

EVALUATION OF SNOHOMISH COUNTY'S
SEPTIC CARE PILOT PROGRAM

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Western's Office of Survey Research

Western Washington University's Office of Survey Research (OSR) supports the mission of the university by annually surveying students, alumni, employers, and Western's campus community to provide valuable assessment and institutional data, analysis, and reports which can be used for improvement of programs, instruction, faculty scholarship, and information services. In addition to this, OSR provides high quality survey writing, administration, and analysis to universities, governments, companies and individuals.

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EVALUATION OF SNOHOMISH COUNTY'S SEPTIC CARE PILOT PROGRAM

Key Findings

- OSR examined three mutually exclusive groups of Snohomish County Residents: those who were part of the County Health Department Sanitary Survey (Sanitary Survey group), those who part of the County Health Department direct mail campaign (Mailer group), and those who were in neither (control group).
- Members of these three groups were statistically similar to one another in terms of age, gender, income, neighborhood type, and frequency of interaction with their neighbors.
- Members of these groups were statistically similar to one another in terms of septic system type and frequency of septic system inspection and pumping.
- Three-fifths of those in the Mailer group recall receiving information from Snohomish County regarding their septic system. Of these individuals, one-third always read them and about two-in-ten replied to the County to receive a promotional item.
- About two-fifths of members of the Sanitary Survey program recall meeting a County representative regarding their system although a considerable number of respondents (12%) were not sure if their residence was part of this program.
- Of those that did remember meeting a County representative through the Sanitary Survey program, 30% visited a website to learn more about their system and 20% contacted a professional pumper for follow-up work.
- Participants in the Mailer group were about five times more likely to claim they learned a substantial amount regarding septic system care over the past year than were members of the control group. These individuals were twice as likely as control group members to report learning a substantial amount regarding their specific septic system design plans and about four times more likely to learn a substantial amount about treatment of wastewater on their property.
- Participants in the Sanitary Survey group were about four times more likely to claim they learned a substantial amount regarding septic system care over the past year than were members of the control group. Members of this group were twice as likely to have learned a substantial amount regarding the treatment of wastewater on their property than were members of the control group.
- Members of the Mailer and Sanitary Survey groups demonstrated behaviors regarding septic system care that were similar to members of the control group. Measured behaviors included: the likelihood of repairing leaky toilets and drains, prevention of hazardous chemicals from entering the septic system, using less water over the course

of the day, spreading out water use over the week, having a pumper regularly inspect the system, and preventing kitchen scraps from going down the drain.

- The specific areas of Maltby and Church Creek were investigated. The impact of the Mailer program increased knowledge of septic system care (both areas) and specific septic system design (Church Creek) relative to the control group living in each area. However, the Mailer program did not measurably alter behaviors within these areas.
- As measured by both knowledge and behaviors, the areas of Fobes Hill and Gretchell Hill had similar outcomes as did those in Church Creek and Maltby.

Executive Summary

In 2010, the Snohomish County Health Department undertook two projects intended to increase septic system care and awareness. The first of these, a field survey of sanitary practices, herein termed the Sanitary Survey, involved contacting owners of septic systems in hopes of educating them regarding their particular system and its maintenance. The second, a direct mail campaign (Mailers), provided owners of septic systems with tips on septic care and directions to additional resources where recipients could learn more. For the purposes of brevity, households receiving either a Sanitary Survey or direct mail are referred to as the treatment groups in this report.

Western Washington University's Office of Survey Research (OSR) was contracted by Snohomish County to conduct a survey of households in the treatment groups to better understand the impacts of these programs. With the aid of the County, OSR constructed a telephone survey that measured gains in knowledge and alterations in behavior potentially initiated by these programs. In order to measure program effectiveness, OSR also constructed a sample of County residents who owned septic systems but received neither treatment (referred to as the control group).

OSR conducted the survey by telephone, calling 1,923 Snohomish County residences between May 5th and June 2nd, 2011. From these contacts, OSR received 205 valid survey responses distributed across the control and treatment groups.

Residents who received the Health Department mailers were significantly more likely to gain knowledge regarding septic system care than were residents in the control group. In fact, mailers increased by fivefold the probability that an individual would claim they learned a "substantial amount" regarding septic system care over the prior year. The mailer program also had positive, measurable impacts in the likelihood a recipient claimed to have learned about wastewater treatment and specific system design plans at their residence. The effectiveness of this program is impressive given that only three-fifths of households recall receiving mailers. It appears that if read, these mailers altered knowledge in important ways.

The Septic Survey program also generated statistically significant increases in septic system knowledge. Households in this program were about four times as likely to claim to have learned a substantial amount regarding septic system care than were members of the control group. They were also more likely to have learned about wastewater treatment.

While increases in knowledge appear large, the survey results suggest that the treatment groups did not have a measurable behavioral response relative to the control group. In all measures of behavioral change, there were no statistical differences between individuals in the Mailer or Septic Survey groups and the control group. As explained in detail below, this lack of evidence either indicates that the Mailer and Septic Surveys did not change behavior or that they change behavior in such a small way that our survey was unable to measure it. Regardless of the reason, the lack of behavioral change suggests that the knowledge gained through these programs may produce, at best, behaviors that benefit Snohomish County septic system health.

This report also examines sub-areas of the County which received mailers. These sub-areas include Church Creek, Maltby, Gretchell Hill, and Fobes Hill. As in the case of the entire sample, mailers in the Church Creek and Maltby areas produce significantly higher self-reported rates of learning about septic system but do not alter behavior. The Gretchell Hill and Fobes Hill areas lacked sufficient numbers of observations to conclude that the mailers had similar effects; however data from these two areas appear similar to those of Church Creek and Maltby, suggesting that there was no differential impact across areas of these programs.

This report concludes with a general discussion that compares OSR's survey with one previously commissioned by Snohomish County through Elway Research. While direct comparisons between these surveys is impossible, combining these surveys do shed light on the ability for the County to promote septic system health.

Treatment Descriptions

The Snohomish County Sanitary Survey Program (Sanitary Survey) involved the Snohomish County Health District staff going door to door conducting surveys and educating people about their septic system. The Health District sent follow up information, including information regarding the resident's specific septic system, to residents after these conversations. In total, 488 residences were part of this program.

The Direct Mail Campaign (Mailers) consisted of approximately 900 homes who received mailers inviting recipients to meet with a Snohomish County Health District official to discuss their septic systems. Included in these mailers were tips on septic care and directions to a website to learn more about septic maintenance. These individuals were also invited to a Fall, 2010 septic care workshop. Four distinct communities received these mailers: Church Creek, Getchel Hill, Maltby, and Fobes Hill.

Survey Design and Administration

Collaboratively designed by OSR and Snohomish County, the survey comprised four sets of questions designed to elicit information about the type of septic system installed, to measure gains in knowledge about issues related to septic systems, to measure changes in behavior related to septic system care, and to gather basic demographic information. The first set of questions assesses perceived gains in knowledge over the past year regarding septic system care and design specific to the resident's system. The second set of questions were designed to measure changes in behaviors associated with septic system health including frequency of pumping, repairing of leaking faucets, preventing hazardous chemicals from entering the system, actively searching for drain field odors and leaks, and reduced water use. When calling, OSR specifically requested to speak with the person most knowledgeable about the septic system and most responsible for its care.

A pdf version of the phone survey with frequency data appears in Appendix A of this report. As this report condenses some of the questions asked of respondents, the reader may find it helpful to consult Appendix A for the actual question text.

Snohomish County provided OSR with an electronic list of 2,735 households which have septic systems and OSR was able to acquire phone numbers for 1,923 of them. These households fall into three categories: those who were part of the Sanitary Survey program, those in the direct mail campaign, and those who were in neither treatment group (termed control). The control group was vetted to ensure they lived on a property with a septic system and were members of either the Church Creek or Maltby areas. There were no households that fell into more than one category.

The survey was designed to be given over the phone. However, because research in survey methodology has documented that providing respondents with multiple modes of completing surveys increases the likelihood of response, OSR designed a complimentary survey to be given via a secure website to respondents who specifically requested completing the survey online.

On May 5th and 10th OSR piloted the phone survey and electronically recorded 20 complete responses. These were reviewed by Snohomish County and OSR. The survey was revised based upon Snohomish County input and then launched on May 17th. Phone calling was completed on June 2nd. Households not answering the initial call received up to three additional follow-up calls. OSR placed a total of 4,633 phone calls to all households. Table 1 documents the disposition of the 1,923 households in the sample.

Of the 1,923 households for which a phone number existed, OSR was unable to contact 17.6% due to bad phone numbers and an additional 18.5% never answered the phone. 52.3% of households refused to answer survey questions and .9% requested the survey via the internet but never started it. Of the 205 remaining households, OSR received complete phone surveys from 182, complete surveys via the internet from 6, partially complete surveys over the phone from 10, and partially complete surveys via the internet from 7. In the case of partial completions, OSR incorporated the provided data which

Table 1: Disposition of Sample				
	Control	Sanitary Survey	Direct Mail	Total
Households provided by Snohomish County	890	359	674	1923
Less: Bad Phone Number	139	71	129	339
Less: No Answer	172	62	122	356
Less: Refused Survey	471	188	346	1005
Less: Failure to complete online survey	5	3	10	18
Total Valid Respondents	103	35	67	205
Completed Survey by Phone	90	31	61	182
Partially Completed Survey by Phone	4	2	4	10
Completed Survey Online	4	1	0	5
Partially Completed Survey Online	5	1	2	8
Subtotal	103	35	67	205

means that some questions (usually occurring earlier in the survey) will have more responses than later questions. The 205 responses represent 12.9% of the number of households for which OSR had valid phone numbers.

