TUTI Report 41-2005

Using Before and After Household Travel Surveys to Evaluate a TravelSmart Program

A paper presented at the
28th Australasian Transport Research Forum, Sydney, September 2005

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23 June 2005

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The Victorian Department of Infrastructure, as part of its long-term commitment to the development of sustainable transport policies and strategies, has taken a lead role in the implementation of large-scale TravelSmart programs, the objectives of which are "to maximise sustainable travel and activity choices made by individuals, households and organizations through the utilisation of voluntary behaviour change tools".

In 2004, the Department conducted a large-scale community TravelSmart project in the local government area of Darebin, in the inner north-eastern suburbs of Melbourne. Approximately 30,000 households were contacted over several months in mid-2004, using the IndiMark technique. The Victorian 2004 TravelSmart project was subjected to a full independent evaluation using a variety of techniques. This paper describes the procedures used in the conduct of Before and After household travel surveys in March 2004 and March 2005. The survey methodology was based on a self-completion one-day travel diary questionnaire. This questionnaire was personally delivered to sampled households two days before their designated Travel Day and personally collected one day after their Travel Day. On the evening before their Travel day, households were phoned to remind them of their Travel Day and to motivate them to complete the survey.

The paper describes the survey methodology, and provides details of the procedural outcomes of the Before and After surveys. Response rates of 52% and 65% were obtained in the Before and After surveys, respectively. The 52% response rate in the Before survey compared favourably with the 41% response rate obtained in Darebin in the 1994-96 VATS survey. The increase in response rate is thought to be mainly due to the higher levels of personal contact designed into the NESTS survey. Indeed, an analysis of response rates in the Before and After surveys as a function of the extent of personal contact on delivery of the survey forms and via Motivational Phone Calls showed that the personal contact on delivery increased the response rate by an average of 26 percentage points while the motivational call increased response rate by an average of 10 percentage points.

The results of the Before and After household travel surveys indicate that households who participated in the program decreased VKT in the order of 7%, but did not show an increase in public or non-motorised transport use. Households who did not participate in TravelSmart appear to have increased their car travel and decreased their use of public transport. Over the whole target population, the positive travel behaviour changes of participating TravelSmart households appear to have been countered by the negative travel behaviour changes of non-participating TravelSmart households to the degree that there is negligible change across participants and non-participants. On the other hand, the odometer surveys conducted as part of the Before and After surveys indicated a reduction in VKT across participating and non-participating households of about 5%, which is consistent with the 2-3% reduction in on-road traffic volumes in the study area identified in a parallel evaluation study using secondary data sources.

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1 Introduction

The Victorian Department of Infrastructure, as part of its long-term commitment to the development of sustainable transport policies and strategies, has taken a lead role in the implementation of large-scale TravelSmart programs, the objectives of which are "to maximise sustainable travel and activity choices made by individuals, households and organizations through the utilisation of voluntary behaviour change tools".

In 2004, the Department conducted a large-scale community TravelSmart project in the local government area of Darebin, in the inner north-eastern suburbs of Melbourne. Approximately 30,000 households were contacted over several months in mid-2004, using the IndiMark technique (James et al., 1999). The objectives of the project were as follows:

- To achieve a change in travel behaviour of approximately 10% reduction in car trips and car kilometres, across the target population, without restricting personal activity, or adverse community or political reaction.
- To raise awareness of travel behaviour change, to facilitate a greater understanding of travel behaviour change, and to encourage positive attitudes towards travel behaviour change by the community, local and state government staff, and politicians.

To facilitate evaluation of the 2004 TravelSmart community project, a two-pronged monitoring program was commissioned by the Department. The evaluation project entailed:

- The conduct of a Before-and-After household travel survey of residents of Darebin, before and after the implementation of the TravelSmart project
- The conduct of a Trends Analysis using data available from public transport operators and VicRoads, to identify background trends in travel behaviour and to identify any specific changes in the study area of Darebin.

This paper describes the survey methodology employed in the Before and After household travel surveys, while a companion paper (Richardson et.al., 2005) describes the Trend Analysis of the secondary data sources. A summary of the survey results, in the context of the TravelSmart evaluation, is provided at the end of the paper.

2 The Before and After household travel surveys

The North-Eastern Suburbs Travel Survey (NESTS) was a Survey of Day-to-Day Travel conducted in the North-Eastern Suburbs of Melbourne with the Before Survey conducted in March 2004 and the After Survey conducted in March 2005. "Day-to-Day" travel includes all the everyday travel that people do as they go about their lives, such as going to and from work, going shopping, visiting friends, going to sporting events, and even just walking the dog!

The survey was designed and conducted by The Urban Transport Institute (TUTI) and I-view Pty Ltd, two companies with extensive experience in such surveys throughout Australia and overseas. The survey was conducted for the Victorian Department of Infrastructure.
Because the surveys were conducted as a Panel Survey, the survey instruments stayed the same in both the Before and After surveys to ensure that any observed differences in the

Before and After surveys were not due to changes in the survey instruments, while the survey procedures and the sample design changed slightly in the two surveys, as described below.

2.1 The Before Survey

The Before Survey was conducted in March 2004, about 6 weeks before the implementation of the TravelSmart program commenced in late-April 2004. The intention of the survey was to establish a base level of travel patterns before implementation of TravelSmart.

2.1.1 Survey Instruments

The NESTS project was centred on the use of self-completion questionnaires, supported by a range of other data gathering techniques (such as face-to-face interviews and telephone interviews). There were four major components to the survey questionnaires; the household form, the person form, the vehicle form and the travel diary forms.

