

Measuring Demand Management Impacts in a Sustainable Compliance Environment for the Americans with Disabilities Act

Orange County, California

Heather Menninger-Mayeda, Erin Rogers, Dana Wiemiller, Patrick Sampson, and Gracie Davis

This paper considers the hypothesis that growth management of specialized transportation demand can effectively influence growth in paratransit services complementary to the Americans with Disabilities Act (ADA), contributing to financially sustainable ADA compliance. Federal policies to implement the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users and documented field experiences of ADA complementary paratransit services speak to the challenges of balancing compliance with consumers' needs. The Orange County Transportation Authority (OCTA), Orange County, California, is creating sustainable strategies that comply with the law and provide mechanisms deep within the community to create alternative services to meet specialized transportation needs. This paper reports on implementation of an ADA demand management plan, tracking the impact of its strategies. Focus areas include (a) paratransit service policies, (b) fixed-route service policies, and (c) coordination with community-based providers. Interventions affect the three levers on costs of total trips, efficiency of those trips, and unit costs of service. Eleven specific strategies and measures of these are presented. Longitudinal data are examined to identify impacts on OCTA's Access paratransit program in relation to trip bookings, productivity, and unit and total costs. Actual ridership and revenue-hour data are contrasted with projections of OCTA's ADA demand estimation tool, its 99% confidence level anticipating significant, continuing trip growth. The paper concludes that it is possible to achieve a growth in the program that is less than the growth in available funds—in measurable ways—through multiple strategies. These include partial funding by the transit authority of community-based transportation alternatives.

This paper examines the following hypothesis on behalf of the Orange County Transportation Authority (OCTA), Orange County, California: growth management of specialized transportation demand effectively influences the rate of growth for paratransit services complementary to the Americans with Disabilities Act (ADA) and contributes to financially sustainable ADA compliance.

H. Menninger-Mayeda, A-M-M-A, 306 Lee Avenue, Claremont, CA 91711. E. Rogers, D. Wiemiller, P. Sampson, and G. Davis, Orange County Transportation Authority, 550 South Main Street, Orange, CA 92868. Corresponding author: H. Menninger-Mayeda, menninger@earthlink.net.

Transportation Research Record: Journal of the Transportation Research Board, No. 2034, Transportation Research Board of the National Academies, Washington, D.C., 2007, pp. 123–133.
DOI: 10.3141/2034-14

BACKGROUND

Recent federal initiatives—in legislation, regulation, and research—consider the role and importance of specialized transportation and set the stage for this paper's discussion. Additionally, growing understanding of the high costs of ADA complementary paratransit programs makes the development of cost-effective mobility alternatives critically important.

Federal Initiatives

Federal legislative and regulatory language newly addresses coordination, measurement of the impacts to specialized transportation, reasonable accommodation, and transportation programs that go beyond the ADA.

Coordination

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) provides the New Freedom Initiative (Section 5317) and coordination with two existing programs: Section 5310, the capital program for seniors and persons with disabilities, and Section 5316, jobs access and reverse commute. In the March 15, 2006 *Federal Register*, the Federal Transit Administration presents strategies to draw these programs more closely together, described as a “crosscutting requirement to develop a coordinated public transit–human services transportation plan” (1). This regulatory guidance, with implementing circulars, establishes the “locally developed plan” as a planning mechanism to join the often disparate voices of public transit and human service transportation, anticipating that together they can effectively address gaps in the fabric of services.

Measurement of Impacts

Measurement of impacts on specialized transportation was also identified in SAFETEA-LU's early guidance related to coordination, identifying three indicators: efficiency in terms of unique persons served, effectiveness in relation to numbers of communities with easier access to transportation services, and customer satisfaction regarding quality of services. Public comment actively debated the efficacy of these indicators, but no one questions the need for measures of impact for specialized transportation.

Reasonable Accommodation

The debate on reasonable accommodation continues, as with the February 27, 2006, *Federal Register* notice of the proposed rulemaking publication of “Transportation for Individuals with Disabilities—Commute and Intercity Rail Station Platform Accessibility.” This revisit of ADA regulation focuses on further accommodations to enable persons with disabilities to more easily use public transit from various locations and implies there will be instances in which reasonable accommodation cannot be made. This opens the door to recognition of service gaps and needs that go beyond what public transit can reasonably, or even possibly, meet.

Beyond the ADA

SAFETEA-LU provides, among its numerous stipulations, that “the Secretary may make grants under this section to a recipient for new public transportation services and public transportation alternatives beyond those required by the Americans with Disabilities Act of 1990 that assist individuals with disabilities with transportation” [49 USC 5317(b)(1)]. Congress introduced here the notion that all specialized transportation needs cannot be met by the ADA. The New Freedom program and coordination direction with other human services programs are responses to that unmet need.

Federal Research Emphasizes Need for Multiple Strategies

The legislative and regulatory initiatives described speak to a growing body of federal research on specialized transit needs and the mechanisms by which to address these. Such research includes a study of nonemergency medical transportation and the identification of low-income, often single women with children, and seniors, whose

complex health care needs are affected by the nonavailability of transportation (2). The growing senior population was examined specifically for transit impacts, concluding that there will be growth in demand for paratransit services by the oldest and frailest of these age cohorts (3). Another study assessed the cost benefits of coordinated transportation in a range of settings and under a breadth of arrangements from which positive economic benefits can accrue (4). An examination of innovative strategies to meet rural and small urban transportation needs identified over 100 innovations (5). Another example was a study promoting a multiplicity of strategies to better meet the requirements of seniors using public transit (6).

These studies each return to the concept that multiple strategies must be employed to entice drivers from behind the wheel and to meet special trip needs. No single programmatic solution can address the diversity of specialized transportation needs.

OCTA's Challenge

Public transit agencies throughout the United States face increasing challenges in meeting the demand for complementary ADA paratransit service. Between 2000 and 2003, the cost of OCTA's Access program grew 46%, from \$26 million to \$38 million, in large part because of steady ridership increases. In addition, paratransit ridership projections suggested 25% or more growth over the next 5 years. This was documented by using an ADA demand estimating tool (7). The model's output was validated by a second model, of vehicle revenue hours, constructed by OCTA's finance department for its comprehensive business plan (CBP).