Of the 205 responses received, 17.1% were in the Sanitary Survey group, and 32.7% in the direct mail group and 50.2% in the control group. Relative to the initial distribution of 1,923 households for which a phone number was obtained, those providing survey information were statistically identical to those who failed to complete the survey. In other words, there does not appear to be any non-random increase or decrease in the likelihood of respondents to be from the treatment or control groups relative to the initial distribution of households.

A Note on Statistical Significance

In this report, we will frequently discuss “statistical differences” or “statistical significance” of variables. The concept of statistical significance may be most easily explained using the example of the potential differences in group composition between the sample provided by Snohomish County and those who actually responded to the survey. As Table 1 indicates, 46.3% (=890/1923) of all records provided by the County consisted of households in the control group. However, 50.2% (=103/205) of valid responses were from households in this group. Two possibilities exist. First, there may be some underlying tendency for members of the control group to respond to a survey which caused the proportion of responses from to be higher within the group of respondents than their population numbers would suggest. Second, in any random draw of individuals, the randomness of the selection process will generate numbers slightly

different from underlying population. For instance, rolling a six-sided die six times will typically not generate the numbers 1, 2, 3, 4, 5 and 6 despite each number having an equal likelihood of being rolled. Testing for statistical significance amounts to asking if the observed data could reasonably be the result of a predictable process or if it is so different from what is expected, that something else influences how the data was generated. As an example, in the case of a fair die it is possible, however highly unlikely, to observe the roll of six consecutive ones. A fair die could be expected to do this about twice out of one-thousand ($p = .002$) sets of 6 rolls. Based upon this information, an observer could conclude that the die was fair and she happened to see something that occurred relatively infrequently or she could conclude that the die was unfair. Note, in either case, there is a possibility she is wrong. If she concludes the die was fair, then she is accepting the fact that she observed a very rare event. If she concludes the die was unfair, then she might be wrong with probability .002. This probability of being wrong is typically called the p-value and a typical rule of thumb for determining when or when not to conclude the die was fair is to set the p-value equal to 5% ($p = .05$). Under this rule of thumb, after seeing one set of six rolls produce six consecutive ones we would conclude that the die is unfair. In other words, we are willing to conclude this die is unfair because we observed something that happens less frequently ($p = .002$) than a reasonable person would expect to occur. Here, our “reasonable person” is allowing for enough randomness to occur that she is willing to accept rare events if they happen up to 5% of the time.

The analogous case in the responses by group is to ask how likely is it that we randomly chose 205 individuals from our population of 1,923 and produce 50.2% in the resulting control group when the population contained only 46.3% in the control group. It turns out that this is a relatively common event. About 14% of the time a random draw of 205 individuals from a distribution where 46.3% are members of one group will generate more than 50.2% of observed individuals in that group.¹ Because 14% is relatively frequent compared to our rule of thumb of 5%, we fail to conclude that there are statistically more respondents in the control group than the population. In other words, the differences between control group membership in the sample of 205 and the population of 1,923 are small enough to be generated randomly.

All tests of statistical significance used in this paper utilize the 5% rule of thumb. When statistical significance is found, it means the two comparison groups are different enough that we conclude those differences were unlikely to occur randomly. If statistical insignificance is found, we can only say that the differences which arise could have come about randomly although it is still possible that the differences are systematic and the data are not measured with enough precision to be confident that the data is being influenced by something other than its inherent randomness.

¹ The 14% calculation takes into account that there are two other possible groups to be members of: the Mailer and Sanitary Survey groups.

Respondent Profile

In evaluating survey results, it is important to understand the characteristics of the people responding. Table 2 provides descriptive statistics of respondents. As is common with surveys in general, women were more likely to complete the survey than men. Interestingly, despite the data being generated from rural and suburban areas, 2.1% of respondents claimed they lived in urban areas. The median respondent was between ages 51 and 64, attended some college, knows most of their neighbors, talks with them a few times per week and earned a household income between \$50,000 and \$75,000. The modal respondent is employed in the private sector although almost one-third of respondents are retired from work.

As with any survey, readers should be concerned with sample selection bias; that is bias which arises because survey respondents are often not a random selection of the population of survey recipients. Absent specific data on individuals who failed to respond to the survey, it is difficult to judge if sample selection bias is a serious issue in this survey. However, external data can shed some light on this question. According to U.S. Census data for Snohomish County,² the median household income in Snohomish County is \$64,677 a figure that corresponds well with the incomes claimed by respondents. However, the U.S. Census documents 9.8% of the county's residents are aged 65 or over whereas 31% of respondents were. Some of this difference is due to the fact that younger residents were implicitly excluded from our survey so the proportion of respondents will necessarily be older than the average county resident documented by the Census.³ However, when evaluating the results, keep in mind that the survey data is generated by older individuals than the typical county resident and this may bias survey findings. For instance, if older adults are more apt to read Mailers or engage in conversation with Health Department officials, then the positive benefits of these programs documented here may overstate the impact that arises when applied to younger individuals.

A related concern deals with systematic differences that might occur between respondents of different groups. If, for instance, members of the control group tend to have a higher income than those in the Sanitary Survey, then one might find that the control group service their septic systems more frequently than those in the Sanitary Survey. In this case, any positive benefits of the Sanitary Survey program would be masked by differences in income. To check for this possibility, the responses to each question listed in Table 2 for the Sanitary Survey were compared to those of the control group. This process was repeated for the Mailers. In each case, we determined if there was a statistical difference in responses between groups. Failure to find a statistical difference suggests that any differences in responses between groups were small enough to be attributable to randomness in the survey process and not due to systematic differences between groups. A statistical difference indicates that the responses to the

² See <http://quickfacts.census.gov/qfd/states/53/53061.html>

³ The implicit exclusion of younger residents occurs because OSR focused questions on individuals who were responsible for the maintenance of their septic systems. According to the Census, 24.7% of Snohomish County residents are under the age of 18 and thus unlikely to be responsible for their septic systems.

		Control	Sanitary	Mailer	Total
34. Gender	Male	39.4%	31.2%	37.9%	37.5%
	Female	60.6%	68.8%	62.1%	62.5%
23. Neighborhood	Urban	3.1%	3.1%	0%	2.1%
	Suburban	19.8%	18.8%	6.4%	15.2%
	Rural	77.1%	78.1%	93.6%	82.6%
24. Know your neighbors	Most	68.1%	65.6%	60.3%	65.1%
	Some	28.7%	34.3%	39.7%	33.3%
	None	3.2%	0%	0%	1.6%
25. Talk with neighbors	Daily	10.8%	9.7%	6.4%	9%
	Few times per week	57.0%	51.6%	49.2%	53.5%
	Few times per month	20.4%	29.0%	25.4%	23.5%
	Less than once per month	9.7%	9.7%	15.9%	11.7%
	Never	2.1%	0%	3.2%	2.1%
26. Age	18-35	3.3%	0%	3.1%	2.7%
	36-50	26.1%	25.8%	18.8%	23.5%
	51-64	45.7%	41.9%	39.1%	42.8%
	65+	25%	32.3%	39.1%	31.0%
27. Highest Level of Education	Less than High School	0%	0%	0%	0%
	High School	7.5%	20%	22.2%	14.4%
	Vocational School	6.4%	3.3%	4.8%	5.3%
	Some College	34.0%	30%	27.0%	31.0%
	AA	9.6%	6.7%	7.9%	8.6%
	BA	28.7%	26.7%	22.2%	26.2%
Graduate/Professional School	13.9%	13.3%	15.9%	14.4%	
28. Current job	Employed in school	7.4%	3.2%	4.8%	5.8%
	Employed in public sector	12.6%	3.2%	12.7%	11.1%
	Employed in private business	40%	45.2%	39.7%	40.7%
	Homemaker	6.3%	3.2%	6.4%	5.8%
	Not currently working	5.2%	9.7%	3.2%	5.3%
	Retired	28.4%	35.5%	33.3%	31.2%
29. Household income	\$25,000 or less	14.5%	18.2%	12.8%	14.5%
	\$25,000 to \$50,000	14.5%	22.7%	14.9%	15.9%
	\$50,000 to \$75,000	23.2%	27.3%	25.5%	24.6%
	Over \$75,000	47.9%	31.8%	46.8%	44.9%
9. Fall Workshop	Attended	8.1%	3.0%	11.1%	8.2%
	Did not attend	91.9%	97.0%	88.9%	91.8%
N		103	35	67	205

Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “Control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.

particular question differed between groups more than what would be expected due to random survey error. This would be a cause for concern when we later compare the control group with households in either treatment group.

For all questions save one, there was no statistical difference between either the Sanitary Survey or Mailer groups and the control group. The single exception was that respondents in the Mailer group were more likely to claim they live in a rural area and less likely to live in an urban or suburban area than those in the control group (p-value = .006). The implications for the remaining data are unclear. Conceivably, residents of rural areas may care for their septic systems differently than other residents or, possibly, there are unobserved characteristics common among rural residents that correlate with their answers to the survey questions. Again, when evaluating the results in this report, it is important to keep in mind that respondents in the Mailer group are more likely to consider themselves as living in rural areas than those in the control group.