The Household Form

The Household Form asked questions about:

- The number of people usually in the household
- The type of dwelling
- The ownership of the dwelling
- The length of residence at the current address
- The number of bicycles in the household
- The number of dogs in the household
- A contact phone number for the household

The Person Form

The Person Form asked questions about:

- The person's first name
- Their year of birth
- Their gender
- Their relationship to Person 1 (the oldest resident)
- Their country of birth
- Their licence holding status
- Whether they are currently employed
- Whether they are currently studying
- What activities they are engaged in if not employed or studying

The Vehicle Form

The Vehicle Form asked questions about:

- Details of all registered vehicles garaged at the household
- An Odometer question about total kilometres travelled by each vehicle to-date - a follow-up postcard survey was done a week later to see how far the vehicle had travelled in that week.

The Travel Diary Forms

The Travel Diary was a 16-page booklet consisting of four components. Page 1 of the Travel Diary asked questions about:

- The identity of the person
- The date of their Travel Day
- Where they were at 4.00a.m. on the Travel Day
- Whether they undertook any travel on the Travel Day
- If so, what time did they start travelling
- If not, why did they not travel
- If they didn't travel, when did they last travel

The Stops pages (pages 2-14) were all of the same basic format. A Stop is our name for a place that someone goes to as they travel around. Each Stop page asked questions about:

- What was the nature of the Stop
- Where was the Stop
- Why they went to the Stop
- Who (from the household) travelled with the person to the Stop
- How they got to the Stop
- Details of any Private Vehicle Travel
  - What type of private vehicle was used
  - Was the respondent the driver or a passenger
  - How many people, in total, were in the vehicle
  - Whether the vehicle used was from the household and listed on the red Vehicle form (this allows us to determine how each type of vehicle is actually used)
- When they arrived at the Stop
- If they made more travel, when they left the Stop

Page 15 was devoted to a single question about personal income, while Page 16 allowed the respondents to tell us in their own words what they thought about the transport system, and what they thought about the survey.

2.1.2 Sample design

Following the conduct of a Pilot Survey in February 2004, the Before survey was conducted over 28 days in March 2004, in the Local Government Area of Darebin covering the suburbs of Alphington, Fairfield, Northcote, Thornbury and Preston. The total study area was divided into four regions, with each region being surveyed over the four successive weeks of the survey, starting in the south and working through to the north. This was based on the order in which TravelSmart was to be introduced into the area.

Each of the four regions contains 42 CCDs (Census Collectors Districts) so that, each day of the week, six CCDS were surveyed.

The final sample size of households that respond to both the Before and the After Survey was specified in the Brief as 900 households, which was the Department's best estimate of the sample size required to measure a 10% change in VKT with 95% confidence. The NESTS Pilot Survey had indicated a response rate of 52% to the Before survey. Assuming that 75% of these households would also respond to the After survey, and that 15% of households responding to the Before survey will have moved residence before the After survey 12

months later (based on ABS Census figures), it was calculated that survey packs would need to be placed in a total of 16 households in each CCD on each day of the Before survey (a total of 2688 households) in order to achieve the final sample of 900 responding households.

The sample frame adopted for the survey was the list of properties in Darebin on the residential rates database maintained by Darebin Council (this database was available in the form of a GIS database of property boundaries). Within each CCD, therefore, 16 household addresses were randomly sampled from this database, together with 5 randomly sampled replacement addresses. These 21 addresses were then used in the first phase of the survey procedure as described below. For each of these 21 households, an attempt was made to find a unique match of the address in the DtMS (Desktop Marketing Systems) reverse White Pages CD-ROM, in order to find a telephone number for later possible contacts.

2.1.3 Survey procedures

The NESTS methodology was based on a self-completion questionnaire, which was hand-delivered to, and hand-collected from, the survey households. This process was also supplemented by telephone motivational calls, telephone and postal reminders, and telephone clarification calls.

Pre-Contact Delivery Preparations

This phase of the survey included the selection of the sample from the sample frame provided by Darebin Council, the preparation of maps, control sheets and pre-contact letters, and the assembly of Pre-Contact Letter (PCL) packages for use by the field staff.

Pre-Contact Deliveries

This phase of the survey involved field staff in a number of activities in the selected CCDs, including finding the sampled household, checking the address, selecting a replacement household (if the original address proved to be sample loss), delivering the Pre-Contact Letter, recording the outcomes on the PCL Control Sheet and returning the PCL materials to the survey office (established in the local area at Northcote) at the end of the day to enable preparation of the next day's workloads.

Survey Pack Delivery Preparations

This phase of the survey included entering the data recorded on the PCL Control Sheets onto spreadsheets and then importing them into the Admin Program (a program which controlled all aspects of the field operations). Any changes and additions to the location of households on the maps provided to field staff were also recorded, and the maps amended in MapInfo. The Survey Pack Delivery (SPD) Control Sheets and cover letters were then prepared and the Survey Packs to be delivered were assembled.

Survey Pack Deliveries

This phase of the survey included re-finding the sampled household (different field staff were used for the different contacts with the household, which were often running in parallel), then attempting to make face-to-face contact with a member of the household (with up to three attempts to contact the household). If contact was made, the survey was explained and the Survey Pack delivered (unless a refusal was encountered). If contact was not made, then the Survey Pack was left at the household with a We-Missed-You postcard. If the Survey Pack was undeliverable (for example, because dogs prevented access to the house), then the Survey Pack was returned to the Survey Office and mailed to the household at the end of the day by the field staff. If an unconvertible refusal was encountered, the field staff member immediately asked the person two short questions in an attempt to learn more about

the non-respondents. The field staff recorded the outcomes on the SPD Control Sheet and returned the SPD materials to the survey office.

Survey Pack Pickup Preparations

This phase of the survey included entering the data recorded on the SPD Control Sheets onto spreadsheets and then importing them into the Admin Program. This task had two main purposes; firstly, so that the call sheets for the Motivational Calls (see below) could be prepared, and secondly, so that the Control Sheets for the Survey Pack Pickups (SPP) could be prepared.