Figure 1 depicts the growth of Access revenue hours while contrasting both models' output with actual experience over 3 years. The ADA demand estimating tool and the finance department's CBP model both characterize OCTA's challenge to construct a financially sustainable program of ADA compliance. That challenge is to provide a

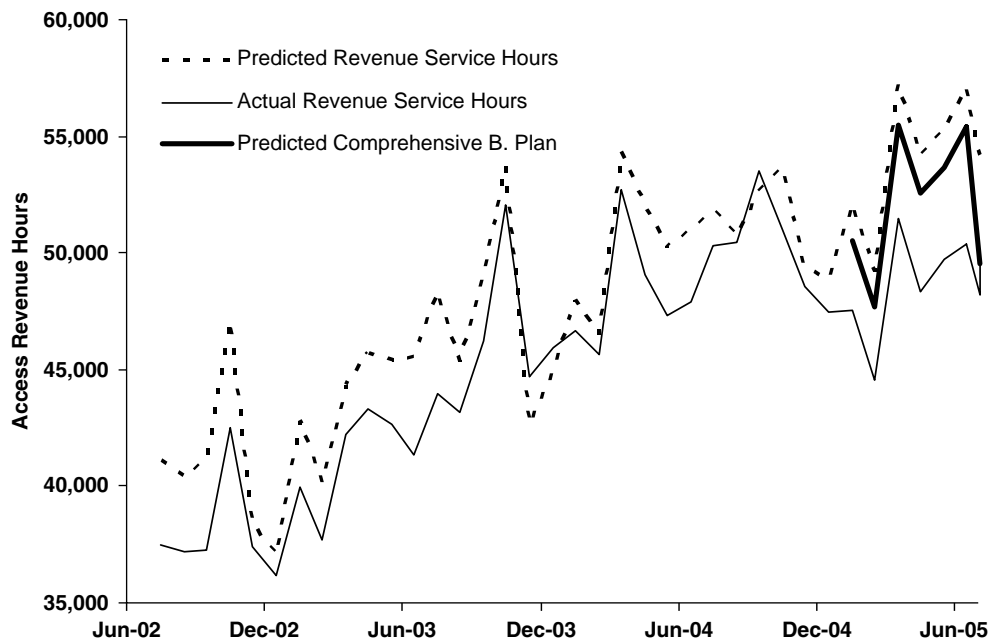


FIGURE 1 OCTA Access program: Access demand model and CBP model projections contrasted with actual revenue-hour experience.

transit program in full compliance with the law, achieved within available resources without jeopardizing other core businesses in the face of continuing growth. In Figure 1, the beginning downturn in actual hours, starting in January 2005, reflects early OCTA administrative interventions to reduce vehicle revenue hours.

By maintaining the status quo, Access policies would eventually threaten the resources needed to grow OCTA's fixed-route transit service, or even to maintain current service levels. A cost analysis conducted by OCTA's finance department revealed that Access cost increases were the result of increasing demand and not due to excessive increases in service cost. These issues prompted OCTA to develop and implement a program to manage paratransit growth. An aggressive program of policy and service changes, fixed-route accessibility, and alternative mobility options was envisioned, while still maintaining public service as intended through ADA legislation. This became the early vision of sustainable ADA compliance and the goal of OCTA's 2003 Paratransit Growth Management Study.

Knowns About OCTA's ADA Demand

A series of six studies over as many years by OCTA and the Orange County Health Care Agency, the county's public health agency, provided a framework to analyze demand and identify demand management strategies (8–13). Findings drawn from these studies indicated the following:

- Population growth along with aging baby boomers will increase the need for transportation assistance.
- New programs, such as the OCTA Senior Mobility Program and the Office on Aging's Senior Non-Emergency Medical Transportation Program, provide mobility choices to those needing specialized transportation.
- OCTA's development of an ADA demand estimating tool, a statistically reliable model, provided necessary baseline data. As growth management policies are implemented, results can be contrasted with the model's projected growth rates.
- Successful implementation of growth management strategies would require effective partnerships among key constituencies and stakeholder organizations.

A review of Access trip characteristics provided data helpful in identifying opportunities for demand management:

- Predictable trip utilization patterns identified peak system capacity requirements and suggested opportunities for demand management.
- Workshop and Regional Center clients (persons with developmental disabilities), representing one-third to two-fifths of all Access trips, are subscription-based and lend themselves more easily to alternative transportation programs.
- Adult day care and adult day health care subscription trips were growing to nearly 40% of trips provided and could be considered for alternative service planning.
- Trips out of the county were frequent, suggesting the need for better coordination between fixed-route and paratransit service planning.
- Trips provided outside the ¾-mi corridor of fixed-route service accounted for nearly 2% of all weekday trips.

Access trips per capita tended to be lower in cities that operated their own specialized transportation services.

METHODOLOGY

Developing OCTA's Growth Management Plan

ADA compliance is not an option. Managing paratransit growth cannot mean placing limitations on trips or reducing levels of service in order to reduce costs. To ensure agencywide recognition and participation in the study process, an internal working group was formed with 25 staff representing functions or departments that impact Access service delivery. Discussion revolved around three themes:

1. Managing paratransit demand as an agencywide issue;
2. Complying with ADA, within available resources, as an agencywide issue; and
3. Managing ADA demand as a continuing process.

The working group discussions also considered how best to implement growth management strategies and the conditions necessary for success. They identified three key conditions:

- Protecting public good will. A comprehensive public participation plan would be critical. Engaging Access users in the process was vital as OCTA considered difficult demand management decisions.
- Ensuring internal OCTA alignment. Public transit programs typically operate within silos specific to service modes and paratransit is organizationally isolated from the primary business of fixed-route and rail operations. Successful demand management strategies would require the collective support of OCTA management and greater alignment among the agency's full family of services to promote these strategies.
- Developing a mix of strategies. No simple or single solution exists. Earlier Orange County studies and industry literature generally suggest that a broad mix of strategies must be employed to attain fiscally sustainable compliance.

Planning for Sustainable ADA Compliance

After extensive internal agency review of 60 potential strategies and a comprehensive program of public outreach and education, the OCTA Board of Directors was presented with a family of interventions. It was apparent that no single strategy would be sufficient. A number of strategies were adopted as a package and scheduled for implementation in July 2005. Adopted strategies were broadly categorized into three areas as follows:

1. Modify ADA service policies, procedures, and delivery, including a partially subsidized same-day taxi service;
2. Encourage use of fully accessible fixed-route services, continuing and extending activities that involve Access riders; and
3. Promote partnerships to improve transportation alternatives, continuing and expanding programs supportive of such partnerships.

Modifying ADA Service Policies

Orange County is situated between Los Angeles County to the north, San Diego County to the south, and Riverside County to the east. The county is 798 mi² with 34 cities. Paratransit service was always provided countywide, with a zone-based dial-a-ride service begun in the 1970s to provide trips between and within zones across

the county. In 1993, OCTA implemented its ADA paratransit service and did not limit trips to the $\frac{3}{4}$ -mi fixed-route corridors. Since that time, service has not only been provided countywide but also into neighboring Los Angeles County where the OCTA fixed route serves a southern portion of the city of Long Beach, California.