In 2008, Snohomish County contracted with Elway Research, Inc. to perform a baseline survey of septic system care and maintenance. OSR does not have the original data from the Elway Survey so it cannot test for statistical significance between surveys; however OSR obtained the Elway report which documents descriptive statistics from its survey. From this report, it is possible to compare profiles of respondents. Compared to the OSR survey, the Elway survey has very similar age and education profiles. Respondents to the OSR survey appear more likely to be female and report higher incomes than those in the Elway survey.

System Profile

In addition to the importance of individual household characteristics, characteristics of the septic system may influence responses to survey questions. Table 3 reports on the type of system that respondents believe to have on their property and the frequency with which they have their system pumped and/or inspected. Nearly half of respondents reported having a gravity distribution system while almost one-third of respondents were unsure of the type of system they used. Three respondents claimed they had “other” systems than those listed by OSR interviewers.

Respondents report servicing their systems relatively infrequently. Nearly one-sixth of households have neither had their system inspected nor pumped since living at their residence.⁴ Almost one-quarter of respondents have had their system serviced more than five years ago and about one-half have their system serviced between every two and five years. About one out of ten respondents claim to service their system every one to two years and three households report servicing their system every year.

⁴ As OSR does not know the length of time these individuals have lived in their residence, it is impossible to know the exact time without service at these residences.

		Control	Sanitary	Mailer	Total
6. Type of System	Gravity Distribution	49.5%	37.1%	55.2%	49.0%
	Low Pressure Distribution	6.8%	17.1%	9.0%	9.2%
	Sandfilter	6.8%	5.7%	10.5%	7.8%
	Aerobic Treatment	1.9%	5.7%	1.5%	2.4%
	Unsure	32.0%	34.3%	23.9%	29.6%
	Other	2.9%	0%	0%	1.9%
8. Frequency of System Service	Every Year	2%	0%	1.5%	1.5%
	Every 1 to 2 Years	9.1%	9.1%	15.4%	11.2%
	Every 2 to 3 Years	30.3%	42.4%	16.9%	27.9%
	Every 3 to 5 Years	20.2%	24.2%	20%	20.8%
	5+ Years	22.2%	15.2%	29.2%	23.4%
	Never have	16.2%	9.1%	16.9%	15.2%
N		103	35	67	205

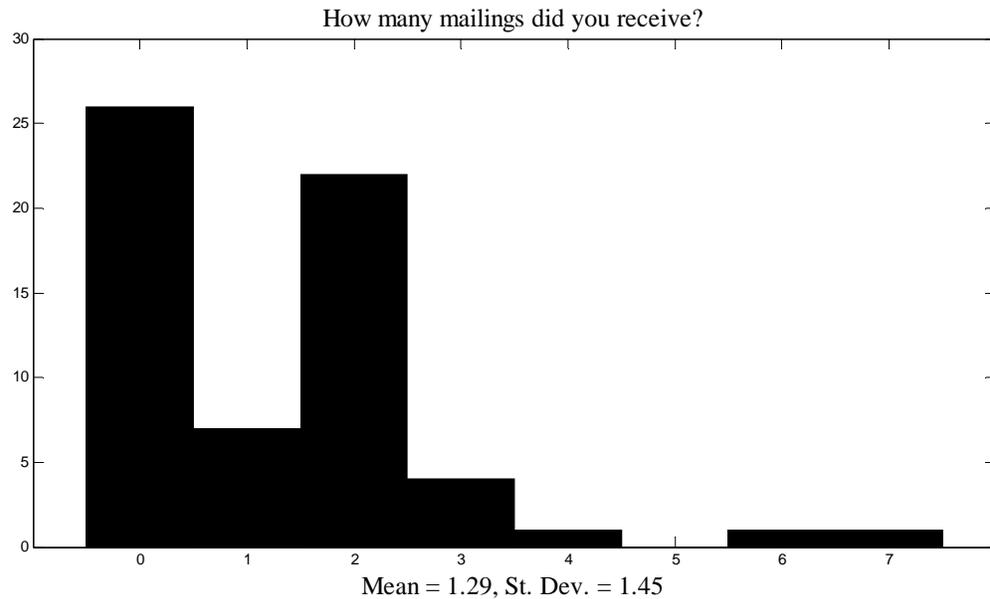
Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “Control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.

OSR checked to see if there were statistical differences in either question on Table 3 between two sets of groups: the Sanitary Survey and control groups, and the Mailer and control groups. No statistical differences were found suggesting that the type of system and frequency of service did not differ between the Mailer or Sanitary groups and the control group. OSR also checked whether the type of system owned influenced the frequency of system service. Again, no statistical impact was found suggesting that the frequency of service is unrelated to the type of system.

The Elway report asked similar questions to the two listed in Table 3.⁵ Compared to OSR’s data, the Elway report observed 4% fewer households with gravity distribution systems, 6% more with LPD systems, 4% more with sand filters and about 8% fewer were unsure of their system type. Respondents to the Elway report more likely (7%) to have never pumped their system and about 5% less likely to pump more often than every two to three years. Again, OSR does not have the original Elway data so testing for statistical differences between surveys is impossible. However, these differences appear small and likely within the range that would be expected to randomly occur between two surveys asking very similar questions.

⁵ See pages 7 and 12 of the Elway Report.

Figure 1: Distribution of Remembered Number of Mailings



Mailer Questions

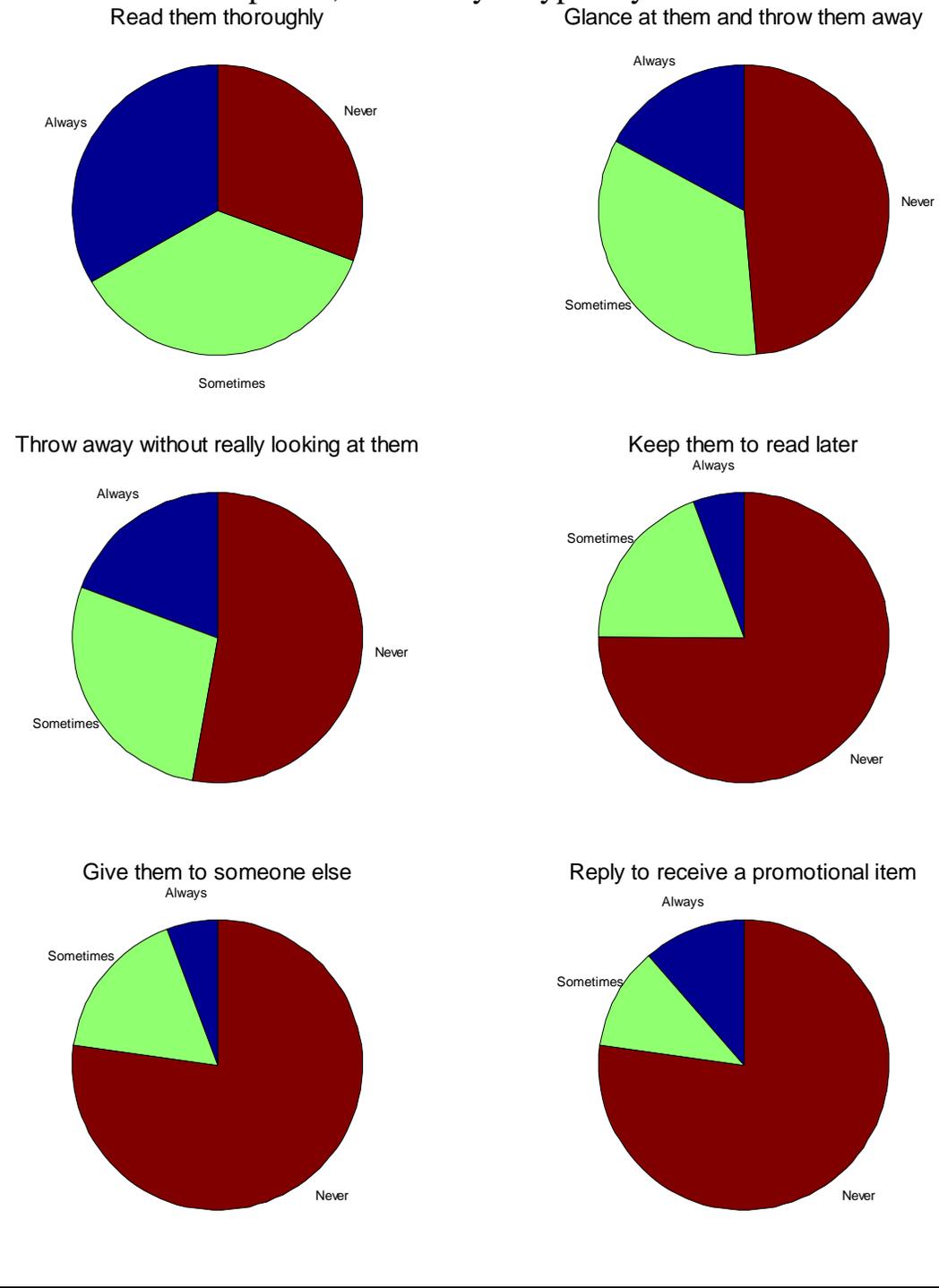
Collaboratively OSR and Snohomish County developed a number of questions with the intention to evaluate the effectiveness of the County’s direct mail campaign. These questions were asked only of the Mailer group which contained 64 valid responses.⁶ Of the 64 responders, 38 (59.4%) answered yes to the question “Over the last three months, do you remember receiving any mail pieces regarding septic care?” According to Snohomish County records, all households in this group received mailers. While three fifths of recipients remembering mailings may seem like a low contact rate for mailings, recall that in multi-person households it is possible that one individual received the mailing while another completed the phone survey. Further, to OSR’s knowledge, the amount of forgetfulness of mailings received three months prior is unexplored but potentially account for these lower figures.

