

## **APPENDIX E: BIAS STUDY PROCESSES AND RESULTS**

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In order to ascertain the existence or extent of bias in the survey process, studies were performed to examine both the external and internal opportunities where bias could result. An external bias study was conducted by telephone. Representatives of 35 fire departments were asked a series of nine questions taken directly from the printed survey. Questions were modified to accommodate the auditory format of a telephone survey. Statistical tests were performed to determine the significance of variances in the responses to the printed surveys from fire departments and the responses of the fire departments who participated in the telephone survey. Statistical tests were conducted at the 95% confidence level. At this confidence level, none of the nine questions contained statistically significant variance. Exhibit 52 identifies the questions asked, the responses, the results of the statistical tests, and the corresponding statistical significance of the external bias process

The internal bias study was conducted to compare the survey responses of the first two survey distribution waves to the responses of the third distribution wave. Mailing #1 and #2 were grouped together because they included the PSWN Program cover letter, while Mailing #3 surveys were distributed with community targeted cover letters. The state foresters segment was not included in this analysis because they were only sent surveys during Mailing #3. Statistical tests were performed to determine the significance of variances in the responses between the two groups. Statistical tests were conducted at the 95% confidence level. At this confidence level, none of the nine questions contained statistically significant variance. Exhibit 53 identifies the questions asked, the responses, the results of the statistical tests, and the corresponding statistical significance. Detailed explanations of the statistical tests performed and how to interpret the results of both the external and internal bias studies follow the tables.

**Exhibit 52**  
**External Bias Results**

Question	Written Survey Respondents (n)	Phone Survey Respondents (n)	Chi-square p-value	Statistical Significance
Does your agency have at least one radio channel designated for communicating with other organizations?	Yes 79.5% (625) No 20.5% (161)	Yes 82.9% (29) No 17.1% (6)	.631	None
Does your agency have plans to replace or substantially upgrade its land mobile radio system?	Yes 56.7% (442) No 43.3% (338)	Yes 42.9% (15) No 57.1% (20)	.107	None

Question	Written Survey Mean (n)	Phone Survey Mean (n)	F test p-value	T test p-value	Statistical Significance
On a scale of 1 to 5 (where 1 = poor and 5= excellent), rate your agency's OVERALL ABILITY today to handle situations where it needs to interoperate with other agencies. (Interoperate means the ability of your agency to communicate with other organizations in the process of performing it functions.)	3.38 (783)	3.37 (35)	.409	.978	None
On a scale from 1 to 5 (where 1 = no knowledge to 5 = very knowledgeable), how familiar is your agency with the Project 25 standards?	1.64 (777)	1.46 (35)	.077	.357	None
On a scale from 1 to 5 (where 1 = no knowledge to 5 = very knowledgeable), how familiar is your agency with the FCC's refarming efforts?	2.07 (777)	1.94 (35)	.405	.567	None
On a scale from 1 to 5 (where 1 = not a problem to 5 = major problem), how serious is the problem of not having enough channels on your land mobile radio system?	2.62 (788)	2.43 (35)	.770	.462	None
On a scale from 1 to 5 (where 1 = not a problem to 5 = major problem), how serious is the problem of frequency interference on your land mobile radio system?	2.65 (776)	2.51 (35)	.584	.577	None
On a scale from 1 to 5 (where 1 = not a problem to 5 = major problem), how serious is the problem of outdated equipment regarding your land mobile radio system?	2.70 (772)	2.54 (35)	.144	.514	None
On a scale of 1 to 5 (where 1 = not important to 5 = extremely important), how important will interoperability ISSUES be to your agency when it	3.91 (760)	3.90 (21)	.156	.968	None

purchases its next land mobile radio system?					
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**Exhibit 53  
Internal Bias Results**

