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Evaluating Community-Based TravelSmart in Melbourne

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Abstract. Spending public funds on Travel Demand Management policies requires rigorous monitoring in order to ensure that policy targets are met in an efficient way. Policy measures that focus on voluntary Travel Behaviour Change are increasingly popular in Australia, where many cities now run community-based TravelSmart campaigns. In addition to a reduction in vehicle-kilometres and the related reduction in air pollution, greenhouse gas emissions and noise, positive effects on the liveability of local neighbourhoods and positive health effects for the target population are expected from these initiatives.

In parallel with the development of the TravelSmart intervention design, multiple attempts are made to develop methods to quantify the impacts of these programs. In the absence of a common methodology to measure the effects of community-based TravelSmart interventions, this paper addresses a series of issues that are critical for such an assessment.

Based on a large-scale community-based TravelSmart intervention conducted in 2004 in the Melbourne suburb of Darebin with a target population of 30,000 households, the paper discusses the evaluation conducted by means of a panel survey before and after the intervention. Specific indicators and measurement techniques are presented that were used to assess travel behaviour change in general and the change in vehicle kilometres in particular. Special attention is drawn to sample size requirements of this 'before' and 'after' panel survey design, and to techniques available for the control for exogenous factors that may affect travel behaviour change independently from the TravelSmart intervention.

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1 Introduction

Spending public funds on Travel Demand Management policies requires rigorous monitoring in order to re-direct resources to the most effective measure or combination of measures. This is also the case for policy measures that focus on voluntary Travel Behaviour Change. Increasingly popular in Australia, many cities now run community based TravelSmart campaigns whereby several objectives are pursued[i]. In addition to a reduction in vehicle–kilometres and the related reduction of air pollution, greenhouse gas (GHG) emissions and traffic noise, positive effects on the liveability of local neighbourhoods and positive health effects for the target population are expected of these initiatives (Ampt, 1999; Brög et al. 2002; Brög et al. 2003). Also, by synchronising the implementation of community based TravelSmart initiatives with school and work-based TravelSmart projects within the same suburban area, a stronger penetration and a multiplicative effect is intended, that would exceed the results of an isolated TravelSmart project.

In parallel with the development of the design of TravelSmart initiatives, current attempts are being made to develop evaluation schemes and toolkits that are able to capture the direct and indirect costs and benefits (Ker et al. 1999; Tisato et al. 1999; Ker 2003; Perkins 2002). Some of these schemes also consider the inclusion of qualitative measurements of impacts for which quantitative data are not readily available (Ker [forthcoming], Litman 2004, Schreffler 2000, Finke et al. 2002). In addition to the outcomes of a TDM campaign, specific assessment frameworks are proposed to evaluate the participants' process of behaviour change on the one hand, and how well the management process was performed by the implementers on the other hand (Transport Studies Group 2001).

The rapidly increasing number of refined and sophisticated assessment schemes and the trend to develop "toolkits" that are readily available for practitioners wanting to design and implement their own TDM measure leaves the impression that there is already a standard best practise available. However, a closer look at the details reveals that for many, even basic, questions, a common methodology has not yet emerged, and that a series of issues critical for a successful TDM assessment remain insufficiently addressed.

Based on the experience gained during a recent large-scale conduct of a community based TravelSmart intervention in the Melbourne suburb of Darebin during 2004-05, the present paper takes a step back to take another look at some basic questions of TravelSmart assessment. The intention is to make a contribution towards a standardized method of assessing travel behaviour change, since this is the core element on which all other cost and benefit components of an assessment are based. In doing so, a number of technical and design–related difficulties are discussed along with possible strategies to avoid or mitigate their impacts on the assessment quality.

Based on a description of the state of practice in the U.S., Schreffler (2000) uses three principal dimensions to discuss the different components of TDM evaluation schemes. Following this classification, Figure 1 highlights the elements used for the evaluation of the large-scale community based TravelSmart interventions in

Melbourne (shaded areas) and the areas on which the present paper focuses in particular (bold frames).