Also asked in OSR’s survey was how many mailings the respondents remember receiving over the past three months. Including those who remembered no mailings, Figure 1 shows the distribution of this variable. The average respondent remembered receiving 1.29 mailings with a median of one. Excluding those who did not remember receiving a mailing, the average number of mailings remembered was 2.2 with a median of 2.

The thirty-eight individuals who recalled receiving a mailing were asked what they did with the mailings they received. Figure 2 graphically presents results from this question and Table B-1 in Appendix B presents summary statistics. One-third of respondents claimed to always read them thoroughly while almost the same number claimed to never

⁶ At this point in the survey, 3 individuals originally in the Mailer group chose not to continue with the survey which explains the difference in 67 responses reported in Table 1 and 64 reported here.

Figure 2: Responses to Questions 14 and 15, “When you received the mail pieces, what did you typically do with them?”



read them thoroughly. Of those who never or sometimes read them thoroughly, common responses were to “sometimes open them, glance at them, and throw them away” (n = 10), to “sometimes keep them to read later” (n = 7), and to “sometimes give them to someone else who also owns a septic system” (n = 6). Four individuals (11.1%) claimed

to always respond in order to receive an offered promotional item and four more individuals claimed to sometimes do this.

Individuals who recall receiving a mailing were asked if, as a result of the mailing, they either visited one or more websites to learn about their septic system or if they contacted a professional pumper to inspect and/or pump their system. One respondent (2.8%) claimed to have visited one or more websites as a result of the mailer and five respondents (14.3%) claimed to have contacted a pumper as a result.

Sanitary Survey Questions

OSR and Snohomish County also collaboratively developed questions targeting members of the Sanitary Survey group. These questions were asked of only members of this group and generated responses from 33 households. Fourteen of these households (42.4%) remembered being contacted by the Snohomish County Health District to participate in a septic system field survey. Four households (12.1%) did not know if they were contacted for a field survey while the rest (n = 15, 45.4%) claimed to not have been contacted. Again, according to Snohomish County records, all of these households were part of the Sanitary Survey and the lack of recall may be attributable to contact being made to different people in multi-person households or actual recall errors.

Of the fourteen households who remember contact with the Health District, nine (64.3%) said the Health District visited their property and assessed their septic system. Ten said the Health District sent a follow-up letter providing information regarding their septic system. These responses are displayed in Figure 3 and detailed in Table B-2 of Appendix B.

Of the ten who received a letter, one (10%) used the information provided to calculate their indoor water use, three (30%) visited one or more websites to learn more about their septic system, and two (20%) contacted a professional to inspect and/or pump their septic system. These responses appear in Figure 4 and Table B-3.

Outcomes

One goal of this survey is to determine whether the Snohomish County interventions (Sanitary Survey and Mailer) increased household knowledge and positively altered behavior. To determine this, the survey asked specific questions regarding knowledge and behavior of all households. In this section, we document these questions and statistically determine whether the interventions impacted household knowledge or behaviors.

The first set of questions, documented in Figure 5 and Table B-4, deal with gains in septic system knowledge over the course of the prior year. Comparing the control group

Figure 3: Responses to Questions 18 and 19,
 “Did the Snohomish County Health District...”

Visit your property and asses your septic system

Send information about your system

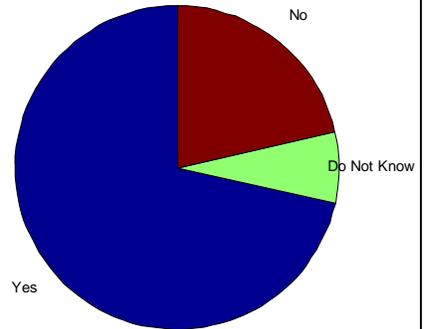
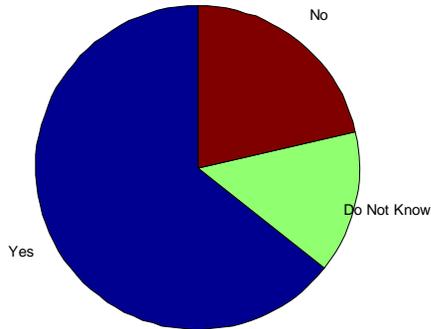
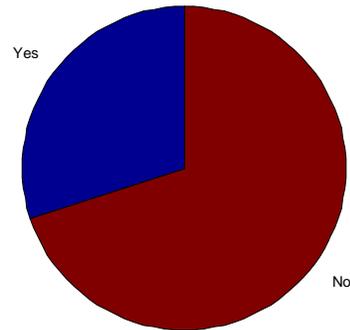
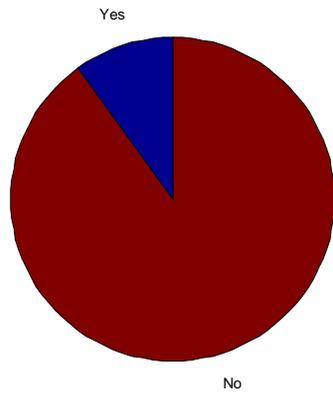


Figure 4: Responses to Question 20, “As a result of the information
 provided by Snohomish Health District, have you...”

Calculated Your Indoor Water Use?

Visited one or more websites?



Visited one or more websites?

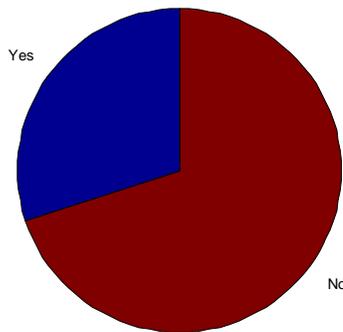
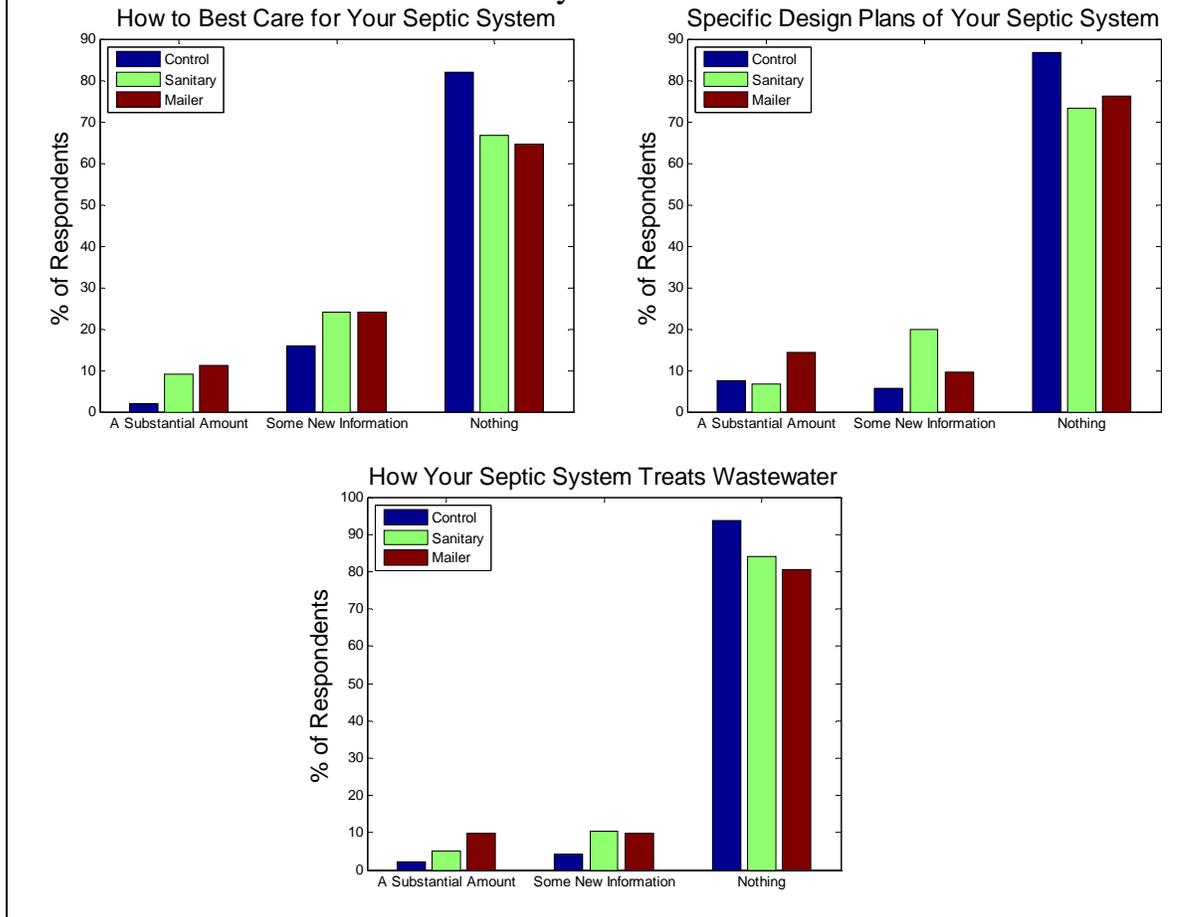


Figure 5: Distribution of Responses to Question 21, “Over the past year, how much have you learned about...”



to those in the Sanitary Survey and Mailer groups provides strong evidence that these interventions did increase knowledge. For instance, whereas 82.1% of the control group claimed to have learned nothing about caring for their system over the past year, only 66.7% of those in the Sanitary Survey program and 64.5% of those in the Mailer program responded that way. Indeed, those in the Mailer program were five times more likely to have learned a substantial amount relative to those in the control group (11.3% versus 2.1%) and those in the Sanitary Survey were about four times as likely to do so (9.1% versus 2.1%). Furthermore, these differences are statistically significant at the 95% level suggesting that the probability that these results arose from randomness in the survey process is remote.