On the evening before each household's Travel Day, those households for whom a phone number was available were phoned from the Survey Office with three objectives in mind:

- To ascertain whether the household received the Survey Pack materials
- To ask whether the household had any questions about the survey
- To remind the household to record odometer readings for all vehicles in the household on the morning of the day following the Motivational Phone Call (i.e. on that household's Travel Day)

Survey Pack Pickups

This phase of the survey included re-finding the sampled household, and checking to see whether the Survey Pack had been left out for collection. If it was not visible, an attempt was made to contact the householder to see whether the survey had been completed. Depending on the response, the survey pack was either collected or a reply-paid envelope was left for the household to return the questionnaires in the mail. Once again, if a refusal was encountered, the two non-response questions were asked. For collected Survey Packs, the field staff checked them for completeness and called back to the household if they were found to be incomplete. The field staff recorded the outcomes on the SPP Control Sheet and returned the SPP materials to the survey office.

Survey Pack Processing

This phase of the survey included electronically scanning the barcodes on the Household Forms of the collected Survey Packs to record that they had been collected, and then attaching corresponding barcode labels to the Travel Diaries to ensure that they remain linked to their household forms. All fully completed Survey Packs were then sent to the Nunawading office of I-view for scanning and data editing. All incomplete Survey Packs (e.g. those with missing diaries) were attempted to be made complete in the field office, before being sent to Nunawading, by means of phone calls to the households to determine why there were missing components. The data recorded on the SPP Control Sheets was input onto spreadsheets and imported into the Admin Program. Any Survey Packs returned through the mail on that day were also barcoded, and included in the packages couriered to Nunawading. Before the completed Survey Packs were sent to Nunawading, selected information about household vehicles was recorded in the Admin Program to provide the base data for the odometer follow-up surveys to be conducted in the following week.

Odometer Follow-up Survey and Reminders

One week after the Travel Day, all responding households that provided valid odometer readings for their vehicles were sent a follow-up postcard survey, asking for the odometer reading of each vehicle seven days after the initial odometer reading was recorded.

One week after the Travel Day, all households that had not yet responded, and for which we had a phone number, were phoned to remind them to return their Survey Packs, or, if they had not completed the survey, to answer the two non-response questions. Non-responding

households that could not be contacted by phone were sent a mailed reminder on the following day.

Questionnaire Scanning and Editing

Once the completed Survey Packs arrived at Nunawading, the spines of the booklets were guillotined and then the individual pages of the Household Forms and Travel Dairies were processed using optical mark recognition (OMR) and image clip scanning. The data from this process was then sent (electronically) to workstations where data entry staff entered text data from the image clips made during the scanning process, and also remedied any problems identified during the scanning (e.g. missing answers, multiple answers etc). The data from the Household and Travel Diary forms were then re-combined into households (using the barcode identifiers) and sent to other workstations where the geocoding took place. Once the geocodes were completed, the data was transferred to an initial version of the final databases, where editing programs were run to identify any data that needed clarification (i.e. missing or inconsistent responses). The clarification questions identified during this stage were then transferred to phone interviewers who then contacted the households to obtain or clarify the missing or inconsistent information. Once the data had been clarified and recombined with the original data, the data files were sent to TUTI for final editing.

Final Data Editing, Analysis and Report Preparation

The two data sets sent to TUTI were the Admin data and the Survey data. The Admin data was analysed to monitor the performance of the survey fieldwork procedures in terms of Pre-Contact Letter Deliveries, Survey Pack Deliveries, Survey Pack Pickups and overall Response Rates. These analyses form the basis for part of the current paper. The Survey data was imported into the final database formats and then checked for omissions, errors and inconsistencies. The Travel Diaries of the under-six year olds were then reconstructed from the other travel diaries, and then the Trip files were created. These data files were then analysed and provide the information summarised later in this paper.

2.2 The After Survey

The After Survey was conducted in March 2005, 12 months after the Before Survey. The intention of the survey was to identify changes in travel patterns that may have occurred after the implementation of TravelSmart.

In some Before and After Survey projects which aim to identify changes in travel behaviour due to a specific policy or project, the Before and After Surveys are also conducted with a Control Group who have not been subjected to the policy or project, as well as the Target Group who have been subjected to the policy or project. Such a procedure was not adopted in this project for four main reasons:

- Given the high penetration rate of TravelSmart within Darebin, there would be few households which would be unaffected by the program
- To find households unaffected by TravelSmart would mean selecting households from a different geographic region, which would introduce demographic and geographic differences into the Control Group
- The high cost of surveying the Control Group, given a fixed overall budget, would mean that the sample size for the surveys of the target group would have to be halved in size
- It was considered that an expansion of the planned Trend Analysis of secondary data sources (Richardson et al., 2005) would serve the purposes of the Control Group survey in identifying background changes in travel patterns.

For the above reasons, a Control Group household travel survey was not conducted for this evaluation. Rather, use was made of the Trends Analysis results (especially for the Metropolitan-wide changes in travel behaviour) to provide an indication of any background changes in travel behaviour that might underlie any changes in travel behaviour observed in the Before and After Surveys.

2.2.1 Sample design

Whereas the Before Survey was conducted with a random cluster sample of Darebin households, the After Survey was only conducted with the 1347 households that had responded to the Before Survey (including the Pilot Survey), since the overall sampling plan was to obtain 900 households that had responded to both the Before and the After Surveys.

2.2.2 Survey procedures

The survey instruments used in the After Survey were identical to those used in the Before Survey to avoid introducing differences in measurement techniques. The survey procedures were essentially the same, but with some differences in the Pre-Contact phase of the survey. Because the After Survey was only conducted with households that had responded to the Before Survey, it was known that they physically existed and therefore did not need to be located and checked again in the field. Therefore, no Pre-Contact visits were made to the addresses, and the Pre-Contact Letter (whose wording was changed to reflect the fact that this was a follow-on to the Before Survey) was mailed to the households rather than personally delivered. Following that, all the phases of the Before Survey were repeated exactly as performed in the Before Survey.

3 Procedural Results for the Before Surveys

This section describes procedural outcomes of the Before Survey for each of the key field phases.