Figure 1 Evaluation of community based TravelSmart – areas of focus

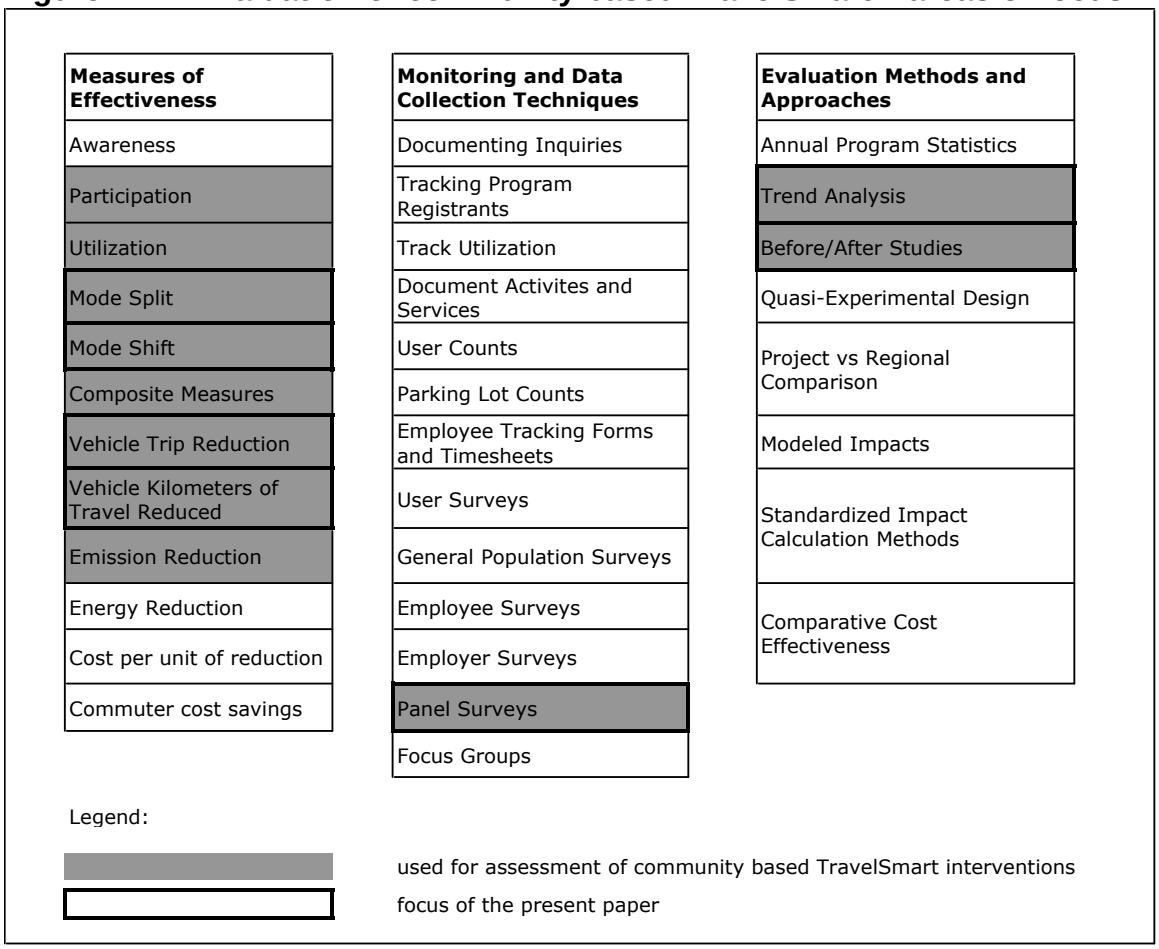

Figure based on Schreffler E.N. (2000) "Mobility Management monitoring and evaluation in the United States". *MOST Mobility Management Strategies for the next Decades, Appendix C: State of Practice* (http://mo.st)

Evaluating the TravelSmart intervention in the target community of Darebin (30,000 target households) was done independently from the intervention itself by means of a 'before' and 'after' panel of randomly selected households. Based on the design of the Victorian Activity and Travel Survey VATS (Richardson and Ampt, 1995) the survey instrument included:

- a Household Form for the recording of socio-demographic variables,
- a Person Form for each person of the household to record the travel behaviour in a one-day diary, and
- a Vehicle Form for details on motorized vehicles used by the household including two odometer readings for each vehicle over a one-week interval.
- A one-day Travel Diary for each member of the households.

