

WINTER SPARE THE AIR STUDY
2009-2010 WINTER WOOD SMOKE SEASON



CONDUCTED FOR THE



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

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INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD) was established in 1955 by the California State Legislature as the first multi-county agency in the State to address the problem of air pollution on a regular basis. The BAAQMD's primary regulatory authority covers stationary sources of air pollution such as factories, industrial facilities, manufacturing operations, gasoline stations and dry cleaners. The BAAQMD is also responsible for transportation control measures to reduce emissions from mobile sources of air pollution in its Clean Air Plan.

Serving the counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, and the western half of Solano and southern half of Sonoma, one of the BAAQMD's primary charges is to increase public awareness of positive air quality choices. To facilitate this effort, the Spare the Air Program was established by the BAAQMD in 1991 to educate residents about air pollution and to encourage them to modify their behavior to reduce and prevent it. During the summer ozone season (May to October), the BAAQMD conducts episodic public education campaigns designed to encourage the public to reduce their driving and use of certain household products on days that are expected to violate ozone air quality standards. During the winter season (November to February), the focus of the Program shifts to reducing the impact of wood burning on air quality by encouraging the public to *not* burn wood and to replace their wood-burning fireplaces and stoves with cleaner alternatives, such as natural gas fireplaces.

Although today many air quality management districts throughout the country administer similar programs, the Spare the Air program in the Bay Area was the first of its kind.

MOTIVATION FOR STUDY The primary motivation for this study was to better understand the public's attitudes and behavior with respect to burning wood, their awareness of the Winter Spare the Air Program, as well as the impact that the Program has had on awareness, opinions and behavior relevant to burning wood and air quality. In this respect, this study is quite similar to past surveys conducted for the BAAQMD every year since 2001.

The passage of California Senate Bill 656 to reduce public exposure to particulate matter (PM10 and PM2.5) was another key motivation for the study.¹ SB 656 requires the California Air Resources Board (ARB), in consultation with local air districts, to develop and adopt a list of the most readily available, feasible and cost-effective control measures that could be used to reduce PM10 and PM2.5—with the goal of making progress in the near-term toward attainment of State and Federal PM10 and PM2.5 standards. Although the Bay Area is currently in attainment for the Federal PM10 and PM2.5 standards, like almost every other area in California it does not meet the stricter State standards.

1. Particulate matter (PM) consists of very small liquid and solid particles suspended in the air, and includes particles smaller than 10 microns (PM10) as well as finer particles smaller than 2.5 microns (PM2.5). Ambient PM is made up of particles that are emitted directly—such as soot and fugitive dust—as well as secondary particles that are formed in the atmosphere from reactions involving precursor pollutants such as oxides of nitrogen, sulfur oxides, volatile organic compounds, and ammonia. Exposure to PM is linked to increased frequency and severity of asthma attacks and even premature death in people with pre-existing cardiac or respiratory disease. Infants and children, the elderly, and persons with heart and lung disease are the most sensitive to PM pollution.

In 2008, the BAAQMD adopted *Regulation 6, Rule 3: Wood-burning Devices* to reduce the harmful emissions that come from wood smoke. The new rule restricts wood burning when air quality reaches unhealthy levels and a Spare the Air advisory is issued, places limits on excessive smoke, requires that only cleaner burning EPA certified stoves and inserts be sold or installed in new construction/remodels, and prohibits the burning of garbage and other harmful materials. With the introduction of the wood-smoke rule and a greater emphasis placed on reducing particulate matter in the Bay Area, the 2009 survey was conducted using a larger than normal sample (3,000 interviews) to produce a highly detailed, up-to-date profile of wood burning behavior in the Bay Area that will allow for statistically reliable estimates within each of the nine member counties.

OVERVIEW OF METHODOLOGY A full description of the methodology used for this study is included later in this report (see *Methodology* on page 60). A total of 3,000 randomly selected residents within the District’s boundaries participated in the survey on one of 60 interviewing dates between November 12, 2009 and February 28, 2010. Randomly selected respondents were offered the option of participating by telephone or online at a secure, password-protected website hosted by True North. Probability-based sampling techniques and monitoring of the demographics resulted in a sample that is representative of the adult population within the District.

