

Impact of Suburban Employee Trip Chaining on Transportation Demand Management

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Suburban commute trip-chaining findings, part of a broader study to assist in the design of transportation demand management (TDM) strategies at an emerging transportation management association, are presented. Data were collected from 42 employer sites and 1,845 employees (48 percent response rate), using a self-administered questionnaire. Travel pattern data revealed that the suburban employees rely heavily on their vehicles to gain access to everyday services. Because this creates a present and future deterrent to ridesharing, the results indicate the need for greater attention to the entire commute trip in the form of new rideshare support services and better land use patterns. Employees exhibited a legitimate need for access to a vehicle during the day. The data defined a full work trip as including stops for meals, shopping, and daycare. The study found that the employees were twice as likely to make stops on their way home from work as they were during the morning; predominant morning chaining was to get gas (45.2 percent), to go to the bank (22.7 percent), to go to the dry cleaners (19.4 percent) and to eat (16.4 percent). After work, travel behavior is to get gas (63 percent), to shop (55.8 percent), to go to the bank (49.6 percent), and to go to the dry cleaners (31.5 percent). Therefore, even if the need for gas is eliminated by forming a rideshare arrangement, access must also be provided to convenience shopping and banking and dry cleaning services to fully support the ability to regularly use a shared-ride mode. Policy recommendations are made for minimizing the negative impact of linked trips on the effective implementation of shared-ride services. These include a better mix of land uses and the delivery of services to employer sites. In summary, a complex system of incentives and personalized attention that rewards behavioral changes in trip making will be required to lessen suburban travel demand.

Suburban traffic congestion, trip reduction ordinances, and air pollution regulations have increased the reliance on the development of effective transportation demand management (TDM) measures. As never before, commute management professionals are called on to demonstrate the effectiveness of shared-ride options, such as carpools, vanpools, and buspools, in accomplishing TDM objectives to reduce the number of single-occupancy vehicles on congested road facilities (1). However, the impact of complex land use relationships and employee travel behaviors, especially work trip chaining, on changing employee commute modes may often be underestimated.

Commuters drive alone to work because they prefer the comfort and privacy of the automobile, but they may also legitimately need access to a vehicle before, during, and after

work. The literature indicates that more than 60 percent of the office workers who drive make intermediate stops on the way to or from work at least three times a week (2). Complex social, economic, technological, and cultural factors determine this suburban transport behavior (3). Workers who totally depend on their cars to gain access to basic needs and everyday services are reluctant to make commute arrangements that limit their freedom of mobility. In such circumstances, TDM programs must offer commuters some other efficient way to conduct their personal business.

In order to design shared-ride services that induce drive-alones to modify their commute habits and modes, it is essential to gain a better understanding of why commuters need their private automobiles during the journey to work. Trip-chaining behavior was examined as part of a larger study of employee commute habits and perceptions in Brentwood, Tennessee. Aspects of trip chaining included why, to what extent, and for what reasons employees needed their vehicles before, during, and after work. The data were used to identify (a) the frequency of chained trips, and (b) the types of personal business activity or stopping that accompany the morning and evening work trip.

Finally, policy implications and methods for dealing with the problem by adjusting land use relationships and providing on-site services are identified. Trip-chaining destinations define the mix of retail services and land uses that support shared-ride objectives at employer sites. Modifying commute chaining behavior will influence mode choice and aid in the reduction of net peak-hour vehicle-miles of travel (VMT).

DESCRIPTION OF THE STUDY ENVIRONMENT

Brentwood, Tennessee, is a suburban community in the Nashville urban area characterized by trends such as rapid population and employment growth, vehicle availability, low residential density, and campus-style office developments with ample free parking. There was excellent highway access but no shared-ride initiatives until the development of the Brentwood Area Transportation Management Association (BATMA) in 1988. Brentwood incorporated in 1969 with only 2,169 people as a bedroom suburb immediately south of Nashville, and has become the premier office location in the region and the highest growth area in Williamson County. The 1990 population of 16,720 is projected to more than double again to 37,400 by 2010. Employment is expected to increase 150

percent between 1990 and 2010 from 11,200 to 28,300. Vehicles available per household will increase from 2.4 in 1980 to 3.0 in 2000. Where there was less than 1,000,000 ft² of combined office-commercial space in 1980, 9,300,000 ft² is projected by 2000, including the largest retail mall in the state.

