



2009
Comprehensive Household Travel
Data Collection Program

MI Travel Counts II



Final Methodological Report

July 30, 2010

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Table of Contents

Table of Contents	ii
List of Figures	iii
List of Tables	iii
Final Methodological Report Appendices	iii
Section 1: Project Background, Objectives, and Purpose of this Document	1
1a. Project Background	1
1b. Project Objectives	1
1c. Purpose of this Report	2
1d. Comparison Report	2
Section 2: Overall Methodology Approach	3
2a. Program Design	3
2b. Project Consultant Team and Roles	3
2c. Overall Program Conduct Flow Plan	3
2d. Program Components	5
Section 3: Sample Design, Methodology, and Procedures	6
3a. Sample Selection	6
3b. Sampling Target Results by Sample Area and Data Cell	9
3c. Sampling Procedures	11
3d. Sample Monitoring	11
Section 4: Data Collection Schedule and Program Elements	12
4a. Schedule	12
4b. Elements	13
Section 5: Response Rates	16
Section 6: Geocoding	18
Section 7: Data Checking and Interim Data and Report Delivery	20
7a. Quality Controls	20
7b. Problems and Solutions	24
Section 8: Data Results (<i>See Comparison Report</i>)	
Section 9: Data Weighting and Expansion (<i>See Comparison Report</i>)	
Section 10: Lessons Learned and Future Recommendations	25

List of Figures

Figure 1:	MTC II Overall Conduct Flow Plan	4
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List of Tables

Table 1.	Retrieval Data by Sample Cell	8
Table 2.	MTC II Schedule by Task	12
Table 3.	Recruitment Sample Disposition	17

Final Methodological Report Appendices

- A. Pre-Notification Recruitment Letter
- B. Diary Cover Letter
- C. Diary Labels
- D. Travel Diary With Person Sheet
- E. Reminder Call Script
- F. Recruitment Script
- G. Retrieval Script
- H. Retrieval Postcard
- I. 1-800 Line Greeting
- J. Answering Machine Message
- K. In-CATI and In-Web-Based Interview Data Checks and Abt SRBI Post Survey Data Checks
- L. Cambridge Systematics Post Survey Data Checks
- M. Methodology for Time and Distance Testing of Geocoded Points
- N. Final Interim Report
- O. CS Third and Final QA/QC Data Checking Report
- P. Sample Plan
 - P1. Original MTC II Sample Plan – Attachment A from RFP
 - P2. Review Memorandum from Peter Stopher, PlanTrans
 - P3. Final Michigan DOT (MTC II) Sample Data Plan 2
 - P4. Abt SRBI Sample Selection and Maintenance Memorandum
- Q. Codebook for MTC II
- R. MTC II Website Home Screen

Section 1. Project Background, Objectives, and Purpose of this Document

***In Brief:** Section 1 provides information about the intended applications of MI Travel Counts II data, identifies the project's principal goals and objectives, and states the purpose of this report.*

1a. Project Background

In 2004-2005, the MI Travel Counts I (MTC I) program was undertaken by the Michigan Department of Transportation (MDOT) and its partners to obtain information on statewide household travel characteristics. Over 14,000 households statewide reported activities and travel for two consecutive days. The data collected from MTC I are being used to update, develop, and calibrate statewide and urban travel demand models. The models estimate future travel demand and travel patterns. The statewide and urban travel demand models are also being used to determine project requirements and investment priorities for the State Long Range Plan, the shorter term Statewide Transportation Improvement Program (STIP), local Metropolitan Planning Organization (MPO) Long Range Plans (LRP), and the MPO Transportation Improvement Plans (TIP). Other uses include air quality conformity and alternatives and detour analysis.

1b. Project Objectives

Given deteriorating economic conditions within the state of Michigan since 2005, and the decline in vehicle miles traveled (VMT), the purpose of MI Travel Counts II (MTC II) was to determine how household travel has changed statewide since the completion of MTC I. Updated travel behavior characteristics are required to determine the magnitude of any changes statewide. MTC II collected the necessary data that will be used to achieve the following objectives:

- Compare, update, validate, and improve travel demand models,
- Evaluate the cause of the decrease in VMT,
- Understand changes in household composition, such as the number of household members, number of household workers, and number of household vehicles.

To accomplish these objectives, MTC II needed to duplicate the processes of MTC I. With this in mind, only four major modifications were made to MTC II from methodologies used for MTC I. These major modifications were:

1. Sampling consisted of re-interviewing households that participated in the MTC I 2004-05 survey, in similar proportions to their completions by data cells (discussed in section 3a) in MTC I. Data cell goals for MTC II were, in turn, based on Census data proportions for a matrix of households by household size, number of vehicles, and number of workers within each of the seven sample areas used in MTC I. Thus, MTC II was conducted as a panel survey.

2. One specific weekday of travel was collected for each household member rather than two consecutive weekdays as collected for MTC I.
3. Friday travel days were assigned for MTC II; they were not assigned for MTC I. This was not intended by MDOT, but will provide a basis for comparing Friday travel to that on other weekdays.
4. For MTC II, no questions were asked about overnight visitors to the household on the assigned travel day.

In total, the efforts produced travel and activity data from 2,395 households statewide (a minimum of 280 completed households per geographic sample area). This methodology report was produced at the end of the data collection phase. Following this phase, Cambridge Systematics (CS) and MDOT conducted an intensive final evaluation of the data. Through the evaluation process, households that met quality standards were identified and carried forward to be used in the Comparison Report. The households identified for review are reported in Appendix O: Final QA/QC Data Checking Report.

1c. Purpose of this Report

This report is intended for the use of current and future MDOT modeling staff or those of other planning agencies. It documents the methodology for carrying out MTC II, and focuses on the processes involved in data collection to achieve sample goals and produce a quality data set, including the techniques and resources used with corresponding outcomes. All of the materials used in MTC II are included as appendices to this report, and summary statistics and findings of the study are provided in a Comparison Report.

The objectives of this report are to present the overall rationale for the approaches and designs used, and to document:

- Designs and instruments
- Problems that were encountered
- Limitations of the approaches and changes implemented
- Possible solutions or changes for future survey efforts

1d. Comparison Report

Comparison results, figures, and analysis of the 2005 and 2009 surveys are available in a separate report. The Comparison Report also compares 2009 travel characteristics to the 2009 National Household Travel Survey (NHTS) conducted by the Federal Highway Administration.

Section 2. Overall Methodology Approach

In Brief: Section 2 describes the program design, the project consultant team, and presents the conduct flow plan and program components.

2a. Program Design

Strategies used in addressing the objectives of the MTC II panel survey included careful attention to detail in the designing of program conduct flow and corresponding components including instruments and materials, a detailed sample design, interviewer training, sample and data collection monitoring, geocoding and data checking standards, and overall quality controls.