When compared to the past surveys conducted for the District on wood burning and the Winter Spare the Air Program, there are several methodological changes worth noting at the outset of this report. In the interest of improving the *validity* and *reliability* of select opinion and behavior measures, the 2009 study continued several questionnaire changes that were first implemented in the 2004 season. The most notable of these changes addressed how the questionnaire measured the impacts of the Winter Spare the Air Program. The changes were made so that the impacts of the winter program on wood burning behavior would be measured using the same basic methodology employed by the BAAQMD—and recommended by CARB and EPA²—to measure the impacts of the summer Spare the Air Program on driving behavior.³

Based on the 2005 results, several additional refinements were made to the 2006 questionnaire with respect to measuring ownership of wood-burning heating devices and the practice off-season burning. Because these improvements occasionally involved changing the wording, format and/or response options for a particular question, in some cases it is not possible to statistically compare the results of the post-2006 surveys with previous surveys for select measures. Where such comparisons are possible, however, this report presents the results from past surveys.

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2. The CARB/EPA Method is summarized in the Transportation Research Board’s (TRB) journal—*Transportation Research Record*—for 2004 in an article entitled *Development of a Quantification Method for Measuring the Travel and Emissions Impacts of Episodic Ozone Alert Programs* (pages 153-159). It is described in detail in the following air resources guidance report: CARB, “Quantification Method Reference Manual: A Method to Measure Travel and Emissions Impacts of Ozone Action Public Education Programs,” April 2003. In addition to Eric Schreffler, Dr. Timothy McLarney and Richard Sarles, the TRB paper and guidance report were co-authored by Joann Lu and Jeff Weir of CARB, as well as Thomas Higgins and Dr. Will Johnson of K.T. Analytics.
 3. For a detailed description of the updated CARB/EPA Method and its application to the BAAQMD’s summer Spare the Air Program, see the *Spare the Air Study: 2009 Summer Ozone Season* report prepared for the BAAQMD by True North.

STATISTICAL SIGNIFICANCE Many of the figures and tables in this report present the results of questions asked in 2009 alongside the results found in prior years for identical questions. In such cases, True North conducted the appropriate tests of statistical significance to identify changes that likely reflect actual changes in public opinion or behavior over time—as opposed to being due to chance associated with selecting two cross-sectional samples independently and at random. Differences between studies are identified as *statistically significant* if we can be 95% confident that the differences reflect an actual change in public opinion or behavior between the two studies. Statistically significant differences within response categories over time are denoted by the † symbol which appears in the figure next to the appropriate response value for 2009.

ORGANIZATION OF REPORT This report is designed to meet the needs of readers who prefer a summary of the findings, as well as those who are interested in the details of the results. For those who seek an overview of the findings, the sections titled *Just the Facts* and *Conclusions* are for you. They provide a summary of the most important factual findings of the survey in bullet-point format and a discussion of their implications. For the interested reader, this section is followed by a more detailed question-by-question discussion of the results from the survey by topic area (see *Table of Contents*), as well as a description of the methodology employed for collecting and analyzing the data. And, for the truly ambitious reader, the questionnaire used for the interviews is contained at the back of this report (see *Questionnaire & Toplines* on page 64).

ACKNOWLEDGEMENTS True North thanks Ralph Borrmann, Dr. David Fairley, and Eric Pop of the BAAQMD for their valuable input during the design stages of this study. Their expertise and insight improved the overall quality of the research presented here.

DISCLAIMER The statements and conclusions in this report are those of the authors, Dr. Timothy McLarney and Richard Sarles at True North Research, Inc. (True North), and not necessarily those of the BAAQMD. Any errors or omissions are the responsibility of the authors.

ABOUT TRUE NORTH True North is a full-service survey research firm that is dedicated to providing public agencies with a clear understanding of the values, perceptions, opinions and behaviors of their residents and customers. Through designing and implementing scientific surveys, focus groups and one-on-one interviews, as well as expert interpretation of the findings, True North helps its clients to move with confidence when making strategic decisions in a variety of areas—such as planning, policy evaluation, performance management, and developing effective public information campaigns.