Restrict Service Area to $\frac{3}{4}$ -mi Corridor

In July 2005, the paratransit service area was reduced to encompass only the $\frac{3}{4}$ -mi corridors of the fixed-route system. Through a geographic information mapping analysis, it was estimated that approximately 2% of the total daily Access trips served were outside of the $\frac{3}{4}$ -mi service area, affecting 315 Access customers. Customers were notified via the *Transit Connection*, a newsletter distributed to all Access customers, of the new service area restriction. Many customers were given individual assistance to identify other available transportation. Complaints were initially high before implementation but negligible when the change was instituted.

Discontinue Same-Day Medical Backup Service

An element of the OCTA Access program included a same-day medical backup service, providing about 160 trips monthly. This service allowed Access eligible customers to request same-day service to medical facilities, with the ability to request a ride within a 60-min window for a premium fare: \$5.00 upon boarding and an additional \$1.00 for every 5-mi trip segment. Consumers using this service could use the same-day taxi program implemented subsequently.

Revise Door Service Fare Policy

On average, 5% of the total Access riders used, on a regular basis, another premium service in which the consumer was escorted by the driver to or from the door. The premium fare for door service was \$.80 (charged at either or both ends of the trip) and was increased to \$2.00 in July 2005 (plus the regular Access fare). Since the premium fare increased, the number of riders utilizing the door service has declined to approximately 3% of total rides. It is presumed that decreasing the number of these trips would help maintain or improve trip scheduling efficiency.

Institute Same-Day Non-ADA Taxi Service

As part of the growth management program, OCTA implemented a same-day taxi service, made available to all Access-eligible customers but capped at 50 trips per day. The program's intent was to mitigate the potential negative impacts of the $\frac{3}{4}$ -mi corridor restriction, to eliminate the same-day medical backup service, and, if possible, to reduce door-assisted service. In addition, it was expected that same-day service might reduce the number of late cancellations and no shows.

The current Access fare is \$2.25. The fare structure for the same-day taxi program is based on the customer paying the \$2.25 Access fare and OCTA subsidizing the next \$7.75, or a \$10.00 total trip cost, which covers a trip of 2 to 3 mi. If the actual trip cost exceeds \$10.00, the customer must pay the additional fare over \$10.00 as shown on

the meter at the trip's conclusion. This service is provided through a contractual arrangement with a local taxi company.

Expand On-Time Window

Expansion of the on-time window is another strategy employed. Its intent allows additional flexibility in scheduling, enhancing system efficiency and productivity. Beginning in July 2005, the on-time window was increased from 20 to 30 min. Impacts of this program are likely to be experienced in improvements to hourly productivity; dispatchers now have a longer window and can increase shared-ride, trip scheduling.

Implement 100% In-Person Eligibility Assessment

ADA regulations require that transit properties have an eligibility certification process for complementary paratransit services. The OCTA's eligibility process has evolved from a paper system, to a partial in-person system, to the current implementation of 100% in-person eligibility assessments, effective July 2005. Before July 2005, approximately 17% of Access eligibility assessments were done in person. Currently 100% are done in person. The eligibility process is managed by OCTA staff and contracted to a physical therapy group to perform the functional assessments.

Since July 2005, the OCTA has received an average of 545 ADA eligibility applications per month. Of this total, 379, or 70%, of the applications are new customers, and 165, or 30%, are recertifications. Of the applications received, approximately 20% do not complete the certification process. The remaining applicants are given an in-person functional assessment. On average, 400 in-person assessments are completed each month.

Encouraging Use of Fixed-Route Service

Critical to the management of Access demand is the expanded use of fixed-route services by Access riders for those trips and circumstances for which they can use scheduled service. Two policies to encourage use of this service were implemented or enhanced beginning in July 2005.

Travel Training

The OCTA offers travel training to individuals with restricted ADA eligibility and those who do not qualify for ADA service. Travel training is conducted by OCTA eligibility staff and a contractor. Between January and June 2005, 23 workshops were conducted for 484 individuals with 50 individuals receiving one-on-one travel training.

Reduced-Fare ID Card

Another strategy implemented to encourage the use of fixed-route service is a reduced-fare ID card for Access-eligible customers. This allows Access eligible customers to ride fixed route for a reduced fare of \$0.25, half of the OCTA fixed-route senior/disabled fare of \$0.50. In the program's first year, approximately 700 cards were issued, with a total of 48,700 trips provided during FY 2005–2006. Both this

and the travel training program are long-term strategies designed to foster independence among persons with disabilities, while reducing the demand for paratransit services.

Promoting Coordination with Community-Based Agencies

The OCTA has been proactive in developing community partnerships and coordination efforts to respond to specialized transit need, well in advance of SAFETEA-LU regulatory guidance on coordination. Three programs are reported here that were constructed over several years to facilitate coordination among agencies and develop alternative transportation options. Each program is partially subsidized by OCTA, using local transportation funds of the California Transportation Development Act, public transit's primary state funding source.

Senior Mobility Program

The cornerstone of this effort has been the Senior Mobility Program. Under this program established in 2002, OCTA provides operating funds and retired paratransit vehicles to cities and non-profit organizations for local community-based senior transportation. Program participants are given the freedom to determine the type of service, destinations, eligibility process, and other parameters of their service. Currently, OCTA provides \$1.3 million in annual funding to 18 participating cities and three nonprofit organizations. In FY 2005–2006, more than 218,000 Senior Mobility Program trips were provided.

Special Agency Transportation

The OCTA has had a long-standing partnership with the Orange County Office on Aging to provide senior nutrition transportation services. The OCTA provides approximately \$344,000 in annual funding to support more than 42,000 trips to senior nutrition sites across the county. For years, this service had been incorporated into the master Access paratransit contract. As Access costs increased and vehicle capacity diminished, OCTA was forced to consider alternative service provision. As a result, this service was transitioned to a taxi provider in July 2004, significantly lowering the cost per trip. Currently 10 cities participate, with services provided to 13 social service sites.

South County Senior Services

The OCTA has also engaged in a long-term partnership with South County Senior Services, an adult day care facility and transportation provider in Laguna Woods, California. Under the terms of this agreement, OCTA provides a per-trip operating subsidy for all Access-eligible clients traveling to the adult day care facility using the South County Senior Services transportation program.

RESULTS

Results of OCTA's demand management program are discussed in relation to change in several key variables: number of consumers utilizing services, rates of utilization, and costs of trips. Because of

the number of interventions implemented in July 2005, it is not easy to ascribe the impacts of any single effort upon any single indicator. Key indicators are presented that reflect Orange County's overall specialized transportation program, namely Access ADA complementary paratransit services, its same-day taxi program, and the coordination partners' programs. Selected results of a 2006 consumer satisfaction survey are provided to suggest consumer response, 4 months after demand management initiatives were implemented. Table 1 presents a summary of the overall program and impacts.