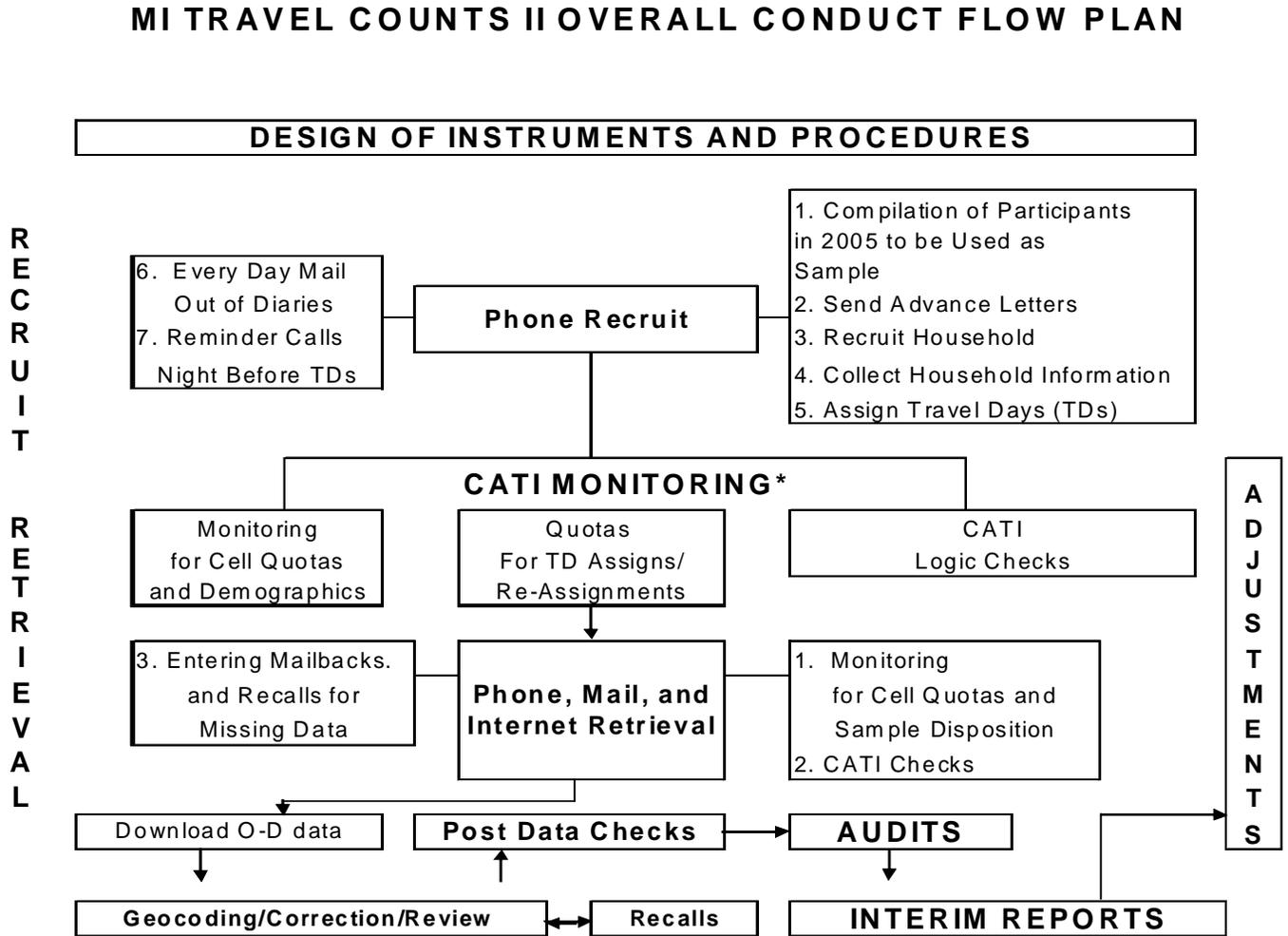
2b. Project Consultant Team and Roles

Abt SRBI served as the prime contractor for MTC II. The Abt SRBI project director for MTC II was the project director for MTC I, when MORPACE was the prime contractor. This management and technology continuity provided consistency between the two efforts. The modeling firm of Cambridge Systematics (CS) was responsible for developing the sampling plan for MTC II and for a bevy of quality audit data checks, sample weighting and expansion, and development of the Comparison Report. Dr. Peter Stopher (PlanTrans), contributed to sampling design and survey document review, playing a similar role undertaken for MTC I. Finally, Resource Systems Group (RSG) provided the platform for Internet retrieval of reported travel, a role they likewise performed in MTC I. Strict adherence to MTC I protocols was a hallmark of MTC II.

2c. Overall Program Conduct Flow Plan

Figure 1 on the following page shows the integrated Conduct Flow Plan for MTC II from design, recruit and retrieval of households, data processing, and geocoding, through auditing, reporting, and correction.

Figure 1: MTC II Overall Conduct Flow Plan



* Computerized-Assisted Telephone Interviewing (CATI)

* Travel Day (TD)

2d. Program Components

The essential program components to MTC II are as follows:

- Development of materials and instruments
- Sample design
- Public outreach tools
- Interviewer training
- Data collection monitoring
- Geocoding
- Data checking and quality control
- Interim data reports

The following sections describe the program components listed above, particularly any changes that were made from MTC I. Sample design is presented in Section 3; data collection elements, starting in Section 4. Section 5 continues with interviewing response rates and refusal summary. Section 6 discusses geocoding. Section 7 reports on data checking, quality control, and interim data reports.

Section 3: Sample Design, Methodology, and Procedures

In Brief: Section 3 provides the sample selection plan and discusses sample procedures used for sample monitoring.

3a. Sample Selection

The sample for the MTC II Survey was composed of households that participated in the MTC I Survey. Both households who participated in MTC I and new households now residing at the previous participant's address, or households that currently have the MTC I participant's phone number, were eligible to participate in MTC II.

This panel survey approach was selected because it would aid comparison with MTC I. With 100% of MTC II households (2,393 of 2,395) having completed MTC I, this wave-to-wave comparison can be considered more robust than a comparison of independent cross-section surveys at different points in time. This approach also sharply truncated the recruit time and cost while allowing for a sufficient number of recruits. Despite these benefits, given the five year interval in interviewing waves, one weakness of the panel approach is that a considerable percent of households can be expected to have changed their sample cell placement (particularly in terms of the number of household members, the number of household vehicles, and the number of available autos)—given the turmoil in economic conditions within the state of Michigan since 2005. An examination of the changes in household cells is in Chapter 6 of the Comparison Report.

As shown in Appendix P, the Final MTC II Sample Plan Memorandum, for MTC II some rare population data cells were collapsed, within geographic sample areas, because of the small sample sizes available from MTC I. Whereas MTC I had a total of 169 data cells across the seven sample areas, data cells for MTC II across the same geographically defined areas totaled 106. These data cells are shown in Table 1.

An additional change from MTC I was that incentives were not allowed in MTC II. In MTC I, incentives of \$20 or \$30 were offered to households in rare populations data cells (low income and zero autos households, and households with 4 or more persons) when all members of these households completed reporting of their travel diaries. However, for MTC II, due to state economic conditions in 2009, MDOT determined that incentives could not be offered. This appears to have had a particularly significant impact on the percent of zero vehicle households completing MTC II. These impacts are discussed in this section in analysis following presentation of Table 1: Retrieval Data by Sample Cell.

It should also be noted that in contrast to a true panel, this sample of respondents did not give explicit prior approval to re-contact. Nevertheless, since all households in the sampling frame agreed to be interviewed for the 2004-05 MTC I Survey, it was allowable under the Council of American Survey Research Organization (CASRO) rules to re-contact all households. From the MTC I sample, 11,319 households agreed to be contacted again and were included in the MTC II sample. In addition, 307 households in

hard to reach cells that did not indicate that they wished to participate in future surveys were included in the sample.

Besides the collapse of some data cells, the sample design for MTC II generally followed MTC I. It divided the State of Michigan into seven sample areas as follows:

1. SEMCOG (Seven Counties of Detroit Area)
2. Small Cities (Population of 5,000-50,000 outside small urban and TMA areas)
3. Transportation Management Areas (TMAs) (Population over 200,000)
4. Small Urban Modeled Areas (Population between 50,000-200,000)
5. Upper Peninsula Rural
6. Northern Lower Peninsula Rural
7. Southern Lower Peninsula Rural

As in MTC I, three additional variables (household size, the number of vehicles in the household, and the number of workers in a household) were used to further divide each geographic stratum into data cells.

