Transportation Demand Management Benchmark
Results from 2008 TDM Program Survey

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To date, limited research has identified comparative metrics for transportation demand management (TDM) programs throughout the United States. Every community is different. Hence the specific activities and strategies employed by a TDM program will likewise differ, but commonalities among programs can be illustrated for comparison and benchmarking. In April 2008, the Texas Transportation Institute conducted a comprehensive survey of TDM programs in the United States. Initial results from this effort are provided for carpool programs, vanpool programs, guaranteed ride home, employer outreach, regional marketing, and performance evaluation. To distinguish characteristics of a big city program from one with a more limited scope, results were generally delineated according to urban area size, including rural areas. However, this delineation did not substantially alter the findings, especially when controlled for population size. Small- and medium-sized TDM programs are generally involved in the same types of activities as are their larger brethren.

Successfully administered transportation demand management (TDM) programs manage congestion and reduce the number of vehicles on area highways, while maintaining full accessibility for individual residents, employees, students, and visitors. Through the use of incentives, pricing, education, and implementation of viable and desirable travel services, TDM encourages travelers to shift demand away from trips by personal automobile to trips by other modes of travel, or to trips that occur at a more efficient time, route, or place. There are three components to TDM, all tightly integrated to build synergies and cost efficiencies:

- Providing actual services and travel options. Transit services and bicycle systems are examples of actual services and options that are provided to travelers. To be successful, TDM must be able to demonstrate viable alternatives to the automobile for travel needs.
- Promotion and education of alternatives. Through marketing, incentives, and education, non–single-occupancy vehicle (SOV) modes of transportation are promoted to travelers. As with consumer products, a potential lifelong customer of non-SOV modes is always simply one good experience away.
- Management through pricing. Balancing the price of services with the use of services is an effective way to create balance in the demand and supply of transportation resources. For example, by managing parking supply through the use of variable parking fees, excess automobile travel can be reduced. Parking pricing helps encourage more transit and shared-car travel to the priced area, and it discourages automobile travel within the priced area.

Altogether, successful TDM programs reduce the number of vehicles using the highway system while providing a variety of mobility options to those who wish to travel. TDM programs employ a variety of alternatives and strategies, mutually supporting the overall objective of SOV trip reduction (\textit{I}).

To date, limited research has identified comparative metrics for TDM programs throughout the United States. Whereas every community is different, and hence, the specific activities and strategies employed by a TDM program will likewise differ, commonalities among programs can be illustrated for comparison and benchmarking purposes. In April 2008, the Texas Transportation Institute (TTI) conducted a comprehensive survey of TDM programs in the United States. Initial results from this effort are provided in this paper.

PREVIOUS EFFORTS TO BENCHMARK TDM PROGRAMS

The prospective benefits from TDM programs can be articulated for both users and society. User benefits include personal cost savings and perceived quality-of-life enhancements. For example, the cost of commuting may be significantly reduced when carpoolers or vanpoolers share the costs. This is especially true in situations with added costs, such as parking fees (2, 3). Survey data have shown that commutes are increasingly becoming congested and stressful, which can be carried over into professional and social situations, exacting a social cost not accounted for in financial accounting. Carpooling enables the riders to relax and allows them to arrive at their destination stress free (2, 4). Societal benefits are most typically associated with reduction in vehicular use [and corresponding reduction in vehicle miles traveled (VMT)] and resulting improvement in air quality. In areas of serious air quality concerns, non-SOV commute alternatives together with managed infrastructure, such as high-occupancy (HOV) lanes and busways, constitute important elements in achieving conformity with air quality targets (5).

Although air quality benefits are the primary reason for regional and statewide financial investment in rideshare incentive programs [most notably, through the Congestion Mitigation and Air Quality (CMAQ) program], estimating the benefits for air quality lacks consistent application throughout the United States. Communities may
directly model trip-reduction and VMT reduction benefits of ridesharing and HOV lanes, produce estimates off model, or directly measure the results of implemented programs (5). Altogether, the variety of estimation methodologies yields a noticeable lack of measurement of the direct benefits on air quality. Various research efforts have attempted to evaluate the pollutant and travel reduction effectiveness of various TDM strategies, but such research has yet to provide solid evidence of the longitudinal impacts of these incentives, either on a regional or sitewide scale.

