TARGETING ENUMERATION ENHANCEMENT METHODOLOGIES: INDICATIONS OF EFFECTIVENESS

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Key Words: Decennial Census, Special Methods, Database, Response

I. Introduction

Enumerating the U.S. population during a decennial census requires various methodologies reflecting the diversity of the population. Deciding where to apply selected methodologies is critical in obtaining cooperation from all persons and maximizing response to the census.

The 1995 Census Test is being conducted in Paterson, NJ; Oakland, CA; and six parishes in northwest Louisiana to determine which and how fundamental design changes will be incorporated in the 2000 Decennial Census. One change being planned for 2000 is the use of a database for targeting special enumeration methods and for general planning functions. An objective of the 1995 Census Test is to design a database for use in targeting special enumeration methods to gain operational experience which will allow improvement of the approach for 2000. Specifically, information will be obtained which will allow improvement of the targeting and provide experience on the implementation process. This database may be used as a prototype for the development of a national database for use in the 2000 Decennial Census.

The following sections provide an overview of the special enumeration enhancement methodologies addressed in the targeting, an overview of the database and targeting methodology, results of the targeting in the 1995 Census Test sites, analysis of the algorithms used in targeting one of the special methods, and future plans for analysis to identify additional database and targeting improvements.

II. Overview of Enumeration Enhancement Methodologies

The Census Bureau reviewed results from previous censuses to develop an inventory of enumeration barriers. A list of enumeration enhancement methodologies was then developed which could address the barriers. These lists were pared down to a final list of eleven methodologies for use in the 1995 Census Test. The final list incorporated extensive internal and external input to identify the barriers with the most impact and the methodologies which would be most effective. (See [1] and [5].)

The following is a brief description of the methodologies used in the 1995 Census Test and hence, those whose areas of application were targeted through use of the database. Further details on the methodologies may be obtained from [2] and [3].

Urban Update/Enumerate: Census enumerators canvass (walk through) an assigned area, update an address list, and conduct enumeration. This special method is intended for areas with expected very low mail response rates due to the type of housing or other potential mail delivery problems.

Spanish Questionnaire Mailout: Questionnaires in Spanish, in addition to the English forms, are mailed out to areas with high concentrations of Spanish only speaking households.

Be Counted Questionnaire: Unaddressed census questionnaires are made available in public places. Thus, the questionnaires are available to persons who do not have access to regular mail delivery.

Questionnaire - Not English/Spanish: Census questionnaires are translated into various languages including Spanish, Chinese, Vietnamese, and Tagalog. These questionnaires are used in various operations including census nonresponse followup, urban update/enumerate, and the Be Counted operation.

Blitz Enumeration: A crew of specially trained enumerators conduct enumeration activities in a very compressed time schedule in a designated area. This method is for areas where there may be a small window of opportunity for enumeration such as a secured multi-unit building.

Paired Enumeration: Two census enumerators are assigned to one area to work together due to safety concerns.

Local Facilitator: A census enumerator is teamed with a non-enumerating local person with knowledge about the community such as, religious leaders, community

activists, and/or recognized local figures to ease the enumeration by translating, encouraging cooperation, finding hidden living quarters, etc.

Assistance Centers: Booths are set up and staffed in large multi-unit buildings, complexes, or neighborhoods to aid in enumerating residents and assist residents in completing their census questionnaires.

Community Based Organizations: Local organizations (for example: churches; service providers; or civic, religious, and social organizations) are used for outreach and promotion assistance such as, dissemination of messages, displaying census posters, and distribution of materials such as flyers.

Rental Companies: In areas with high concentrations of rental units, moving companies, resident managers, managers of temporary storage space, truck rental companies, laundromats, and others who provide services to renters and movers, are asked to participate in census promotion by displaying census posters, distributing census materials to their customers, and placing publicity materials on the sides of their trucks.

Confidentiality Promotion: Messages are developed to address specific fears and concerns of certain groups.