Sample selection for data cells with low response rates in MTC I was adjusted upward to ensure sampling targets were met in these data cells. Likewise, sample selection for data cells with high response rates in MTC I was adjusted downward. Once recruitment for MTC II began, sample selection was further adjusted as the panel survey progressed to take into account recruitment and retrieval response rates by data cell. Note that once a data cell was filled, recruitment was directed to other cells that were underrepresented. Up to six attempts were made to contact all households in difficult to fill cells.

The sample targets, recruitment rates, and final retrieval counts by sample cell are shown in Table 1. Further quality and auditing review of data by sample areas and data cells, resulted in some deletion and flagging of households in the final data delivery, which were deemed to have insufficiently complete information. These final data results are presented in the final QA/QC Report, Appendix A of the Comparison Report. In addition to disproportional sample selection strategies as described above, Abt SRBI implemented refusal conversion techniques in the last phase of the data collection by recontacting recruited households in underrepresented cells, reassigning travel days, and attempting again to retrieve travel inventory data for all members of the household. As noted, incentives were not used in any phase of MTC II as they were in MTC I, due to MDOT policies related to 2009 austere budget conditions.

Table 1. Retrieval Data by Sample Cell

MTC I Strata ID	Cell	Household (HH) Characteristics	2005 Total Household Responses	MTC II Survey Targets	Available Sample to Target Ratio	Recruited HHs	Retrieved HHs	% of Recruited HHs Retrieved	% of Target Retrieved
SEMCOG									
1	1	HH Size=1 Autos=0 Workers=0,1	125	15	6	17	10	58.8%	66.7%
2	2	HH Size=1 Autos=1+ Workers=0	185	21	6	53	47	88.7%	223.8%
3	3	HH Size=1 Autos=1+ Workers=1	297	34	7	56	39	69.6%	114.7%
4	4	HH Size=2 Autos=0 Workers=0,1,2	44	10	4	5	3	60.0%	30.0%
6+7	5	HH Size=2 Autos=1 Workers=1,2	119	14	7	18	8	44.4%	57.1%
5+8	6	HH Size=2 Autos=1,2+ Workers=0	169	19	6	48	39	81.3%	205.3%
12	7	HH Size=3 Autos=1,2,3+ Workers=0	33	10	3	8	6	75.0%	60.0%
9	8	HH Size=2 Autos=2+ Workers=1	121	14	7	39	34	87.2%	242.9%
10	9	HH Size=2 Autos=2+ Workers=2	211	24	7	41	23	56.1%	95.8%
11	10	HH Size=3,4+ Autos=0 Workers=0,1,2,3+	60	10	6	2	1	50.0%	10.0%
13+15	11	HH Size=3 Autos=1,2,3+ Workers=1	138	16	7	20	15	75.0%	93.8%
14+16	12	HH Size=3 Autos=1,2 Workers=2,3	129	15	6	20	9	45.0%	60.0%
17+18	13	HH Size=3 Autos=3+ Workers=2,3	73	10	5	22	13	59.1%	130.0%
19	14	HH Size=4+ Autos=1,2,3+ Workers=0	31	10	2	5	1	20.0%	10.0%
20+22	15	HH Size=4+ Autos=1,2 Workers=1	160	18	7	17	11	64.7%	61.1%
21+23	16	HH Size=4+ Autos=1,2 Workers=2,3+	158	18	6	32	15	46.9%	83.3%
24	17	HH Size=4+ Autos=3+ Workers=1,2	90	12	5	19	12	63.2%	100.0%
25	18	HH Size=4+ Autos=3+ Workers=3+	78	10	7	15	5	33.3%	50.0%
SEMCOG Total			2,221	280	6	437	291	66.6%	103.9%
TMA									
26	19	HH Size=1 Autos=0 Workers=0,1	78	10	5	13	6	46.2%	60.0%
27	20	HH Size=1 Autos=1+ Workers=0	172	23	6	58	49	84.5%	213.0%
28	21	HH Size=1 Autos=1+ Workers=1	258	34	7	50	34	68.0%	100.0%
29	22	HH Size=2,3,4+ Autos=0 Workers=0,1,2,3+	56	10	5	11	6	54.5%	60.0%
30+31	23	HH Size=2 Autos=1 Workers=0,1	145	19	6	25	23	92.0%	121.1%
32+35	24	HH Size=2 Autos=1,2+ Workers=2	274	37	6	89	51	57.3%	137.8%
33	25	HH Size=2 Autos=2+ Workers=0	100	14	5	38	32	84.2%	228.6%
34	26	HH Size=2 Autos=2+ Workers=1	128	17	6	50	43	86.0%	252.9%
36+37+39	27	HH Size=3 Autos=1,2,3+ Workers=0,1	143	19	6	26	13	50.0%	68.4%
40+41	28	HH Size=3 Autos=2,3+ Workers=2	138	18	6	22	13	59.1%	72.2%
38+42	29	HH Size=3 (Autos=1 Workers=2,3) and (Autos=2,3+ Workers=3)	61	10	5	12	3	25.0%	30.0%
43+44+46	30	HH Size=4+ Autos=1,2,3+ Workers=0,1	182	24	6	28	22	78.6%	91.7%
45+47	31	HH Size=4+ Autos=1,2 Workers=2,3+	175	23	6	40	22	55.0%	95.7%
48	32	HH Size=4+ Autos=3+ Workers=2	71	10	6	20	9	45.0%	90.0%
49	33	HH Size=4+ Autos=3+ Workers=3+	84	12	5	20	7	35.0%	58.3%
TMA Total			2,065	280	6	502	333	66.3%	118.9%
Small Urban									
50	34	HH Size=1 Autos=0 Workers=0,1	91	12	5	12	12	100.0%	100.0%
51	35	HH Size=1 Autos=1+ Workers=0	199	26	6	76	62	81.6%	238.5%
52	36	HH Size=1 Autos=1+ Workers=1	234	31	6	45	35	77.8%	112.9%
53	37	HH Size=2,3,4+ Autos=0 Workers=0,1,2,3+	51	10	4	9	1	11.1%	10.0%
54+55	38	HH Size=2 Autos=1 Workers=0,1	160	21	5	33	28	84.8%	133.3%
56+59	39	HH Size=2 Autos=1,2+ Workers=2	264	36	6	64	40	62.5%	111.1%
57	40	HH Size=2 Autos=2+ Workers=0	135	19	5	47	40	85.1%	210.5%
58	41	HH Size=2 Autos=2+ Workers=1	141	19	5	44	31	70.5%	163.2%
60+61+63	42	HH Size=3 Autos=1,2,3+ Workers=0,1	125	18	5	20	13	65.0%	72.2%
62+64	43	HH Size=3 Autos=1,2 Workers=2,3	104	14	6	16	9	56.3%	64.3%
65+66	44	HH Size=3 Autos=3+ Workers=2,3	80	12	5	21	16	76.2%	133.3%
67+68+70	45	HH Size=4+ Autos=1,2,3+ Workers=0,1	155	21	5	26	19	73.1%	90.5%
69+71	46	HH Size=4+ Autos=1,2 Workers=2+	163	21	6	32	14	43.8%	66.7%
72	47	HH Size=4+ Autos=3+ Workers=2	71	10	5	18	10	55.6%	100.0%
73	48	HH Size=4+ Autos=3+ Workers=3+	72	10	5	20	5	25.0%	50.0%
Small Urban Total			2,045	280	6	483	335	69.4%	119.6%
Small Cities									
74	49	HH Size=1 Autos=0 Workers=0,1	118	14	6	20	17	85.0%	121.4%
75	50	HH Size=1 Autos=1+ Workers=0	216	24	6	52	52	100.0%	216.7%
76	51	HH Size=1 Autos=1+ Workers=1	258	29	7	57	44	77.2%	151.7%
77	52	HH Size=2,3,4+ Autos=0 Workers=0,1,2,3+	47	10	4	6	6	100.0%	60.0%
78+79	53	HH Size=2 Autos=1 Workers=0,1	176	20	6	30	21	70.0%	105.0%
80+83	54	HH Size=2 Autos=1,2+ Workers=2	256	31	7	66	48	72.7%	154.8%
81	55	HH Size=2 Autos=2+ Workers=0	150	18	6	41	38	92.7%	211.1%
82	56	HH Size=2 Autos=2+ Workers=1	152	18	6	39	34	87.2%	188.9%
84+85+87	57	HH Size=3 Autos=1,2,3+ Workers=0,1	160	19	7	29	19	65.5%	100.0%
86+88	58	HH Size=3 Autos=1,2 Workers=2,3	150	18	7	18	14	77.8%	77.8%
89+90	59	HH Size=3 Autos=3+ Workers=2,3	93	12	6	23	21	91.3%	175.0%
91+92+94	60	HH Size=4+ Autos=1,2,3+ Workers=0,1	190	24	6	25	17	68.0%	70.8%
93+95	61	HH Size=4+ Autos=1,2 Workers=2,3+	222	26	7	40	27	67.5%	103.8%
96+97	62	HH Size=4+ Autos=3+ Workers=2,3+	140	17	7	24	16	66.7%	94.1%
Small Cities Total			2,328	280	6	470	374	79.6%	133.6%