As evaluated in the literature, effectiveness of TDM strategies varies greatly according to the following factors:

1. Type and degree of strategies (incentives),
2. Affected area, and
3. Extent of concurrent supporting strategies.

The first factor pertains to what strategy is deployed and the extent to which resources are applied to that strategy. For the second factor, effectiveness of a strategy will differ depending on the comparative scale. An extremely successful employer-based vehicular-reduction program may not even be measurable within a ¼-mi radius of the employer. As evaluated in the literature, almost all programs have less than a 1% effect on regional trip making (6, 7). Third, the effects of non-SOV commute programs are not mutually exclusive. Often, a combination of strategies is present when modal use is measured, complicating the isolation of strategies for effectiveness. All three success factors may amplify the success of the TDM strategy when tightly integrated.

Two cross-cutting efforts serve as the principal body of knowledge on the effectiveness of non-SOV commute option programs—one in 1994 and the other in 2002 (5, 8). The former study involved a bounty of data primarily collected by California during a period of mandated trip reduction efforts. Results of the data analysis were used to create a post-process model for FHWA, known as the TDM model. Evaluating worksite-based and regional travel data, the 1994 study concluded that rideshare incentives could potentially eliminate up to 2% of regional VMT and 1% of regional trips (if applied regionally) or up to 3% of VMT and 4% of trips when promoted at employment sites.

The latter study pertained to a review of data submitted by regional and statewide entities participating in the CMAQ improvement program. For most very large and large metropolitan areas, and some medium-sized areas, CMAQ provides a significant amount of funding for rideshare programs. Additionally, to the extent that local and regional transportation service providers use their funding to leverage CMAQ funding, local and regional funds are also reported under CMAQ performance reviews. According to the Committee for the CMAQ Improvement Program, few retrospective analyses of projects are conducted to determine whether estimated changes in travel behavior and emission benefits have actually occurred. Local agency staff members cite the small size and large numbers of projects as a deterrent to conducting such evaluations cost-effectively. Nor is it easy to conduct such evaluations in a methodologically sound way. (5, p. 115)

This has made the evaluation of the effectiveness of TDM programs problematic.

**TDM PROGRAM SURVEY**

The purpose of the 2008 TDM Program Survey was to assemble a comparative benchmark for TDM programs, whether they are employed on a regional or localized scale. Contributions from survey participants were not independently verified for accuracy; as a result, findings rely on the individual's knowledge and access to appropriate data. TDM service providers were limited to those entities that provide service to more than one worksite; individual employers and property management TDM providers were excluded from the survey. Of note is that university programs were included if their operations extended beyond the direct campus (such as operators of transportation management associations).

TTI compiled a listing of known TDM service providers in the United States. This listing was primarily derived from membership in the Association for Commuter Transportation as well as links to organizations from state departments of transportation and metropolitan planning organizations. From this listing, TTI selected prospective contacts (typically the director or coordinator of the TDM program) for each service organization and sent a series of e-mail solicitations (initial solicitation plus reminder follow-up e-mails), requesting participation in the research effort. Participants completed an online survey developed expressly for this research. In total, 289 agencies across 38 states (including the District of Columbia) were solicited. Of these, TTI received 122 unique agency responses, constituting a 42% response rate. This result yielded a confidence interval of ±6.76 at the 95% confidence level.

The analysis of topic for this paper concentrates on citywide, countywide, or regional TDM programs. As a result, survey data from subarea programs (including transportation management associations and universities) and agencies with only a minimal involvement in TDM (such as transit agencies that did not expressly state involvement) are excluded from analysis in this paper. In total, 67 programs across 46 urban and rural areas are represented in this analysis, shown in Figure 1.

