Standards (UFAS), which are generally consistent with the ANSI standard. ANSI A117.1 was published originally in 1961 and revised in 1980 and 1986. UFAS was published in 1984.

