Effectiveness of Follow-Up Techniques with Nonresponders in Mail Surveys

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One hundred thirty-six mail questionnaire studies which surveyed at least 70 pharmacy practitioners, pharmacy school alumni or pharmacy school-based educators in the U.S. or Canada from 1985 to August 1995 were reviewed to assess the relationships between different follow-up techniques and survey return rates. The scope of each study was categorized as being national, regional/provincewide/statewide, single school (alums) or multiple school (faculty). Least squares multiple regression, weighted for survey sample size, was used to assess the association between return rate and use of prenotification, reminders, second and subsequent mailings, telephone follow-up and other follow-up methods. Although the effectiveness of these techniques varied as a function of a study’s scope, and not all techniques were used in every survey, only a second mailing of the survey instrument to nonresponders was significantly associated with higher return rates across all respondent categories.

INTRODUCTION
To maximize return rates on mail surveys, survey researchers(1-3) recommend using a variety of techniques, e.g., prenotifying members of the study sample, including a pre-addressed postage-paid return envelope in the survey packet, and following up with sample subjects who fail to respond to the initial survey mailing (nonresponders). Nonresponder follow-up techniques include reminder cards, multiple mailings of cover letters and surveys, telephone pleas soliciting participation, or sequential combinations of these techniques for persistent nonresponders (e.g., a reminder card followed by a second mailing followed by a telephone follow-up)(1-3).

Although telephone follow-up is a recommended technique to use with persistent nonresponders(1,3), Dillman(2) notes that very few studies have specifically examined the use of this approach(4). Likewise, neither of two recent meta analyses which examine the effectiveness of different mail questionnaire return-maximizing techniques address the impact of telephone follow-up(5,6).

During two recent mail surveys of pharmacy practitioners(7,8), telephone contacts were made with persistent nonresponders as the final layer of follow-up used. The overall return rates on these surveys were 86 percent with 578 surveys being returned(7), and 81 percent with 215 surveys being returned(8), respectively. On a third survey among 178 University of Montana pharmacy program alumni where telephone follow-up was not utilized, a final return rate of 66 percent was obtained with 118 surveys being returned (unpublished data). While higher return rates are certainly more desirable to maximize the generalizability of a survey’s findings, long-distance telephone follow-ups with nonresponders also added substantially to the overall costs of the two earlier projects, a shortcoming of this follow-up technique noted by others(1-3). The differential return rates and corresponding differential costs to conduct these studies led to the present investigation of the pharmacy literature to examine the effectiveness of different techniques for maximizing return rates on mail surveys conducted among pharmacy practitioners, pharmacy school alumni and pharmacy school-based educators.

The research questions of interest in this study were:
1. What is the impact of different follow-up procedures with nonresponders on the return rates of mail surveys conducted among pharmacy practitioners, pharmacy school alumni and pharmacy school-based educators?
2. How does the impact of any particular mail questionnaire follow-up procedure vary across pharmacy practitioners, pharmacy school alumni and pharmacy school-based educators?
3. Is the marginal cost of telephone follow-up with persistent nonresponders justified by the marginal return rate resulting from this follow-up effort?

METHODOLOGY
Database Development

A database of mail survey studies conducted among pharmacy practitioners, pharmacy school alumni and pharmacy school-based educators was constructed from reports published in peer-refereed journals from January 1, 1985 through July 31, 1995. Articles considered for database inclusion were identified in a variety of ways. The keywords “pharmacist” (sub-keywords community, consultant, hospital, institutional) and “education” (sub-keyword pharmaceutical) were used to conduct a manual search of International Pharmaceutical Abstracts to identify articles describing such surveys. The search was limited to the peer-reviewed literature because it was found that reports appearing in refereed journals consistently provided more complete accounts of the survey methodology used than did articles in non-refereed publications.

In addition, each issue of the American Journal of Pharmaceutical Education, the American Journal of Health-Systems Pharmacy (and its predecessors), and the Journal of Pharmaceutical Marketing and Management were reviewed from July 31, 1995 back through January 1, 1985 (or through the inaugural issue if after January 1, 1985) to locate additional survey studies which might not have been listed under the IPA keywords utilized. These three journals were selected because they are peer-reviewed and frequently pub-
lish the results of surveys conducted among pharmacy practitioners, pharmacy school alumni and pharmacy educators.