Table 1. Retrieval Data by Sample Cell (Continued)

MTC I Strata ID	Cell	Household (HH) Characteristics	2005 Total Household Responses	MTC II Survey Targets	Available Sample to Target Ratio	Recruited HHs	Retrieved HHs	% of Recruited HHs Retrieved	% of Target Retrieved
Upper Peninsula Rural									
98	63	HH Size=1 Autos=0 Workers=0,1	104	14	5	17	12	70.6%	85.7%
99	64	HH Size=1 Autos=1,2,3+ Workers=0	246	32	6	71	59	83.1%	184.4%
100	65	HH Size=1 Autos=1,2,3+ Workers=1	218	30	6	41	34	82.9%	113.3%
101	66	HH Size=2,3,4+ Autos=0 Workers=0,1,2+	24	10	2	2	0	0.0%	0.0%
102+103	67	HH Size=2 Autos=1 Workers=0,1	169	21	5	30	27	90.0%	128.6%
104+107	68	HH Size=2 Autos=1,2,3+ Workers=2	229	30	6	68	35	51.5%	116.7%
105	69	HH Size=2 Autos=2,3+ Workers=0	171	21	6	53	48	90.6%	228.6%
106	70	HH Size=2 Autos=2,3+ Workers=1	152	19	6	43	49	114.0%	257.9%
108+109	71	HH Size=3 (Autos=1,2,3+ Workers=0) and (Autos 1,3+ Workers=1)	81	12	6	15	11	73.3%	91.7%
111	72	HH Size=3 Autos=2 Workers=1	42	10	3	10	7	70.0%	70.0%
110+112	73	HH Size=3 Autos=1,2 Workers=2,3	105	14	6	12	8	66.7%	57.1%
113+114	74	HH Size=3 Autos=3+ Workers=2,3	71	10	5	31	21	67.7%	210.0%
115+116+118	75	HH Size=4+ Autos=1,2,3+ Workers=0,1	132	16	7	23	15	65.2%	93.8%
117+119	76	HH Size=4+ Autos=1,2 Workers=2,3+	167	21	6	29	19	65.5%	90.5%
120	77	HH Size=4+ Autos=3+ Workers=2	59	10	4	20	9	45.0%	90.0%
121	78	HH Size=4+ Autos=3+ Workers=3+	57	10	4	9	4	44.4%	40.0%
Upper Peninsula Rural Total			2,027	280	6	474	358	75.5%	127.9%
Northern Lower Peninsula Rural									
122	79	HH Size=1 Autos=0 Workers=0,1	72	10	4	20	13	65.0%	130.0%
123	80	HH Size=1 Autos=1+ Workers=0	246	32	6	68	52	76.5%	162.5%
124	81	HH Size=1 Autos=1+ Workers=1	211	28	6	45	37	82.2%	132.1%
125+126+127	82	(HH Size=2 Autos=1 Workers=0,1) and (HH Size=2,3,4+ Autos=0 Workers=0,1,2,3+)	211	28	5	42	38	90.5%	135.7%
128+131	83	HH Size=2 Autos=1,2+ Workers=2	233	30	6	67	37	55.2%	123.3%
129	84	HH Size=2 Autos=2+ Workers=0	189	26	5	58	49	84.5%	188.5%
130	85	HH Size=2 Autos=2+ Workers=1	148	22	6	35	25	71.4%	113.6%
132+133+135	86	HH Size=3 Autos=1,2,3+ Workers=0,1	136	18	6	34	26	76.5%	144.4%
134+136	87	HH Size=3 Autos=1,2 Workers=2,3	87	12	6	13	9	69.2%	75.0%
137+138	88	HH Size=3 Autos=3+ Workers=2,3	76	10	6	23	15	65.2%	150.0%
139+140+142	89	HH Size=4+ Autos=1,2,3+ Workers=0,1	164	24	5	25	18	72.0%	75.0%
141+143	90	HH Size=4+ Autos=1,2 Workers=2,3+	176	24	6	33	12	36.4%	50.0%
144+145	91	HH Size=4+ Autos=3+ Workers=2,3+	124	16	6	31	11	35.5%	68.8%
Northern Lower Peninsula Rural Total			2,073	280	6	494	342	69.2%	122.1%
Southern Lower Peninsula Rural									
146	92	HH Size=1 Autos=0 Workers=0,1	73	10	5	12	8	66.7%	80.0%
147	93	HH Size=1 Autos=1+ Workers=0	194	24	6	62	49	79.0%	204.2%
148	94	HH Size=1 Autos=1+ Workers=1	233	31	6	47	32	68.1%	103.2%
149	95	HH Size=2,3,4+ Autos=0 Workers=0,1,2,3+	27	10	2	2	1	50.0%	10.0%
150	96	HH Size=2 Autos=1 Workers=0	76	10	4	23	19	82.6%	190.0%
151	97	HH Size=2 Autos=1 Workers=1	66	10	5	9	8	88.9%	80.0%
152+155	98	HH Size=2 Autos=1,2+ Workers=2	269	35	6	76	50	65.8%	142.9%
153	99	HH Size=2 Autos=2+ Workers=0	155	20	5	51	43	84.3%	215.0%
154	100	HH Size=2 Autos=2+ Workers=1	148	20	6	52	37	71.2%	185.0%
156+157+159	101	HH Size=3 Autos=1,2,3+ Workers=0,1	130	18	6	23	16	69.6%	88.9%
158+160	102	HH Size=3 Autos=1,2 Workers=2,3	113	15	6	17	11	64.7%	73.3%
161+162	103	HH Size=3 Autos=3+ Workers=2,3	82	12	5	30	21	70.0%	175.0%
163+164+166	104	HH Size=4+ Autos=1,2,3+ Workers=0,1	165	22	6	30	23	76.7%	104.5%
165+167	105	HH Size=4+ Autos=1,2 Workers=2,3+	182	23	6	30	17	56.7%	73.9%
168+169	106	HH Size=4+ Autos=3+ Workers=2,3+	146	20	6	50	27	54.0%	135.0%
Southern Lower Peninsula Rural Total			2,059	280	6	514	362	70.4%	129.3%
TOTAL			14,818	1,960		3,374	2395	71.0%	122.1%

3b. Sampling Target Results by Sample Area and Data Cell

Sampling goals were reached for each sample area. Within each sample area results by data cell targets were as follows:

SEMCOG: 8 of 18 data cells reached less than two-thirds (66.7%) of the target; only three cells were under one-half (50%) of target—two of these three cells were for zero auto households, the other was a 4+ -person, 0 worker data cell.