Access Consumer Utilization

Numbers of Active and Eligible Clients

The OCTA Access program currently has approximately 26,000 eligible customers. Of that, about 6,200 (24%) are regular users of the service or active clients, booking an average of 15 trips per month. Figure 2 shows a leveling in the numbers of both eligible and active customers using Access each month since the institution of 100% assessment in July 2005.

A leveling of both active users and eligible users may be a consequence of changes to the certification process. Several conflicting trends lie behind the rates presented in Figure 2. The number of total applications received monthly is down by approximately 13%. Therefore, the total number of people completing certification has declined; however, more people are being given unrestricted eligibility status. Currently, approximately 54% of the total applicants are given unrestricted eligibility status compared with 43% during FY 2004–2005. The proportion of persons not completing the application process increased, from 9.6% in FY 2004–2005 to 19.4% in FY 2005–2006. The application denial rate has declined to 4% in FY 2005–2006, from 7% in FY 2004–2005. Although the rate of utilization of services cannot be attributed to the implementation of 100% in-person assessments alone, it is notable that growth in Access-eligible customers increased by only 2% compared with an annual average of 12% in prior years.

Trip Booking Patterns

Consumer patterns of Access utilization appear to be changing. A booking is a request for a trip and bookings exceed the number of trips completed. Bookings include trips that may subsequently be canceled or are no-shows, but are a better measure of presenting demand than simply considering completed trips. Figure 3 shows that the steady increase in bookings per month since 2001 has slowed substantially, beginning during FY 2004–2005 as OCTA began to institute various changes in practices. Bookings per month during FY 2005–2006 actually declined and have not significantly increased, shown in Figure 3 in relation to a linear regression trend line extrapolated from the rate of bookings through June 2005. Bookings vary seasonally but are not increasing at rates seen previously.

Historical trends suggest monthly bookings would routinely exceed 100,000. However, actual experience ranges from 75,000 to more than 90,000 bookings monthly, below the 100,000+ level that demand projections suggest.

This pattern of decline in the rate of bookings is also vividly represented in Figure 3 in relation to the percentage change in bookings from the current period to the same period in the prior year, depicting negative booking rates beginning in July 2005 through June 2006.

TABLE 1 Typology of Measures for ADA Demand Management

Intervention	Description and Comment	Type of Measure	Area of Impact	Specific Impact
Access service policies				
Expand on-time window	Went from 20- to 30-min promise window	Increase shared-rides potential	Increase productivity	Estimated at more than half of measurable impact
Restrict service to ¼-mi corridor	2% of total daily trips beyond ¼ mi at time of policy change 315 eligible Access customers at time of policy change	Reduce trip lengths	Increase productivity Reduce total costs	Estimated 2% of impact Few complaints; some indication that these consumers are using same-day taxi service
Discontinue same-day service	\$5 fare for same-day trip request for trips for medical purposes only 160 trips per month at time of policy change	Reduce high-cost trip	Reduce total costs	Estimated <1% of impact Little impact as same-day taxi service replaced this with no trip purpose requirement
Revise door fare policy	Fare was \$0.80; now \$2.00	Change in % of trips with door service requested Decreases dwell time	Increase productivity	Door service fell from 5% of all trips to 3% of all trips
Add same-day taxi service	\$2.25 fare for first 3 mi OCTA pays \$7.75 of \$10 trip; customer pays full cost beyond 3 mi Mitigates the service area restriction to ¼-mi corridor and the discontinued same-day service	Subsidy per trip	Reduce total cost Decrease unit trip cost. Increase personal mobility	Estimated <1% of impact. OCTA cost per trip \$7.75 Trips capped at 56 trips per day Provided 12,981 trips first year; savings of up to \$220,000 on OCTA's per trip cost
Implement 100% in-person assessment	Previously 17% in-person assessment of ADA applicants 20 min in-person assessment but using Access to go and return can make for a several hour process.	Change in rate of new applications Change in total number of people certified and impact on number of trips booked	Trip growth managed	Estimated 7% to 8% of impact Decrease in persons certified (% and actual numbers) Increase in unrestricted ADA status Decrease from 4% to 2% in denials of ADA status Increase in certification costs
Fixed route initiatives				
Travel training	Three types of travel training offered (groups, agencies, individuals)	Increase in access users on fixed-route	Decrease Access trips	In 2005 23 workshops; 484 persons; 50 persons one-to-one training.
Reduced fare I.D. for Access users	Access users get 25 cents fare	Increase in access users on fixed-route	Decrease Access trips Increase fixed route use Increase personal mobility	Fixed route use estimated at 3% of impact. 400 cards issues in 1st month; 3,800 trips on fixed-route by access users in same period
Coordination initiatives				
Senior Mobility Program	Community senior transportation supported by OCTA: \$1.3 million total to 17 cities and 3 agencies; FY 05 providing 218,000 trips	Increase mobility options	Trip growth managed Decrease unit trip cost Increase personal mobility	Coordination impacts estimated at 7% to 8% overall. OCTA cost per trip of \$5.62
Special agency trips	Agency transportation supported by OCTA: \$344,000 to 10 agencies; FY 06 providing 42,000 trips	Increase mobility options	Increase match from DHHS agencies to alternate public transportation Decrease unit trip cost	Coordination impacts estimated at 7% to 8% overall. OCTA cost per trip of \$1.77
South County seniors/ adult day health care	Meeting individualized trip needs and deferring Access trips.	Increase mobility options	Increase match from DHHS agencies to alternate public transportation Decrease unit trip cost	Coordination impacts estimated at 7% to 8% overall. OCTA cost per trip of \$12.75

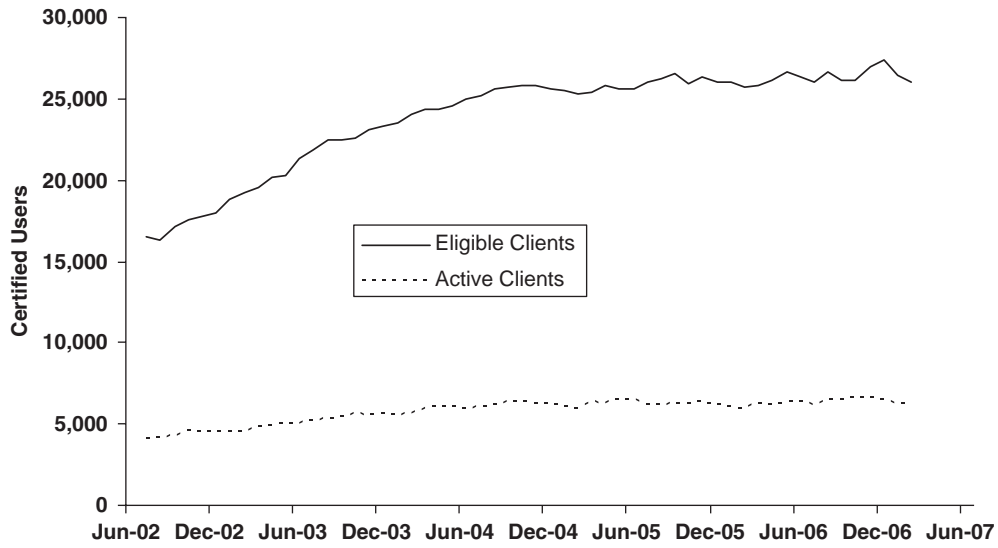


FIGURE 2 OCTA Access program: monthly eligible and active clients among Access certified users, June 2002 to June 2007.