Data Analysis

Similar to an earlier study of surveys conducted by Heberlein and Baumgartner(9), regression analysis of the identified mail surveys was undertaken in the present project so as to examine a greater proportion of the variance in both outcome and predictor variables of the studies than is possible with other statistical techniques. Whereas many of the studies in Heberlein and Baumgartner’s database incorporated design features specifically intended to examine the impacts of different treatments on mail questionnaire return rates, the present investigation utilizes studies whose raison d’etre had nothing at all to do with comparing the effectiveness of different follow-up procedures. This difference in database specification arose out of necessity, the literature search for the present investigation failing to yield a single study which examined the impact of different survey techniques or follow-up methodologies on return rates among pharmacy practitioners, pharmacy school alumni or pharmacy school-based educators.

The unit of measure for the present investigation was the individual survey study. For studies which surveyed other groups in addition to pharmacy practitioners, pharmacy school alumni or pharmacy educators, e.g., nurses, hospital administrators or pharmaceutical company officials, return rates obtained among these extraneous groups were excluded from the database. Data from each survey were collected using the following variables:

Return rate. Return rate, the dependent variable in the study, was a continuous variable calculated as the raw number of usable and unusable questionnaires received, divided by the number of questionnaires mailed out less those returned as undeliverable. Returned but unusable questionnaires were included in the gross return rate calculations for each study because no single definition for “incomplete survey” was universally applied from report to report. Moreover, several studies defined surveys as “unusable” if they were received from retired pharmacists, pharmacists no longer in active practice, or those not working in the particular practice setting under study(10,11). In these cases, surveys had been mailed to pharmacists extraneous to the study’s population of interest because the pharmacist mailing database used lacked the demographic detail necessary to identify an individual pharmacist as belonging to a particular, narrowly-defined population(10). This lack of database specificity also precluded adjusting a study’s eligible population base to estimate sample size requirements. Finally, with the exception of one study in which over 100 surveys were discarded as unusable for the above reasons(10), the total number of unusable surveys discarded across all studies was so small as to have no influence on subsequent statistical analyses.

Prenotification. Prenotification was a dummy predictor variable defined as any kind of announcement regarding the survey to potential respondents prior to the mailing of the surveys. Studies were categorized as having used prenotification if investigators reported utilizing a mass announcement (such as in a professional association newsletter or at an association meeting), an individual announcement (such as a notification letter), or a combination of these approaches. This variable was scored zero if the authors failed to specifically mention use of prenotification.

Reminder. Reminder, another dummy predictor variable, was categorized as having been used if researchers reported sending out thank you/reminder cards or letters to all potential respondents, or reminder letters to nonresponders only. If use of a reminder was not noted by the authors, this variable received a zero score.

Second Mailing. A second mailing, also a dummy predictor variable, was scored as having been utilized if the study authors reported mailing a second copy of the questionnaire to nonresponders. This variable was scored zero if no additional mailings of the survey were reported.

Telephone Follow-Up. Telephone follow-up, yet another dummy predictor variable, was considered to have been utilized where investigators reported calling nonresponders to request that they complete the questionnaire, or in those cases where the investigators ultimately had the respondent answer the survey questions over the telephone. Where no use of telephone follow-up is reported, this variable was assigned a zero score.

Other Follow-Up. Other follow-up, the final predictor variable considered, was a dummy predictor variable scored “1” if more than one repeat mailing of survey packets was made to persistent nonresponders. The very few studies which included a gift as an incentive to complete a survey in addition to using any of the follow-up procedures described above were also considered to have utilized “other follow-up.” All other studies were scored zero on this variable, including those which used various combinations of prenotification, a reminder, a single repeat mailing and telephone follow-up with persistent nonresponders as long as no additional repeat mailings or other types of follow-up were reported.

Sample Size. Sample size was selected as the weighting variable because preliminary analysis of the data revealed a high correlation between survey return rates and the number of subjects surveyed, and was found to intercorrelate with the predictor variables “second mailing” and “telephone follow-up.” Sample size was defined as the number of potential contacts (pharmacy practitioners, pharmacy school alumni or pharmacy school-based educators) selected by a study’s investigators to receive a questionnaire packet, less the number of packets returned as undeliverable.