The predominant land use—single-family residential on large lots—occupies 89 percent of all uses. The majority of the 45 percent undeveloped land in the community is also zoned for low-density residential. The zoning ordinance makes no provision for planned unit developments and actually prohibits mixture of uses. For instance, most of the largest office park is zoned C-1, which prohibits location of any retail use within the office zone. It is evident that the trends under way favor the increased use of the private automobile and imply future traffic problems. Even with numerous planned improvements, projected traffic volumes will strain the capacity of many roads. In particular, the city's major thoroughfare and I-65 currently function at or near capacity during peak-hour operation, and projections indicate saturated traffic volumes (Level of Service E-F) on other major facilities by 2000. The map shown in Figure 1 locates Brentwood in relation to Nashville and presents traffic projections for 2010.

BATMA

BATMA was established in September 1988 to improve traffic congestion in the area. Brentwood was the first southern community successful in establishing a TMA. The major effort of the first year was the implementation and analysis of the employee travel needs survey. The survey evaluated baseline conditions and perceptions to match congestion management techniques to employee needs and problems. Occurring at the same time were activities to build transportation coalitions, expand mobility options, and strengthen land use and transportation.

RESEARCH METHODOLOGY

The employee travel needs survey assessed ambient commute conditions and baseline commuter travel patterns and perceptions to evaluate the appropriateness of various congestion management strategies and to gain an understanding of the area commuter travel market (4). All employer sites of more than 40 employees and representative sites with less than 40

