EVALUATION OF THE POSTAL IDENTIFICATION OF VACANT AND NONEXISTENT UNITS

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I. INTRODUCTION

The 1995 Census Test used undeliverable, first class mailing pieces (referred to as Postmaster Returns or PMRs) returned by the United States Postal Service (USPS) to the Census Bureau to identify vacant and nonexistent units in the two urban test sites - Oakland, CA and Paterson, NJ. Initially, field followup of every PMR address was to be conducted in a PMR Followup operation. However, this operation was not conducted due to program changes resulting from increased resource requirements of other major test objectives. As an alternative, the postal classifications (postal markings of the reason for not delivering a mailing piece) of the PMRs from the prenotice letter and the initial questionnaire were examined.

This report documents results of the 1995 Census Test objective: Evaluation of the Postal Identification of Vacant and Nonexistent Units. It contains background information describing the operation and PMR rates by mailing piece, form type, and reason for undeliverability. It also contains comparisons of the postal classifications to the USPS Delivery Sequence File (DSF), Nonresponse Followup (NRFU) results, and Integrated Coverage Measurement (ICM) results.

The results of this evaluation will help inform the decisions for 2000 on using PMRs to identify vacant units, handling the nonvacant PMRs, the best timing for conducting the followup of a sample of the vacant PMRs, selecting a location for capturing the PMRs, and designing a sample.

II. BACKGROUND

A multi-piece mailing approach using first class mail was implemented in the 1995 Census Test to improve mail response rates. The multi-piece approach included mailing a prenotice letter, an initial questionnaire, and a reminder postcard to all housing units in the urban test sites. A replacement questionnaire was sent to housing units for which an initial questionnaire was not returned.

The PMRs from the initial questionnaire that were classified as vacant were considered to be true vacants. Neither the replacement mailing nor field followup was conducted for any of these PMR addresses checked-in by March 16, 1995. The nonvacant PMRs from the initial questionnaire were included in the replacement mailing and the universe of addresses eligible for NRFU.

The PMRs from the prenotice letter, initial questionnaire, and replacement questionnaire were returned to Census Bureau Headquarters in Suitland, Maryland, and checked-in by identification number, date returned, and reason for undeliverability. Only the PMRs from the prenotice letter and the initial questionnaire were examined for this evaluation. The PMR reasons were categorized as follows:

A. **Vacant** - Vacant, owner deceased, temporarily away, moved left no address, etc.
B. **Bad address** - No such office in state, no such street, no such number, no such address, unknown address, changed street name, insufficient address, no such apartment number, etc.
C. **Refused** - Current occupants would not accept the mail.
D. **Other** - Duplicate, demolished, vacant lot, no mail receptacle, PO Box, commercial only, etc.
E. **Unknown** - No reason written on the PMR.

III. LIMITATIONS

These results cannot be generalized to other areas of the country having characteristics that are different from Paterson and Oakland. The reliability of the evaluation was affected by and dependent upon the following:

A. Errors were possible in capturing the PMR reasons for the prenotice letter and initial questionnaire.
B. The PMRs received and checked in after May 15, 1995 (the last day of check-in) were excluded.
C. Field verification of PMR postal classifications was only performed for PMR addresses that were in the NRFU or ICM randomly selected samples.
D. An address on the DSF was flagged as "vacant" only if it had been unoccupied for 90 days or more.
E. Sampling was used for the NRFU and ICM operations.
F. Errors were possible in capturing the data for the NRFU and ICM operations.
G. Statistical significance was not tested for the results in Sections IV.A through IV.F. Though projecting results are implied outside the study areas, further research is encouraged to validate the findings.

H. Statistical significance was tested for the results in Sections IV.G. and IV.H. when we sampled for the 1995 NRFU and ICM. All reported comparisons were statistically significant at a significance level of α=0.05.

IV. RESULTS

This section gives the results of the postal identification of vacant and nonvacant PMRs from the first class mailings of the prenotice letter and the initial questionnaire for the Oakland and Paterson test sites. These results consist of PMR rates by mailing piece, form type, and reason; postal classification comparisons between the prenotice letter and the initial questionnaire; and postal classification comparisons between the initial questionnaire and the DSF, NRFU results, and ICM results.