Scope. The scope of a study population was examined as a possible moderator variable because other researchers have found variations in survey return rates among subpopulations of respondents(6,9). Relating these findings to the present study, it was conjectured that alumni from a given pharmacy school might be more motivated to reply to a survey undertaken by their alma mater than would pharmacists lacking any connection with the researchers’ institution. It was further conjectured that pharmacy school-based educators might be more sympathetic to survey studies conducted by peer educators, and thus be more likely to respond to surveys originating from pharmacy schools than would pharmacists lacking direct ties to academia.
ANOVA (F = 11.17; df = 3,1321 P<0.001) followed by Bonferroni test.

which comprise the present database, it was assumed that populations and the questionnaires employed in the studies survey return rate(9). Based upon descriptions of the target respondent has been found to be highly correlated to the analysis. First, saliency of a questionnaire’s content to the number of assumptions which were made to facilitate data scope.

macy schools were classified as being “multiple school” in school, or among multiple faculty from at least a few phar-
ducted among one faculty member from each pharmacy considered to be “single school” in scope. Surveys con-
from one or two schools or colleges of pharmacy were selected were within the same region. Surveys of alumni states or provinces were involved, or if all of the jurisdictions “regional, state or province-wide” scope if three or fewer Canada were surveyed. A survey was categorized as having a macy school-based educators from four or more states or provinces representing different regions of the U.S. or Canada were surveyed. A survey was categorized as having a “regional, state or province-wide” scope if three or fewer states or provinces were involved, or if all of the jurisdictions selected were within the same region. Surveys of alumni from one or two schools or colleges of pharmacy were considered to be “single school” in scope. Surveys conducted among one faculty member from each pharmacy school, or among multiple faculty from at least a few pharmacy schools were classified as being “multiple school” in scope.

Data were analyzed using SPSS for Windows(12). For each category of the moderator variable “scope,” a weighted stepwise least squares multiple regression analysis was undertaken to assess the following equation:

\[
\text{Return Rate} = \frac{\text{Sample Size}(\text{Prenotification} + \text{Reminder} + \text{Second Mailing} + \text{Telephone Follow-Up} + \text{Other Follow-Up} + \varepsilon)}{\text{Sample Size}}
\]

An alpha level of 0.05 was selected to define statistical significance.

Assumptions

Review of the articles in the database gave rise to a number of assumptions which were made to facilitate data analysis. First, saliency of a questionnaire’s content to the respondent has been found to be highly correlated to the survey return rate(9). Based upon descriptions of the target populations and the questionnaires employed in the studies which comprise the present database, it was assumed that survey topics were highly relevant to their target populations. Therefore, saliency was treated as a constant and not measured in the present study.

Second, contacting survey researchers and requesting relevant information missing from the published descriptions of their studies is costly and brings less than ideal results(5,9). Therefore, unless a particular follow-up technique was specifically mentioned in a published report, e.g., including a small gift in the survey packet, it was assumed that the technique was not used in the study. Two exceptions were made to this assumption, involving the inclusion of covering letters and pre-addressed stamped return envelopes with survey packets. It was assumed that these two design features were used in every study, even in those rare instances where they were not specifically mentioned. These design features were therefore treated as constants and not examined in the present study.

RESULTS

Citations for the 135 articles meeting the study criteria in Table I are included as an appendix to this report. In addition to the 63 articles identified in this Journal, articles were located in the American Journal of Health-System Pharmacy (or its predecessor — 49 articles), the Journal of Pharmaceutical Marketing and Management (11 articles), American Pharmacy (6 articles), the Journal of Social and Administrative Pharmacy (4 articles), and Annals of Pharmacotherapy (or its predecessors — 2 articles). An additional published study appearing in the Canadian public health literature(7) met the inclusion criteria and was included in the review. Summary characteristics of the reports reviewed appear in Table II.

Across the four groups (national, state/provincial, alumni

### Table I. Inclusion and exclusion criteria for survey studies reviewed.

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tbody>
<tr>
<td>1. The report described a mail survey of pharmacists or pharmacy educators in the United States and/or Canada.</td>
<td>1. Article consisted of a second-hand report of a survey study.</td>
</tr>
<tr>
<td>2. The study was described in a full article.</td>
<td>2. Studies described in an abstract only.</td>
</tr>
<tr>
<td>4. The full report of the survey was published in English.</td>
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<tr>
<td>5. The sample surveyed was selected at random (census survey allowable).</td>
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<tr>
<td>6. The size of the survey sample was at least 70 (coinciding with the minimum number of U.S. schools of pharmacy schools in operation since 1985).</td>
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<tr>
<td>7. At least one analysis of a survey’s data appeared in the literature after 1984.</td>
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</tbody>
</table>

*Data from a few surveys were revisited in the literature a number of times, occasionally several years after the initial description of the survey was published.