3.1 Pre-contact letter results

Five days before each Travel Day, field staff checked the validity of the sampled addresses in the field, and delivered Pre-Contact Letters (PCL) to each of the 16 valid households in each CCD. As might have been expected, the quality of the Residential Rates address list obtained from Darebin Council was reasonably good, with 3% of all addresses being identified as sample loss (i.e. invalid residential addresses) at this stage of the survey. The main reason identified at this stage was that the address was not a residential address. This was because there were some properties in the Residential Rates database that were not residential properties (e.g. ambulance stations, fire stations, Telstra properties and other “public service” properties which are charged residential, rather than commercial, rates). There were also a number of vacant residential properties identified at this stage, although many more were identified later in the process.

3.2 Survey pack delivery results

Two days before each Travel Day, field staff attempted to deliver the Survey Packs to those households previously identified as being valid household addresses.

3.2.1 Type of Survey Pack Delivery

The method of delivery of the Survey Packs is shown in Figure 1. A majority of Survey Packs (about 63%) were in fact delivered personally to a member of the household. Another 24% were left at the household with a postcard attached, while about 11% were refused by households at this stage. A small number of addresses (about 2%) were also found to be

Sample Loss at this stage (mostly households that were clearly unoccupied, either visibly or via advice from neighbours), while some Survey Packs (about 1%) could not be delivered (usually because access was prevented because of large dogs or other obstacles) and were mailed.

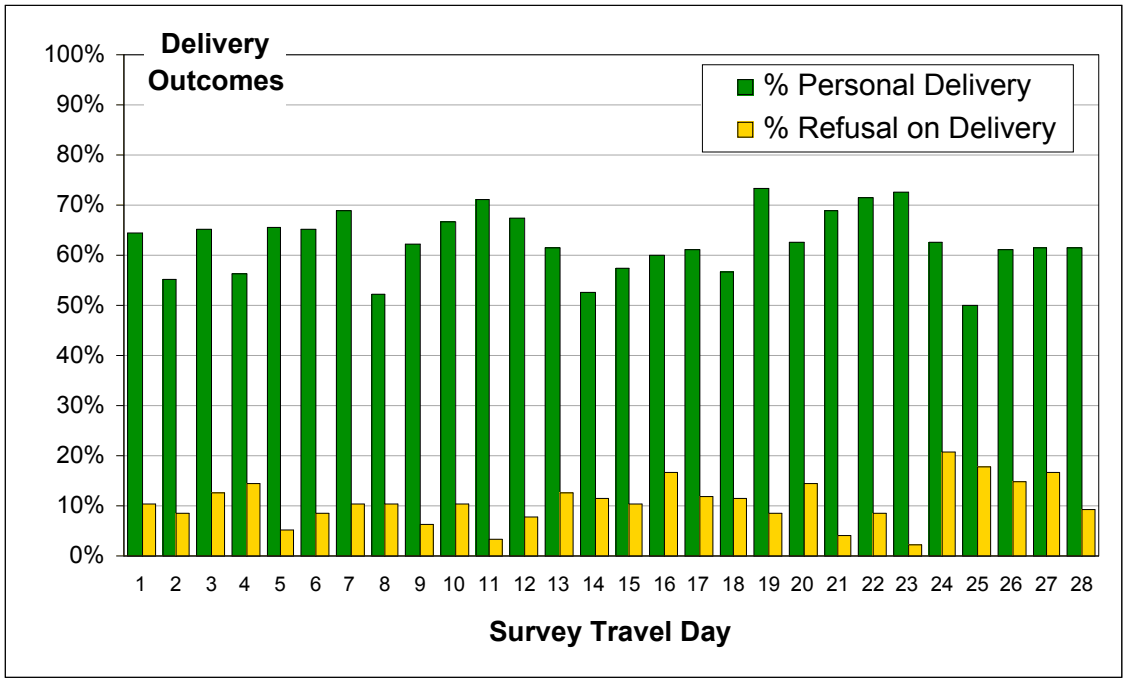

Figure 1 Type of Survey Pack Delivery

The success in making personal deliveries to households is a function of the type of dwelling. As shown in Table 1, it was possible to make personal deliveries to 67% of separate houses, but only to 53% of flats and apartments.

Table 1 Delivery Method by Dwelling Type

	Dwelling Type	
Delivery Method	Separate House	Flat, Apartment
Personally	67%	53%
Left at Household	20%	33%
Refusal	11%	11%
Not Delivered - Sample Loss	1%	2%
Not Delivered - Mailed	1%	1%

As will be seen later, a high proportion of personal deliveries is important, since it is a major determinant of the overall response rate to the survey.

3.2.2 Asking for a phone number

When a member of the household was successfully contacted at the Survey Pack Delivery stage, they were asked for a contact phone number in case we needed to contact them during the survey. The majority of households (about 85%) were willing to provide a contact number when asked. Less than 15% of households refused to provide a number, and most of these had already refused to participate in the survey anyway. However, a proportion of households were never contacted personally, while some who were contacted were not asked for a number (either because the interviewer forgot to ask the question or because they judged that asking the question may have been detrimental to the survey where a respondent was judged to be wavering between accepting or refusing the questionnaire and asking for a phone number may have pushed them into becoming a refusal). As a result, contact numbers were obtained for only 54% of all households.

3.2.3 Refusals at the survey delivery stage

If a household refused at the delivery stage to participate in the survey, they were immediately asked two questions "for quality control purposes". These questions were:

- The number of people in the household
- The number of vehicles in the household

The purpose of these questions was to get some idea of whether non-respondents were systematically different to respondents to the survey. From an analysis of this data, it could be seen that, on average, about 70% of refusals were willing to answer the non-response questions when asked immediately after they refused to participate in the main survey. The average household size of refusals was about 2.1, which is slightly smaller than the Darebin average household size of about 2.4 (ABS Census 2001). The average cars per household was about 1.1, which is also less than the Darebin average of 1.3. Thus, it appears that smaller, less mobile, households were more likely to refuse at the delivery stage of the survey.