TMA: 4 of 15 data cells were less than 66.7% of the target; only one cell was under 50% target—a 3-person household target data cell with autos less than or equal to workers.

SMALL URBAN AREAS: 3 of 15 data cells were less than 66.7% of the target; only one data cell was less than 50% under target—a zero-auto household cell.

SMALL CITIES: Only 1 of 14 data cells was under 66.7% of the target and no data cells were under 50% of target. The data cell under 66.7% target was for zero auto households.

UPPER PENINSULA RURAL: 3 of 16 data cells were less than 66.7% of the target; no households were recruited for one data cell—again, a zero vehicle household cell.

NORTHERN LOWER PENINSULA RURAL: Only 1 of 13 data cells was less than 66.7% of the target; no data cells were under 50% target.

SOUTHERN LOWER PENINSULA RURAL: Only 1 of 15 data cells was under 50% of the target. Again, this was a zero auto data cell for households.

Thus, the inability to complete households with zero autos accounted for six of eight data cells with completion rates under 50% of sampling target. Historically, analysis of response rates for Household Travel Surveys has shown that significant incentives (\$20-\$30) per household are required to obtain the participation of zero auto, mostly low-income households. The shift in available tools (no incentives could be offered in MTC II, as opposed to the \$20 or \$30 offered to zero auto households in MTC I) may well explain much of the drop-off in household data completion rates from MTC I to MTC II among these households. The recruitment rate given available/attempted households for MTC II zero vehicles households was only 10% compared to an overall recruitment to available/attempted households rate of 29%. From sample disposition data it appears that the primary reason for the lower recruitment rate for zero vehicle households was the inability to reach these households, perhaps indicating that in a declining economic environment these zero vehicle lower income households are highly mobile. On the other hand, the much lower retrieval to recruit rate for zero vehicle households (36% as compared to the overall MTC II retrieval rate of 71%) is likely to reflect the lack of incentives. The MTC II Comparison Report will further explore the degree to which the decline in recruitment of zero vehicle households in MTC II is attributable to zero vehicle households changing data cells, because five years later they now have an auto.

Note that in Table 1, many cells have more than 100% of their targets retrieved. This is due to:

- allowing for a margin of completed households that do not meet acceptable standards (as described under Item 7 beginning on page 22), and

- because quotas can only be enforced on the recruitment, and some data cells had much higher than expected retrieval rates. Quotas on recruitment were carefully monitored to ensure that resources were not wasted collecting information from households in already completed cells. However, once a household was recruited it must be retrieved, so some exceeding of retrieval targets is unavoidable.

3c. Sampling Procedures

Advance letters were sent to households before recruitment. The advance letter mailings were sent out in two waves. The first wave consisted of two groups: 1) a proportional distribution of households based on MTC II data cell sampling targets with available sample to target ratios between 5 and 7 (i.e., at least 1 in 5 or 1 in 7 of available sample need to complete the survey; put another way, with a ratio of 5, at least 20% of the sample need to complete the survey), including only those households that agreed to participate in future surveys, and 2) all the hard to reach households with available sample to target ratios targets equal to 4 or less, including respondents that did not agree to participate in future surveys. The sample ratio targets are indicated in the sixth column of Table 1.

The proportion of households selected from each data cell for the second advance letter mailing took into account response rates for each data cell from the first advance letter mailing, with increased selection among households in data cells with lower response rates.

3d. Sample Monitoring

Sampling was monitored daily and adjusted weekly, if necessary, to promote appropriate levels of recruitments and travel inventory completions by sampling data cells. Regular status reports that tallied by sample area the number of recruited and retrieved households by sampling data cells (household size by number of vehicles by number of workers in the household by sample area) were provided.

To ensure that households in each sample area were randomly spread across the available fall travel days, Abt SRBI's sampling call algorithm randomly selected households from all data cells and assigned them randomly to a travel day. Additionally, each non-responder received up to six call attempts strategically made across weekdays, weeknights, and weekends.

Section 4: Data Collection Schedule and Program Elements

In Brief: *The first part of this section provides the schedule for MTC II data collection. The remainder of this section outlines data collection elements and notable changes from MTC I.*

4a. Schedule

The MTC II data collection schedule, presented according to task as described in the Work Plan, is shown below in Table 2.

Table 2: MTC II Schedule by Task

CURRENT ACTION ITEMS	DELIVERABLE / ITEM	DELIVERY DATE
Task 1: Project Work and Management Plan		
Weekly Progress Conference Call and Weekly Progress Report	Conference Call and Weekly Progress Report	From 6/2009 to 7/2010
Work Plan	Final Work Plan	Approved 7/8/2009
Task 2: Review and Modification of MTC I Materials and Instruments		
Memorandum describing modifications to survey instruments and first point of contact method and retrieval modes	Final Memo: Modifications to survey instruments	Approved 9/18/2009
Task 3: Sample Design Review		
Memorandum affirming the sampling plan or outlining minor revisions to the plan OR Memorandum describing a new sampling plan	Final Memo: Sample Plan	Approved 9/10/2009
Task 4: Data Collection Program Implementation Procedures, Geocoding, Data Checking, and Quality Control		
Memorandum describing sample selection and maintenance procedures	Final Memo: Sample selection	Approved 8/28/2009
Memorandum describing how to deal with households that previously received incentives	Final Memo: Incentives	Approved 8/17/2009
Memorandum describing implementation of the checks in the MITC Data Coding and Quality Control Manual	Final Memo: Data Coding and Quality Control Manual	Approved 10/15/2009
Memorandum describing proposed geocoding process	Final Memo: Geocoding Process	Approved 10/15/2009
Begin Recruitment Interviews	3,350 Households Recruited	8/31/2009
Begin Retrieval Interviews	2,041 HH Phone Completed 359 HH Internet Completed 2,400 Total Completed	9/15/2009
End Recruitment Interviews	Recruit 3,350 households	11/4/2009
End Retrieval Interviews	Retrieve 2,400 households	12/11/2009

Table 2. MTC II Schedule by Task (Continued)