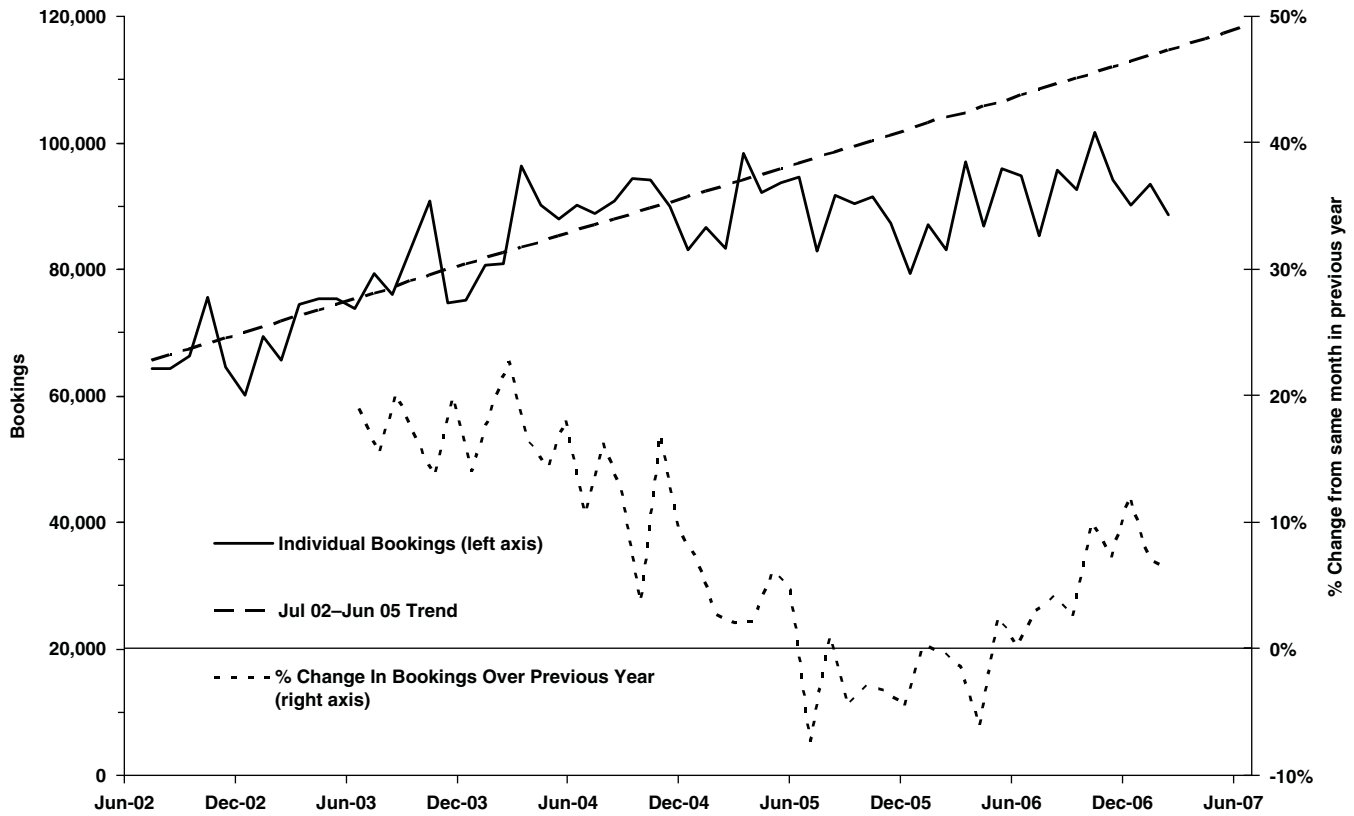


FIGURE 3 OCTA Access program: trip bookings per month and percentage change in bookings from same month in previous year, June 2002 to June 2007.

In recent past months, there have been positive percent changes in the booking rates (approaching 10% increases), but well below the previous 15% to 20% monthly increases.

Access Service Efficiencies

Productivity

Impacts on productivity are being realized, due in part to the strict enforcement of the 3/4-mi service area which removed longer trips. Expanding the window of on-time performance is also expected to have a substantial impact on productivity, making it easier for dispatchers to group trips and still ensure on-time delivery of passengers. Figure 4 shows steady increases in productivity, from a low of 1.73 at the beginning of this 4-year period to a high of 2.01 passengers per revenue hour by late 2005, with some decline in productivity since June 2006. Somewhat declining recent productivity is a consequence of a change in contractor that has slowed some of the previous contractors' productivity gains.

Early gains represented a 16% increase in productivity and, when spread over 50,000 annual vehicle service hours, this is an additional 15,000 one-way passenger trips carried with the same resources. Productivity improvements clearly reduce the cost per trip. Change in cost per trip is a key indicator to support policy decisions, while increasing productivity bodes well for continuing declining trip costs.

Revenue Service Hours

OCTA's Access contract operator is driven by revenue service hours, although the pricing structure includes a number of fixed and variable cost elements. Figure 5 presents revenue-hour projections and experience. Monitoring revenue service hours is central to both controlling costs and reflecting the impact of the breadth of interventions described. Revenue service hours are controlled administratively, in that the

Community Transportation Services Department authorizes levels of revenue service. But the level also reflects changes in demand because it can be increased or decreased to mirror changes in service demand. OCTA staff work closely with their contract operator to ensure that levels of service provided will roughly correspond to service demands, varying monthly with the seasonal patterns of demand that OCTA's Access program routinely experiences. Beginning in June 2006, monthly revenue service hours stayed below 50,000 revenue hours, after a long history of monthly increases (Figure 5). This was in part the result of careful management of resources and contributed to increased productivity, as demonstrated in Figure 4.

Actual revenue service hours of 45,000 to 50,000 per month during FY 2005–2006 could have been expected to be 20% higher and more, if the demand estimation model and the CBP model projections had been realized. Because revenue service hours can be administratively changed, they do not in and of themselves show that the demand strategies are working but, rather, are an intervening variable that is both affected by changes in demand and can affect other measures, such as productivity. Clearly careful monitoring of revenue service hour utilization is an important tool in the overall management of an ADA complementary paratransit program.

