

Part B: Collection of Information Employing Statistical Methods

B.1 Respondent Universe and Sampling Methods

Universe of Core Households and Final Evaluation Sample

The purpose of the MTO final impact evaluation is to assess the effect of the experimental treatment on the lives of participants on average between 10 and 12 years after the time of random assignment. The final evaluation will include the full program population (4,604 families).

Universe of Core Household Members

Within the 4,604 core households that are the sample for the final evaluation, there are 17,000 members ranging in age (measured at the end of calendar year 2007) from 10 to over 100. The core household membership is fixed by definition, since core household members are those who lived with the MTO applicant during the process of Section 8 eligibility determination prior to MTO random assignment. Core members are those members of the family who were identified as planning to move together if awarded a voucher or certificate through the MTO program. Thus, core household membership is exogenous to the experiment (that is, not affected by which of the three MTO mobility groups to which an applicant was randomly assigned), while current household composition is not (since MTO assignments could for example affect the propensity of MTO applicants to be married or live with other relatives).

Through passive tracking, the 1997 and 2000 MTO canvasses, and the 2002 Interim survey, data are available on the whereabouts of nearly all core household members. Sampling of youth for the final evaluation will be carried out regardless of where they are located (including those who are no longer living with the original MTO adult applicant), and arrangements will be made to test and interview youth wherever they are currently living.

Sampling of Youth

Among core household members, 6,647 persons will be between the ages of 10 and 20 on December 31, 2007. These are the members eligible to be selected for the youth survey sample frame. Exhibit 9 shows their distribution by age group and by number in core family.

The sampling plan calls for random selection of up to three children ages 10 to 20 per core household. Over 75 percent of the 4,604 core households in the final evaluation still have children in this age range. (The remainder had children under 18 when they joined MTO but now have only core children who will be over the age of 20 at the end of 2007). The distribution of numbers per household (shown in the lower panel of Exhibit 9) implies that, for the 70 percent of households in the MTO study who have from one to three children in the relevant age range, there need be no selection of children – we will seek to interview all of the children ages 10-20 in the core household. The random sampling of youth will only be relevant for the remaining 257 households that contain more than three youth ages 10-20. Because the children in these 257 households are of different

ages, we will not know the precise age composition of the overall child/youth sample frame for the MTO long-term evaluation until it is actually drawn (that is, until we have randomly selected 3 children from households with more than 3 children in the relevant age range). In cases where our youth survey sample includes two or more children per MTO household, we will adjust the standard errors in our analysis to account for the fact that observations drawn from the same home will not be statistically independent.

Exhibit 9 Child and Youth Population for MTO Final Evaluation

	Number	Percent
Age Group on 12/31/2007		
Ages 10-13	1219	18.34%
Ages 14-18	3923	59.02%
Ages 19-20	1505	22.64%
TOTAL	6647	100.00%
Number of Children or Youth in Core Household		
None	1079	23.44%
One	1552	33.71%
Two	1160	25.20%
Three	556	12.08%
Four or more	257	5.58%

B.2 Information Collection Procedures

Sample Design

All households enrolled in the MTO demonstration will be eligible for inclusion in the study. If sufficient additional funding is secured¹, we will include each adult and up to three children between the ages of 10 and 20 (without further stratification on age) from among the core MTO households. In this way, analyses can be conducted combining children of different ages without having to weight the data specifically for this step.

We plan to employ a two-stage stratified sampling design for MTO. For the first stage of the sample, MTO households will be stratified into four groups, based on location and cost factors. Working with SRC's Statistical Design Group, we will identify optimal sampling rates for each group (with slightly lower sampling rates in the more expensive strata, allowing us to maximize the effective sample size for a given data-collection budget). The Stage 1 sample will be released for interviewing in April 2008. Our response rate goal for the first stage of interviewing is 70%.

¹ See pending Federal costs described in Section A.14.