Monthly Field Reports	Data Collection Mthly Report	See Interim Reports Submitted 11/12/2009, 12/21/2009, and 3/16/2010
Task 5: Data Delivery, Final Report, and Comparison to MI Travel Counts and 2008 NHTS		
250 completed household data set & Interim Report 1	Interim Report (250)	Final 11/12/2009 CS Report 11/19/09
1000 completed household data set & Interim Report 2	Interim Report (1000)	12/21/2009
CS 2nd Interim Data Check Report	2nd Data Check Report	12/16/2009
Draft Final Data Set with 2,400 completed HH	Draft Final Data Set	1/8/2010
CS Auto Geocoding in TransCAD of Non-Geocodables	TransCAD Geocodes	12/29/2009
Draft Final Interim Report from Abt SRBI	Draft Final Report	3/16/2010
CS Final Interim Data Check Report	Final Data Check Report	4/8/2010
Final Data Set with Corrected Geocodes	Final Data Set w/Geocodes	4/9/2010
CS Draft Comparison Report	Draft Comparison Report	6/28/2010
CS Final Comparison Report	Final Comparison Report	7/30/2010

Survey Design and Data Collection were completed as scheduled. Difficulties with data processing, however, caused delay on final data deliveries. While the target for completed households was 1,960 and 2,395 completed households were delivered, CS data checking and auditing found problems in three additional areas that required review of 371 households. The problem areas included households containing a trip where the origin and the destination were the same, households where the respondent reported travel times that did not match time and distance testing between the origin and destination geocoding points, and households where more than 25% of origins and destinations were not geocoded. The households requiring review were from sampling data cells that were either under or close to sampling targets. Abt SRBI, CS, and MDOT undertook these reviews and dates for draft and final dataset deliveries were adjusted to reflect the review and correction time needed.

4b. Elements

An important part of preparation for MTC II was the review and update of the MTC I program materials and instruments. The following materials and instruments were reviewed and approved by MDOT, generally with only minor changes:

- Pre-Notification Recruitment Letter (Appendix A)
- Diary Cover Letter (Appendix B)
- Diary Labels (Appendix C)
- Travel Diary and Person Sheet (Appendix D)
- Reminder Call Script (Appendix E)
- Recruitment Script (Appendix F)

- Retrieval Script (Appendix G)
- Retrieval Postcard (Appendix H)
- 1-800 Greeting (Appendix I)
- Answering Machine Message (Appendix J)
- In-CATI and In-Web-Based Interview Data Checks and Abt SRBI Post Survey Data Checks (Appendix K)
- CS Post Survey Data Checks (Appendix L)
- Methodology for Time and Distance Testing of Geocoded Points (Appendix M)
- Website Home Screen (Appendix R)

A primary revision was required to change the Travel Diary to a 24-hour inventory from the MTC I 48-hour diary.

With input from the project team, MDOT also updated the MI Travel Counts website as a means of providing information regarding the study to the general public and contacted households. Web pages from MTC I were updated and re-activated.

Other revisions to program materials included the following:

- The pre-recruitment letter was changed to acknowledge that the respondent household may have participated in MTC I in 2004-05.
- Additionally, a lead was added at the beginning of the recruitment survey to acknowledge that the respondent may have participated in this survey in 2004 or 2005.
- For the MTC II recruitment survey the household was asked for their address at the end of the interview rather than at the beginning. Since for MTC II we knew that most households contacted qualified geographically, confirmation of address seemed more appropriate when asking where to send the diaries.
- With the MTC II diaries and cover letter, the web address for the retrieval survey and a password were provided so that household respondents could immediately choose to report their diary travel via the Internet.
- For MTC II, visitor questions were removed from both the recruitment and travel inventory retrieval interview.
- Unlike MTC I, Internet retrieval programming for MTC II was completed prior to project launch and was available for the entire duration of the study.

Public Relations Note

An unusual number of respondent complaints were received regarding the use of an out-of-state consultant (Abt SRBI) to conduct this MTC II study. (When a respondent received a recruitment or retrieval call, Abt SRBI's New York area code appeared on the respondent's Caller ID screen). MORPACE, the Michigan based firm that conducted MTC I no longer conducts Household Travel Surveys but the former MTC I project director is now with Abt SRBI and working in Michigan—so Abt SRBI was able to provide procedural continuity for this panel survey. No other Michigan firm submitted a proposal for the MTC II project. It is presumed that the bad economy in Michigan and news coverage of

state budget problems in 2009 precipitated the concern about funds going outside the State. Respondents were reassured that the project management, geocoding, printing, and mailing were being conducted in Michigan.

Section 5. Response Rates

In Brief: Section 5 presents the recruitment and retrieval response rates for MTC II.

As with MTC I, MTC II used a two-stage interviewing process: (1) recruit households from the panel sample as described and (2) retrieve person and travel information from all members of the recruited households. The two response rates are determined separately and are called, respectively, the recruitment response rate and the retrieval response rate.

The Abt SRBI CATI system recorded a disposition (or outcome) for each of the phone numbers in the selected panel sample. Call attempts yielded three types of dispositions: (1) eligible, (2) ineligible, and (3) unknown eligibility. Subcategories for each of these dispositions are shown below in Table 3.

Using the CASRO method of estimating response rates, we would assume, based on our experience to date, that the percent of eligible households is 52% (taking into account eligible/eligible + ineligible (4,687/9,015)). Thus, the percent of unknown numbers that can be expected to be eligible is estimated at $(2,611 * 0.52)$ or 1,358. Completed households as a percent of estimated eligible households are therefore 55.8% $[3,374/(4,687 + 1,358)]$. The recruitment response rate is estimated at 55.8%. In MTC I, the recruitment response rate was calculated to be a comparable 50.5%.

In comparing the MTC II and MTC I sample dispositions, the main differences are that relatively more sample in MTC II were non-working numbers (25% in MTC II panel sample vs. 5% in MTC I—a freshly selected RDD sample). At the same time, as expected, there were more eligible sample in MTC II (40% in MTC II vs. 12% in MTC I). The high non-working number percent for MTC II (one-fourth of panel sample selected numbers) is an indication of high mobility among former MTC I participants—perhaps an indicator of the extent of economic turmoil within Michigan within the past two years. In total, 839 (7.2%) of advanced letters sent to valid MTC I addresses were returned as undeliverable. The Post Office marked 56% (313) of these returned letters as “vacant”. The majority of these addresses were within the SEMCOG region, largely within the city of Detroit. In addition, the trend towards more cell-phone-only households also likely contributed to the relatively high percentage of non-working numbers.

However, differences between wrong numbers and eligible numbers between MTC I and MTC II balanced out to yield comparable recruitment response rates, slightly higher in MTC II.

Table 3. Recruitment Sample Disposition

Sample Category	Frequency	Percent
<i>Eligible</i>	4687	40%
Completed Recruit Interviews	3374	29%
Refused	174	1%
Terminated Mid-Interview/Cancelled	1056	9%
Language Barrier/Deaf/Health Problems	83	1%
<i>Ineligible</i>	4328	38%
Travel Date Quota Reached	18	0%
Geographic Screen-Out	191	2%
Disconnected	138	1%
Fax Machine/Data Line	71	1%
Advance Letter Not Deliverable	839	9%
Number not Working	3,071	25%
<i>Unknown</i>	2611	22%
No Answer/Busy	944	8%
Answering Machine	505	4%
Scheduled for Callback	1162	10%
Total Sample	11,626	100%

The final MTC II retrieval response rate was 71.0% (2,395 retrieved/3,374 recruited). In comparison, the retrieval rate in MTC I was 57.2%. Part of the reason for increased retrieval rate (in addition to the effects using a panel sample) could be attributed to the rise of the Internet as a viable third mode for retrievals. For MTC II, 19% of persons participating in the study chose to fill out their activity/travel and person information by Internet. In comparison, for MTC I, less than 1% were Internet retrievals. Not surprisingly, the percentages of both phone retrievals (62% MTC II vs. 74% MTC I) and mail retrievals (19% MTC II vs. 25% MTC I) decreased. The Comparison Report will further analyze differences by collection mode.