3.3 Motivational call results

On the evening before each of the Travel Days, Motivational Phone Calls were placed to each household, where possible. Across all households, Table 2 shows that 52% were called in Weeks 1 through 4. The proportion called was lower in Week 3 because of a staffing problem which prevented any calls being made on two days of this week. Across the four weeks, an average of 32% of households were personally contacted. The vast majority of these calls were well received, even though some households took this opportunity to refuse to participate in the survey.

Table 2 Outcomes of Motivational Calls

	Week				
Motivational Call Outcome	1	2	3	4	Total
Not Called	285	304	442	257	1288
Successful Contact	202	230	166	268	866
Answering Machine	81	56	17	39	193
Refusal	18	10	6	23	57
No Contact Made	85	72	41	85	283
TOTAL	671	672	672	672	2687
% Called	58%	55%	34%	62%	52%
% Personally Contacted	30%	34%	25%	40%	32%

The success in placing the Motivational Calls depended on whether the household had been personally contacted at the Survey Pack Delivery (SPD) stage. Of those households who were personally contacted at the delivery stage, most of these had a phone number available, either from the DtMS reverse White Pages or from the phone number they provided when contacted. On the other hand, for those households not personally contacted, only about 50% of these had a phone number available from the reverse White Pages. As a result, about 80% of households already personally contacted were phoned (in weeks 1, 2, and 4), while only about 40% of households not personally contacted were phoned (in weeks 1, 2, and 4). This is unfortunate, since it is the households not yet personally contacted who would be the best targets for the Motivational Calls as a means of increasing response rates. This is compounded by the fact that of those households already contacted who are phoned, about 75% of them are personally reached with the phone call, whereas of those households not already contacted who are phoned, only about 30% of them are personally reached with the phone call. This was probably a reflection of the different reliability of the phone numbers personally provided or obtained through the White Pages. It is also related to the fact that personal deliveries were more likely to have been made to separate houses, which have

higher numbers of residents than flats and apartments and hence there is more likely to be someone at home to answer the Motivational Call.

3.4 Survey pack pickup results

On the day after each of the Travel Days, field staff visited the households to collect completed Survey Packs. Field staff first checked to see whether the completed survey pack had been left out for collection. If it was not visible, an attempt was made to contact the householder to see whether the survey had been completed. Depending on the response, the survey pack was either collected or a reply-paid envelope was left for the household to return the questionnaires in the mail.

3.4.1 Type of Survey Pack Pickup

The type of pickup procedure undertaken on each day in the four weeks of the survey is shown in Figure 2 and summarised by week in Table 3.

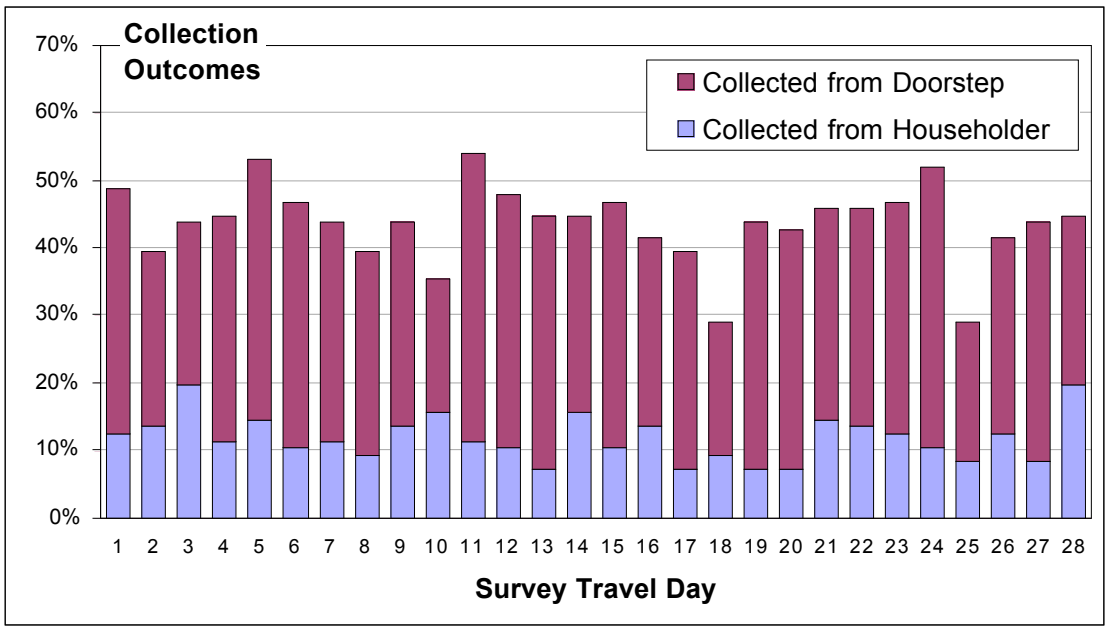

Figure 2 Collection Outcome by Day of Survey

Table 3 Type of Survey Pack Pickups

	Week				
Pickup Method	1	2	3	4	Total
From householder	90	80	67	82	319
From doorstep etc	218	218	211	210	857
Refusal-personally	46	44	56	37	183
Blank forms left on doorstep	24	46	45	72	187
R-P envelope left with householder	70	72	70	62	274
No contact-left a R-P envelope	113	108	113	106	440
Other (write in Comments)	19	12	18	4	53
No Collection Attempted	92	92	92	99	375
TOTAL	672	672	672	672	2688
% Collected from Respondent	13%	12%	10%	12%	12%
% Collected from Doorstep	32%	32%	31%	31%	32%
% Collected on Day	46%	44%	41%	43%	44%

It can be seen that Survey Packs were picked up from households on approximately 44% of occasions, with more completed Survey Packs being collected from doorsteps and other

places where the householder had left them (32%) than were collected personally from householders (12%). On about 14% of occasions, a refusal was encountered either personally (7%) or via uncompleted Survey Packs being left out for collection (7%).