For the purpose of organization, very large urban areas have more than 3 million population, large is between 1 million and 3 million, medium is between 500,000 and 1 million, small is fewer than 500,000, and rural comprises an area with no dominant urban area.

These classifications are the same as in the annual TTI Urban Mobility Report (9).

**Carpool Programs**

Nationally, carpooling is the most common modal alternative to the SOV, for its national mode share for commuting is multiple times higher than all other modes besides driving alone. If a TDM agency wishes to encourage carpooling outside household arrangements, ridematching is typically employed. Typically, ridematching is most effective when offered regionwide, large enough to provide multiple viable matches, and current for contact information.

However, most ridematching programs have small-sized ridematching databases especially relative to their urban population size. As shown in Figure 2, approximately half of all programs, regardless of urban area size, have fewer than 2,500 people in their regional ridematching databases. That said and to be expected, larger database sizes correspond with larger urban areas, with over 30% each of large and very large urban areas with more than 15,000 registrants. Unknown from the data in Figure 2 is the extent to which the small urban areas purge their databases, perhaps explaining their appearance in the category of 10,000 to 14,999. Annual additions to the ridematch database are fairly proportionate to the size of the database, as shown in Figure 3. However, of note is that most agencies are more aggressive with new entries, typically exceeding the 10% annual threshold for new entrants.
FIGURE 1  Regions responding to TDM program survey.

FIGURE 2  Size of carpool database.
Vanpool Programs

Unlike carpooling, even the most successful vanpool programs are limited to the number of vans available. As such, vanpools tend to be viewed as an overall mobility option for regions with disaggregated employment nodes, or a means of addressing trip making for specific employers.

As could be expected, the larger the metropolitan area, the greater is the number of operational vanpools in the region. As shown in Figure 5, though, large urban areas tend to lag behind their medium-sized and very large-sized counterparts in the total number of vanpools in service. Indeed, half of responding medium-sized communities have more than 100 vanpools in operation, whereas none of the responding large-sized communities exhibit the same.

Figure 6 shows the mean percentage of a region’s vanpool fleet that corresponds with different size categories. Despite the recent trends toward the use of minivans and the discontinuation of large-size vans (which seat 10 to 14 people), more than 60% of the operational vanpool fleet fall in the midrange and large categories, with no clear favoritism across urban area size save for small urban areas’ preference for minivans.

Finally, Figure 7 shows who has primary responsibility for various administrative tasks: the agency itself (or regional partner), third-party entity and vendor, or individual vanpools. Generally, the agency tends to be almost universally responsible for placing riders in vans, whereas the individual vanpool is responsible for gasoline, tolls, and other fees associated with operating the vanpool on a day-to-day basis. Besides these two general categories, the division of responsibility is conducted by various entities based on their institutional arrangements.

Figure 8 shows the types of vanpool subsidies (beyond capital and administration overhead) that are used by various agencies. Almost one-third of all vanpool service providers do not offer any subsidies for service. However, for those that do offer subsidies, agencies in all urban area sizes offer, on average, more than one type of subsidy. Incentives for drivers (such as free use of the van) are the most common, followed by flat-rate pricing or empty-seat subsidies.

Emergency or Guaranteed Ride Home

A critical barrier to commuter use of non-SOV modes is the perceived dependence on a vehicle during work hours. Commuters desire having a vehicle ready for use, to run an errand or have an off-site meeting, or for just in case an emergency occurs. One strategy offered is guaranteed (emergency) ride home (GRH) programs for...
FIGURE 4 Placement rates for carpools and vanpools.

FIGURE 5 Number of operational vanpools in region.
FIGURE 6 Mean percentage of van size by size category.

FIGURE 7 Administration of vanpools.
Emergencies or unexpected working hours (such as a late meeting). Evidence suggests that a GRH program will encourage some commuters who would not otherwise use non-SOV modes to do so, for the service seems to provide peace of mind to commuters, although they may never find a need to use it (7).