Section 6: Geocoding

In Brief: Section 6 presents the details of the MTC II geocoding process, the problems encountered, and solutions implemented.

Process

The geocoding process took place concurrently with the data collection task. All address information was continually downloaded for geocoding throughout the data collection process. The first attempt was to geocode to street address. If no street address was available, Internet address look-ups were manually attempted using business name and type, cross streets, and city. Failures were referred to the phone room for re-contact. If re-contact did provide appropriate data, then geocoding to street intersection were attempted. Incompletes were flagged in the data file and reviewed with CS and MDOT.

In cases where more than 25% of a household's reported trip ends were initially designated as "ungeocodable" by Abt SRBI, the entire household record was reviewed with CS and MDOT personnel. (An ungeocodable location was one which initially was not geocoded to at least the nearest street intersection and city.) This review determined whether the household should be removed from the data file and replaced, or whether the household's overall demographic and trip/activity information was sufficient to warrant keeping the household in the final data file. The rationale for keeping such households with incomplete geocoding information was that the trade-off might be a less representative overall household sample base.

All geocoded points in the data file contain a code indicating the level to which they were geocoded such as street address, intersection, etc. Also there is a variable to indicate the software used to geocode, either ArcView or TransCAD. Throughout key points in the process, CS reviewed interim and final geocoding files and recommended corrective actions.

Specifics regarding the geocoding process included the following:

- For points geocoded to longitude and latitude, the hierarchy of preferred spatial scales was 1) physical street address then 2) nearest intersection.
- In all cases, attempts were made to look-up the exact street address by Internet when a street address was not provided, before geocoding to street intersection.
- The following targets were to be met:
 - 99% or more of home addresses will be geocoded to longitude and latitude
 - 95% or more of all school and work locations will be geocoded to longitude and latitude
 - 90% or more of other stops/locations will be geocoded to longitude and latitude
- Offsets were set at 25 feet.

- For locations that were not automatically geocoded, Abt SRBI developed a process for on-line and map checks to manually geocode those locations. Manual geocoding was attempted using MapPoint (Microsoft) software.

Geocoding to TAZ, block group midpoints or other Census polygons were not allowed. The Comparison Report will provide final information about geocoding rates after review of the 371+ households that were designated for further auditing and correction. (See Appendix A of the Comparison Report: Final QA/QC Data Checking Report.)

- Only after the manual geocoding options were exhausted was the location deemed ungeocodable. Manual geocoding was accomplished using the latest ArcView TeleAtlas (GDT) files: first, by looking up the street address in Google Maps and approximating its location on the street in ArcView, and if the street address was not available, by geocoding to nearest intersection.
- A household was not considered complete if more than 25% of its locations were ungeocoded.
- The final level of geocoding accomplished is indicated in the dataset and in the Comparison Report.

Section 7: Data Checking and Interim Data and Report Delivery

In Brief: Section 7 provides the details of data checking quality controls, the problems encountered and solutions offered, and interim data and report deliveries that were employed ensure quality.

7a. Quality Controls

Abt SRBI employed a series of thorough checks and protocols to ensure the validity and reliability of all MTC II data.

Specifically, the following steps were taken:

- On a continuous basis during data collection, Abt SRBI reviewed all data for completeness and accuracy.
- For MTC II, specific post-survey data checks were performed by CS as they were for MTC I. A complete list of these data checks is attached as Appendix L. Detailed automated post-retrieval data checks were made on all data files (household, person, and trip). Integration consistency checks were conducted across multiple files. Specific checks pertaining to geocoding were also incorporated.
- All data checks and editing were fully documented.
- Manipulated data (cross tabulations) were checked against raw data and any discrepancies were identified and errors corrected.
- All reports underwent a quality review to ensure accuracy of any figures included and to ensure that MDOT communications requirements were met.

CS staff assisted in performing quality control checks of the collected survey data. CS assisted in performing geocoding checks by testing geocoded activity locations (trip ends) for time and distance reasonableness, given respondents' responses to leaving and arrival times for trips, and the travel mode used. These tests were performed using TransCAD and the tolerances established for MTC I geocoding checking as described in Appendix M. Abt SRBI and CS documented their findings in the datasets and interim reports.

Recommendations as to which households to exclude or manually review were made by CS. In making the decisions as to which households should be excluded, the following two factors were taken into account:

1. The comprehensive quality of the household's information, and

2. Whether the household is from a difficult to fill data cell.

MDOT made the final decision regarding which households to remove from the final data file, based on balancing the two factors above and on guidelines for completeness described below in point #7.

The following 7 points were essential to the quality control plan.

1. Management Elements of Quality Assurance

The elements of the project management plan that were important to quality assurance included the following:

- Effective involvement of CS and MDOT staff to assure survey outcomes meet modeling and clients' needs.
- Monitoring the many areas of design where biases and errors can occur.
- Providing a dedicated team of supervisors, trainers, and interviewers.
- Establishing and maintaining a detailed project work schedule.
- Developing and maintaining detailed data collection protocols.
- Monitoring survey labor and cost expenditures so that overruns in one area of the survey do not affect efforts and outcomes in other areas.
- Effective selection, training, and debriefing of interviewers and fieldworkers, explaining the effort and their responsibilities.
- Project management staff monitoring of interviews, in addition to continuous phone room supervisor monitoring. Feedback in the form of supplemental training.
- Electronic tracking and monitoring of interviewers' performance – dialing statistics, completed interviews, refusals, non-contacts, and average interviewer lengths.
- Implementing an appropriate public information effort.
- Establishing measures to protect respondents privacy rights and to assure confidentiality of survey data.
- Secure storage and/or disposal of survey data, equipment, and materials.

2. Specific Quality Issues to Be Addressed

Beyond design and management elements, the project quality control plan addressed some of the most common errors, biases, and failures found in other, recent travel surveys conducted across the USA. These were:

- Failure to sufficiently meet sampling goals, overall and by established geographic and demographic data cells.
- Non-response bias in the form of underrepresentation of certain, often rare population groups such as 4+ person households, lower income households, zero vehicle households, etc.

- Overrepresentation of certain populations that more readily cooperate with surveys such as retired households.
- Item non-response bias such as refusal to answer household income, employment, or trip activity information.
- Underreporting of trips and missing trip segments.
- Inconsistent reporting of trips where trip (tour) sequencing does not make sense.
- Inappropriate imputation of data.
- Data record and structure inadequacies.
- Failure to meet established weekly and monthly data collection targets.

Three well developed progress tracking programs were used to assure that these quality control issues were addressed and corrected as data collection proceeded. The first was a *Continuous Data Flow Tracking System*, the second was *Automated Data Processing and Data Checking Systems*, and the third was *Monthly Interim Reporting and Review Systems*. These three systems are described in points 3-5 which follow.

3. Continuous Data Flow Tracking System

The MDOT MTC II survey required complex data collection steps and elements. The process included five steps. In order, they are:

- Selection of the household from the available MTC I completed household sample, taking into account sampling ratio goals as established
- Mailing of advance informational letters
- Recruitment by phone
- Mailing of travel diaries for each member of the household
- Collection of 24-hour travel inventories for each household member by phone, Internet, or mail following the assigned travel day

This quality control process required that each household sample element be individually tracked to completion or to final disposition of their status. This required Abt SRBI's electronic *Continuous Data Flow Tracking System* for travel surveys, which was customized to the needs of the MTC II survey. This electronic sample management system provided the up-to-date status of each household sample element through the five steps of the survey process. Particularly important was tracking and reporting of the progress of households sharing the same specific travel day. The system generated continuous information to assure that each household was receiving appropriate attention so that quick remedial action could be taken as needed. Timely contact increased the response rates. Summary survey statistics were provided with the weekly and interim reports.