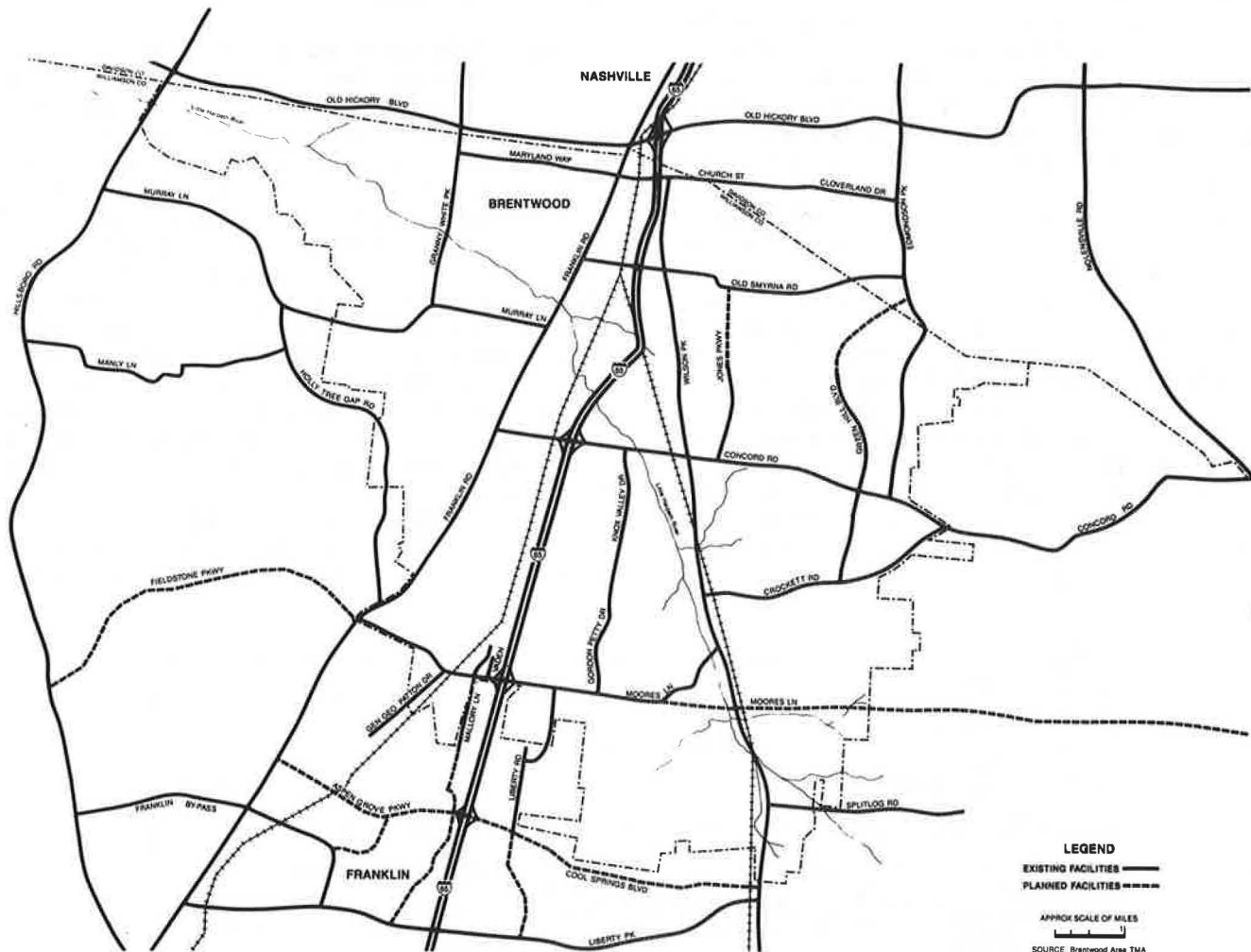


FIGURE 1 Brentwood area location map.

employees were included. Forty-two employer sites participated in the survey; 1,845 employee surveys were returned, for an overall employee response rate of 48 percent. The survey instrument was a self-administered questionnaire containing 31 questions on congestion, stress, travel patterns, current and potential mode, on-site services, and incentive preferences.

COMMUTER PROFILE

Before presenting the trip-chaining results, a brief commuter profile is presented to provide a better understanding of the suburban respondents. In general, the majority were female drive-alones, who characterized their commute as congested and stressful but who were interested in commute alternative incentives. Clerical, managerial, and professional or technical workers accounted for 78 percent of the total respondents. Thirty-seven percent of the respondents were male and 63 percent were female. The largest age category was 30 to 39 years old (34 percent) followed by 20 to 29 years old (27 percent) and 40 to 49 years old (22 percent). More than half of the total respondents had annual household incomes under \$40,000.

Their current mobility appears reasonable in terms of commute distances and times. Two-thirds of the employees have one-way commutes of 25 min or less. Almost half (49 percent) live 10 mi or less from their workplace, whereas 42 percent live 15 mi or more from work. The majority reside in adjacent Davidson County (55 percent) or within Williamson County (31 percent), whereas only 15 percent live and work in Brentwood.

Stress and congestion are elevated at disproportionate levels to the reasonably mobile commute distances and times. Sixty-five percent of the total employees find their travel on the Interstate to be always or usually congested, compared with 59 percent who say local streets are always or usually congested. Overall, 85 percent of the total employees perceive some degree of congestion characterizing their commute. In addition, half of the total respondents rated their work trip to be as stressful as anything they do all day. One-quarter of the total respondents described their commute experience as more to much more stressful than anything they do all day.

Of the total 1,845 employees surveyed, 87 percent typically drive alone to work. Of the 11.2 percent who carpool, 9.5 percent ride in two-person carpools. The high drive-alone rate

and low rideshare rates were to be expected in the suburban county lacking transit or an organized rideshare effort. However, almost half of the respondents were willing to consider a future mode other than driving alone to work, favoring carpools by 31 percent. Figure 2 shows the future mode choice data.