During their careers, Dr. McLarney (President) and Mr. Sarles (Principal Researcher) have designed and conducted over 500 survey research studies for public agencies—including dozens of studies related to air quality and Spare the Air public education programs.



JUST THE FACTS

The following is an outline of the main factual findings from the 2009 study. For the reader's convenience, we have organized the findings according to the section titles used in the body of this report. Thus, to learn more about a particular finding and how it may compare to findings from prior surveys (where applicable), simply turn to the appropriate report section.

WINTER WOOD BURNING BEHAVIOR

- Forty-five percent (45%) of respondents reported that their household contained at least one *wood-burning* fireplace, pellet stove or wood stove.
- Twenty-one percent (21%) of households in the District contain at least one fireplace that burns natural gas or propane.
- Among households with a wood-burning fireplace or wood stove, the most commonly used wood was natural wood logs (42%), followed by manufactured logs (21%), and scrap wood (2%).
- Twenty percent (20%) of respondents who primarily burn natural wood logs were unable to identify the type of wood that they burn. Among those who knew the type of wood, oak was the most common (58%), followed by hardwood in general (15%) and pine (10%).
- When households that primarily burn natural wood logs were asked how they typically acquire their wood, respondents were split between those who gather their own (41%), those who purchase the wood from a local store (23%), and those who rely on a wood supplier (31%). Six percent (6%) mentioned an alternative source.
- Two-thirds (68%) of respondents who primarily burn natural logs stated that their wood is already dry and seasoned at the time they acquire it, whereas 19% reported that they typically acquire wood that is fresh-cut, 7% indicated that it depends or is a mixture, and 4% were unsure.
- Households that burn wood were divided between those who primarily burn for heat (54%) and those who primarily burn for ambiance (46%).
- Seventy percent (70%) of households that contain a pellet stove indicated that they would use the device this winter. The rate of use was somewhat lower for wood stoves (66%) and natural gas/propane fireplaces (63%), and significantly lower for wood-burning fireplaces (43%).
- Overall, 10% of households District-wide reported that they would not use their wood-burning heating device *at all* during the winter due to the campaign.⁴
- Overall, just under half (45%) of respondents indicated that they expected to burn wood on a weekly basis, although most (27%) stated that they would burn wood three days or less per week. Overall, 16% indicated that they expected to burn wood two to three times per month, 20% once per month, and 15% expected to burn wood less often than once per month.

4. That is, they mentioned air quality and/or health-related reasons for not using the wood-burning device this winter *and* they were aware of the Spare the Air Tonight campaign. Note that this figure does not include households that intend to use their wood-burning device, but did refrain from burning wood on at least one occasion due to the campaign (see Figure 35 on page 32 for figure on full campaign impacts).

- Thirty-five percent (35%) of respondents whose household includes at least one wood-burning fireplace, pellet stove and/or wood stove *and* expected to burn wood during the winter months indicated that they had burned wood during the week prior to the interview. Approximately 14% had burned wood the day prior to the interview.
- On a typical burn day, wood-burning households averaged 4.06 hours of burning time.
- On a typical burn day, wood-burning households consumed an average 4.76 logs.
- More than half (59%) of respondents indicated that they started their most recent fire between 6PM and 8:59PM, and an additional 23% started their fire a bit earlier between 3PM and 5:59PM.

CHANGES IN WOOD BURNING BEHAVIOR

- Overall, 59% of households that own a wood-burning heating device and expected to burn wood this season reported that they anticipated burning wood at about the same frequency this season as last.
- Fifty-five percent (55%) of respondents who have a wood-burning fireplace, wood stove and/or pellet stove *and* expected to burn wood during the 2009-2010 winter season indicated that—on at least one occasion—they refrained from burning wood.
- When asked *why* they chose not to burn wood on these occasions, 28% specifically mentioned the Winter Spare the Air campaign and an additional 5% offered an air quality or health-related reason.
- Among all households with a wood-burning fireplace, pellet stove or wood stove, 10% chose not to burn *at all* during the winter season because of the Winter Spare the Air Tonight campaign, and an additional 15% refrained from burning on at least one occasion for the same reason.
- Among the target market for Spare the Air alerts (households with a demonstrated inclination to burn wood that week), 16% chose not to burn on the Spare the Air day in response to the campaign, and an additional 42% refrained from burning but for reasons unrelated to Spare the Air.