When the Stage 1 response rate goal has been achieved, we will review and stratify the remaining outstanding cases, taking into account cost, survey errors, and propensity models created during Stage 1 interviewing. Optimal sub-sampling rates will be selected (again in consultation with SRC's Statistical Design Group) and approximately 40% of the remaining sample will be randomly selected and released for Stage 2 interviewing. To maximize the success of Stage 2 interviewing, we plan to increase our respondent interview incentives from \$50 to \$100, and use our most experienced and successful MTO interviewers to obtain our response rate goal of 60% for this second stage of interviewing. Note that because the 40% of cases selected in Stage 2 are randomly selected, their survey responses provide a representative picture of what is happening among all of the cases that were not interviewed in Stage 1. Put differently, random sampling of cases in Stage 2 lets us "weight up" their responses to project the outcomes of the entire set of cases not interviewed in Stage 1.

The final sampling weight will be the product of the Stage 1 and Stage 2 weights.

Estimation Procedures

As described in Section A.16 above, the data to be collected for the final evaluation will be used to estimate impacts of the demonstration on a wide range of outcomes. For each outcome, impacts will be estimated by regressing the outcome on a set of baseline characteristics and a dummy variable that indicates whether the sample member belongs to the treatment or control group. Impacts will be estimated separately for the MTO experimental group and the Section 8 comparison group, relative to the in-place control group. With random assignment, ordinary least squares will produce unbiased estimates.

Degree of Accuracy Required

It is important to consider the precision with which we will be able to measure impacts on the proposed outcomes and mediators, given the sample sizes available, since imprecise estimates reduce our ability to draw meaningful inferences about the ways in which MTO impacts the lives of participating families. The best way to assess the precision of the estimates that can be derived from an experimental design is to examine the **minimum detectable effects** (MDEs) obtainable under that design (Orr, 1999). The minimum detectable effect is the smallest true program impact that has a good chance of being identified with data from a given sample. The MDE is defined as 2.8 times the estimated standard error (see Orr, 1999), and represents the smallest true impact that has an 80 percent chance of being statistically significant, using a two-tailed hypothesis test at the 10 percent level. The smaller the MDE, the more precise the estimate. We focus on calculating MDEs for the intent to treat (ITT) estimate, that is, the regression-adjusted difference in mean outcomes for respondents assigned to the MTO experimental group versus the control group. We focus on ITT impacts because they are simpler and require fewer statistical assumptions than the TOT impact estimates described earlier in our OMB submission.

Exhibits 10 and 11 show MDEs as a percent of the control mean for selected outcomes, for adults and youth, respectively.² Separate MDEs are shown for the ITT effects of assignment to the MTO

² The MDEs shown here do not take into account two offsetting influences on the precision of the estimates. First, to the extent that covariates in the impact regression explain some of the variation of the dependent variable, the precision of the

experimental group and to the Section 8 comparison group. The MDEs shown in the exhibit are calculated using data from a variety of sources, including from the MTO interim evaluation (see Orr et al., 2003) or for new outcomes that were not included on the interim study, from nationally representative data sources.

As the exhibits demonstrate, for the adult outcomes we can be reasonably confident of detecting impacts that range from 1.8 to 24.0 percent of the control mean, with slightly better precision (smaller MDEs) for the MTO experimental group than for the Section 8 comparison group. If the true impacts from the MTO demonstration are similar in size to those found by Rosenbaum (1992) for the Gautreaux mobility program, then we would have adequate statistical power (precision) to detect these MTO impacts. For the most part the MDEs that we calculate for youth outcomes suggest at least as much precision with the youth analysis as for the adult analysis, consistent with the idea that our MTO youth survey sample frame for the long-term evaluation will be even larger than our adult sample. Previous waves of the MTO evaluation have found program impacts on a variety of youth outcomes that are as large or sometimes larger than the MDEs that we calculate in Exhibit 11 for the long-term MTO evaluation (see Katz, Kling and Liebman, 2001, Ludwig, Duncan and Hirschfield, 2001, Ludwig, Ladd and Duncan, 2001, Orr et al., 2003, Kling, Ludwig and Katz, 2005, and Kling, Liebman and Katz, 2007).

estimates will be somewhat better than shown here. Second, because the random assignment ratio varied across sites and over time, to obtain unbiased impact estimates the sample observations must be weighted to reflect their different assignment probabilities; this will reduce the precision of the estimates. We do not expect either of these factors to change the MDEs by more than 5-10 percent, and for a typical dependent variable, we expect them to be roughly offsetting.