However, the employees indicated they would not change modes without the proper incentive. Ironically, more employees were able to identify an incentive to rideshare (63.3 percent) than were able to select a future alternative mode (48 percent). The preferred employee rideshare incentives included access to a park-and-ride lot near home (20 percent), a lunchtime shuttle (16 percent), flexible work schedules (14 percent), employee cafeterias (14 percent), employer-provided vanpools (12 percent), transit (12 percent) and matching assistance (11 percent). Also mentioned were on-site childcare (8 percent), priority parking (8 percent), recognition (7 percent), vanpool subsidy (6 percent), HOV lanes (5 percent), and other on-site services (4 percent).

Grouping the expressed incentives in relationship to site needs reveals that more than one-quarter identified a site-related incentive (lunch shuttle, cafeteria, child care, and other).

BEFORE AND AFTER WORK TRAVEL NEEDS

The data indicate that the majority of the employees chain other destinations onto their morning and evening commute trips. Only 9 percent of the total respondents go directly to and from work without any trip chaining. Evening stops were more than twice as likely to occur as morning stops. Figure 3 presents before and after work travel patterns. More than half of the employees chain trips onto the morning commute, whereas 49 percent go directly to work each morning without stopping. Of those who stop, 18 percent make a chained trip once a week, 11 percent stop twice a week, 5 percent stop three times, 2 percent stop four times, and 15 percent stop every day of the work week. Trip-chaining behavior is more prevalent on the return trip, with 81 percent making some stop during the week. Of these, 22 percent stop once a week, 26 percent stop twice a week, 15 percent stop three times a week, 5 percent stop four times a week, and 13 percent chain trips every day.

A pattern of overlapping morning and evening stops by number of days stopping is discernible. For instance, making no or only one stop in the morning correlates with making

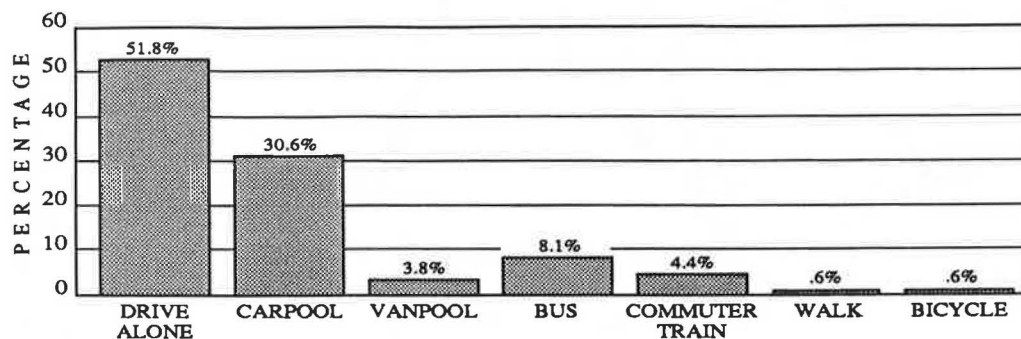


FIGURE 2 Potential commute modes (N = 1,819).

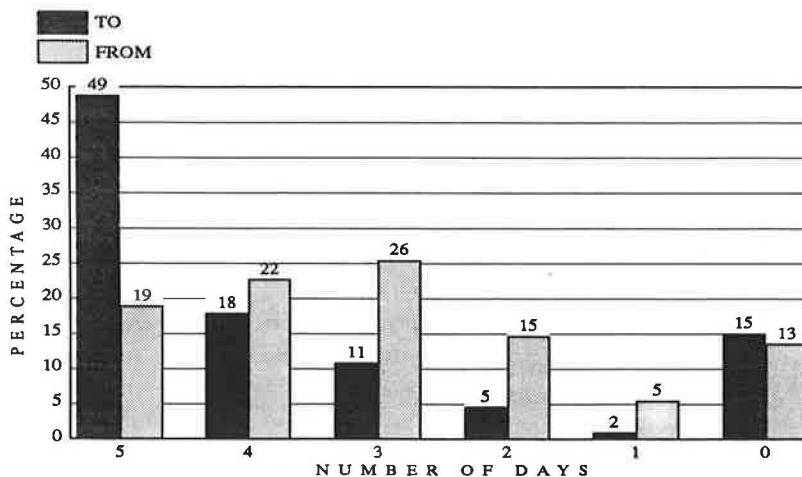


FIGURE 3 Number of days respondents go directly to and from work without chaining trips (*N* = 1,796 and 1,791, respectively).

few evening stops. Of those who stopped two mornings a week, 43 percent also stopped two evenings a week. More than half of the respondents who trip chain three mornings a week also trip chain three evenings a week, and so on. Table 1 presents the relationship between morning and evening stopping behavior by the number of days the behavior occurred.