The standard errors (s.e.'s) for the weighted estimates in Sections G and H were computed using the simple random sampling jackknife variance procedure (Wolter, 1985). The estimates were produced by the VPLX statistical software (Fay, 1990). The s.e.'s for the estimates are in parentheses.

Mailing pieces that were not sent back to the Census Bureau as PMRs were defined as "deliverable" (Deliv). The nonvacant PMR category includes postal classifications of "nonexistent", "bad addresses", "refusal", "other", and addresses for which a PMR reason was not given.

A. What are the PMR rates by mailing piece?

Table 1. PMR Rates by Mailing Piece

Mailing Piece/ Test Site	First Class Mailing Pieces	Number of PMRs	Rate (%)
Prenotice Letter			
Oakland	156,923	10,078	6.4
Paterson	48,677	2,101	4.3
Initial Questionnaire			
Oakland	149,341	11,495	7.7
Paterson	46,188	2,074	4.5

Table 1 gives the number of first class mailing pieces, the number of PMRs, and the PMR rates for the prenotice letter and the initial questionnaire. The number of first class mailing pieces for the prenotice letter and the initial questionnaire should have been equivalent within each test site but were not because of the way the address files were processed.

The PMR rates appear higher in Oakland than in Paterson for both mailing pieces. The PMR rates for both mailing pieces in Oakland were between 6 and 8 percent. The PMR rates for both mailing pieces in Paterson were around 4.5 percent.

B. What are the PMR rates by form type?

The first class mailings of the initial questionnaire consisted of four types of forms: a short form, an abbreviated long form, a medium long form, and a comprehensive long form. All four types of forms contained the six 100 percent questions; i.e., sex, age, relationship, Hispanic origin, race, and tenure (renter/owner status). The short form consisted of seven questions and was eight pages long. The three long forms contained substantially different numbers of questions and pages--ranging from 17 to 54 questions and 20 to 28 pages.

Table 2 shows the PMR rates for the short form, and the three long forms combined.

Table 2. PMR Rates by Form Type

Test Site	Short Form		Long Forms	
	First Class Mailing Pieces	PMR Rate (%)	First Class Mailing Pieces	PMR Rate (%)
Oakland	124,943	7.9	24,398	6.9
Paterson	38,489	4.5	7,699	4.2

The PMR rates for the short form and the long forms are approximately the same in each test site, differing by one percentage point for Oakland and 0.3 percentage points for Paterson. The PMR rates were about the same for each type of long form in each test site -- about 6.9 percent for Oakland and 4.2 percent for Paterson.

C. At what rate do letter carriers identify vacant and nonvacant PMR addresses?

The PMR rates for the prenotice letter and the initial questionnaire were calculated by reason to determine the rate at which the USPS identified vacant and nonvacant units. The nonvacant PMR rate includes PMRs that were classified as any reason other than "vacant." Table 3 presents the PMR rates by reason.

Table 3. Mailing Piece PMR Rates by Reason

Mailing Piece/ Test Site	First Class Mailing Pieces	Vacant PMR Rate (%)	Nonvacant PMR Rate (%)
Prenotice Letter			
Oakland	156,923	4.5	1.9
Paterson	48,677	2.3	2.0
Initial Q'naire			
Oakland	149,341	5.6	2.1
Paterson	46,188	2.5	2.0

In Oakland, the vacant PMR rates for the prenotice letter and the initial questionnaire were between 4 and 6 percent. Approximately 70 percent of the total number of PMRs in Oakland were classified as "vacant" for the prenotice letter and for the initial questionnaire.

In Paterson, the vacant PMR rates for the prenotice letter and the initial questionnaire were about 2.5 percent. The vacant PMRs for each mailing piece were around 55 percent of the total number of PMRs in Paterson.

The nonvacant PMR rates were approximately the same for both sites and both mailing pieces -- about 2 percent. Around 90 percent of the nonvacant PMRs for both sites and both mailing pieces were classified as "bad addresses."

D. Is there a better method than using just the initial questionnaire to identify vacant and nonvacant PMR addresses? What if we used the prenotice letter or a combination of the prenotice letter and the initial questionnaire to identify vacant and nonvacant PMR addresses?

The postal classifications from the prenotice letter and the initial questionnaire were compared in Tables 4 and 5 to help determine which mailing piece(s) to use to identify vacant and nonexistent units and to assess the consistency of postal vacancy classifications.