There are other statistically significant results indicated in Figure 5. Focusing on these, respondents in the Mailer program were more likely to learn a substantial amount about their system’s treatment of wastewater and less likely to have learned nothing about wastewater and their systems specific design plans than were those in the control group. Households in the Sanitary group claimed to learn more over the past year about wastewater than those in the control group. Sanitary Survey participants were about

twice as likely to claim they learned a substantial amount regarding wastewater. Likewise, the Mailer group was about twice as likely to have learned a substantial amount about their specific septic system than members of the control group.

Taken as a whole, it appears that both the Mailer and Sanitary Survey programs increased knowledge regarding the care and operation of respondent's septic systems. We next ask if this increased knowledge impacted household behavior.

Figure 6 and Table B-5 addresses the impact of these County interventions on specific household behaviors which influence septic system and community health. The most important fact about Figure 6 is that, for any survey question, there are no statistically significant differences between Sanitary Survey or Mailer groups and the control group. At least two statistically indistinguishable possibilities for this exist. First, it is possible that the Mailer and Sanitary Survey programs do impact behavior but these impacts are small enough that our survey does not measure them precisely enough to distinguish them from the control group. Second, it is possible that neither program altered household behavior. Given the prior findings that households in these programs learned about their septic systems, it is likely the former explanation but, again, statistically these are indistinguishable.

It should be remembered that about two-fifths of households in the Mailer group failed to recall receiving information from the County. In Figure 6, these individuals are included in the Mailer group. For whatever reason, if they did not receive a mailer, one would not expect their reported behavior to change which, in turn, may cause the behavioral data to appear more similar to the control group than would be true if we examined only those who recalled receiving the mailer. To check for this possibility, we drop the 26 individuals from the Mailer group who do not recall receiving septic information from the County and recalculate the Mailer percentages displayed in Figure 6. Even after this, there is no statistical difference between the Mailer and control groups for any of the questions.

A similar problem occurred in the Sanitary Survey. Of the 33 surveyed households in the Sanitary Survey group, only fourteen remember being contacted by the county leaving 19 people who were either unsure of being contacted or sure of not being contacted in the Sanitary Survey group. We drop these 19 individuals from the Sanitary Survey group and re-compute the percentages reported in Figure 6 looking for statistical significance between these and the control group. Again, no statistical differences in behavioral questions emerged from this smaller Sanitary Survey group.

A few practical reasons for the lack of differences in behavior and treatment groups come to mind. The Elway report documents that 54% of households rate themselves as a ten (out of ten) on a question that asks them to self-rate their septic system care.⁷ Further, 87% of households gave themselves a 10 with respect to keeping their drain field clear, 56% answered similarly with respect to being careful of what goes down sink drains, and 51% gave themselves a 10 with respect to regulating the amount of water used. While

⁷ See p. 8 of the Elway Report.

Figure 6: Distribution of Responses to Question 22,
 “Compared to a year ago, how likely are you to...”

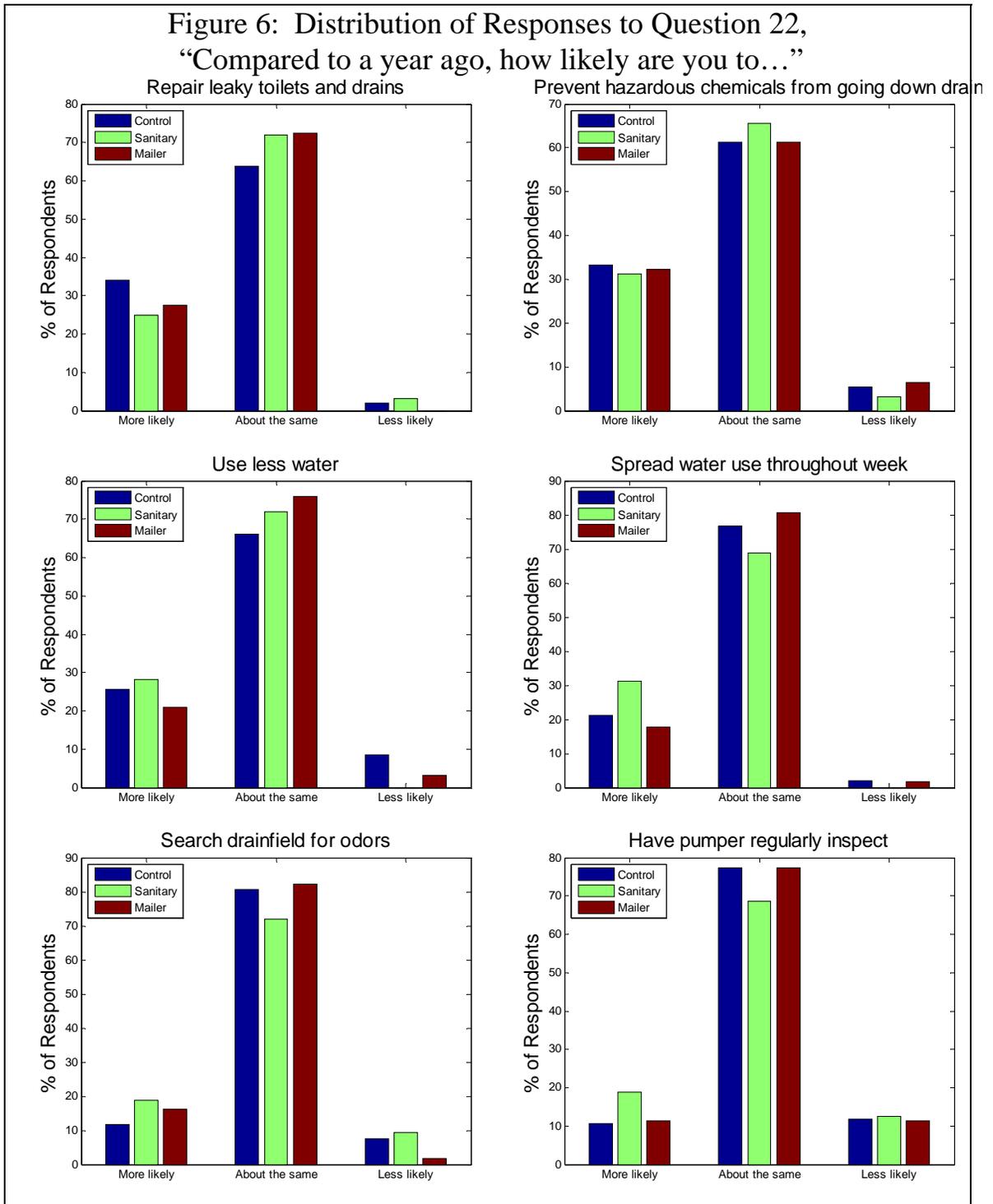
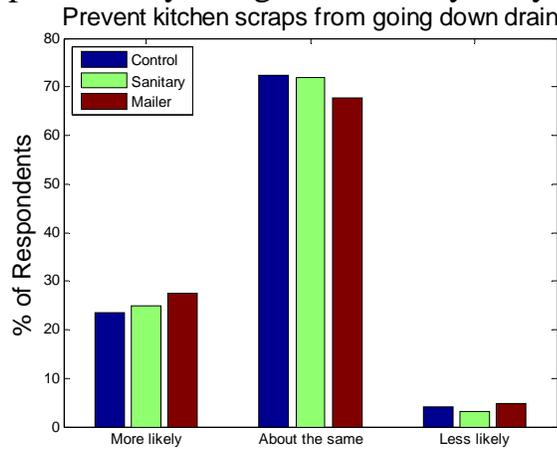


Figure 6, Continued: Distribution of Responses to Question 22,
 “Compared to a year ago, how likely are you to...”



such an excellent record may be debatable, if this attitude is pervasive among septic system owners then it would be difficult to undertake a program to positively influence self-perception of behaviors.