BEFORE AND AFTER WORK STOPPING DESTINATIONS

The data also identified the most common employee chaining destinations or travel needs. Fulfilling employee trip needs can be provided for by modifying the environment of the work site, whether by varying land use configurations or by stimulating the market to respond to service demands by an innovative delivery system. Gaining insight into stopping destinations is key to exploring how the suburban environment might substitute or satisfy these needs with different land use types and densities or service delivery relationships. Table 2 presents the types of trips or destinations that Brentwood area employees chain to the work commute.

The predominant reason Brentwood area employees stop to and from work is to get gas (45 and 63 percent, respectively). Other trips that are frequently incorporated in the morning work trip include going to the bank (23 percent), to

the dry cleaners (19 percent), to eat (16 percent), to shop (12 percent), to do work-related errands (10 percent), and to child care arrangements (10 percent).

Stops tend to be more frequent on the way home from work, presumably because employees have greater freedom with their time. Apart from fuel stops (63 percent), commuters frequently stop on the way home to shop (56 percent), to go to the bank (50 percent), to go to the dry cleaners (31 percent), to eat (20 percent), to go to the doctor (14 percent), and to perform work-related errands (13 percent).

Because most of the total respondents make stops for fuel, retail shopping, and banking during the commute, moderating or eliminating the need to travel to satisfy these needs could significantly improve employee opportunity to rideshare. The most obvious observation is that if a person joins a vanpool or rides the bus, the need for gas is eliminated. Then, mixing office and retail uses would enable employees to walk to perform other shopping errands. Banking needs can simply be provided by the installation of automated teller machines (ATMs) in building lobbies or snack rooms combined with direct-deposit opportunities.

Several child care-related observations result from comparing the stopping behavior of Brentwood area employees. More than 20 percent of the total morning stops are child-related, either to take young children to preschool or day care (10.4 percent) or to take older children to school (10.2 per-

TABLE 1 RELATIONSHIP BETWEEN A.M. AND P.M. STOPS (*N* = 1,736)

		P.M. Stops					
A.M. Stops	0 Days	1 Day	2 Days	3 Days	4 Days	5 Days	TOTAL
0 Days	60%	4%	9%	10%	10%	7%	266
1 Day	12	38	19	6	9	16	32
2 Days	6	10	43	24	11	6	80
3 Days	6	5	17	54	14	4	192
4 Days	4	6	14	26	44	6	316
5 Days	5	4	13	24	22	32	849
TOTAL	233	91	254	439	392	328	1736

TABLE 2 REASONS FOR STOPPING BEFORE AND AFTER WORK ($N = 1,845$)

	TO WORK		FROM WORK	
	%	#	%	#
To get gas	45	834	63	1163
Educational	1	15	5	97
Childcare	10	192	12	227
Children to School	10	188	6	114
Pick up/Drop off Carpooler	3	58	3	61
To Eat	16	302	20	366
Dry Cleaners	19	358	31	582
Bank	23	419	50	916
Doctor	6	103	14	258
Exercise	2	36	11	206
Entertainment	1	18	9	172
Shopping	12	218	56	1029
Pick up/Drop off Other	4	68	1	27
Work Related	10	194	13	234
None of Above	8	148	3	61

cent). In the evening, more commuters pick up preschool children than stop for school children, probably because school hours rarely coincide with work hours so that many children transfer to an afterschool care situation or ride home some other way. Company-provided exercise and child care facilities, cafeterias, and dry cleaning contracted through a concierge vendor, particularly in large single-employer buildings, could also improve TDM participation and aid in congestion reduction.