4. Automated Data Checking and Data Processing Systems

Abt SRBI's Computer-Assisted-Telephone-Interviewing (CATI) program and Resource Systems Group's Web-based interviewing program for travel inventory retrieval interviews both offered extensive in-system data checking capabilities. In-CATI checks and automated data-entry kept ranges and responses consistent and non-repetitive. A

customized list of in-CATI and in-Web-based survey data checks for the MTC II Survey are presented in Appendix K.

5. Monthly Interim Reporting and Review

An interim report and interim dataset was submitted to MDOT approximately three weeks after completion of 250 households and, again at the completion of 1,000 households. (Due to data processing errors a Trip file was not available for Interim Report 1). The interim reports documented that, in general, the overall sampling requirements, as well as all subsampling requirements established were being met. Sampling stratification criteria were monitored, reported, and met--or the interim reports specified corrective measures which were implemented (with MDOT's approval) during the subsequent data collection period(s). This provided the continuous documentation and processes needed to stay on target.

As described in the Appendix L, CS performed an extensive list of checks before interim data was submitted to MDOT. Data files submitted with the interim reports flagged the results of data checks to show item non-response and missing or inconsistent geocoded trip locations and data. A summary report highlighted these case issues.

Abt SRBI produced analytic tables for the interim reports using in-house licensed software (Quantum, Excel, SAS, and SPSS) to review and report both summaries of respondent characteristics and trip characteristics.

6. Approaches to Correct for Non-Response Bias

To address non-response among hard to reach or rare population data cells and to achieve target sample goals for these cells, Abt SRBI employed both of the following strategies for MTC II:

- Adjusted recruitment sample targets based on the varying actual retrieval rates for different data cells;
- Conduct of a full non-response, refusal conversion interviewing system. We attempted to re-interview (with a re-assigned travel day) households recruited in rare population data cells that did not complete the diary task. In general, the refusal conversion efforts were very successful. Of the households contacted for refusal conversion, 70% (322/458) either mailed in their diaries from their previously assigned travel day or completed travel inventories for all household members after being assigned a new travel day in November 2009. However, the majority of refusal conversions were from those households who, when recalled, mailed in their travel diaries for their previously assigned date.

7. Definition of a Completed Household

It was important to final quality control that the Project Team agreed on the definition of a "completed household." This was necessary so that households with significant

missing or inconsistent data, or households not meeting sampling goals, could be corrected or replaced as the data collection proceeded. This avoided discovering at the end, when there are few alternatives, that the data collection effort had not met sampling and/or modeling goals. Criteria for determining what was a “completed household” are given below:

- For variables which served as sample controls (sample area, household size, number of vehicles, number of workers), zero missing data was allowed.
- Overall, missing information for age could not exceed 5% and missing information for income could not exceed 7%.
- The level of geocoding required for home, work, school, or trip locations is an important factor when determining which households are complete. Overall, the target was that 99%-100% of home addresses be geocoded to latitude/longitude and 95% of school and primary work addresses geocoded to latitude/longitude (where a specific address is an appropriate response). A minimum of 90% of all trip locations was expected to be geocoded to latitude/longitude. For the household to be considered complete, not more than 25% of trip locations were allowed to be non-geocodable. To ensure the best results, the most up-to-date GDT files for the state of Michigan were purchased from ArcView/TeleAtlas and were utilized by Abt SRBI for geocoding.
- Households with five or more members could be considered complete if only one household member’s travel inventory was missing.
- Not all persons or households traveled on any given day. When a majority of the members of a household reported “no travel” on an assigned travel day, the entire household record was reviewed by Abt SRBI, along with the reasons given for no travel.

7b. Problems and Solutions

A new MTC II programmer encountered difficulties in constructing the Interim Report 1 trip data files and again there were programming problems with the Draft Final dataset delivered. These problems were corrected but caused delays in dataset deliveries.

After the draft final dataset was fully reviewed by CS and MDOT, a memo was drafted directing the Abt SRBI programmer in making changes to the data files. Some of these changes involved manual corrections, others involved correcting geocodes and further refinement and coding of “other specify” responses.

CS’ Final QA/Data Checking Report (Appendix A of the Comparison Report), provides the results of final data checking, which included manual review of 371+ households with one or more of three problems: (1) a trip origin and destination that were the same, (2) more than 25% of the households trip origins and destinations were not geocoded, and

(3) time and distance testing conducted revealed a mismatch between household trip geocoding points and the trip time reported by the respondent, taking into account mode and general location. If corrections to geocodes were made as a result of the manual reviews, the newly geocoded information replaced original geocoded information in the dataset. In addition, a derived travel time was calculated by CS using TransCAD and geocoding points, and this derived travel time was placed as a new variable within the dataset.

A final data collection issue is that the CATI program for MTC II allowed for input of only 9 trips per person. 201 of 5,302 persons (3.8%) in the data file recorded 9 trips and indicated that they had not completed all travel (TRAV=1). However, 55 or 27% of these persons reported "home" as their ninth trip location, 75 (37%) reported their last trip location as either home or a residence, and 23 (11%) reported the last trip as to work. An initial review of QA/QC Data Checking Report results indicates that many of the households with persons potentially reporting more than nine trips have been deleted from the final dataset. The Comparison Report will analyze this issue and develop an analytical solution.

Section 8: Data Results

Comparison figures and analysis of 2009 MTC II results with 2004-05 MTC I results and with the 2009 NHTS were developed by CS and are available in the Comparison Report.

Section 9: Data Weighting and Expansion

Data weighting and analysis can be found in the Comparison Report.

Section 10: Lessons Learned and Future Recommendations

In Brief: Section 10 presents bulleted points of specific lessons learned and recommendations for future MI Travel Counts projects.

- For auto sufficiency sample designs, further aggregation of cells should be allowed so that data cell representation does not fall below a minimum of 5%. MTC I and II document that, even with random digit dialing (RDD) responsive design techniques, the budget and time required to recruit and retrieve rare populations below this level of incidence have diminishing benefits and returns. Rare population (mostly low income and zero auto) households had low participation rates even when successfully recruited. Data cells need to be further collapsed for sampling and analysis.
- As in MTC I, adjusting panel sample for recruitment based on sample data cell response rates as well as refusal conversion attempts with households already recruited proved to be effective techniques for recruiting rare population

households. However, response rates for these households dropped in MTC II when substantial differential incentives were not used.

- Developing trip files to match MTC I is a complex process and should have been fully worked out in a pretest before start up of MTC II so as not to delay interim reporting. Additional preplanning time would have reduced problems with integrating CATI and Internet software and database programming issues.
- A full database of latitude/longitude unique locations should have been developed as the geocoding proceeded to ensure cross-referencing when the same information appears in Household, Person, and Trip files, or across persons or households. This procedure would maintain improved geocoding consistency.
- Given the short time interval between the Second Interim Report and the Final and Third Interim Report, it was difficult for Abt SRBI and CS to report errors in time for them to be fixed in the next deliverable.
- The data audits and reviews conducted by Abt SRBI and CS through the interim process were very helpful in identifying data issues. Additional numbers of these data checks should be integrated into CATI programming and developed for automated post-data checking and editing.
- The public relations program, press releases, and pre-notification letters were very helpful in validating the study. Assurances that the majority of the work was conducted in-state helped to alleviate concerns about the use of an out-of-state contractor.