Sub-Area Outcomes

Included within the three general groups (Sanitary Survey, Mailer, and control), Snohomish County provided data on four geographical locations: Church Creek, Gretchell Hill, Maltby and Fobes Hill. This section investigates whether residents in these areas differ in their survey responses.

For each individual in the Mailer group, Snohomish County identified whether they lived in one of the four locations. However, for each individual in the control group, Snohomish County identified whether they lived in one of two areas: Church Creek and Maltby. With this data in hand, OSR can check for differences within location for only these two areas. However, we can also check to see whether individuals in the Mailer group who live in Gretchell Hill and Fobes Hill differ from individuals who live in the other two locations or who are in the composite control group. We follow this strategy in the work that follows.

For each location-group combination, Table 4 shows the demographic information learned from the survey for the two locations which have valid control and Mailer groups. For all questions except two, members of the treatment group are statistically similar to members of the control group who live in the same location. The exceptions are the Mailers in Church Creek tended to be older than the Church Creek control group and the control group in Maltby tended to be better educated than those in the Maltby Mailer group. While these differences may be important, overall it appears that respondents in the Mailer group were similar to those in the control group.

		Church Creek		Maltby	
		Control	Mailer	Control	Mailer
34. Gender	Male	27.1%	25%	52.2%	41.2%
	Female	72.9%	75%	47.8%	58.8%
23. Neighborhood	Urban	2.2%	0%	2.3%	0%
	Suburban	10.9%	0%	29.6%	21.4%
	Rural	87.0%	100%	68.2%	78.6%
24. Know your neighbors	Most	73.3%	66.7%	63.6%	60%
	Some	26.7%	33.3%	31.8%	40%
	None	0%	0%	4.6%	0%
25. Talk with neighbors	Daily	10.9%	0%	7.1%	6.7%
	Few times per week	56.5%	33.3%	59.5%	46.7%
	Few times per month	17.4%	50%	23.8%	26.7%
	Less than once per month	13.0%	16.7%	7.1%	13.3%
	Never	2.1%	0%	2.4%	6.7%
26. Age	18-35	2.2%	0%	4.6%	0%
	36-50	33.3%	8.3%	16.3%	31.2%
	51-64	40%	41.7%	51.2%	31.2%
	65+	24.4%	50%	27.9%	37.5%
27. Highest Level of Education	Less than High School	0%	0%	0%	0%
	High School	13.0%	16.7%	2.3%	26.7%
	Vocational School	8.7%	8.3%	4.6%	0%
	Some College	45.6%	16.7%	20.9%	6.7%
	AA	8.7%	16.7%	11.6%	13.3%
	BA	15.2%	16.7%	44.2%	13.3%
	Graduate/Professional School	8.7%	25%	16.3%	0%
28. Current job	Employed in a school	8.7%	8.3%	4.6%	0%
	Employed in public sector	13.0%	8.3%	13.6%	20%
	Employed in private business	39.1%	33.3%	40.9%	33.3%
	Homemaker	8.7%	0%	2.3%	6.7%
	Not currently working	4.4%	0%	6.8%	13.3%
	Retired	26.1%	50%	31.8%	26.7%
29. Household income	\$25,000 or less	16.1%	22.2%	12.1%	8.3%
	\$25,000 to \$50,000	16.1%	22.2%	15.2%	8.3%
	\$50,000 to \$75,000	22.6%	22.2%	27.3%	41.7%
	Over \$75,000	45.2%	33.3%	45.4%	41.7%
9. Fall Workshop	Attended	8.7%	8.3%	2.3%	12.5%
	Did not attend	91.3%	91.7%	97.7%	87.5%
N		46	13	45	16

Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.

		Church Creek		Maltby	
		Control	Mailer	Control	Mailer
6. Type of System	Gravity Distribution	50%	69.2%	52.2%	58.8%
	Low Pressure Distribution	4.2%	23.1%	8.7%	0%
	Sandfilter	6.3%	0%	6.5%	17.6%
	Aerobic Treatment	2.0%	0%	0%	0%
	Unsure	37.5%	7.7%	28.3%	23.6%
	Other	0%	0%	4.3%	0%
8. Frequency of System Service	Every Year	2.2%	0%	2.2%	0%
	Every 1 to 2 Years	10.9%	30.8%	8.9%	12.5%
	Every 2 to 3 Years	26.1%	7.7%	35.6%	37.5%
	Every 3 to 5 Years	15.2%	23.1%	20%	6.3%
	5+ Years	21.7%	30.8%	24.4%	25%
	Never have	23.9%	7.7%	8.9%	18.7%
N		48	13	45	16

Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.

Table 5 displays the type of system and frequency of service by location. Like the broader sample, the majority of systems are gravity distribution systems. Again, a significant fraction of respondents did not know what type of system was on their property. Within location, there were no statistical differences in these measures between control and treatment groups.

Tables 6 and 7 explore the knowledge and behavior aspects of the Mailer programs within the Church Creek and Maltby areas. Like the full sample, individuals receiving the mailers in both Maltby and Church Creek claimed to learn more about their septic system than their respective control groups. Indeed, residents of Church Creek who received the mailer were ten times more likely to claim they learned substantial amounts of information about caring for their septic system than were other Church Creek residents. Residents in Maltby receiving the mailings were five times more likely to respond that they learned a substantial amount than their control group counterparts.

Turning attention to behavioral differences between locations, Table 7 shows that there are no statistical differences between control and Mailer groups by location.

As a final investigation, we turn attention to comparisons of the four locations that received mailers. Here, we present Tables 8 and 9 which compare the differences in knowledge and behavior by these locations. In order to make comparisons equivalent across locations, we restrict the sample to only those individuals who received Mailers; the control observations were eliminated (because they were located in only two of the

21. Over the past year, how much have you learned about ...					
		Church Creek		Maltby	
		Control	Mailer	Control	Mailer
21.a. How to best care for your septic system	A substantial amount	2.2%	25%	2.3%	13.3%
	Some new information	19.6%	25%	9.1%	26.7%
	Nothing	78.3%	50%	88.6%	60%
21.b. Your property's specific septic care system design plans	A substantial amount	4.2%	33.3%	8.3%	25%
	Some new information	8.3%	33.3%	4.2%	0%
	Nothing	87.5%	33.3%	87.5%	75%
21.c. How your septic system treats wastewater on your property	A substantial amount	4.6%	11.1%	0%	14.3%
	Some new information	4.6%	11.1%	5%	14.3%
	Nothing	90.8%	77.8%	95%	71.4%
N		46	12	20	8

Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.

four locations). Further, because there is no control group, we do not perform tests of statistical significance. Instead, we simply focus on response comparisons and note that the quantity of responses for individual locations is relatively small suggesting that statistical tests would likely lack enough precision to arrive at statistically significant results.

As is clear from Table 13, residents of the Church Creek area appear much more likely to have learned a substantial amount regarding septic care and about their specific septic systems than residents of the other three locations. Thus, for some reason, it appears that the Mailer may have had a greater impact in this location than the others. However, there does not appear to be much difference in learning about wastewater treatment across locations. In the same vein, Table 14 shows only small differences in behavioral measures across locations. This is not surprising given that there were no behavioral difference found in the larger sample.

Discussion

The OSR survey has provided answers to some questions. Specifically, it appears that the Mailer and Septic Survey programs increased knowledge about septic system care and specific septic system designs. However, these programs appeared to make little difference in the behavior of users of septic systems and this raises at least one yet unanswered question: why didn't the Mailer or Sanitary Survey campaigns influence behavior of respondents?

Based upon the Elway Survey, it is clear that Snohomish County residents believe they

**Table 7: Behavioral Responses to Sanitary Survey
and Mailer Programs, By Location**

22. Compared to a year ago, how likely are you to ...					
		Church Creek		Maltby	
		Control	Mailer	Control	Mailer
22.a. Repair leaky toilets and drains	More likely	32.6%	25%	34.1%	33.3%
	About the same	63.0%	75%	65.9%	66.7%
	Less likely	4.3%	0%	0%	0%
22.b. Prevent hazardous chemicals from going down the drain	More likely	26.1%	25%	37.2%	53.3%
	About the same	69.6%	66.7%	55.8%	40%
	Less likely	4.3%	8.3%	7.0%	6.7%
22.c. Use less water over the course of the day	More likely	19.6%	8.3%	31.8%	26.7%
	About the same	69.6%	83.3%	61.4%	73.3%
	Less likely	10.9%	8.3%	6.8%	0%
22.d. Spread out your water use throughout the week	More likely	21.7%	25%	20.5%	26.7%
	About the same	73.9%	66.6%	79.5%	73.3%
	Less likely	4.4%	8.4%	0%	0%
22.e. Walk over your drain field searching for odors	More likely	13.0%	16.7%	11.6%	6.7%
	About the same	78.3%	83.3%	81.4%	93.3%
	Less likely	8.7%	0%	7.0%	0%
22.f. Have a pumper inspect your system on a regular schedule	More likely	11.1%	8.3%	9.1%	13.3%
	About the same	73.3%	75%	81.8%	86.7%
	Less likely	15.6%	16.7%	9.1%	0%
22.g. Prevent kitchen scraps from going down the drain	More likely	15.2%	8.3%	31.8%	53.3%
	About the same	80.4%	91.7%	63.6%	46.7%
	Less likely	4.4%	0%	4.6%	0%
N		46	12	44	15

Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.

do a very good job maintaining their septic systems.⁸ Indeed, almost all reported (correctly) that old medications and coffee grounds do not belong in the system and most correctly reported that limiting bleach, drain de-cloggers, and food scraps should be limited to small quantities. However, the Elway report also pointed out that many people who believed they were very good at septic system care did not know what type of system they had and their maintenance plan appeared to be doing nothing until they noticed a smell, wet ground, or drain backing up. Given this partial state of knowledge and the apparent success in raising knowledge of the Mailer and Sanitary Survey, it seems likely that continuing these programs will help residents to better understand their systems.