On about 26% of occasions, a reply-paid envelope was left with or at the household for the Survey Pack to be returned in the mail. As shown in Figure 3, the Reply-Paid Envelope was returned with a completed questionnaire on about 30% of occasions.

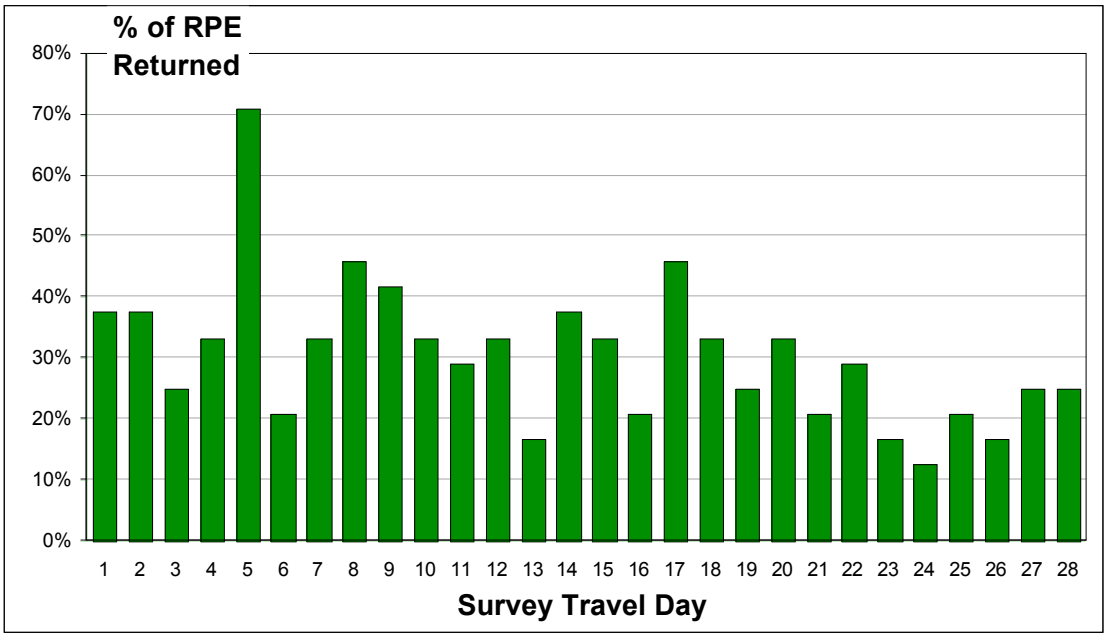

Figure 3 Proportion of Reply-Paid Envelopes Returned by Mail

3.4.2 Characteristics of Refusals at Pickup

If a personal refusal was encountered at the pickup stage, then field staff again asked the two non-response questions about household size and number of household vehicles. About 53% of refusals at the pickup stage answered these questions. The average household size was about 2.6 (slightly larger than the Darebin average of 2.4) while the average vehicles per household was about 1.2 (slightly smaller than the Darebin average of 1.3). It therefore appears that refusals at the pickup stage come from larger households than refusals at the delivery stage, but that their vehicle ownership rate is less than the Darebin average. However, the differences are not statistically significant.

3.5 Response rates

This section of the paper describes the overall responses rates obtained, and the response rates within various sub-groups of the sampled households, such as delivery method and placement of Motivational Call.

3.5.1 Overall Response Rates

The overall response rates achieved on each day of the survey are shown in Figure 4, while the summary results by week are shown in Table 4.

Table 4 Overall Response Rates by Week

	Week				
Response Category	1	2	3	4	Total
Responses	352	347	317	320	1336
Sample Loss	42	33	28	12	115
Refusals	165	168	197	221	751
Non-Responses	113	124	130	119	486
TOTAL	672	672	672	672	2688
Response Rate	56%	54%	49%	48%	52%
% Collected from Respondent	13%	12%	10%	12%	12%
% Collected from Doorstep	33%	33%	31%	31%	32%
% Mailed Back	10%	9%	8%	5%	8%