While the questionnaire was self-completion, personal delivery and collection of the survey packs increased the personal contact with households.

In a small sub-sample of some 390 households, a slightly different survey instrument design was tested, whereby the recording period was extended over eight days (i.e. from one Tuesday to the next), whereby a simplified recording method of daily mode

choice was used, and two odometer readings in a one-week interval were recorded in the vehicle part of the questionnaire.

Conducted in March 2004 ('before' wave) and March 2005 ('after' wave) the final results of the panel are not available for the present paper. Instead, this paper concentrates on technical issues related to the measures of effectiveness of a TravelSmart intervention and on experience gained with the 'before' and 'after' survey in a panel format.

2 Issues related to Measures of Effectiveness

2.1 Disaggregated data to measure the objectives of a TravelSmart campaign

In the Darebin community-based TravelSmart, the principal intention of the authority is the reduction of motorized travel in order to achieve reductions in greenhouse gas emissions by delivering a voluntary travel behaviour change methodology to all households of a target area. In concrete terms, the goal of this community-based TravelSmart intervention was *"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"* (Department of Infrastructure, 2003). Although other benefits were also to be expected, i.e. health benefits for the participants that change their travel behaviour by increasing their share of non-motorized modes (walking, cycling), this evaluation did not include their assessment.

Assessing the greenhouse gas reduction of the target population requires disaggregated travel behaviour data at a level of the participating unit. Since the community based TravelSmart intervention addresses households, this is also the principal unit of data collection. In the absence of a Melbourne wide continuous household travel survey that would also cover the TravelSmart area with a sufficiently large sample for a cross-sectional comparison over time, a travel survey had to be conducted specifically for that particular project. In addition to tracking change in vehicle kilometres (VKT) and change in mode use, the travel data on a household level will ultimately provide a base for different components of a more comprehensive cost/benefit analysis.

Given the size of the target population of recent community-based TravelSmart interventions in Australia, the evaluation cannot be performed with all target households but has to be conducted on the bases of a random sample. In order for the sample to properly reflect the development of the entire target population, a number of requirements must be met some of which are discussed in more detail in Chapter 3.

2.2 Establishing the base case by using the same population frame for survey and intervention

In order to establish a base case without intervention, the first 'before' survey was conducted in the target area of the later TravelSmart implementation in such a way that there was at least a one-month interval between the last survey day and the first implementation day. The timing of the 'before' and 'after' wave is important because it determines how well the (decay) effect of a campaign can be monitored over time, and also how well impacts of the survey on the intervention up-take can be

prevented (see Chapter 3.4). In order to connect the results of the base case to the intervention effect on a disaggregated level, the same address database (i.e. database of the Council residential rates available in the form of a GIS database of property boundaries) that is used for the implementation of the TravelSmart intervention should also be used for the sampling of the survey household. Thus, the target population of the intervention is also the population frame for the evaluation survey. If, for whatever reason, the program implementation does exclude a specific type of household (i.e. old peoples homes, etc.) they should also be excluded from the sample frame of the survey. Only if the population frame for the survey and the implementation match exactly, is it possible to expand the behaviour change results recorded in the survey to the total target population.

2.3 Recording travel behaviour change at three different levels

The recording of travel behaviour change can occur at three different levels. From a logistical and survey technical point of view the household has been chosen as the principal survey unit. However, to understand the origins of change, the survey should also accommodate disaggregate results on a person level and on a vehicle level. This way, the change in terms of units travelled can then be traced back to changes in household-demographics (change in number of household members), to changes in vehicle availability and to changes in actual travel behaviour.

2.4 Survey instrument and content

The surveys conducted for the evaluation of the large-scale community based TravelSmart interventions are surveys of “Day-to-Day” travel (Richardson, 2004). The survey was conducted by delivering questionnaires to sampled households and having them fill in these questionnaires describing their travel on a specific Travel Day. Some limited information was also asked about the people, who live in that household and the motorized vehicles used by the household members. For each motorized vehicle, a first odometer reading was recorded at the start of the Travel Day before using the vehicle. In order to calculate a one-week interval of vehicle kilometres a follow-up survey was conducted to record a second odometer reading for each vehicle in the household. Figure 2 provides a list of items recorded about the household, the persons and the vehicles.