⁸ See Elway report, pp. 4-5.

Table 8: Knowledge Gains Over the Prior Year, By Mailer Region

21. Over the past year, how much have you learned about ...					
		Church Creek	Maltby	Getchell Hill	Fobes Hill
21.a. How to best care for your septic system	A substantial amount	25%	13.3%	6.3%	5.3%
	Some new information	25%	26.7%	18.7%	26.3%
	Nothing	50%	60%	75.%	68.4%
21.b. Your property’s specific septic system design plans	A substantial amount	33.3%	25%	0%	0%
	Some new information	33.3%	0%	0%	16.7%
	Nothing	33.3%	75%	100%	83.3%
21.c. How your septic system treats wastewater on your property	A substantial amount	11.1%	14.3%	16.7%	0%
	Some new information	11.1%	14.3%	0%	15.4%
	Nothing	77.8%	71.4%	83.3%	84.6%
N		12	8	16	19

Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.

The fact that County residents claim to know so much about septic system care (over half rated themselves a ten out of ten in septic system care) may be one reason why the Mailer and Sanitary Survey did so little to alter behavior. If one perceives that they are doing a good job, then increased knowledge may simply strengthen existing beliefs. This is likely reinforced by the nature of septic systems. A septic system is almost a perfect example of an “out-of-sight, out-of-mind” piece of equipment. If the system does not fail in an obvious way, then a resident likely rarely considers it and, when they do, probably thinks it is functioning well. Thus, absent obvious signs of failure, residents will typically claim they do a good job caring for their system. This is especially true of people who occasionally walk the perimeter of their system looking for leaks, monitor their water use, and try to limit their disposal of harmful objects through the drain. For this type of individual, there is likely little reason to learn general principles of septic system care and about their specific septic systems. This survey documents the ability of the county to increase knowledge even among households who think they are doing a good job already.

A related reason for the lack of impact on behaviors is the fact that few households actually experience septic problems. Less than 6% of County residents informed the Elway Survey that they experience more than one septic problem per year and about three-fourths claimed to have never experienced a problem.⁹ While unobservable problems with septic systems may exist (and have harmful impacts on the environment), the fact that these are unobservable make behavior change difficult to obtain.

At least one other reason may explain why the County treatments had such little impact on behavior. Although a poorly operating septic system can impose costs on neighbors

⁹ Elway report, p. 11.

22. Compared to a year ago, how likely are you to ...					
		Church Creek	Maltby	Getchell Hill	Fobes Hill
22.a. Repair leaky toilets and drains	More likely	25%	33.3%	18.8%	31.6%
	About the same	75%	66.7%	81.2%	68.4%
	Less likely	0%	0%	0%	0%
22.b. Prevent hazardous chemicals from going down the drain	More likely	25%	53.3%	31.3%	21.0%
	About the same	66.7%	40%	62.5%	73.7%
	Less likely	8.3%	6.7%	6.2%	5.3%
22.c. Use less water over the course of the day	More likely	8.3%	26.7%	31.3%	15.8%
	About the same	83.3%	73.3%	62.5%	84.2%
	Less likely	8.3%	0%	6.2%	0%
22.d. Spread out your water use throughout the week	More likely	25%	26.7%	12.5%	10.5%
	About the same	66.6%	73.3%	87.5%	89.5%
	Less likely	8.4%	0%	0%	0%
22.e. Walk over your drainfield searching for odors	More likely	16.7%	6.7%	25%	15.8%
	About the same	83.3%	93.3%	68.8%	84.2%
	Less likely	0%	0%	6.2%	0%
22.f. Have a pumper inspect your system on a regular schedule	More likely	8.3%	13.3%	12.5%	10.5%
	About the same	75%	86.7%	81.3%	68.4%
	Less likely	16.7%	0%	6.2%	21.0%
22.g. Prevent kitchen scraps from going down the drain	More likely	8.3%	53.3%	18.8%	26.3%
	About the same	91.7%	46.7%	68.7%	68.4%
	Less likely	0%	0%	12.5%	5.3%
N		12	15	16	19

Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.

and the environment, ultimately a poorly operating system imposes significant costs on the occupants of the home. It is these people who have to live with the effects of a poorly maintained system and thus these people have the largest incentive to care for their system. Indeed, the Elway report demonstrated that the primary reasons for septic system maintenance were to keep kids, family and pets safe, to ensure that toilets and drains work well, to avoid cost of repairs, to avoid trouble with authorities, and to keep neighbors from complaining.¹⁰ With the possible exception of the last item on this list, all represent costs imposed on the household of a poorly functioning system. Individuals facing these costs have significant incentives to avoid them through a maintenance program. If the general experience of households is that their prior methods of septic system maintenance has led them to have general success with their system, then informing individuals of specific septic design plans and methods of improvement may

¹⁰ Elway report, p. 21.

make little difference in actual behavior. After all, it is hard to argue with the (perceived) success of what has been done in the past.

As Snohomish County moves forward in its septic system programs, OSR would recommend evaluation of any implemented program by using a few specific tools. First, OSR suggests evaluating tools using a before/after – control/treatment group strategy. This report has presented an example of the control/treatment strategy. By excluding some households from receiving the treatment, we have been able to identify the impacts of the Mailer and Sanitary Survey campaigns by comparing those in the treatment group with those in the control group. Assuming these groups are otherwise identical makes this identification a valid method. However, this can be strengthened by also combining data before and after treatments. The Elway report and the OSR control group provide a possible method of doing this. For instance, the respondents to the Elway report answered that survey prior to any County interventions. If the County can then target some of the Elway respondents with a treatment and then re-ask questions similar to the original survey, the County should be able to more precisely detect any change in behavior attributable to their intervention.

Finally, despite the fact that the Mailer and Sanitary Survey did not impact household behavior, increasing septic system knowledge and awareness may have long-term benefits that are not measured in this survey. Knowing better methods to care for a system may cause households to make small changes which have long-term benefits. For instance, advancing a pumping or inspection schedule by three months would not be detectable on this survey but, if done more frequently over a long period, may significantly increase system health. Increased knowledge may cause an individual to think twice prior to acting in a detrimental way which may benefit them significantly. As the County provides information, residents may view the County in a better light and turn to it for advice.

Appendix A

Snohomish County Septic Survey

Respondent ID

192

Grou Survey Group

p 103 Control
35 Sanitary Survey
67 Mailer

Hello, my name is _____ and I'm calling from Western Washington University.

We are conducting a survey that will help local agencies protect public health and water quality in Snohomish County.

The survey will take less than 10 minutes, and your responses are confidential.

Cons Would you like to participate in the survey?

ent 184 Yes
0 No

1. Most of our questions have to do with county septic systems. Do you have a septic system on this property?

191 Yes
0 No
0 I don't know

0 Opt Out
0 don't opt out

Thank you for your time.

Terminate Call.

2. I would like to speak with the person at this house who is most familiar with the septic system or who would be most responsible for its maintenance. Would that be you?

187 Yes

0 No

3. Is there someone else who is more familiar with the household wastewater system?

0 Yes

0 No

4. Is that person available?

0 Yes

0 No

Hello, my name is _____ and I'm calling from Western Washington University.

We are conducting a survey that will help local agencies protect public health and water quality in Snohomish County.

The survey will take less than 10 minutes, and your responses are confidential.

6. As I said, these questions are about your septic system. When we speak of the septic system, we mean the sewage treatment and disposal system on your property, including the septic tank and the drain field. What type of septic system do you have? Is it...

Read all options, if they are not sure, mark "Not sure".

101 Gravity Distribution

19 Low Pressure distribution (LPD)

16 Sandfilter (with LPD or drip disposal)

5 Aerobic treatment (with LPD or drip disposal)

61 Not Sure

3 Other (describe below):

7. 3

8. Since you've lived in your home, how often do you usually have your septic tank inspected and/or pumped?

- 3 Every year
- 22 Every 1 to 2 years
- 55 Every 2 to 3 years
- 41 Every 3 to 5 years
- 46 5+ years
- 30 Never have

9. Did you attend a septic care workshop last fall?

- 15 Yes
- 178 No

- 7 Opt Out
- 0 don't opt out

10. Over the last three months, do you remember receiving any mail pieces regarding septic care?

- 38 Yes
- 26 No

- 0 Opt Out
- 0 don't opt out

11. How many did you receive?
Please take your best guess.

36

12. Over the past three months, who have you received mail pieces from regarding septic care?

- 0 Snohomish Health District
- 0 Professional Pumper
- 1 Washington State University Extension
- 0 Don't know
- 0 Other (specify below)

13. 0

0 Opt Out
0 don't opt out

14. When you received the mail pieces, what did you typically do with them? Did you...

	Always	Sometimes	Never
Read them thoroughly	12	13	11

0 Opt Out
0 don't opt out

15. When you received the mail pieces, what did you typically do with them? Did you...

	Always	Sometimes	Never
Open, glance at them, and throw them away	6	12	5
Throw them away without really looking at them	7	10	7
Keep them to read later	2	7	15
Give them to someone else who also owns a septic system	2	6	27
Reply to receive a promotional item	4	4	16

0 Opt Out
0 don't opt out

16. As a result of these mailers, have you...

	Yes	No
Visited one or more websites to learn more about your septic system and/or how to care for it?	1	35
Contacted a professional pumper to inspect and/or pump your septic system?	5	30

0 Opt Out
0 don't opt out

17. Were you contacted by the Snohomish Health District to participate in a septic system field survey?

14 Yes
15 No
4 Don't know

0 Opt Out
0 don't opt out

18. Did Snohomish Health District visit your property and assess your property's septic system?

9 Yes
3 No
2 Don't know

19. Did you receive a follow-up letter from Snohomish Health District that provided information about your property's septic system?