Passenger Trips

Passenger boardings are perhaps the most telling measure of whether ADA demand management is working. Figure 5 also contrasts the pattern of actual Access ridership with the ADA demand estimation. The model, which was statistically validated at confidence levels of over 99% at the time of the original multiple regression, shows a continuing upward trend that has *not* been realized (6). The demand model would suggest monthly ridership exceeding 120,000 trips during FY 2005–2006, while actual experience through March 2007 shows trip levels below 100,000 trips per month.

The difference between projected trips and actual trips is between 10,000 and 20,000 trips per month, beginning about December 2005,

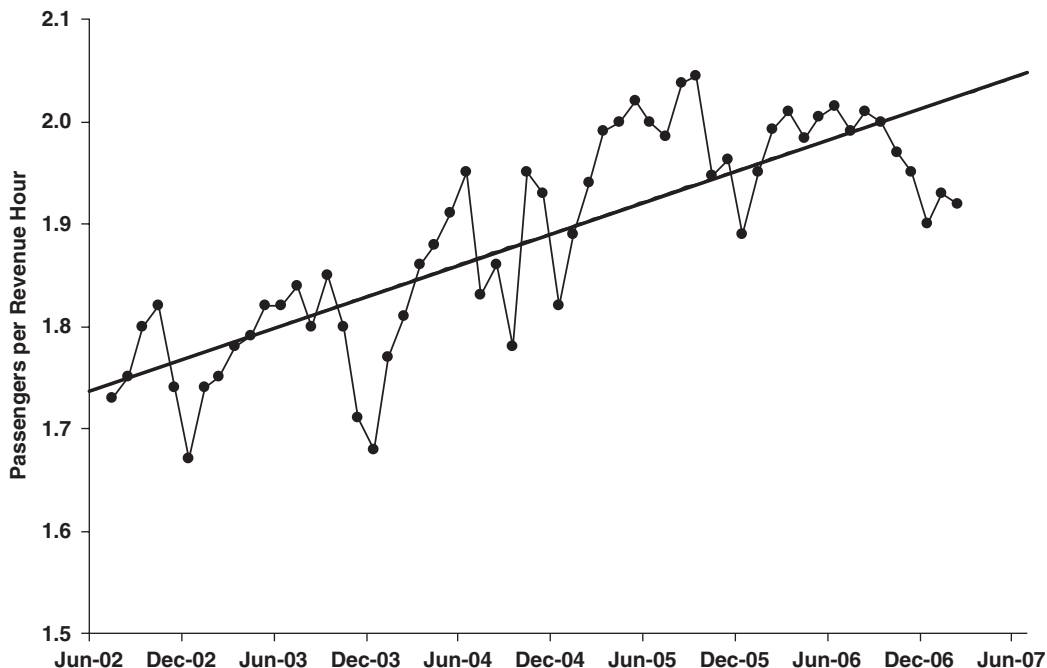


FIGURE 4 OCTA Access program: passengers per revenue hour, June 2002 to June 2007.

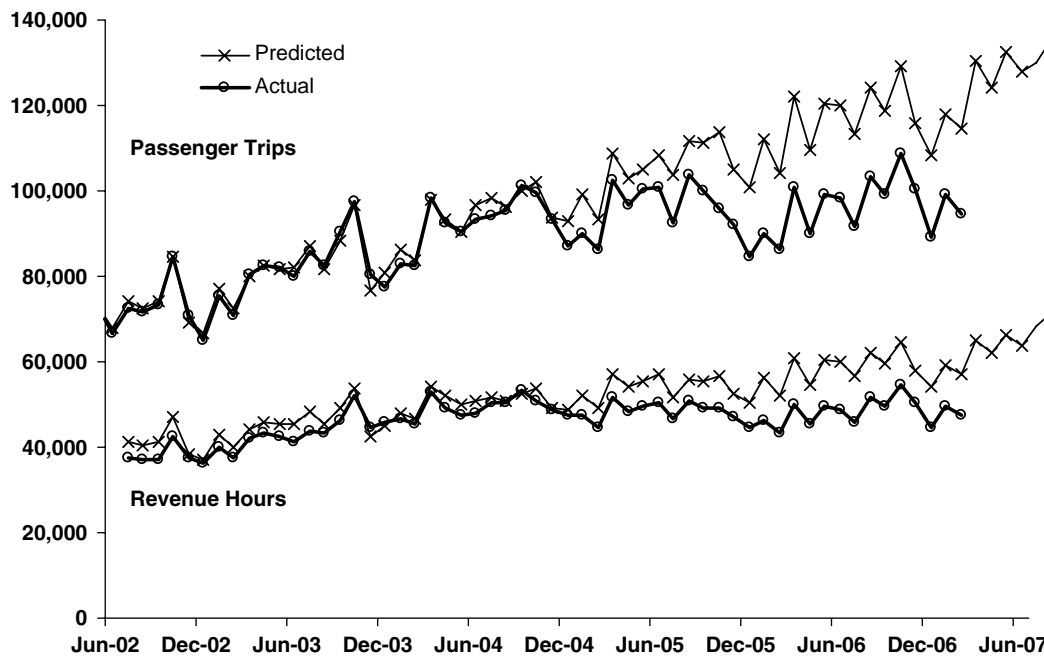


FIGURE 5 OCTA Access program: comparison of modeled passenger trips and revenue hours, predicted to actual, June 2002 and actual through March 2007.

6 months into implementation of the new initiatives. For the 9-month period from June 2006 through March 2007, this trend suggests that a range of 90,000 to 180,000 fewer trips were provided than were predicted by the model, a significant reduction in Access trips (Figure 5).

The OCTA interventions appear to be successfully containing growth rates, while community-based programs are increasing through the Senior Mobility Program. This is potentially diverting some growth in ADA trip demand to locally based transportation services with which consumers in Orange County have professed greater satisfaction (7).

Service Costs

Cost measures are a fundamental mechanism by which to measure change and the impact of program initiatives. Table 2 lists the compar-

ative costs, both unit costs and total costs, of the various trip-providing programs that OCTA is subsidizing.

Tables 2 and 3 show that the coordinated transportation programs are very cost-effective, with OCTA’s average per-trip cost of \$5.62 for the three programs, contrasting favorably with the Access per-trip cost of \$26.55. Together these trips, numbering 273,482, account for 19% of OCTA-supported specialized transportation and represent an array of local mobility options. Local mobility choices are very popular in the local communities. They carry some proportion of ADA trips, estimated by staff at 25%.