Figure 2 Items recorded about the household, the persons and the vehicles

Household Form	Person Form	Vehicle Form
Number of people living in the household	Persons first name (as link to travel diary)	Type of vehcile
Type of dwelling	Year of birth	Make
Ownership of dwelling	Gender	Model
Length of residence at current address	Relationship to person 1 (oldest person)	Year
Number of bicycles in the household	Country of birth	Number of cylinders
Number of dogs in the household	License holding status	Fuel type
Contact phone number of the household	Current employment status	Ownership (private, company, government)
		First odometer recording
		Second odometer recording (separate follow-up survey)

(For details on each specific item see "North-Eastern Suburbs Travel Survey (NESTS). "*Procedural Results Report"*. www.tuti.com.au/PUBLICATIONS/2004).

For all persons aged 5 years and older, a one-day Travel Diary was completed containing the following four components (Richardson, 2004):

Travel Diary Form (page 1) - Details on the person and the Travel Day:

- Identity of the person (person number and first name from the Person Form)
- Date of Travel Day
- The person's location at 4 a.m. on the Travel Day (starting point for travel patterns);
- Whether a person undertook any travel on the Travel Day or not,
  - If yes, the starting time of travelling,
  - If not, the reason why they did not travel, and when they last travelled.

Travel Diary Form (page 2-14) – Stops pages, with stops being the places where respondents go to as they travel around. For each stop page the following questions were asked:

- What was the nature of the Stop
  Description of the type of place that the person went to, if possible accompanied by the name of that place (e.g. the name of a shop)
- Where was the Stop
  In order to calculate travel distances, and to understand the geographic spread of travel, we need to know where people went to, so that x-y coordinates can be assigned to all locations visited. In order to do this, information is needed from which it would be possible to find the location on a map. For this purpose a full street address would be best, but realising that most people don't know the full street address of their destinations, a variety of ways are offered for describing where they go to.

- Why they went to the Stop
  This question provides information on the reasons why people travel. The question offers categories for some of these reasons, but most of the information is obtained from people's responses to the "other reason" answer at the bottom of the question.
- Who (from the household) travelled with the person to the Stop
  Since children under the age of 5 are not asked to fill in a Travel Diary, this question is asked so that it is possible to reconstruct their travel patterns for the large number of trips, where they are accompanied by someone else in the household.
- How they got to the Stop
  This questions is concerned with the method of transport used to get to a Stop. In addition to a broad answer (private vehicle, walking, bicycle etc) there are some specific questions for those respondents who use a private vehicle.
- Details of any Private Vehicle Travel
  For those respondents using a private vehicle, there are a number of additional questions:
  - What type of private vehicle was used
  - Was the respondent the driver or a passenger
  - How many people, in total, were in the vehicle (including people from outside the household)
  - Whether the vehicle used was from the household and listed on the Vehicle Form (this allows us to determine how each type of vehicle is actually used)
- When they arrived at the Stop
  We would like this information as accurately as possible (but we realise that many people round off to the nearest 5 minutes).
- If they made more travel, when they left the Stop
  We ask if the person made any more stops after this one, and if so when did they leave this Stop.

This particular survey instrument design is based on "stops" and the corresponding layout of the travel diaries was developed and tested in the early 1990s (Ampt and Richardson, 1994). It has since been successfully used in a number of travel surveys in Melbourne, Perth, Brisbane and the coastal areas of Queensland. Although the list of items to record on each "stop-page" seems quite long, the respondent burden has been found to be relatively low because of the logical flow of the questions reflecting the course of daily travel.