Of the 149,341 first class mailing pieces (prenotice letter and initial questionnaire) for Oakland, approximately 96 percent of the postal classifications for both mailing pieces agreed. The initial questionnaire appear to have identified more vacant and nonvacant PMRs than the prenotice letter (11,495 vs. 10,078). Around 64 percent of the vacant PMRs from the initial questionnaires were confirmed as vacant PMRs by the prenotice letter mailing pieces. About 26 percent of both the vacant and nonvacant PMRs from the initial questionnaire were deliverable as prenotice letter mailing pieces. Nearly 16 percent of the prenotice letter PMRs (both vacant and nonvacant) were deliverable as initial questionnaire mailing pieces.

Table 4. Prenotice Letter Postal Classification by Initial Questionnaire Postal Classification: OAKLAND

OAKLAND TEST SITE		Initial Questionnaire			
		Deliv	Vacant PMR	Nonvacant PMR	Total
Prenotice Letter	Deliv	136,275	2,099	889	139,263
	Vacant PMR	1,075	5,279	652	7,006
	Nonvacant PMR	496	924	1,652	3,072
	Total	137,846	8,302	3,193	149,341

Of the 46,188 first class mailing pieces (prenotice letter and initial questionnaire) for Paterson, approximately 98 percent of the postal classifications for both mailing pieces agreed. The prenotice letter and the initial questionnaire appear to have identified similar numbers of vacant and nonvacant PMR addresses (2,101 for the prenotice letter vs. 2,074 for the initial questionnaire). Around 68 percent of the vacant PMRs from the initial questionnaires were confirmed as vacant PMRs by the prenotice letter mailing pieces. About 21 percent of the vacant and 15 percent of the nonvacant PMRs from the initial questionnaire were deliverable as prenotice letter mailing pieces. Around 19 percent of the prenotice letter PMRs (both vacant and nonvacant) were deliverable as initial questionnaire mailing pieces.

Table 5. Prenotice Letter Postal Classification by Initial Questionnaire Postal Classification: PATERSON

PATERSON TEST SITE		Initial Questionnaire			
		Deliv	Vacant PMR	Nonvacant PMR	Total
Prenotice Letter	Deliv	43,711	240	136	44,087
	Vacant PMR	214	785	128	1,127
	Nonvacant PMR	189	132	653	974
	Total	44,114	1,157	917	46,188

It appears that it is better to use the initial questionnaire than the prenotice letter to identify vacant and nonexistent units. If we use the prenotice letter or a combination of the prenotice letter and the initial questionnaire to identify these units so that we can start a vacant followup operation earlier, we will be excluding from the followup universe

what could be a significant number of units that will be vacant when we mail the initial questionnaire. This could compromise the quality of the data on vacant units.

E. What is the best date to begin a PMR followup operation?

The cumulative percentage of prenotice letter and initial questionnaire PMRs were examined by the date they were received and checked in to help determine the optimal timing for a PMR followup operation.

For Oakland, the prenotice letter and the initial questionnaire were mailed on February 24th and February 28th, respectively. About 72 percent of the prenotice letter PMRs and 50 percent of the initial questionnaire PMRs were received and checked in by March 16th--the "cut date" for the replacement mailing. Around 95 percent of the PMRs for both mailing pieces were received and checked in by the second week in April.

For Paterson, the prenotice letter and the initial questionnaire were mailed on February 27th and March 1st, respectively. Nearly 95 percent of the PMRs for both mailing pieces were received and checked in by March 16th. Oakland did not reach this level until the second week of April, almost a month later. Almost all of the PMRs (99 percent) for both mailing pieces for Paterson were received and checked in by the end of March.

If we continue to use the initial questionnaire for identifying these units, it appears that the best date to conduct the PMR followup operation is around the time when the replacement questionnaire is mailed (March 22-23), as was originally planned for the 1995 Census Test. However, in Oakland a large proportion of the PMRs were not checked in by this date, possibly in part because of the distance between the test site and the check in location. Also, there is some anecdotal evidence that other factors (such as poor weather conditions) may have caused delays in the delivery of the mailing pieces and the PMRs to the check in location.