The OCTA’s unit cost on the Special Agency trips of \$1.77 is extremely cost-effective. This program is largely supported by Older Americans Act Title III funding, whereas OCTA provides only modest funding levels and contract management of the vehicle operations.

The South County Senior Service’s unit cost for adult day care transportation (\$12.75)—although the highest of the three coordinated

TABLE 2 OCTA’s Community Services Programs: Comparison of Costs and Deferred Costs, FY 2005–2006

Specialized Transportation Program	Passenger Trips	Trips as % of Total	Program Cost	Cost per Trip	OCTA Contract Cost	OCTA Avg. Cost per Trip
Total coordinated programs	273,482	19	\$3,163,232	\$11.57	\$1,536,194	\$5.62
Senior Mobility Program (17 city and 3 agency programs)	217,817		\$2,584,986	\$11.87	\$1,298,547	\$5.96
Special agency trips (13 sites in 10 cities)	42,467		\$324,064	\$8.18	\$69,426	\$1.77
South County Senior Services (1 adult day health care program)	13,198		\$254,182	\$16.50	\$168,222	\$12.75
OCTA’s Same-Day Taxi	11,681	1	\$116,810	\$10.00	\$90,528	\$7.75
OCTA’s Access	1,180,171	81	\$33,994,641	\$29.05	\$31,339,256	\$26.55
Total OCTA-supported specialized transportation	1,465,334	100	\$37,274,683	\$25.44	\$32,875,450	\$22.44
OCTA’s reduced fare ID program for Access users	48,700	n/a	\$158,275	\$3.25	\$158,275	\$3.00

TABLE 3 OCTA's Specialized Transportation Programs: Potential Savings as Compared with Access, FY 2005–2006

Specialized Transportation Program	Annual Trips via Access	Total Cost ^a	Annual Cost Deferred via Alternative Program
Coordinated	273,482	\$7,260,947	\$1.8–\$7.3 million
Same-day taxi	11,681	\$310,131	\$55–\$220,000
Reduced fare ID	48,700	\$1,292,985	\$323,000–\$1.3 million
			Total
			\$2.2 million–\$8.8 million

NOTE: FY 2005–2006 range of deferred costs assumes each alternative program provides between 25% and 100% of ADA trips and that ¼ of all riders on these programs are ADA eligible taking ADA trips.
^aAccess cost = \$26.55 per trip.

programs—is still less than half the cost of an Access trip. Adult day health care has been an area of growth in Orange County and is typically an intensive, door-to-door, escorted service. Strategies such as this one to reduce the costs of individualized transportation will be critical to an effective demand management program.

The Same-Day Taxi program, a new initiative, currently counts for less than 1% of all trips. Its utilization is growing steadily, although only at about half of the anticipated cap level of almost 20,000 trips annually as of this writing. The per-trip cost to OCTA (\$7.75)—one-third of the \$26.55 Access per-trip cost—is a significant savings to OCTA when 100% of these trips would otherwise be made on Access.

The sum of costs deferred, represented at the bottom of Table 3, is between \$2.2 million and \$8.8 million. Additionally, these services have brought an added \$1.7 million in funds to OCTA's specialized transportation programming. These added funds are a mix of city revenues, social service agency funding, and customer fares. At the same time, OCTA has made it a policy choice to contribute from its own local transportation funding to the costs of specialized transportation programs that go beyond the ADA.

Finally, the implemented policies appear to be controlling growth in demand for the relatively expensive Access trips. If the rates of difference between the actual number of Access trips and the projected number presented in Figure 5 hold into the future—a decrease of between 10,000 to 20,000 trips per month—OCTA may be realizing a decline of between 120,000 and 240,000 trips annually. This translates into an annual savings of \$3.2 million to \$6.4 million. These projected savings are different from those generated by lower per-cost trips shown in Table 3, but the range suggests that some higher-cost Access trips have already been replaced through OCTA's demand management program.

Customer Response to Demand Management Initiatives

OCTA conducted an Access Customer Satisfaction Survey during October 2005, 4 months after the July 2005 initiatives were implemented. The survey was sent to 27,000 eligible respondents with tabulated results from 2,728—a 10% return rate. Of those responding, almost half (48%) were using the service at least 1 day a week and one-quarter (28%) at least monthly. The average years of use by respondents was 3.1, with a quarter (28%) using the service 4 years or more.

The survey reported that over 85% of riders were satisfied with the service, with more than half of all respondents (54.8%) reporting

they were very satisfied and 30.7% indicating they were somewhat satisfied. Another 4.3% were neither satisfied nor dissatisfied, and a total of 10.1% of respondents reported they were somewhat dissatisfied (6.3%) or very dissatisfied (3.8%). Overall satisfaction with Access was indicated positively by 85.5% of respondents in this first 4 months of the demand management initiatives.

In rating elements of the service, the highest rated aspects had little to do with the demand management program. The reservation process, in the midrange of ratings with a 77.9% positive satisfaction rating, is potentially affected by various demand management activities. The 30-min on-time pickup window and the ¾-mi corridor are demand management elements and reflect both the lowest positive satisfaction ratings (62.5% and 54%, respectively) and the highest dissatisfaction ratings (17% and 23%, respectively). Notably, these areas of dissatisfaction were not sufficient to bring down the overall positive satisfaction rating of 85.5%.

DISCUSSION OF RESULTS

Initiatives presented in relation to Access service policies, fixed-route service policies, and coordination were considered against various standard measures. Certain cost efficiencies were measured and demonstrated, reducing unit trip costs and overall program costs. Certain service effectiveness measures were also demonstrated, with increased productivity and contained revenue service hour growth rates. Consumer responses were assessed in various areas and, although there was clear dissatisfaction with the restriction of the service area to the ¾-mi corridor and the expansion of the on-time window from 20 min to 30 min, the overall positive rating of the service by 85% of respondents is encouraging.

Another dimension, not readily presented as a measure, is the coordination effort spearheaded by public transit with other organizations to develop additional specialized transportation alternatives. Through these new partners, cities and social service agencies, OCTA leveraged additional dollars, helped create a new mix of supplemental transportation services, and increased choices available to consumers.

One indicator not examined here is that of trips per capita. OCTA's overall program provides 1.465 million specialized transit trips annually (Table 2). In relation to the 2006 county population estimate by the California Department of Finance of 3,072,336 persons, this translates to a per-capita trip rate of 0.48, almost one-half of a specialized transit trip annually for every person in the county. Per-capita trip rates have not been extensively examined or tracked for specialized transit, but this indicator establishes at least a mean by which to monitor comparable rates within the county's 34 cities, as well as to compare this county against other counties.