Figure 9 shows the maximum number of GRH rides per year that are offered to program participants. As seen, most programs limit the number of GRH trips to four or fewer per year, although many programs do not confine their trips to a set number of trips (represented as Other in this graphic). Figure 10 shows the average number of program participants who use GRH services. Notably, three-quarters of all responding agencies report that fewer than 500 individuals use GRH services per year. Finally, Figure 11 indicates the process for payment for GRH services. Approximately half of responding agencies use vouchers provided to individual participants. A notable percentage of rural, large, and very large urban areas use direct transaction payments to GRH service providers, such as taxi, rental car, and transit services.

Marketing and Outreach

Marketing and outreach for modal alternatives form the foundation of many TDM programs. As seen in the survey results, marketing is conducted through a variety of strategies and mechanisms, with the attempt to find what works for each community. Figure 12 illustrates the types of employer outreach conducted by regional TDM programs. Maintaining a personal level of contact with employers, through site visits, participation in employer associations, or presentations to businesses, rates highly for TDM programs incorporating an employer outreach program. With the exception of e-mail solicitation, impersonal attempts for outreach (such as direct mail and newspaper advertising) are not used as often. As shown in Figure 13, employer outreach programs incorporate a variety of marketing and education strategies, with no strategy particularly dominant.

Figure 14 shows the specific marketing strategies deployed in a regional setting. The most common strategy is a program website, followed by employer marketing and commute fairs. The use of social marketing, an emerging concept for TDM promotion, is limited to less than 20% of responding programs. As could be expected, peer-to-peer promotional efforts tend to be more common in smaller communities.

Performance Evaluation

As seen in Figure 15, a majority of programs evaluate their performance, for program awareness, vehicular trip reduction, modal shifts, and outreach measures. The survey did not address nor examine the robustness of these evaluations; it just asked respondents whether or not they do the evaluation for the criteria. The least common criteria evaluated were customer satisfaction, goals achievement, and cost-effectiveness.

Figure 16 provides the specific metrics used in performance evaluation. Metrics for which the agency likely has the requisite data available, such as number of individuals participating in events and number of operational vanpools, rate highly in regard to employment. By comparison, those metrics whose data may be external to the
FIGURE 9  Maximum number of GRH rides per year per participant.

FIGURE 10  TDM program participants using GRH services each year.
FIGURE 11 Payment process for GRH services.

FIGURE 12 Methods for employer outreach (ETC = employee transportation coordinator).
FIGURE 13 Employer outreach and marketing strategies deployed (TMA = transportation management association, TMO = transportation management office).

FIGURE 14 Regional marketing strategies deployed.
FIGURE 15  TDM performance evaluation.

FIGURE 16  Performance evaluation metrics employed.
agency, such as travel time delay reduction or emissions reduction, are employed by only a small percentage of TDM programs. Interestingly, more than 70% of respondents stated they evaluate their program for vehicular trip reduction (Figure 15), yet slightly more than 60% claimed number of vehicular trips reduced as a metric (Figure 16, with lesser rates for SOV rate, transit ridership, and mode shifts, additional components to vehicular trip reduction). Thus, there is a gap of 10% of respondents who claim evaluation for vehicular trip reduction but do not actually measure it.

FINAL THOUGHTS

The purpose of this survey was to provide a mechanism for benchmarking TDM program services and administration. To distinguish the characteristics of a big city program from that with a more limited scope, results were generally delineated by urban area size, including rural areas. Interestingly, this delineation did not substantially alter the findings, especially when controlled for population size. In short, small- and medium-sized TDM programs are generally doing the same types of activities as their larger brethren are.

This analysis only provided descriptive statistics, likely useful for TDM practitioners toward defining what their TDM programs could be doing, while learning from their peers. However, the difference between “could” and “should” is found in the relationship among activities, funding, and performance. This relationship will be further explored in subsequent analysis from the 2008 TDM Program Survey.

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