F. How well does the DSF vacant information correspond to the PMR postal endorsements?

The USPS provided vintages of the DSF for December 1993 and April 1995 for Oakland and Paterson. The postal classifications of the initial questionnaire and those on both vintages of the DSF for both sites were cross-tabulated. The purpose of this analysis was to assess the potential of using the DSF vacant information to determine staffing needs for a PMR followup operation and/or as a universe for the sample design.

A total of 140,632 addresses for the Oakland test site were exact matches between the December 1993 DSF and the postcensus Decennial Master Address File (DMAF). For the April 1995 DSF, a total of 142,329 addresses for Oakland matched exactly to the DMAF. The PMRs from the initial questionnaire appear to have identified more vacant units than either vintage of the DSF (7,070 vs. 1,475 for the December 1993 DSF and 7,205 vs. 624 for the April 1995 DSF). Only a small percentage of the vacant PMRs were flagged as vacant on each vintage of the DSF--2.4 percent for the December 1993 DSF and 2 percent for the April 1995 DSF.

A total of 33,996 addresses for the Paterson test site were exact matches between the December 1993 DSF and the postcenus DMAF. For the April 1995 DSF, a total of 33,445 addresses for Paterson matched exactly to the DMAF. The PMRs from the initial questionnaire appear to have identified more vacant units than either vintage of the DSF (826 vs. 172 for the December 1993 DSF and 821 vs. 165 for the April 1995 DSF). As in Oakland, a small percentage of the vacant PMRs were flagged as vacant on each vintage of the DSF--5.2 percent for the December 1993 DSF and 5.1 percent for the April 1995 DSF.

The DSF vacant information does not appear to be useful to determine staffing needs for a PMR followup operation or to design the sample since only a small percentage of the initial questionnaire vacant PMRs were flagged as vacant on the DSF in both Oakland and Paterson. This may be due, in part, to the rule of the USPS which states that an address on the DSF is flagged as "vacant" only if it has been unoccupied for 90 days or more.

G. How well did the USPS nonvacant classifications correspond to the NRFU classifications?

The postal classifications from the initial questionnaire and the NRFU classifications were compared to calculate the number of vacant units that the USPS did not identify and to provide information on nonvacant PMRs. Tables 6 and 7 are cross tabulations of the postal classifications for the initial questionnaire by the NRFU classifications for Oakland and Paterson, respectively. The universe for these tables was the weighted NRFU sample addresses.

All addresses returned as vacant PMRs were excluded from the NRFU workload and therefore are not reflected in these tables. The nonvacant PMRs were included in the universe of addresses eligible for NRFU. Only those nonvacant PMRs that were actually in the NRFU sample are reflected in the tables.

The NRFU "deleted" category includes such units as demolished/burned out, duplicate, nonresidential, condemned, and units enumerators were not able to locate.

The "no status" category consists of computer assisted telephone interviewed (CATI) NRFU cases for which the variable on the data files used to analyze this data was not set when the data files were received.

Table 6. NRFU Classification by USPS Classification of the Initial Questionnaire: OAKLAND

OAKLAND TEST SITE		USPS		
		Deliv	Nonvacant PMR	Total
NRFU	Occupied	50,610 (312.3)	1,354 (77.4)	51,964 (311.3)
	Vacant	7,948 (173.6)	1,082 (64.9)	9,030 (183.1)
	Deleted	1,962 (87.5)	1,040 (61.6)	3,002 (106.1)
	No status	4,833 (138.0)	87 (16.1)	4,920 (138.8)
	Total	65,353 (276.4)	3,563 (117.6)	68,916 (260.3)

For Oakland, about 32 percent (1.5 percent s.e.) of the nonvacant PMRs were classified as deleted or had no status assigned by the NRFU enumerators. The remaining nonvacant PMRs were classified as follows: 38 percent (1.7 percent s.e.) were occupied and 30 percent (1.5 percent s.e.) were vacant. In addition, about 12 percent (0.3 percent s.e.) of the deliverable units in the NRFU workload were classified as vacant by NRFU enumerators.