### Table II. Summary characteristics of reports comprising database for present study (N = 136)

<table>
<thead>
<tr>
<th>Target sample surveys</th>
<th>Pharmacists (National) (n=62)</th>
<th>Pharmacists (Region/State/Province) (n=37)</th>
<th>Pharmacy school alumni (n=13)</th>
<th>Pharmacy school faculty (n=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean sample size ± SD</td>
<td>960 ± 885</td>
<td>748 ± 933</td>
<td>674 ± 391</td>
<td>286 ± 403</td>
</tr>
<tr>
<td>Sample size range</td>
<td>87 – 3940</td>
<td>89 – 5539</td>
<td>125 – 1518</td>
<td>70 – 1357</td>
</tr>
<tr>
<td>Mean return rates ± SD</td>
<td>54.20 ± 18.26%</td>
<td>57.96 ± 15.35%</td>
<td>59.13 ± 14.24%</td>
<td>77.02 ± 14.69%</td>
</tr>
</tbody>
</table>

*Variances equal per Levene Test. Mean return rate for surveys among pharmacy faculty were significantly greater than among other groups examined per ANOVA (F = 11.17; df = 3,1321 P<0.001) followed by Bonferroni test.*
Table III. Final regression equations\textsuperscript{a,b}

| National surveys of pharmacists (n=62) | Return rate = 16.88 (second mailing + 11.15 prenotification) + 11.17 reminder + 31.13 | $R^2 = 0.3916$ |
| Regional, statewide or provincewide surveys of pharmacists (n=37) | Return rate = 23.30 (second mailing) + 39.30 | $R^2 = 0.5078$ |
| Pharmacy school alumni\textsuperscript{c} (n=13) | Return rate = 16.95 (second mailing) + 48.10 | $R^2 = 0.4155$ |
| Pharmacy school faculty (n=24) | Return rate = 14.06 (second mailing) - 12.56 (other follow-up) + 61.94 | $R^2 = 0.2295$ |

\textsuperscript{a}Equations arising from weighted least squares regression analysis for mail surveys among pharmacists, pharmacy school alumni and pharmacy school faculty.

\textsuperscript{b}Return rate = Raw number of usable and unusable questionnaires received divided by the number of questionnaires mailed out less those which were returned as undeliverable.

\textsuperscript{c}None of the studies in this category utilized prenotification, telephone or “other” follow-up methods.

or faculty), the proportion of studies using at least one form of follow-up with nonresponders was similar, ($\chi^2 = 5.00; \text{df} = 3; P = 0.172$), as was the proportion of studies utilizing telephone follow-up with nonresponders ($\chi^2 = 3.26; \text{df} = 3; P = 0.353$). Differences in return rates between the four groups, therefore, could not be attributed to an aversion to using follow-ups among any particular group nor to a tendency to use telephone follow-ups more among any particular group. As the variances around the mean return rates across the four groups were found to be equal based upon results from the Levene Test for Homogeneity of Variances ($P = 0.203$), ANOVA followed by the Bonferroni posteriori test was conducted. The results from the ANOVA revealed that the mean return rate on surveys among pharmacy school-based educators was significantly greater than the mean return rates among pharmacy practitioners surveyed nationally or statewide, or among pharmacy school alumni (Table II).

The results of the weighted least squares regression analyses for the surveys are presented in Table III. For the 63 surveys of pharmacy practitioners which were national in scope, prenotification before the initial mailing of surveys, the use of reminder/thank you cards after the first mailing, and a second mailing of questionnaires to nonresponders were significantly correlated to return rate. Neither the variables, “telephone follow-up” nor “other follow-up” remained in the equation.

For pharmacy practitioners surveyed at the state or provincial levels, involving 36 reports, only the use of a second mailing to nonresponders was significantly correlated to return rate. Likewise, the 13 surveys conducted among pharmacy school alumni reveal that a second mailing to nonresponders is the only follow-up modality which consistently impacts return rates.

As with all other groups, survey return rates among pharmacy school-based educators, involving 24 reports, appear to improve when second mailings of questionnaires are made to nonresponders. Additional mailings or other incentives were found to actually be negatively correlated to return rates for this group (Table III).