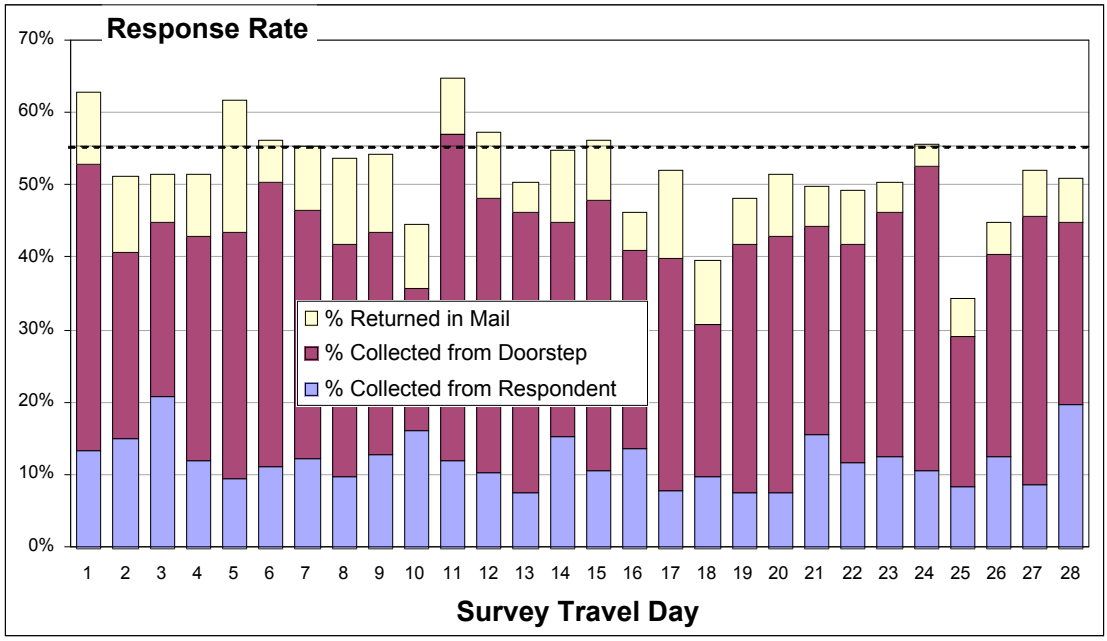

Figure 4 Response Rates by Day of Survey

It can be seen that the overall response rate for the Before Survey was 52% (the same as obtained in the Pilot Survey), compared to the target response rate of 55%. This relatively low response rate was not unexpected since, in the Victorian Activity & Travel Survey (VATS) from 1994-96, Darebin had experienced the second lowest response rate of all the municipalities, with a response rate (41%) that was consistently 7% below the mean metropolitan response rate (48%) for all the survey years. The NESTS Before Survey response rates started out at 56% in Week 1, and then gradually fell to about 48% in Week 4. The main reason for this fall in response rate is the fall in returns through the mail. This could be due to the fact that Easter immediately followed the survey and hence households who were yet to return their surveys may have forgotten to do so once Easter had passed.

3.5.2 Types of Response

A detailed analysis of the responses indicated that the majority of completed questionnaires are picked up from households on the collection day (44%), with about 8% coming back via the mail. A higher proportion of personal refusals occur at delivery (10%) than on pickup (5%), although there are a large number of refusals occurring at pickup via blank forms being left out for collection (10%). A small number of refusals occur via the Motivational or Reminder Calls. Finally, about 17% of non-responses occur from simply receiving nothing back at any stage. Finally, even though the addresses had been screened at the Pre-Contact Letter delivery stage, there were still some addresses which later turned out to be Sample Loss when it was discovered that the house at that address was permanently or temporarily unoccupied or otherwise out-of-scope (4%).

3.5.3 Response Rates by Type of Delivery

In previous surveys of this type conducted by TUTI and I-view, such as the 2003-04 South-East Queensland Travel Survey (SEQTS), it was found that response rates were higher for households where the Survey Pack was personally delivered than for households where the Survey Pack was simply left at the household. This same finding is shown in Table 5 for the NESTS Before Survey, with a 57% response rate for personal contact at delivery (including those who refused the survey at this personal contact) and a 37% response rate for no personal contact at delivery. Fortunately, about 74% of households have personal contact at delivery, and it is therefore important for this high proportion of personal contact at delivery to be maintained in order to maximize response rates.

Table 5 Response Rates by Type of Delivery

	Delivery Method	
Response Code	Personal Contact	No Personal Contact
Respondent	1103	229
Sample Loss	10	30
Non-respondent	842	386
TOTAL	1955	645
Response Rate	57%	37%

3.5.4 Response Rates by Motivational Call

Given the apparent importance of personal contact, the other option for personal contact was via the Motivational Call. As shown in Table 6, those households where a Motivational Call was attempted had a 64% response rate, while those households where no Motivational Call was attempted had only a 37% response rate. Among those households where a Motivational Call was attempted, those where personal contact was made on the phone had a 68% response rate, those where an answering machine message was left had 69% response rate, while those where no contact was made had a 50% response rate. It would therefore appear, inter alia, that the Motivational Calls were successful in increasing response rates.

Table 6 Response Rates by Placement of Motivational Call

	Motivational Call Outcome				
Response Code	Not	Motivational Call Placed			
	Placed	Contact Made	Answering Machine	No Contact Made	Total
Respondent	443	623	132	137	892
Sample Loss	101	1	2	11	14
Non-respondent	744	299	59	135	493
TOTAL	1288	923	193	283	1399
Response Rate	37%	68%	69%	50%	64%

3.5.5 Response Rates by Delivery Type and Motivational Call Outcome

A full understanding of the effect of the Motivational Calls is, however, not possible without a more detailed breakdown of the results, because of the interaction between several factors. Firstly, some of the households where a Motivational Call was not attempted could not have had a call because no phone number was available. Secondly, the availability of a phone number depended on whether personal contact had already been made at the delivery stage (where respondents were specifically asked for a contact phone number). A more detailed description of the effect of the Motivational Call is shown in Table 7.

Table 7 Before Survey Response Rates by Delivery Method and Motivational Call

	Survey Pack Delivery Method			
	Personal Contact		No Personal Contact	
	Motivational Call		**Motivational Call**	
Response Code	Placed	Not Placed	Placed	Not Placed
Respondent	796	306	96	133
Sample Loss	1	6	9	21
Non-respondent	361	198	131	255
TOTAL	1158	510	236	409
Response Rate	69%	61%	42%	34%

While Table 6 had suggested a large difference in responses rates between households that received Motivational calls and those that did not receive them, Table7 shows that most of this difference in response rates is due to the method of delivery of the Survey Packs. For example, for these households where contact was made in the delivery process, the response rate is generally higher than when personal contact was not made. For both groups of households, the placement of the Motivational Call increases the response rate by eight percentage points (from 61% to 69% and from 34% to 42%). It therefore appears that the major difference in response rate is due to the delivery method, and that the Motivational Call has a secondary effect, which is equally effective for households that have and have not been contacted personally in the delivery stage.

4 Procedural Results for the After Surveys

This section describes the main procedural outcomes of the After Survey, compared to the Before Survey, for each of the key field phases. Because the After Survey was only conducted with households that had already responded to the Before Survey, the overall procedural results are, not unexpectedly, more favourable than in the Before survey, as shown in Table 8.