Table 7. NRFU Classification by USPS Classification of the Initial Questionnaire: PATERSON

PATERSON TEST SITE		USPS		
		Deliv	Nonvacant PMR	Total
NRFU	Occupied	20,345 (132.3)	898 (55.3)	21,243 (126.2)
	Vacant	1,997 (80.0)	291 (31.5)	2,288 (85.1)
	Deleted	1,574 (71.2)	252 (29.0)	1,826 (76.2)
	No status	1,088 (60.2)	14 (7.0)	1,102 (60.6)
	Total	25,004 (81.9)	1,455 (62.2)	26,459 (47.4)

For Paterson, about 18 percent (1.9 percent s.e.) of the nonvacant PMRs were classified as deleted or had no status assigned by the NRFU enumerators. The remaining nonvacant PMRs were classified as follows: 62 percent (2.4 percent s.e.) were occupied and 20 percent (2.0 percent s.e.) were vacant. Additionally, about 8 percent (0.3 percent s.e.) of the deliverable units in the NRFU workload were classified as vacant by NRFU enumerators.

The majority of the initial questionnaire nonvacant PMRs were classified either as occupied or vacant units during NRFU in both Oakland and Paterson. In addition, NRFU enumerators identified between 8 to 13 percent more vacant units than the USPS.

H. How well did the USPS postal endorsements correspond to the ICM classifications?

The postal classifications from the initial questionnaire were compared to the ICM classifications to try to determine how well the USPS postal endorsements accurately reflect occupancy status of the housing units, and calculate the number of vacant and nonexistent units that the USPS did not identify. Tables 8 and 9 are cross tabulations of the postal classifications for the initial questionnaire by the ICM classifications for Oakland and Paterson, respectively. The universe for these tables was the weighted ICM sample addresses that matched to the census. The ICM "nonexistent" category includes units that could not be located during ICM or that did not exist on Census Day.

Table 8. ICM Classification by USPS Classification of the Initial Questionnaire: OAKLAND

OAKLAND TEST SITE		USPS			
		Deliv	Vacant PMR	Nonvacant PMR	Total
ICM	Occupied	123,312 (698.4)	1,872 (173.0)	761 (124.5)	125,945 (679.7)
	Vacant	6,947 (326.7)	4,386 (270.6)	658 (105.6)	11,991 (427.6)
	Nonexistent	2,451 (209.9)	324 (71.6)	135 (51.0)	2,910 (227.0)
	Other	1,081 (130.9)	79 (37.6)	28 (27.9)	1,188 (138.9)
	Total	133,791 (606.6)	6,661 (327.6)	1,582 (172.8)	142,034 (512.1)

For the initial questionnaire in Oakland, ICM identified significantly more vacant units than the USPS (11,991 vs. 6,661). Around 5 percent (0.2 percent s.e.) of the deliverables were classified as vacant by ICM. About 66 percent (2.4 percent s.e.) of the vacant PMRs were confirmed as vacants by ICM. Approximately 28 percent (2.2 percent s.e.) of the vacant and 48 percent (5.6 percent s.e.) of the nonvacant PMRs were classified as occupied housing units by ICM.

Table 9. ICM Classification by USPS Classification of the Initial Questionnaire: PATERSON

PATERSON TEST SITE		USPS			
		Deliv	Vacant PMR	Nonvacant PMR	Total
ICM	Occupied	39,090 (164.8)	229 (38.0)	335 (46.5)	39,654 (155.2)
	Vacant	1,999 (112.7)	381 (48.9)	165 (31.9)	2,545 (125.5)
	Nonexistent	522 (57.3)	35 (16.1)	69 (20.9)	626 (63.0)
	Other	112 (26.6)	6 (5.8)	12 (8.3)	130 (28.4)
	Total	41,723 (111.3)	651 (64.0)	581 (60.5)	42,955 (67.1)

For the initial questionnaire in Paterson, ICM identified significantly more vacant units than the USPS (2,545 vs. 651). Around 5 percent (0.3 percent s.e.) of the deliverables were classified as vacant by ICM. About 59 percent (4.9 percent s.e.) of the vacant PMRs were confirmed as vacants by ICM. Approximately 35 percent (4.8 percent s.e.) of the vacant and 58 percent (5.2 percent s.e.) of the nonvacant PMRs were classified as occupied housing units by ICM.

The majority of the initial questionnaire nonvacant PMRs were classified either as occupied or vacant units during ICM in both Oakland and Paterson. In addition, the USPS did not identify a large proportion of vacant units in neither Oakland nor Paterson.

V. CONCLUSION

Overall, the results indicate that using the USPS classifications without followup or verification to identify vacant or nonvacant units is likely to adversely impact census coverage.

VI. REFERENCES

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