RECALL AND AWARENESS OF WINTER SPARE THE AIR MESSAGING

- Overall, 67% of adults in the Bay Area recalled being exposed to news stories, advertisements or public service announcements related to the Winter Spare the Air Program during the winter months.
- When asked to indicate where they obtained the information about the Winter Spare the Air Program, the most commonly cited sources were television (55%), radio (33%), and a newspaper (19%).
- Thirty-four percent (34%) of respondents interviewed on the day after a Winter Spare the Air episode were aware of the advisory for the prior day.

ATTITUDES ABOUT WOOD SMOKE

- Approximately 65% of adults in the Bay Area perceive that there are negative health effects associated with breathing wood smoke.
- When asked in an open-ended manner to identify some of the specific negative health effects associated with breathing wood smoke, most respondents focused on lung disease in general (40%) or made a specific reference to asthma (30%).
- Seventeen percent (17%) of Bay Area adults perceive that their neighborhood periodically experiences air pollution from wood smoke. Ten percent (10%) stated that the problem was a small one, 4% indicated it was a moderate or medium problem, and 2% felt that air pollution due to wood smoke was a big problem in their neighborhood.

WOOD SMOKE RULE

- Most respondents (63%) indicated that they were aware of the BAAQMD's policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels.
- One-quarter (26%) of respondents felt well-informed about the rules that are part of the new policy, 28% felt somewhat informed, 21% slightly informed, and 22% felt not at all informed about the rules that are part of the policy.
- Seventy-one percent (71%) of Bay Area residents indicated that they support the no-burn policy on nights when air pollution is expected to reach unhealthy levels. Approximately 19% opposed the policy, 2% stated that it depends, and 8% were unsure or offered no opinion.
- Three-quarters or more of the public appear correctly informed regarding the fact that violators of the 'no burn' policy will receive a warning prior to citations (89%), that households with natural gas/propane fireplaces are still allowed to burn on designated 'no burn' days (85%), and that residents are required to check the status of air quality prior to burning wood between November and February (76%).
- Approximately two-thirds of respondents also held the correct opinion that households for which wood burning is their only source of heat are still allowed to burn wood on 'no burn' days (67%), and that they can be cited at any time of the year if there is a lot of visible smoke coming from their chimney (62%).
- Just 56% agreed that wood burning is a major source of pollution in the Bay Area contributing up to one-third or more of the airborne particle pollution on many winter days, 60% incorrectly assumed that *no* households are allowed to burn wood on no burn days, half (51%) of respondents felt that households with EPA certified stoves would still be allowed to burn on 'no burn' days, and 41% believed that it's OK to burn different types of wood—including driftwood, treated wood, moist wood, and used pallets—as long as it is a clean air day.
- Overall, 45% of respondents indicated that they know how to find out whether today is a 'no burn' day.
- When asked what sources they would turn to for this information, the most commonly mentioned were a website in general (62%), newspaper (23%), telephone hotline (18%), radio (17%), and BAAQMD web site (14%).

FIREPLACE & POLLUTION KNOWLEDGE

- A clear majority of respondents correctly labeled as false the statements *It is okay to burn materials other than firewood in my fireplace* (82% false), and *A fireplace is an efficient source of heat* (70%).
- The percentage who correctly identified as false the final two statements was much lower, however, with just 50% disagreeing that *All fires in my fireplace should produce visible smoke from the chimney* and 40% disagreeing that *Manufactured logs burn cleaner than seasoned firewood*.