<b>Question</b>	<b>Regular Letter Respondents (n)</b>	<b>Special Letter Respondents (n)</b>	<b>Chi-square p-value</b>	<b>Statistical Significance</b>
Does your agency have at least one radio channel designated for communicating with other organizations?	Yes 79.6% (610) No 20.4% (156)	Yes 79.1% (185) No 20.9% (49)	.849	None
Does your agency have plans to replace or substantially upgrade its land mobile radio system?	Yes 55.7% (423) No 44.3% (336)	Yes 63.0% (162) No 37.0% (95)	.181	None

<b>Question</b>	<b>Regular Letter Mean (n)</b>	<b>Special Letter Mean (n)</b>	<b>F test p-value</b>	<b>T test p-value</b>	<b>Statistical Significance</b>
On a scale of 1 to 5 (where 1 = poor and 5= excellent), rate your agency's OVERALL ABILITY today to handle situations where it needs to interoperate with other agencies. (Interoperate means the ability of your agency to communicate with other organizations in the process of performing its functions.)	3.41 (766)	3.25 (232)	.209	.066	None
On a scale from 1 to 5 (where 1 = no knowledge to 5 = very knowledgeable), how familiar is your agency with the Project 25 standards?	1.62 (757)	1.69 (231)	.190	.395	None
On a scale from 1 to 5 (where 1 = no knowledge to 5 = very knowledgeable), how familiar is your agency with the FCC's refarming efforts?	2.03 (759)	2.10 (230)	.498	.423	None
On a scale from 1 to 5 (where 1 = not a problem to 5 = major problem), how serious is the problem of not having enough channels on your land mobile radio system?	2.56 (766)	2.73 (235)	.416	.135	None
On a scale from 1 to 5 (where 1 = not a problem to 5 = major problem), how serious is the problem of frequency interference on your land mobile radio system?	2.71 (755)	2.70 (231)	.066	.946	None
On a scale from 1 to 5 (where 1 = not a problem to 5 = major problem), how serious is the problem of outdated equipment regarding your land mobile radio system?	2.70 (754)	2.82 (228)	.871	.279	None
On a scale of 1 to 5 (where 1 = not important to 5 = extremely important), how important will interoperability	3.93 (736)	3.84 (227)	.106	.301	None

ISSUES be to your agency when it purchases its next land mobile radio system?					
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Depending upon the question type, the responses were compared using chi-square analysis and independent t-tests. The two dichotomous (i.e., yes-no) questions were analyzed with a chi-square test. A chi-square analysis is a test for evaluating the level of statistical significance attained by a bivariate analysis in a cross-tabulation. The chi-square test procedure assumes that no relationship exists between the two variables in the population and determines whether any apparent relationship obtained in a sample cross-tabulation is attributable to chance. In order to determine if there is significant statistical difference in the responses of the two groups, and consequently a bias in the responses received for this question, the significance value (or p-value) produced is compared to an established .05 threshold. A p-value  $< .05$ , means that there is less than a 5% probability that difference in the responses occurred by chance alone.

The remaining seven ordinal response questions (i.e., ratings from 1 to 5) were analyzed with independent t-tests, which compares the mean responses of the two groups. Independent t-tests provide two t-test results and corresponding significance values (p-values). The first is based on the assumption of equal variances and the second is based on the assumption of unequal variances between the distributions being compared. In order to determine which t-test and corresponding p-value to use, it must first be determined if the null hypothesis of equal variances can be rejected. This is done by evaluating the significance level of the Levene's Test for Equality of Variances (the F test), which is presented in conjunction with the t-test. The significance value (p-value) of the F test is also placed against the .05 threshold. If it is  $< .05$ , then the null hypothesis can be rejected and the t-test and p-value associated with the assumptions of unequal variances is used, otherwise the t-test and p-value associated with the assumption of equal variances is used. Just as with the chi-square tests, t-tests with p-values  $< .05$  are statistically significant and imply bias, while those  $> .05$  offer no statistical significant difference.

None of the p-values for the two chi-square tests and the seven independent t-tests for either the external bias or the internal bias were below the .05 threshold; therefore, no statistically significant differences were found among the responses to the survey.