TRIP-CHAINING

The types of trips that employees typically chain during the commute are presented in Table 3. Because of their greater frequency, and consequent impact on both the highway system and ability to rideshare, the trip chaining that accompanies stops for gas, banking, dry cleaning, eating, work errands, and child care is of special concern. For instance, commuters who stop for gas on the way to work also most often stop for eating (21 percent), dry cleaning (16 percent), the bank (16 percent), and child care (12 percent). Therefore, assuming that gas stops could be reduced or eliminated through a vanpooling arrangement, an additional, comprehensive network of banking, child care, and eating services would be required to fully support a continuing ability to rideshare. Trip chaining most often associated with dry cleaning stops includes eating (23 percent), child care (13 percent), and performing work errands (11 percent). Assuming that the suburban site lacked midday transit, then even if concierge dry cleaning were made available, the eating and childcare needs must be provided for on or near the site. A child care facility, restaurants close to the work site, and use of fleet vehicles to do work-related errands could then fully eliminate the need for a vehicle during the day.

The findings validated an assumption that the greatest consistency of overlapping morning and evening stops would be for child care (91 percent), ridesharers (60 percent), and dry cleaning (33 percent). In addition, one-third of employees who eat in the morning also eat in the evening. In addition, certain typologies can be glimpsed according to the types of trip-chain destinations commonly accessed.

Eighty percent of employees who drop their children off at child care on the way to work also pick them up after work. This category of commuting employee performs little before or after work trip chaining other than the child care respon-

TABLE 3 RELATIONSHIP BETWEEN FACILITY USE BEFORE AND AFTER WORK ($N = 2,459$)

Stops to Work	Stops Made on Way From Work													TOTAL	
	Educat	Childcare	To Sch.	Carpool	To Eat	Wk Err	Cleaner	Bank	Doc	Enter	Exer	Gas	Shop		
Education	62%	12%	0%	0%	12%	0%	6%	0%	0%	0%	0%	6%	0%	100	16
Childcare	2	91	2	1	.5	.5	1	.5	0	0	0	0	0	100	192
Children to School	5	24	35	1	2	4	7	7	1	0	.5	4	3	100	188
Drop Carpooler	2	15	7	60	2	0	2	3	0	0	0	2	0	100	58
To Eat	9	9	4	3	34	3	10	11	1	1	1	6	2	100	302
Work Errands	10	8	10	.5	19	30	11	3	0	1	1	0	1	100	192
Dry Cleaners	6	13	6	.3	23	10	33	3	1	0	1	1	1	100	350
Bank	6	10	4	1	23	8	16	17	3	2	.5	4	2	100	375
Doctor	6	10	3	1	33	7	15	13	3	3	0	1	0	100	67
Entertainment	0	0	0	14	14	0	14	14	0	29	1	14	0	100	7
Exercise	6	0	6	0	25	12	12	0	0	6	12	6	6	100	16
To Get Gas	4	11	4	2	19	7	15	15	1	1	1	10	2	100	647
General Shopping	2	2	2	3	19	5	18	17	2	2	1	11	10	100	94
None	5	3	1	1	12	5	12	16	1	0	1	7	8	100	147

sibility. This is, presumably, because this single-trip task is demanding and constrained by elements of time. Thus, it is not their habit to make stops during their work trips. For these reasons, they might make ideal ridesharers provided that on-site child care was provided by the employer or child care facilities were incorporated within a convenient park-and-ride lot. Likewise, working parents dropping children at school in the morning perform minimal trip chaining on the way home, although one-quarter also travel to the child care arrangement and more than one-third also pick up school-age children.

Observing the generally limited trip chaining of working parents (and assuming the sacrifice of other trips altogether or the shifting of trips to other times of the day) leads to the conclusion that working parents would use additional site services and a better mix of retail within walking distance.

General shopping is most closely associated with stopping to eat.

Ridesharers tend to do little trip chaining other than child care responsibilities.

Employees who go out to eat are likely to perform a variety of other activities once they are in their vehicles.

Medical visits most typically chain with eating and dry cleaning.