10 Yes
3 No
1 Don't know

0 Opt Out
0 don't opt out

20. As a result of the information provided by Snohomish Health District, have you:

	Yes	No
Calculated your indoor water use?	1	9
Visited one or more websites to learn more about your septic system and/or how to care for it?	3	7
Contacted a professional pumper to inspect and/or pump your septic system?	2	8

0 Opt Out
0 don't opt out

21. Over the past year, how much have you learned about...

	A substantial amount	Some new information	Nothing new
How to best care for your septic system?	0	0	0
How to best care for your septic system?	12	38	139
Your property's specific septic system design plans	6	8	68
How your septic system treats wastewater on your property	5	7	88

0 Opt Out
0 don't opt out

22. Compared to a year ago, how likely are you to...

	More likely	The same	Less likely
Repair leaky toilets and drains	0	0	0
Repair leaky toilets and drains	57	128	3
Prevent hazardous chemicals from going down the drain	61	116	10
Use less water over the course of a day	46	132	10
Spread out your water use throughout the week	41	144	3
Walk over your drainfield searching for odors or leakage	27	149	11
Have a pumper inspect your system on regular schedule	23	142	22
Prevent kitchen scraps from going down the drain	47	133	8

I have just a few last questions for our statistical analysis.

23. How would you describe your neighborhood? Is it...

- 4 Urban
- 29 Suburban
- 154 Rural

24. Would you say you know most, some, or none of your neighbors by name?

- 121 Most
- 63 Some
- 2 None

25. During an average week, how often would you say you talk with your neighbors?

- 15 Daily
- 99 A few times a week
- 44 A few times a month
- 22 Less than a month
- 4 Never

26. Is your age between:

- 4 18-35
- 44 36-50
- 80 51-64
- 57 65+

27. What highest level of education you have completed?

- 0 Less than high school
- 27 High School
- 10 Business Vocational School
- 58 Some College
- 15 Associate's degree
- 47 Bachelor's degree
- 27 Graduate Professional School

- 28.** Which of the following best describes you at this time? Are you:
- 10 Employed in an educational institution
 - 21 Employed in the public sector, like a governmental agency
 - 76 Employed in a private business
 - 10 A home-maker
 - 10 Not currently working
 - 59 Retired
- 29.** Finally, which of these categories best describes your approximate household income before taxes
- 19 \$25,000 or less
 - 22 \$25,000 to \$50,000
 - 34 \$50,000 to \$75,000
 - 62 Over \$75,000
- 30.** Is there a good time I could call back and talk with the person most responsible for the maintenance of the septic system?
- 0 Yes
 - 0 No
- 31.** Is there a good time for me to call back?
- 0 Yes
 - 8 No

When may I call back? - Enter in database

May I have the name of the person most responsible for the septic system? - put this name in the name field in calling database

Thank you for your time.

- 32.** Would you be willing to take the survey online?
- 0 Yes
 - 7 No
- 33.** What is your email address? This address will be used only for this survey invitation.
- 0

If no email address, send them to the following URL:

Ok, you may access the survey at...

www.wvu.edu/septicsurvey1

www.wvu.edu/septicsurvey2

www.wvu.edu/septicsurvey3

Thank you very much. You have been very helpful.

Thank you for your time.

34. Record Gender of Respondent (do not ask question)

72 Male

119 Female

Appendix B

Table B-1: Disposition of Mailers			
14-15. When you received the mail pieces, what did you typically do with them?			
	Always	Sometimes	Never
14. Read them thoroughly	33.3% (n=12)	36.1% (n=13)	30.6% (n=11)
15.a. Open them, glance at them, and throw them away	17.1% (n = 6)	34.3% (n = 12)	48.6% (n = 17)
15.b. Throw them away without really looking at them	19.4% (n = 7)	27.8% (n = 10)	52.8% (n = 19)
15.c. Keep them to read later	5.6% (n = 2)	19.4% (n =7)	75% (n = 27)
15.d. Give them to someone else who also owns a septic system	5.7% (n =2)	17.1% (n = 6)	77.1% (n = 27)
15.e Reply to receive a promotional item	11.4% (n = 4)	11.4% (n = 4)	77.2% (n = 27)

Notes: Percentages may not add to 100% due to rounding. Numbers in front of question name refer to the specific question text documented in Appendix A.

Table B-2: Recollection of the Sanitary Survey Program			
18-19. Did Snohomish Health District...			
	Yes	No	Don't Know
18. visit your property and assess your property's septic system?	64.3% (n = 9)	21.4% (n = 3)	14.3% (n = 2)
19. send a follow-up letter providing information about your septic system?	71.4% (n = 10)	21.4% (n = 3)	7.1% (n = 1)

Notes: Percentages may not add to 100% due to rounding. Numbers in front of question name refer to the specific question text documented in Appendix A.

Table B-3: Impacts of Sanitary Survey		
20. As a result of the information provided by Snohomish Health District, have you...		
	Yes	No
20.a. Calculated your indoor water use?	10% (n = 1)	90% (n = 9)
20.b. Visited one or more websites to learn more about your septic system and/or care for it?	30% (n = 3)	70% (n = 7)
20.c. Contacted a professional pumper to inspect and/or pump your septic system?	20% (n = 2)	80% (n = 8)

Notes: Percentages may not add to 100% due to rounding. Numbers in front of question name refer to the specific question text documented in Appendix A.

Table B-4: Knowledge Gains Over the Prior Year					
21. Over the past year, how much have you learned about ...					
		Control	Sanitary	Mailer	Total
21.a. How to best care for your septic system	A substantial amount	2.1%	9.1%	11.3%	6.3%
	Some new information	15.8%	24.2%	24.2%	20%
	Nothing	82.1%	66.7%	64.5%	73.7%
21.b. Your property's specific septic care system design plans	A substantial amount	7.5%	6.7%	14.3%	9%
	Some new information	5.6%	20%	9.5%	9%
	Nothing	86.8%	73.3%	76.2%	82%
21.c. How your septic system treats wastewater on your property	A substantial amount	2.1%	5.2%	9.8%	5.6%
	Some new information	4.3%	10.5%	9.8%	7.5%
	Nothing	93.6%	84.2%	80.5%	86.9%
N		94	33	62	189

Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.

Table B-5: Behavioral Responses to Sanitary Survey and Mailer Programs					
22. Compared to a year ago, how likely are you to ...					
		Control	Sanitary	Mailer	Total
22.a. Repair leaky toilets and drains	More likely	34.0%	25%	27.4%	30.3%
	About the same	63.8%	71.9%	72.6%	68.1%
	Less likely	2.1%	3.1%	0%	1.6%
22.b. Prevent hazardous chemicals from going down the drain	More likely	33.3%	31.3%	32.3%	32.6%
	About the same	61.3%	65.6%	61.3%	62.0%
	Less likely	5.4%	3.1%	6.4%	5.4%
22.c. Use less water over the course of the day	More likely	25.5%	28.1%	21.0%	24.5%
	About the same	66.0%	71.9%	75.8%	70.2%
	Less likely	8.5%	0%	3.2%	5.3%
22.d. Spread out your water use throughout the week	More likely	21.3%	31.3%	17.7%	21.8%
	About the same	76.6%	68.7%	80.7%	76.6%
	Less likely	2.1%	0%	1.6%	1.6%
22.e. Walk over your drainfield searching for odors	More likely	11.8%	18.8%	16.1%	14.4%
	About the same	80.6%	71.9%	82.3%	79.7%
	Less likely	7.5%	9.3%	1.6%	5.9%
22.f. Have a pumper inspect your system on a regular schedule	More likely	10.7%	18.8%	11.3%	12.3%
	About the same	77.4%	68.7%	77.4%	75.9%
	Less likely	11.8%	12.5%	11.3%	11.8%
22.g. Prevent kitchen scraps from going down the drain	More likely	23.4%	25%	27.4%	25%
	About the same	72.3%	71.9%	67.7%	70.7%
	Less likely	4.2%	3.1%	4.8%	4.2%
N		94	32	62	188

Notes: Percentages may not add to 100% due to rounding. Bolded numbers in “Sanitary” or “Mailer” columns indicate a statistical difference from the “control” column at the 95% level. Numbers in front of question name refer to the specific question text documented in Appendix A.