2.5 "Stops" replacing "trips" as the reference unit for Travel Diaries

In fact, one of the major advantages of the stop-based design is that from the respondent's point of view it does not rely on the notion of "trip". It has long been recognized by survey designers that it is nearly impossible to communicate one precise definition of "trip" to the respondents that covers all possible travel patterns. As a consequence, the interpretation of "trip" may vary from respondent to respondent and there is potential to introduce considerable "interpretation" bias into

the result. Using the stop approach, it is therefore not left to the respondent to "define" what a trip is, but rather, trips are formed by the analyst after the data collection according to a well-defined set of rules. For the same reason, a similar approach has been applied in a number of European countries. For example, for the very same reason the Swiss national household survey on travel behaviour abandoned the "trip" concept in the early 90s and replaced it with the recording of "stages" in their CATI based household travel survey (in German 'Etappen') (Junod, Davatz and Seethaler, 1996). The flow of the CATI interview for this travel survey was constructed in a way that is very similar to the stop-based Travel Diary design used here. Using stages or stops as a reference unit for daily mobility, it is also possible to record the distance and time for each mode separately even if we are dealing with multi-modal trips.

2.6 Availability of different indicators to assess the change in mobility

Using the above described survey instrument for the 'before' and 'after' wave of the panel households, behaviour change can be recorded in different ways:

- Change in daily mobility on a person level
  - Change in mode use (number of times a particular mode was used in the 'before' and 'after' survey),
  - Change in distance and travel time by mode.
- Change in motorized travel on a vehicle level
  - Change in frequency that a car was used,
  - Vehicle kilometres and travel time by vehicle.
- Change in daily mobility on a household level
  - Aggregation of mobility indicators for all household members,
  - Aggregation of results for all vehicles used by the household.

According to the various targets of a TravelSmart intervention, different indicators can be chosen from the above list. For example, for a first estimate of the reduction in GHG emissions and other pollutants, the total reduction in VKT on a household level is appropriate. A refinement of the emission estimates can then be achieved by taking into account the information on vehicle type, fuel type and vehicle age along with the information on distance and travel time of each vehicle. Recording the travel time for each mode also allows an assessment of the impact of the TravelSmart intervention on peak and off-peak travel demand, and whether for a given mode the temporal distribution of its use has changed along with its total level. And finally, to assess the health benefits of a TravelSmart intervention, changes in duration and distance of walking and cycling can be analysed on a person level. However, the sample size has to be very large to allow for an expansion to the total target population for these modes.

2.7 The role of the odometer readings

The combined travel diaries of all household members provide some information about the kilometres driven with all vehicles used by a household. However, given the high day-to-day variability, a very large sample size would be necessary if the before-and-after comparison of vehicle kilometres was performed based on one single day only. Recording an odometer reading at the start and the end of a travel week reduces the sample requirement considerably because the variability of the daily VKT-average is reduced when calculated with the travel distances aggregated

over seven days instead of one day only (see also Chapter 3.1 for further sample size considerations).

Besides the advantage from a sample size point of view, odometer readings are a more objective measure compared to the travel distances estimated by the respondents. In this context it will be interesting to see how well the aggregated vehicle kilometres from the travel diaries correspond to the average daily VKT based on odometer readings.

2.8 Measuring the intervention up-take and the travel behaviour change independently from each other

Whereas travel behaviour change is the focus of the 'before' and 'after' panel survey and recorded by using a specific survey instrument, the intervention up-take is measured at the same time as the TravelSmart intervention is being rolled out. To ensure objectivity the evaluation should be separated from the implementation, i.e. by having each task conducted by a different team. Following the idea of a blind test, the addresses randomly sampled for the 'before' survey should not be known to the team that is implementing the TravelSmart intervention.

3 Issues related to Data Collection Techniques

Having discussed selected issues related to the choice of appropriate measures of effectiveness, the present chapter deals with specific issues related to the survey methodology. The question of survey type – cross-sectional versus panel – is strongly linked to sample size considerations. And no matter what survey design is chosen, there must be mechanisms in place to control for exogenous effects and confounding factors that are not related to the intervention itself.