III.   Overview of the Database and Targeting Methodology

The primary issues which had to be addressed to create a targeting database and identify geographic areas in which to implement the special enumeration enhancement methodologies included the: 1) geographic level of tabulation; 2) data items to include; and 3) algorithms to use for targeting the special methodologies.

In order to achieve the goal of restricting the use of the special methods to limited geographic areas where they would be of most benefit, the tabulation level should be relatively low. However, operational concerns prevent the targeted areas from being too small. In addition, the census data measures include use of sample data which would become ineffective due to sampling variance at very small levels. Thus, the database was created based on tabulations at a block group level.

Much research has been performed during past censuses and census evaluations on the characteristics of populations and areas with lower enumeration rates. This research, and data availability, were used to identify the 1990 Census tabulations which would be most useful in targeting the special enumeration methodologies.

The variables included in the database were combined in algorithms based on minimum levels of methodology specific criteria (percent multi-units, poverty rate, etc.). There were one to eight algorithms defined for each method. Block groups meeting all the minimum cutoff criteria for at least one of the algorithms for a given methodology were initially targeted for that methodology.

In addition to the specific criteria, there were three general filtering criteria applied for some methodologies: 1) hard-to-count designation, 2) at least 400 persons, and 3) at least 100 housing units. A full description of the hard-to-count designation is given in [4].

Results of the initial targeting were provided on a paper listing to the Census Bureau's regional offices (ROs) for review based on their local knowledge of the suitability of the methodologies for the targeted areas and field checks of the areas. The RO personnel annotated the listings to provide feedback. They noted which areas should not have been targeted, those which should have been targeted for a different methodology, as well as those which were not targeted but should have been.

IV.   Targeting Results

Table 1 provides the total number of block groups and the number which meet the general filtering criteria for targeting by test site. As some special methods had one or more of these criteria in their algorithms, this was a limiting factor in how many block groups could be targeted for certain special methods. Although the population and housing unit criteria were not very restrictive, the hard-to-count criterion severely restricted the block groups which could be targeted for selected special methods. An analysis showing the appropriateness of the hard-to-count designation is given in [4].

Table 2 presents the number of block groups targeted for each special method after application of the computer algorithms and after the RO review for each test site. Urban Update/Enumerate is not included in the table since this method was the subject of a special test and was therefore subject to different targeting guidelines. Also, note that the RO review could not change the targeting for the Spanish Questionnaire Mailout since it also was the subject of a special test and restricted to the Oakland and Paterson sites. In addition, Questionnaire - Not English/Spanish was restricted to the Oakland test site.

There is variation among methods and sites on the degree of revision made to the number of block groups initially targeted during the RO review. Comments by the RO personnel indicate that, in general, the changes

result from the computer targeting an area which is not appropriate for the particular method or else missing an area for which a method is appropriate. For example, all areas targeted for Assistance Centers in Paterson were dropped since the region did not think the areas were appropriate for this method.

Rental Companies was dropped from all 28 initially targeted areas across the three sites - except for one in Paterson. A common reason given for these changes was that the areas have a high proportion of low income households which would tend not to use rental companies for moving assistance.

For Be Counted Questionnaire, there was relatively little change in the number of block groups for Oakland, but the number of groups almost doubled in Paterson and Louisiana. Table 3 provides the number of targeted block groups by their targeting status after the initial targeting and after the RO review for Be Counted Questionnaire. Table 3 shows the increase is a result of many areas being added and few or no areas dropped during RO review. Most of the areas were added because of the presence of marginal housing conditions, the areas were considered to be difficult to enumerate, and/or there were readily available locations for distribution of Be Counted questionnaires (such as churches or community centers).

Table 4 shows the targeting status of block groups for Paired Enumeration. Many areas were dropped and few added during RO review in Oakland and Louisiana. However, in Paterson, no areas were dropped and a substantial number were added. All of the areas in Louisiana and about half of the areas in Oakland were dropped because this method did not seem appropriate for the area. The other half of the Oakland areas were dropped because it was believed that the blitz methodology would be more appropriate. The Paired Enumeration method was added in Paterson as they identified additional areas with safety concerns. These results are examined further in Section V.