Table 8 Procedural Results for the After Survey

Field Phase and Outcome Measure	Before Survey	After Survey
Pre-Contact Letter		
%Sample Loss	3%	0%
Survey Pack Delivery		
% Personal Contact	74%	76%
% Personal Delivery	63%	68%
% Refusal	11%	8%
Phone Number Provided	54%	84%
Phone Number Provided when Asked	85%	97%
% Answering Refusal Questions	70%	87%
Ave HH Size of Refusals	2.1	1.9
Ave Vehicles for Refusals	1.3	0.9
Motivational Calls		
% Called	52%	77%
% Personally Contacted	32%	51%
Survey Pack Pickup		
% Collected on Day	44%	52%
% Collected from Doorstep	32%	36%
% Collected Personally	12%	16%
% Refusal	14%	7%
% Left Reply-Paid Envelope	26%	30%
% of RPE Returned	30%	44%
% Answering Refusal Questions	53%	91%
Ave HH Size of Refusals	2.6	1.8
Ave Vehicles for Refusals	1.2	0.9
Response Rate		
Overall Response Rate	52%	65%

Overall, a response rate of 65% was obtained in the After Survey, compared to 52% in the Before Survey. The higher response rate in the After Survey is undoubtedly due to a range of factors including self-selection bias and the different demographics of the samples for the Before and After Surveys. Interestingly, however, the personal contact on delivery of the survey forms and the placement of the Motivational Call continued to have an effect on response rates in the After Survey as shown in Table 9. The response rates are 6-12% higher in all groups in the After Survey, but the personal contact on delivery still increases the response rate by about 25 percentage points (cf 27% in the Before Survey) while the motivational call increases response rate by about 12 percentage points (cf 8% in the Before Survey).

Table 9 After Survey Response Rates by Delivery Method and Motivational Call

	Survey Pack Delivery Method			
	Personal contact		No Personal Contact	
	Motivational Call		**Motivational Call**	
Response Code	Placed	Not Placed	Placed	Not Placed
Respondent	663	45	128	32
Sample Loss	0	0	2	17
Non-respondent	178	22	107	45
TOTAL	841	67	237	94
Response Rate	79%	67%	54%	42%

A total of 881 households responded to the After Survey. While this might appear close to the target number of 900 households, not all 881 households were useable in the Before and After comparisons. 59 of these households were mostly or entirely different in composition to the household at that address in the Before Survey. This could be due to an entirely new household moving in to that address or, in the case of group households, one or two members of the household being the same but a greater number of household members being different. A further 140 households were basically the same as the household at that address in the Before Survey, but with minor differences. This could be due to additions or deletions from a family group (e.g. new babies being born or older children leaving home), or minor changes to the composition of a group household. Only 682 of the 881 households had exactly the same composition as in the Before Survey (as identified by age, gender and first name of the household members). Thus, either 682 or 822 households are available for comparison, depending on the definition adopted for households to belong to the Panel Survey.

5 Some Findings from the Before and After Surveys

To round off this paper, a summary of some results that have become available just before the deadline for paper submission will be described.

The results of the Before and After household travel surveys indicate that households that participated in the TravelSmart program decreased VKT by about 7%, but did not show a corresponding increase in public or non-motorised transport use. Households that did not participate in TravelSmart appear to have increased their car travel and decreased their use of public transport. Over the whole target population of households approached in TravelSmart, the positive travel behaviour changes of participating TravelSmart households appear to have been countered by the negative travel behaviour changes of non-participating TravelSmart households to the degree that there is negligible change across participants and non-participants. On the other hand, the odometer surveys conducted as part of the Before and After surveys indicated a reduction in VKT across participating and non-participating households of about 5%, which is consistent with the 2-3% reduction in on-road traffic volumes in the study area identified in a parallel evaluation study using secondary data sources (Richardson et al., 2005). In that study, observations of public transport ticket validations, public transport ticket sales, public transport customer satisfaction and road

traffic volumes suggest that there have been positive changes in the Darebin project area in the directions expected relative to underlying trends across the metropolitan area. The changes, while significant, are small and not of the order of magnitude expected based on similar projects undertaken previously in Australia and overseas. In comparing these results with the results of the travel survey, however, we should point out that these results are on-the-ground results that would have been diluted by households outside of the study area (especially the through traffic in the road traffic counts).

Further analysis and research is required to better understand these outcomes. This will be possible using data of similar format being obtained from the 2005 Maribyrnong and Moonee Valley TravelSmart Communities. From this, the TravelSmart Communities approach can be refined to increase its effectiveness.

6 Conclusions

This paper has described the conduct of Before and After household travel surveys (NESTS) for the purpose of evaluating changes in travel behaviour following the implementation of a TravelSmart travel behaviour change program in Darebin in the inner north-eastern suburbs of Melbourne. It has also provided details of the procedural results obtained during the conduct of the two surveys. Response rates of 52% and 65% were obtained in the Before and After surveys, respectively. The 52% response rate in the Before survey compared favourably with the 41% response rate obtained in Darebin in the 1994-96 VATS survey.

The increase in response rate is thought to be mainly due to the higher levels of personal contact designed into the NESTS survey. Indeed, an analysis of response rates in the Before and After surveys as a function of the extent of personal contact on delivery of the survey forms and via Motivational Phone Calls showed that the personal contact on delivery increased the response rate by an average of 26 percentage points while the motivational call increased response rate by an average of 10 percentage points. The importance of making personal contact, especially through the Motivational Call, has recently been threatened by the withdrawal of the DtMS (reverse White Pages) product from the market (after legal action by Telstra for alleged infringement of copyright). Finding an alternative source of phone numbers is therefore of some importance if the telephone is to continue to be used to make personal contact in such surveys.

The results of the Before and After household travel surveys indicate that households who participated in the program decreased VKT in the order of 7%, but did not show an increase in public or non-motorised transport use. Households who did not participate in TravelSmart appear to have increased their car travel and decreased their use of public transport. Over the whole target population, the positive travel behaviour changes of participating TravelSmart households appear to have been countered by the negative travel behaviour changes of non-participating TravelSmart households to the degree that there is negligible change across participants and non-participants. On the other hand, the odometer surveys conducted as part of the Before and After surveys indicated a reduction in VKT across participating and non-participating households of about 5%, which is consistent with the 2-3% reduction in on-road traffic volumes in the study area identified in a parallel evaluation study using secondary data sources.

7 References

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