Thirty percent of people who conduct business errands in the morning are also likely to do errands in the evening. They also eat, take children to school, pick up cleaning, and pursue educational goals, but they do not often make stops for gas, medical, entertainment, or exercise purposes.

Conversely, employees who stop for entertainment purposes rarely pursue education, have child care responsibilities, perform work errands, or go to the doctor, but they frequently get gas, go to the bank, go to the dry cleaners, and stop to eat. They are sociable types who are also likely to have someone rideshare with them.

Morning education stops correlate with evening eating (13 percent) and child care responsibilities (13 percent). Making no morning stops on the way to work correlates most frequently with stopping in the evening at banking establishments (16 percent), restaurants (12 percent), dry cleaning stores (12 percent), and general retail shops (8 percent).

EMPLOYEE PREFERENCE FOR ON-SITE SERVICES

An often-cited solution to moderating employee trip-chaining behavior is to provide a mixed-use multiservice environment on or near major work sites. In order to further pursue the relationship between the availability of services and trip-making characteristics, participants were asked to identify facilities

1. That they think they now have access to, and
2. To which they desired greater access where access was defined as within walking distance (three blocks).

The greatest employee interest is for additional on- or near-site post office facilities, restaurants, general retail, snack

bars, and convenience shopping. By way of explanation, for most respondents, the existing post office is inconveniently located in the extreme northeast corner of the community, separated from the largest office park by a congested intersection. Then, C-1 zoning limits the location of snack bars, because although they may be located within a building for building occupants only, it is prohibited to advertise their establishment for use by the general public.

Table 4 presents data on facilities that the employees would like to have within three blocks and on facilities that the employees use outside Brentwood. This comparison reveals some unmet site needs. For instance, 49 percent of the 292 employees who identified a need for a more conveniently located restaurant to their work site frequent restaurants outside Brentwood. Of the 193 employees who identified a need for on-site convenience stores, more than one-quarter shop outside the community for convenience items.

In general, however, employees who identified the need for closer dry cleaning, exercise facilities, post office, and banks are not leaving the area to fulfill these needs. Only for medical, child care, and exercise facilities do greater numbers of employees conduct daytime business outside instead of inside the city. These data are promising in terms of the success and employee usage of concierge services and additional retail. They indicate that most employees prefer to shop closer to the workplace when it is possible to do so.

Types of facilities desired on or near the site were examined by income levels and current commute modes. Lower annual household income employees (<\$20,000) are most likely to desire closer medical facilities; as incomes rise, preference diminishes. The most marked preference for closer child care and restaurants is in the \$20,000 to \$29,000 range. Employees in the \$50,000 to \$59,000 range identified a need for more convenient banking and snack bars. The lower incomes are the least interested in a closer post office, whereas incomes in the \$40,000 to \$69,000 range are the most interested. Lastly, employees in the \$20,000 to \$49,000 range are most interested in more convenient dry cleaning.

Drive-alones are most interested in a closer snack bar (17 percent), restaurants (11 percent), medical services (10 percent), and convenience stores (7 percent), whereas carpoolers desire closer medical services (14 percent), snack bars (13 percent), and restaurants (12 percent).

TABLE 4 FACILITIES ON SITE VERSUS FACILITIES DESIRED ON SITE (N = 1,845)

FACILITIES	NOW ON-SITE	DESIRED ON-SITE
Medical	38%	10%
Snack Bar	40	20
Convenience Store	38	18
Restaurant	50	31
Child care	18	10
Banking	60	13
Dry Cleaners	41	11
Exercise	20	19
Post Office	18	32
General Retail	32	25

POLICY IMPLICATIONS

The research defines a full work trip for most Brentwood area employees as including daycare stops, meals, and convenience shopping. These imply a legitimate need for access to a vehicle during, before, and after the work day, although these travel needs also interfere with the ability of the employees to share rides as evidenced by the high drive-alone rate (87 percent). Therefore, several conclusions are drawn:

1. Effective TDM programs must focus on the entire trip and not just computer matching of employees into vanpools, carpools, or transit and workplace surveys. Focusing on the whole trip entails providing access to a comprehensive range of employee needs.