V.   Algorithm Analysis

Most of the special methods had more than one combination of characteristics (algorithms) by which the method could be initially targeted by computer. A question of interest about these sets of algorithms is whether some algorithms are redundant. This question is examined below for the Paired Enumeration method. Tables 7 - 9 show the correlation coefficients between the characteristics used in targeting the Paired Enumeration special method. Examination of the correlations shows relatively low levels of correlation among the variables. For variables that show correlation in one test site, the relationship usually does

not hold across sites. For example, "Mobile Home or Trailer" and "Boarded Up Units" has a relatively high negative correlation in Louisiana (-0.416), but much lower correlation levels in Oakland and Paterson (-0.019 and -0.140). Similarly, "Less Than Grade 9 Education" and "Mail Response" has a relatively low correlation in Louisiana (-0.024), but relatively high levels in Oakland and Paterson (0.449 and 0.441). In addition, the differences are not just between the urban (Oakland and Paterson) and rural (Louisiana) sites. The correlation level between "Mobile Home or Trailer" and "Poverty" is similar for Oakland and Louisiana (-0.204 and -0.161), while the level is opposite and relatively high for Paterson (0.433).

VI.   Future Plans

Information is being collected from the regional offices on which methods were actually used during enumeration activities of the 1995 Census Test. This information will be compared to the planned uses after the RO review.

The Census Bureau is exploring ways in which to incorporate administrative record data into census processes. Some administrative record information may be useful in updating measures in the planning database from 1990 or adding information not otherwise available. For example, since a primary purpose of the Paired Enumeration methodology is to provide increased safety for enumerators, measures of crime variables may provide improved targeting for this method.

Mail response rates and some census characteristics based on the 1995 Census Test along with administrative record data will be added to the database. Analyses will examine whether these updated data could have targeted the special methods more in line with the targeting after the RO review.

The Census Bureau is looking for new ways to seek out and incorporate local area knowledge into census processes. Toward this end, local government officials in the Oakland test site will be given the opportunity to review the initial computer targeting and provide feedback. They will have similar materials used during the RO review. These results will be compared with the RO review results to determine whether similar results are obtained or whether the local governments may provide different perspectives.

VII. Conclusions

The purpose of this paper was to examine the impact of the RO review on the targeting of the special methods

and to provide an initial analysis of the algorithms used in targeting.

Comparison of the block groups targeted for the various special methods before and after the RO review, clearly shows the significant impact of the review for certain methods. Although the RO review generated many changes in the targeting, it also showed that the initial targeting was frequently accurate. In addition, it is seen that there may be large regional differences. Even among just three sites, there was often a large disparity in the effect of the RO review for certain methods.

A high level of correlation between variables used in the targeting algorithms for a given special method would suggest that the variables provide redundant information. Low levels, on the other hand, would suggest that the variables could potentially target different areas for the method. The correlations of the variables used in the algorithms for Paired Enumeration, suggest potential benefit from, and a need for, the use of multiple algorithms in targeting a special method. There may not be just one variable which can best identify areas which would be benefitted by the use of the special method. In addition, different areas may require different variables to properly target a given special method. The use of multiple variables in multiple algorithms effectively "widens the net" in an effort to identify areas most in need of these special methods.

In summary, the 1995 Census Test shows that there is promise in the ability of a suitably constructed database to target small geographic areas for use of a special method to aid census enumeration. However, it also shows the benefit of a review by individuals knowledgeable with the local area. The review may compensate for unknown key missing variables or changes which may have occurred in an area since the original data collection.