Exhibit 10 – MDEs on Selected Adult Outcomes (ITT Estimates)

Outcome	Mean ³	MDE as % of mean	
		MTO Experimental	Section 8
Housing			
Receiving any housing assistance	.71	7.5%	8.3%
Rate Housing as Excellent or Good	.52	11.8%	12.9%
Satisfied or Very Satisfied with Housing	.48	12.9%	14.1%
Problem With Vermin	.53	11.6%	12.7%
Problem With Heating/Plumbing	.39	14.9%	16.3%
Problem With Peeling Paint/Plaster	.49	12.5%	13.6%
Any Household Member Crime Victim (Last 6 Months)	.21	22.6%	24.0%
Economic			
Currently employed	.52	11.2%	12.3%
Receiving TANF	.29	18.5%	20.5%
Currently employed & Not Receiving TANF	.45	10.4%	10.9%
Annual earnings	\$8899	\$1216	\$1341
Household Income	\$15536	\$1522	\$1696
Physical Health			
General Health (very good/good vs. fair/poor)	.67	8.3%	9.2%
High Blood Pressure	.30	18.7%	20.4%
Currently Obese	.47	12.8%	14.6%
Biomarker⁴			
Total Cholesterol	204	2.4%	2.6%
C-Reactive Protein	5.7	16.4%	17.8%
Glycosylated Hemoglobin	5.6	1.8%	2.0%
Body Mass Index	29.3	2.8%	3.1%
Mental Health			
Psychological Distress (K6) Index	.33	12.7%	13.6%
Any DSM-IV Disorder- 12-Month ⁵	.24	19.9%	21.7%
Any DSM-IV Disorder- Lifetime	.39	14.2%	15.4%

³ MDEs are presented as a percent of the control mean for Interim items and as a percent of the source mean for non-Interim items (the four biomarker and two DSM-IV disorder measures).

⁴ MDEs derived from data collected in the 2003-04 edition of the National Health and Nutrition Examination Survey.

⁵ MDEs derived on DSM-IV diagnoses derived from data collected as part of the National Co-morbidity Survey-Revised. The disorders included in the calculation for adults included major depressive disorder, bipolar disorder, post-traumatic stress disorder, generalized anxiety disorder, intermittent explosive disorder, and panic disorder.

Exhibit 11 – MDEs on Selected Youth (Age 12-19) Outcomes (ITT Estimates)

Outcome	Mean ⁶	MDE as % of mean	
		MTO Experimental	Section 8
Achievement and School Progress			
ECLS 5 th Grade Reading Scores	137	1.9%	2.1%
ECLS 5 th Grade Math Scores	111	2.2%	2.4%
Educationally On Track	.74	6.8%	7.5%
Social Behavior			
Behavior Problems Index	.26	13.3%	14.2%
Delinquency Index	.09	21.9%	24.6%
Physical Health			
General Health (very good/good vs. fair/poor)	.71	8.5%	9.4%
Mental Health			
Psychological Distress (K6) Index	.26	14.2%	15.1%
Any DSM-IV Disorder- 12-Month ⁷	.54	10.1%	11.0%
Any DSM-IV Disorder- Lifetime	.59	9.2%	10.0%
Mediators			
Parents Rarely or Never Help with Homework ⁸	.45	12.1%	13.2%
Comfortable Talking to 3+ Adults ⁹	.35	41.7%	46.5%
Friends Think Grades Very Important ⁷	.45	12.2%	13.2%

It may be possible to obtain even more precise estimates of impacts on these outcomes by focusing the analysis in some cases on MTO sub-groups for whom the outcome in question is most relevant – for example, males are responsible for committing the large majority of all criminal offenses in the U.S.¹⁰ Another way to define sub-groups for this type of analysis is to use baseline data to identify those most at risk of such behaviors or conditions. To the extent that appropriate baseline data are available, we will do so in the analysis.

⁶ MDEs are presented as a percent of the control mean for Interim items and as a percent of the source mean for non-Interim items (the ECLS test score, DSM-IV disorder, parent help with homework, number of adults to whom respondent can speak comfortably, and importance of grades to friends measures).

⁷ DSM-IV diagnosis data come from the National Comorbidity Survey-Revised. The disorders included in the calculation for adults included the six disorders used in the adult calculation as well as attention deficit disorder, oppositional defiant disorder, and conduct disorder.

⁸ Data come from the National Educational Longitudinal Survey (NELS88).