3.1 The relationship between survey type and sample size considerations

Choosing a cross-sectional survey type for the 'before' and 'after' data collection rather than a panel design has two disadvantages. Firstly, no information will be available on the nature of the travel behaviour change within the households and only an aggregate result for the target area as a whole can be obtained. Secondly, the sample size requirements are larger for cross-sectional surveys. A recent comparison by Richardson (2002a) of the cross-sectional travel survey data of the Victorian Activity and Travel Survey (VATS) and a German six-week household panel survey (MobiDrive) has demonstrated that in order to measure the effects of TravelSmart:

- The panel survey is preferred to the cross-sectional survey because the between-sample variance is eliminated and a smaller sample size is required for the 'before-and-after' comparison;

- The prime attention should be paid to kilometres travelled of all persons and all vehicles in a household to account for the reallocation of trips between persons and vehicles. Also, a single person or vehicle has more relative variability than all persons or all vehicles of a household combined;

- Weekly data collection is preferred to daily data collection because the reallocation of activities during a week induced by TravelSmart will be

accounted for (e.g saving up a number of activities in the same region for a trip on one single day).

Considering all of these issues together, a panel survey of weekly kilometres travelled by all vehicles in the household has the lowest required sample size (for a detailed discussion, see Richardson 2002a, 2002c).

Once the final number of responding households for the 'before' and 'after' panel survey has been established that is necessary to detect an expected difference between the household-VKT at the required Alpha- and Beta-levels, it is then necessary to establish the number of households that need to be sampled initially. For the large-scale TravelSmart intervention in the Melbourne suburb of Darebin conducted in 2004, the final sample size of households responding to both the 'before' and 'after' survey was specified as 900. A previous pilot survey had indicated a response rate of 52% to the 'before' survey and it was assumed that 75% of these households would also respond to the 'after' survey. Finally, given that the 'before' and 'after' survey were to be conducted at the same month within a year's interval, statistics on residential mobility for the target area suggested that 15% of the sampled households would have moved residence during that time. Taking all three factors into account (0.52*0.75*0.85=0.33), an initial sample of some 2700 households had to be drawn.

3.2 Ensuring comparability between panel waves

In order to ensure maximum comparability between panel waves, the households were assigned to the same day of the week for the reporting of their travel diaries. Also, the 'before' and 'after' surveys were conducted in the same month of the year and covered the same holiday weekend (i.e. the long weekend for Labour Day).

3.3. Controlling for exogenous effects without using a 'control group'

In order to control for effects that are unrelated to an intervention, the research design literature suggests that a control group that is not exposed to the 'treatment' should also be surveyed (DeVaus, 2001). In the case of community based TravelSmart, the task consists of isolating the effect of the TravelSmart intervention from exogenous effects on travel behaviour that are unrelated to the campaign, i.e. changes in fuel prices, in public transit fares, etc. and that occur during the implementation time. After initially considering the use of a control group, this idea had to be abandoned for two reasons.

Firstly, the comparison of test versus control would require the doubling of the sample size and hence would require a doubling in evaluation expenditures. Secondly, it was found that the control group concept was inappropriate for this particular context. According to the 'ceteris paribus' principle, a control group should be the same in all aspects with the exception of the 'treatment' for which it is compared against the test group. For a community based TravelSmart intervention this requirement is virtually impossible to meet. For households that are located close to the target area in order to achieve geographic similarity, the problem of 'contamination' arises. Although not directly included in the TravelSmart intervention, their members read about it in the local paper and hear about it from friends and family living in the close-by target area. As a consequence, their travel behaviour may change and they no longer constitute a true control group. On the other hand,

avoiding ‘contamination’ means leaving the region around the target area altogether which then violates the requirement of geographic similarity.

In this situation, it was decided to control for different exogenous effects by using appropriate secondary data sets over a period of 12 months or longer. For exogenous changes related to the public transit system (e.g. a rise in ticket fares), ticket sales data and ticket validation data are used. In order to isolate the effects of TravelSmart from exogenous effects in the domain of road traffic (e.g. changes in fuel prices, infrastructure changes, etc.) traffic counts of five different road types were used. Counts of local streets and main roads within the target community were compared to the counts of roads on the border of the target area and in neighbouring suburbs. A long-term base line trend was provided by metropolitan wide traffic count data over five years. For the control of exogenous effects on walking and cycling (e.g. due to a ‘healthy life-style’ campaign during the TravelSmart intervention period promoting walking or new separated bicycle lanes in the target area, etc.), no secondary data are currently available.