REFERENCES

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ACKNOWLEDGEMENTS

Table 1: Number of Block Groups Meeting Selected Criteria by 1995 Census Test Site

Test Site	Total	Criteria		
		Hard-to-count	Population	Housing Units
Oakland	423	84	360	384
Paterson	134	26	120	125
Louisiana	124	22	121	124

Table 2: Number of Block Groups Targeted for Special Method Assignment by 1995 Census Test Site and Stage of Targeting

Special Method	Oakland		Paterson		Louisiana	
	Initial	Regional Office Review	Initial	Regional Office Review	Initial	Regional Office Review
Spanish Questionnaire Mailout	20	20	37	37	NA	NA
Be Counted Questionnaire	40	42	12	23	11	23
Questionnaire - Not English/Spanish	11	13	NA	NA	NA	NA
Blitz Enumeration	5	14	3	1	0	0
Paired Enumeration	35	23	8	17	7	2
Local Facilitator	5	5	8	8	3	1
Assistance Centers	5	4	4	0	0	0
Community-Based Organizations	11	10	9	11	8	19
Rental Companies	9	0	12	1	7	0
Confidentiality Promotion	13	11	7	15	2	0

NA - Not Applicable

Table 3: Number of Block Groups by Their Targeting Status after Initial Targeting and Regional Office Review - Be Counted Questionnaire

Initial	After Regional Office Review								
	Oakland			Paterson			Louisiana		
	Total	Targeted	Not Targeted	Total	Targeted	Not Targeted	Total	Targeted	Not Targeted
Total	423	42	381	134	23	111	124	23	101
Targeted	40	39	1	12	12	0	11	10	1
Not Targeted	383	3	380	122	11	111	113	13	100

Table 4: Number of Block Groups by Their Targeting Status after Initial Targeting and Regional Office Review - Paired Enumeration

Initial	After Regional Office Review								
	Oakland			Paterson			Louisiana		
	Total	Targeted	Not Targeted	Total	Targeted	Not Targeted	Total	Targeted	Not Targeted
Total	423	23	400	134	17	117	124	2	122
Targeted	35	18	17	8	8	0	7	1	6
Not Targeted	388	5	383	126	9	117	117	1	116

Table 5: Correlation Coefficients Between Characteristics Used for Targeting in Hard-to-Count Block Groups for Paired Enumeration: Oakland

Characteristic	Mail Response	Boarded Up Units	Mobile Home or Trailer	Households with 6+ Persons	Poverty	Less Than Grade 9 Education	Post-1985 Immigrants
Mail Response	1.000	-0.145	-0.104	0.220	-0.280	0.449	0.067
Boarded Up Units		1.000	-0.019	-0.015	0.245	-0.061	-0.010
Mobile Home or Trailer			1.000	0.048	-0.204	-0.096	0.033
Households with 6+ Persons				1.000	0.189	0.483	0.079
Poverty					1.000	-0.193	-0.108
Less Than Grade 9 Education						1.000	0.103
Post-1985 Immigrants							1.000

Table 6: Correlation Coefficients Between Characteristics Used for Targeting in Hard-to-Count Block Groups for Paired Enumeration: Paterson

Characteristic	Mail Response	Boarded Up Units	Mobile Home or Trailer	Households with 6+ Persons	Poverty	Less Than Grade 9 Education	Post-1985 Immigrants
Mail Response	1.000	-0.415	0.372	-0.558	0.072	0.441	-0.369
Boarded Up Units		1.000	-0.140	0.430	-0.296	-0.303	0.387
Mobile Home or Trailer			1.000	-0.316	0.433	0.101	-0.240
Households with 6+ Persons				1.000	-0.283	-0.098	0.150
Poverty					1.000	0.165	-0.503
Less Than Grade 9 Education						1.000	-0.420
Post-1985 Immigrants							1.000

Table 7: Correlation Coefficients Between Characteristics Used for Targeting in Hard-to-Count Block Groups for Paired Enumeration: Louisiana

Characteristic	Mail Response	Boarded Up Units	Mobile Home or Trailer	Households with 6+ Persons	Poverty	Less Than Grade 9 Education	Post-1985 Immigrants
Mail Response	1.000	-0.261	0.179	0.412	0.189	-0.024	-0.390
Boarded Up Units		1.000	-0.416	0.055	0.164	0.096	-0.329
Mobile Home or Trailer			1.000	-0.003	-0.161	0.055	-0.334
Households with 6+ Persons				1.000	0.161	-0.011	0.216
Poverty					1.000	-0.161	-0.027
Less Than Grade 9 Education						1.000	-0.665
Post-1985 Immigrants							1.000