Finally, the question can be asked as to whether the OCTA Access program would have leveled out eventually on its own, suggesting a maturation of service levels where the targeted population was requesting and getting services needed. This idea is nullified by two factors. First, Orange County has a steadily increasing senior population, including growth in the proportion of the old and oldest seniors who have the greatest mobility need. With the Pacific Ocean as the western border of this 798-mi² county, the attraction continues for this region both as a retirement community and as a climate gentle to aging bodies. Second, there have been California statewide policy initiatives, notably in implementing the Olmstead Decision, which promote and require community-based living for even the most frail populations. Population and policy changes both suggest that demand for specialized transportation is neither declining nor even leveling.

Finally, the high level of confidence (99%) of the statistical ADA trip demand model developed by OCTA indicates that the historical

growth patterns would have continued without significant intervention. This paper demonstrates the effectiveness of the breadth of strategies that OCTA has implemented, giving substance to its vision of a financially sustainable ADA compliance program.

LIMITATIONS

This paper briefly discussed the response by consumers. Some early indications suggest dissatisfaction with new policies restricting Access service, but it is not yet possible to measure the expanded mobility that these initiatives also brought to individuals. And how do these program initiatives affect individual trip-making patterns, choices, use of the Access program, and the utilization of the developing transportation alternatives?

Richer examination of these issues will be important to monitor over time. OCTA has worked extensively in recent years on outreach, education, and public involvement to bring along the community even as policy and procedural changes are implemented. This appears likely to have educated consumers or helped offset concerns or difficulties with the service changes instituted. Certainly customer satisfaction warrants continued attention and examination. Additional statistical analyses are indicated, such as a multivariate analysis by which to reliably assess those interventions having greatest impact on changes in demand and trip utilization.

CONCLUSIONS

This paper described the OCTA's demand management program that worked on the ADA cost levers of total trips, efficiency of providing those trips, and the unit costs of trips. It also worked to create additional cost-effective mobility choices for the public transit authority. The analysis has demonstrated that a fiscally sustainable ADA program is achievable through growth management strategies, influencing the rate of growth in ADA service utilization.

Clearly the central premise of the program is that no single strategy will be sufficient, and only a mix of strategies can effectively influence the complex factors that contribute to demand for ADA paratransit. Notably, the coordinated, community-based services implemented meet higher expectations and provide more individualized service than the minimum requirements of the ADA possibly can. There is early evidence of greater levels of satisfaction by consumers and agency personnel with this mix of community-based options.

Success has been presented against various measures:

1. Trip bookings are declining monthly, with 10,000 to 25,000 fewer trips each month than otherwise projected by trip modeling efforts and potentially as many as 100,000 fewer trips in the second 6 months after implementation;
2. Monthly revenue service hours have stabilized after years of steady increases; and
3. Productivity has increased by 16%, allowing an additional 15,000 passengers trips to be provided with the same 50,000 revenue hours.

Consumer response shows overall high satisfaction ratings, with 85% rating the service good and very good, despite identified areas of dissatisfaction that do include selected demand management initiatives. Concurrently, there are more than 20 coordinated transportation services receiving some OCTA subsidy, plus additional senior nutrition site and adult day health care services which collectively account for an additional 20% of trips, over and above OCTA's Access program. Each supplemental program involves match fund-

ing of different levels from various sources. These programs, locally oriented by definition, have per-trip costs considerably lower than that of the Access program.

In combination, these initiatives suggest savings to OCTA that range from \$2.2 million to \$8.8 million in the first year of implementation, a range affected by the uncertainty as to the actual number of ADA riders using the alternative services. Further impacts over time must be monitored. There are indications that positive trends will continue, pointing to a successful program for managing ADA demand. OCTA is crafting a financially sustainable ADA complementary paratransit program—a creative mix of initiatives that individually make small impacts while collectively reversing unsustainable growth trends. Clearly, to continue to do so will require identifying and implementing additional changes as time and experience warrant, both to meet consumer needs and maintain sustainable ADA compliance.

ACKNOWLEDGMENTS

The authors acknowledge the former manager of the OCTA Community Transportation Services Department, Beth McCormick, who provided the early leadership and vision to develop a plan by which these initiatives were established. TRB's anonymous reviewers' guidance was much appreciated, as well as helpful direction by colleagues Roy Glauthier and Barry Wilson. The comments and assistance of P. Kirk Visscher further strengthened this paper.

REFERENCES

1. *Federal Register*, Vol. 71, No. 50, March 15, 2006, p. 13456.
2. Hughes-Cromwick, P., H. Mull, and J. Bologna. *Cost-Benefit Analysis of Providing Non-Emergency Medical Transportation*. Transit Cooperative Research Program, Web-Only Document 29. Transportation Research Board of the National Academies, Washington, D.C., Jan. 2006.
3. ICF Consulting. *Estimating the Impacts of the Aging Population on Transit Ridership*. National Cooperative Highway Research Program, Web-Only Document 86. Transportation Research Board of the National Academies, Washington, D.C., Jan. 2006.
4. Burkhardt, J. E., D. Koffman, and G. Murray. *TCRP Report 91: Economic Benefits of Coordinating Human Service Transportation and Transit Services*. Transportation Research Board of the National Academies, Washington, D.C., 2003.
5. KFH Group, Inc. and A-M-M-A. *TCRP Report 70: Guidebook for Change and Innovation at Rural and Small Urban Transit Systems*. TRB, National Research Council, Washington, D.C., 2001.
6. Burkhardt, J. E., A. T. McGavock, C. A. Nelson, and C. G. B. Mitchell. *TCRP Report 82: Improving Public Transit Options for Older Persons*. Transportation Research Board of the National Academies, Washington, D.C., 2002.
7. Menninger-Mayeda, H., P. M. Berger, D. E. Berger, B. McCormick, and D. K. Boyle. Demand Forecasting and the Americans with Disabilities Act: Orange County, California, Transportation Authority's Access Program. In *Transportation Research Record: Journal of the Transportation Research Board, No. 1884*, Transportation Research Board of the National Academies, Washington, D.C., 2004, pp. 55–64.
8. Nelson-Nygaard Consulting. *Senior Transportation Analysis and Senior Mobility Program*. Orange County Transportation Authority, Orange, Calif., 2000.
9. A-M-M-A. *Senior Non-Emergency Medical Transportation Stud.* County of Orange Health Care Agency, Santa Ana, Calif., 2001.
10. A-M-M-A. *ADA Paratransit Service Demand Study*. Orange County Transportation Authority, Orange, Calif., 2003.
11. Multisystems. *2003 Update of ADA Service Compliance*. Orange County Transportation Authority, Orange, Calif., 2003.
12. Transportation Planning and Policy. *2003 Update of ADA Service Compliance*. Orange County Transportation Authority, Orange, Calif., 2003.
13. Dan Boyle & Associates. *South Orange County Transit Study*. Orange County Transportation Authority, Orange, Calif., 2004.