Of 19 studies utilizing telephone follow-up with persistent nonresponders, only one reports the number of surveys recovered specifically as a result of this technique\textsuperscript{13}. It is therefore not possible to assess the marginal value of this follow-up approach in the present investigation.

DISCUSSION

Some findings from this review of mail surveys are disappointing, others are surprising, and all have important implications for investigators conducting mail survey research among pharmacy practitioners, pharmacy school alumni and pharmacy school-based educators. Despite meeting the inclusion criteria for this project, several of the studies included in the database were either poorly executed, incompletely reported, or both. Many of the studies used in the present investigation omit mention of several methodological details examined by Heberlein and Baumgartner\textsuperscript{9}, e.g., whether address labels or hand-addressed envelopes were used, or whether postage was by meter or stamp. Sample size determinations were reported in only 21 of the 136 articles, and patterns of nonresponse were analyzed, if only in cursory fashion, in only 47 of the reports. Omitting sample size determination and nonresponse analysis did not restrain authors of at least one article, however, from extrapolating the results from their tiny number of responses across the entire population of interest and making grand pronouncements regarding what a particular group of pharmacists believed\textsuperscript{14}. As all of the reports evaluated appeared in the peer-reviewed literature, and almost all included at least one author who held an academic appointment, the number of articles that fell short of a scholarly level of execution and reporting was surprising.

In answer to the first two research questions posed in the present study, the findings from this review of surveys suggest that a second mailing of the study questionnaire to nonresponders is most consistently associated with higher
return rates, with prenotification and reminder cards being associated with higher return rates on national surveys. When weighted by sample size, neither telephone follow-ups nor third (or subsequent) survey mailings to persistent nonresponders were significantly associated with increased return rates. As telephone-follow-ups with persistent nonresponders were not found to be significantly associated with higher return rates, the question regarding the marginal value of this technique becomes moot.

As a number of handbooks on conducting mail surveys recommend telephoning persistent nonresponders(1-3), that this follow-up technique so consistently lacked any statistically significant correlation with return rates was surprising. This finding, however, may be no more than an artifact arising from the small number of studies in the database which report utilizing telephone follow-up with nonresponders (19/136), a weakness in the present study. An examination of all 136 studies revealed that those reporting use of telephone follow-up with nonresponders involved statistically smaller sample sizes than did surveys not telephoning nonresponders (451 ± 475 vs. 806 ± 864, Mann-Whitney U = 790, P = 0.043).

Although second mailings among pharmacy school-based educators were also associated with significantly increased return rates of questionnaires, third and subsequent mailings had no additional effect, and were in fact negatively associated with return rates. In general, surveys may have particularly low return rates for a variety of reasons unrelated to the presence or absence of follow-ups with nonresponders(2), and it may be that investigators utilizing particularly laborious questionnaires felt compelled to use repeated mailings in an effort to maximize return rates. This negative correlation between return rates and the use of “other” follow-ups aside, surveys among pharmacy faculty produced the highest mean return rate, consistently exceeding 75 percent (0.95 CI = 70.8 percent to 83.2 percent). This confidence interval of return rates from surveys among pharmacy schools(15).

The squared multiple regression coefficients (R²) arising from the final regression equations (Table III) are relatively small, follow-up techniques examined in the present study accounting for between 23 percent of the variance for mail surveys conducted among pharmacy school faculty to 51 percent of the variance in nationwide surveys of pharmacy practitioners. Other factors not examined in the present study have been shown to contribute to the variance seen in final return rates. Salience of the topic to the respondent, for example, assumed to be high for all surveys in the present study and therefore not included as a variable, is strongly positively associated with final return rates(9).

CONCLUSIONS

For mail surveys conducted among pharmacy practitioners, pharmacy school alumni or pharmacy school-based educators, the effectiveness of follow-up techniques with nonresponders was found to be dependent upon the scope of the study. For surveys of pharmacy practitioners being conducted nationwide, sequentially prenotifying subjects, mailing reminder/thank you cards and conducting a second mailing of the survey instrument to nonresponders were all significantly associated with increased questionnaire return rates. For regional, statewide or provincwide surveys of pharmacists, for surveys of pharmacy school alumni, or for surveys of pharmacy school-based educators, a second mailing of the questionnaire was the only follow-up technique positively and significantly associated with survey return rates.

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