⁹ This measure was based on Interim data for youth aged 15-20 (not 12-19 as with the other Interim measures).

¹⁰ The MDEs in Exhibit 10 do not take account of the inclusion of baseline variables as covariates in the impact regression. This effect will vary across outcomes, but will generally be relatively small. For outcomes that are persistent over time, however (e.g., chronic medical conditions), inclusion of the baseline value can substantially improve the precision of the impact estimate.

In summary, then, it appears that our target MTO sample frames of around 4,600 MTO female adults and 6,600 youth ages 10-20 should provide adequate precision to detect plausible MTO program impacts.

Procedures with Special Populations

The MTO population contains a considerable number of respondents whose first language is Spanish. As in all previous MTO data collections, HUD's Contractor will translate each of the adult survey instruments and modules into Spanish, for administration in the language most comfortable for the respondent. All preliminary contacting materials and consent forms will also be made available in Spanish.

For the educational testing of youth and children, however, HUD's Contractor will only administer the ECLS tests in English. We have been advised that the test is not well translated, with respondents likely to get confused and provide unreliable data. In addition, prior data collection and focus group experience indicates that the children in MTO families are proficient in English even when the parents are not. The results of the analyses of these test data will be interpreted as the long-term effects of the MTO intervention on the ability of participating youth to read and conduct math exercises in English.

B.3 Methods to Maximize Response Rates

As in the interim study, we will employ two-phase sampling to obtain responses from a representative sub-sample of hard-to-locate respondents (Groves 2004). The target response rate for all elements of the MTO final evaluation data collection is 85 – 90 percent.¹¹ Such a high response rate for the long-run MTO survey is feasible given the ongoing efforts by HUD to track MTO families and our success in obtaining a response rate of this level for the interim MTO evaluation in 2002. Due to the tracking and locating efforts HUD has sponsored since the demonstration began, there has been very little attrition and the location of the sample is known to a very high degree.

Several methods will be used to maximize the response rates for the MTO final evaluation data collection. These methods involve preliminary tracking and locating, incentive payments, and sample control during the data collection period.

Preliminary Tracking and Locating

In order to maximize response to the MTO final evaluation, HUD's Contractor has planned a focused locating effort before the main data collection begins. The purpose of this locating effort is to obtain updated address, phone, and secondary contact information for all MTO heads of household, as was done in advance of each MTO canvass. ISR will also attempt to collect the same information for sampled youth (ages 10-20) no longer living with the core household head.

¹¹ We plan to employ two-phase sampling, with a goal of a 70% Response Rate during the initial phase and a goal of a 60% Response Rate for a 4-in-10 subsample of hard-to-locate respondents not interviewed during the first phase. If the phase one response rate was 70% (e.g., 3149/4498), and a 4-in-10 subsample of hard-to-locate cases were worked in phase two with a response rate of 60% (324/540), then the effective response rate would be $.80 + .20 * .50 = .88$, or 88%.

The locating effort will be carried out largely by mail, with some reminder phone calls and some in-person visits to obtain updated address and telephone number information for selected respondents. The initial mailing will include a letter explaining the study, a toll-free number to call if the respondent has questions, and a post card to be returned with address or telephone number updates. If the letter is returned as undeliverable, ISR will send the case to our tracking team who will use a combination of active and passive tracking methods to obtain an updated address or telephone number for the selected respondent.

The introductory letter will be sent to all household heads. Approximately 2-3 weeks after the initial mailing (if it is not returned as undeliverable), the assigned interviewer will contact the respondent to schedule an interview.

Use of Incentive Payments

When respondents are being contacted to schedule appointments, the interviewers will offer incentive payments as discussed fully in Section A.9 above. The substantial amounts being offered for cooperation with the surveys and educational testing should help gain cooperation from most of the sample members.