3.4 Avoiding instrument reactivity

An important problem that reaches beyond the immediate concerns with the quality of an evaluation is the effect that the survey evaluation can have on the TravelSmart intervention itself. Known as ‘instrument reactivity’ (DeVaus, 2001), the ‘before’ survey can affect how the responding households react to the TravelSmart intervention to which they are exposed after the survey. Although a thorough research of instrument reactivity in the context of community based TravelSmart has not yet been conducted, recent experience has provided some anecdotal evidence about possible effects of this nature. A number of different scenarios are imaginable, in some of which the effect of a TravelSmart intervention is enhanced, while in others it is decreased. For example:

Scenario 1: The ‘before’ survey affects travel behaviour change before TravelSmart

By filling in the Travel Diaries, the household members become aware of the amount of their (motorized) travel. This awareness inclines them to organise their travel patterns more efficiently. So, before the TravelSmart intervention has even started, their VKT on a household level decrease because of their participation in the ‘before’ survey. As a result, the reduction in VKT due to TravelSmart appears to be larger because it ‘harvests’ some of the travel behaviour change that was actually initiated by the ‘before’ survey.

Scenario 2: The ‘before’ survey increases the up-take of TravelSmart

In some households, the ‘before’ travel survey can raise awareness for daily travel, which in turn can raise the householders’ propensity to participate in TravelSmart once the campaign has started. Households who would not have taken up TravelSmart do so now, because of their exposure to the ‘before’ travel survey.

Scenario 3: The ‘before’ survey decreases the up-take of TravelSmart

In some households, the request to fill in a Travel Diary for each member of the household may result in household members reacting with fatigue to the TravelSmart intervention. Households who might have participated in TravelSmart no longer do so, because of their exposure to the ‘before’ travel survey.

Scenario 4: The 'before' survey has no effect on travel behaviour nor on participation in TravelSmart

The 'before' travel survey has no effect on travel behaviour nor does it affect the propensity of the householders to participate in TravelSmart. From an evaluation point of view, this scenario is of course the preferred one because it allows the result of the sample to be expanded to the whole target population without correcting for the effect of survey instrument reactivity.

At this point in time it is too early for quantitative results on survey reactivity in the large-scale community-based TravelSmart intervention in Darebin. However, a number of strategies were taken to minimise this effect. For example, the 'before' survey was conducted at least one month before the start of the TravelSmart campaign. Survey announcement letter and materials carried different logos and had a visual appearance different from the TravelSmart materials. Also, the evaluation survey and the TravelSmart intervention were announced by different institutions and carried out by different field staff. Whether all these measures combined were able to eliminate survey reactivity and its impact on TravelSmart is the subject of current investigations.

4 Conclusions and outlook

The first large-scale evaluation of the 2004/2005 TravelSmart project has just finished, and further evaluations for another two large-scale community based TravelSmart interventions are currently being undertaken in Melbourne. The 'before' surveys took place in October 2004 and will be followed by the implementation of TravelSmart over several months, with the 'after' surveys in October 2005. This work in progress will allow further light to be shed on the issues discussed in this paper and to back up some of our recommendations with quantitative results. In addition to survey content, instrument design and data collection techniques, further problems related to the fieldwork of the survey conduct and to the data editing, data correcting for different biases (Richardson, 2002b) and data analysis need to be examined in more detail, for example:

- the question of how to avoid non-response and how to deal with non-response once it has occurred,
- the question of how to identify and handle biases that are introduced by proxy interviews, or
- the question of how to use GIS based information and other secondary data to correct and calibrate self-reported estimations of travel distances, etc.

Finally, given the considerable funds that are required to conduct 'before' and 'after' travel surveys with a sample size of several hundreds of households, one might ask a more fundamental question: To what extent are surveys really necessary to evaluate the effectiveness of community based TravelSmart interventions and by what cheaper means could they successfully be replaced? And in which way can the analysis of secondary data provide a reliable tool for the assessment of the short-term effects of a TravelSmart intervention as well as its longer-term impacts (or decay) over several years?

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in South Australia www.transport.sa.gov.au/publications/environment.asp#newsletter;
in Queensland www.transport.qld.gov.au/qt/PubTrans.nsf/index/TravelSmartPrograms,
in Victoria www.travelsmart.vic.gov.au/,), and by the Australian Greenhouse Office www.travelsmart.gov.au/