2. In built-out suburban settings with campus-like sites, the provision of services on site through concierge arrangements that bring the service to the employee may offer the greatest relief. But in the long run, particularly at emerging activity centers, the best strategy is a better, richer mix of land use relationships. Infilling of density and a greater variety of uses may also be possible at mature low-density parks.

3. Workers need assurances that they will not be stranded if they must work late or make an emergency trip home. Guaranteed ride home programs using taxi vouchers or transit passes address this need for security.

4. Workers need services and amenities at or within convenient walking distance of their workplace. Mixed-use zoning regulations that allow a better blending of retail and office should be promoted. A suitable pedestrian environment links resources and uses with continuous sidewalks on both sides of the street and good lighting to encourage pedestrian activity. These elements should be promoted through the site-plan review process.

5. In order to fulfill their total daily travel needs in settings that lack transit or pedestrian access to a full range of services, commuters need access to some form of daytime transportation, whether it is the use of company fleet vehicles, taxi vouchers, shuttles, or transit.

6. Clustered buildings enable suburban employees to share service and be closer for sharing rides; they help overcome some of the limitations of low density.

7. Concierge services, such as dry cleaning pick-up and delivery, and in-house amenities, such as ATMs and direct banking deposit and cafeterias, promote a supportive environment for commute alternative programs. Location of services and facilities at park-and-ride lots is another method of delivering services to the ridesharing consumer.

8. The data identify a potential new rideshare product for rideshare agencies and particularly TMAs that seek nondues income sources. Although the need is clearly there to focus on the whole work trip to enhance rideshare rates, in most suburban markets there is a void in delivery of services to the workplace. An innovative response to the need would be to market the more traditional concierge services, such as dry cleaning, with packaging and delivery of innovative concierge services, such as delivery and pick-up of prescriptions, video tapes, gifts, and shoe repair. For instance, remote rental transaction booths are being test-marketed in several U.S. cities by Budget Rent A Car.

9. Private-sector provision of services must make good business sense to become acceptable. For instance, although food services may attract higher rents and help a property lease more quickly, health clubs may not. Federally funded market research is needed to stimulate private-sector confidence in implementing innovative practices.

10. New intelligent vehicle-highway system technology should take into account the trip-chaining behavior of commuters and install on-board systems to allow individuals to perform certain functions from their vehicles.

In summary, the scale and dimension of many existing ride-share programs may need to transition to TDM programs to more fully address the range of commuter travel needs. Ride-sharing services must evolve from priority on commuter matching to also promote full-service programs with integrated strategies that address the complex travel needs of today's commuter. At the same time, the impact of land use patterns on commuter trip chaining and the subsequent ability to rideshare necessitates program emphasis on both the macro, or regional, level and the micro, or corridor, cluster, and site levels. A closer working relationship between transit and ridesharing professionals and land use planners is the key to achieving integrated and effective transportation management strategies.

DIRECTIONS FOR ADDITIONAL RESEARCH

This study identified the frequency and types of trips made during the usual journey to work and proposed that mixed-used environments could satisfy a wide range of employee needs previously satisfied by automobile travel. Going beyond this identification, future research should

- Isolate the need for a vehicle before and after work for trip chaining from other reasons commuters prefer to drive alone (fuel costs, parking costs and availability, joy of driving, congestion levels, etc.).
- Identify the intensity, mix, and scale of land use that accomplishes the goal of supporting shared-ride trip making.
- Identify the economies of scale that may exist in the provision of suburban on-site services. What minimum employment densities are required to supply services profitably?
- Identify the types of services typically supplied to the worksite by vendors and the ways that they could be packaged more effectively.
- When minimum employment densities per building may not exist, are there ways to package and market the concierge concept in the lower floor area ratio settings?
- Examine the relationship between employee productivity and satisfaction and the provision of on-site services. Additional on-site services may appeal to managers and CEOs on the basis of these factors more than ridesharing, so research should be pursued in this area.

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