Sample Control During the Data Collection Period

During the data collection period, non-response levels and response bias will be minimized in the following ways:

- The Contractor will use trained field interviewers and testers who are skilled at maintaining rapport with respondents, so that the number of break-offs and the incidence of item non-response will be kept low.
- The data collection procedures will limit intrusiveness by conducting the adult and youth interviews and testing simultaneously (to reduce the amount of time in the home) where feasible.
- Respondents will have a choice of time for the data collection.
- If the respondent prefers to have the interview conducted at a location other than his/her home, the interviewer will arrange for a location that is convenient for the respondent, and provides privacy (e.g., a conference room at a local library) so the respondent's answers are not overheard by others.
- Additional tracking and locating steps will be taken, as needed, when sample members are not found at the phone numbers or addresses previously collected.
- Finally, the Contractor's survey director and field supervisors will manage the sample to ensure that the target response rates are achieved (or approached) evenly for all three randomly assigned groups in each MTO site and for movers and non-movers alike.

By these methods, the Contractor anticipates being able to achieve an 85 to 90 percent effective response rate for all data collection components associated with the final evaluation.

B.4 Test of Procedures

Prior to submission of the OMB package, HUD's data collection contractor, NBER and ISR conducted pretests with a convenience sample of 4 low-income, minority female adults, and 5 low-income, minority youth respondents. The pre-test was of a paper and pencil version of the survey excluding the modules on mental health disorders drawn from the National Co-Morbidity survey. The purpose of this very small sample pre-test was to allow experienced ISR interviewers to become acquainted with the survey instrument and offer preliminary and early guidance on revisions. The pre-test also provided us with rough benchmark time estimates for particular modules (described in Section A.12).

Because of the complexity of the survey and proposed data collection at the time of the survey, NBER and ISR will also conduct post-OMB clearance pre-testing of the survey instruments and assessments covered by this clearance request. After clearance by OMB for our proposed survey work, two formal pretests will be conducted before our final MTO evaluation fieldwork commences. The first pretest is scheduled for October 2007, with a convenience sample of low-income volunteer respondents in the Detroit, Michigan area (proximate to ISR's offices in Ann Arbor), the second pretest is scheduled for January 2008 with a small set of MTO respondents. The pretest interviewers will keep close track of elapsed time and will take detailed notes on places in the instruments where skip patterns needed revision or where respondents did not understand the question wording.

As a result of the pretest, we anticipate minor adjustments will be necessary. Because the majority of the items in the instruments are taken from the MTO Interim evaluation and other well-tested instruments, we expect the changes to include the following:

- Omitting lower-priority questions, to conform with goals for survey length.
- Simplify the language in instruments, letters, or consent forms, to be sure that all respondents will understand what is being asked.
- Clarify skip patterns, or modify question order to make the questions flow more smoothly and logically for the respondents.

B.5 Individuals Consulted on Statistical Aspects of the Design

The individuals shown in Exhibit 12 assisted HUD in the statistical design of the final evaluation.

Exhibit 12 Individuals Consulted on the Study Design

Name	Telephone Number	Role in Study
Dr. Greg Duncan	847-467-1503	NBER team, Northwestern University
Dr. Lisa Gennetian	914-834-2200	NBER team, The Brookings Institution
Dr. Lawrence Katz	617-588-0304	NBER team, Harvard University
Dr. Ronald Kessler	617-432-3587	NBER team, Harvard University
Dr. Jeffrey Kling	202-797-6000	NBER team, The Brookings Institution

Dr. Jens Ludwig	773-702-3242	NBER team, University of Chicago
Dr. Larry Orr	301-913-0520	Abt Associates, Principal Investigator of the MTO Interim Evaluation

In addition to the individual listed above, HUD and NBER work closely with many of the world's leading survey statisticians at the University of Michigan Survey Research Center. SRC's Statistical Design Group (SDG) has been led by Steven Heeringa who has more than 27 years of sample design experience and has been responsible for the design, development and implementation of probability samples for major SRC projects. Heeringa has served as a sample design consultant to a number of government and non-government organizations including the National Heart Lung and Blood Institute (NHLBI), the Agency for Health Care and Prevention Research (AHCPR), and the General Motors Corporation. HUD and NBER also receive consultation from James Wagner, Senior Project Manager, has over 10 years of experience in managing projects and staff in the field of survey research and works closely with the MTO project team on sampling, estimation of weights and variance, development of budget models, and forecasting of costs.

Inquiries regarding the statistical aspects of the study's planned analysis should be directed to:

Dr. Jens Ludwig
University of Chicago
969 East 60th Street
Chicago, Illinois 60637
Phone: (773) 702-3242
Fax: (773) 702-0874
E-mail: jludwig@uchicago.edu

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