PERCEPTIONS OF ENTITIES

- Prior to taking the survey, 64% of respondents had heard of the Bay Area Air Quality Management District and 61% had heard of the Winter Spare the Air Program.
- Among respondents who had heard of the BAAQMD, 42% held a favorable opinion of the agency, whereas 46% held a neutral opinion or were unsure, and just 10% held an unfavorable opinion.
- Among respondents who had heard of the Winter Spare the Air Program, 56% held a favorable opinion of the Program, whereas 33% held a neutral opinion or weren't sure of their opinion, and 10% held an unfavorable opinion.
- Fifty-one percent (51%) of respondents recalled hearing, reading or seeing a news story, advertisement or public service announcement in the six months prior to taking the interview that pertained to the BAAQMD. The corresponding figure for the Winter Spare the Air campaign was 66%.



CONCLUSIONS

As noted in the *Introduction*, this study was designed to provide a better understanding of the public's attitudes and behavior with respect to burning wood, their awareness of the Winter Spare the Air Program, as well as the impact that the Program has had on awareness, opinions and behavior relevant to wood burning and air quality. Whereas subsequent sections of this report are devoted to conveying the detailed results of the study, in this section we attempt to 'see the forest through the trees' and note how the collective results answer some of the key questions that motivated the research.

What is the profile of wood burning behavior in the Bay Area?

Overall, 45% of households in the Bay Area own at least one *wood-burning* fireplace, wood stove or pellet stove, and 21% burned wood in the 2009-2010 winter months. Among all households that own a wood-burning device, 21% expected to burn wood on a weekly basis, 25% expected to burn less often than once per week, and 54% did not expect to burn wood this season. Although the type of wood burned varies considerably, as does the source from which the wood is obtained, two-thirds (68%) of households that burn natural wood reported that their wood is already dry and seasoned at the time it is acquired.

Wood burning behavior varies considerably depending on how frequently a household burns. Wood-burning households can easily be divided between the 45% that burn at least once per week (frequent burners) and those that burn less often (infrequent burners). Not only do frequent burners build fires more often, they tend to burn significantly more hours per burn day (4.89 hours on average) and consume more wood per burn day (5.60 logs on average) when compared to infrequent burners. Their reasons for burning wood are also different. Whereas frequent burners primarily build fires for heat, infrequent burners primarily build fires for ambiance.

For more information about wood burning behavior in the Bay Area, see *Winter Wood Burning Behavior* on page 11.

How effective was the Winter Spare the Air Campaign during the 2009-2010 winter?

The Winter Spare the Air campaign seeks to shape public awareness and opinions about the District and air quality issues, as well as change behavior with respect to burning wood. Accordingly, the survey sought to measure the impacts that the campaign had on each of these dimensions.

The BAAQMD followed a remarkably successful 2008-2009 Winter Spare the Air campaign with an equally impressive 2009-2010 effort. Although recalled exposure to information about the BAAQMD and campaign-related messaging dipped slightly from the all-time high levels established in 2008, the campaign set new high-water marks in other areas—including awareness of the wood-smoke policy, how informed residents feel about the rules that are part of the policy, knowledge of how to find

out whether today is a ‘no burn’ day, and awareness of specific Spare the Air day episodes. Moreover, the magnitude of the positive changes in the past year were substantial in some cases. For example, the proportion of residents who were aware of specific Winter Spare the Air episodes increased by 6% to 34% in the past year, continuing a trend of increasing awareness that began in 2006.

With respect to attitudes about wood smoke, the Program has also succeeded in raising public recognition of the negative health impacts of breathing wood smoke by 16% since 2002. This increased awareness of the health-related problems caused by wood smoke arguably underpins what is broad support for the BAAQMD’s adoption of the *Regulation 6, Rule 3: Wood-burning Devices* policy designed to improve air quality in the region. Approximately 71% of Bay Area adults support the policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels.

Although the changes in public awareness and attitudes related to the Winter Spare the Air program were substantial in the past few years, they pale in comparison to the *behavioral* changes that have occurred with respect to wood-burning. Based on the survey data, it is estimated that among all households with a wood-burning fireplace, pellet stove or wood stove, 10% chose not to burn *at all* during the winter season because of the Winter Spare the Air campaign, and an additional 15% refrained from burning on at least one occasion for the same reason. Collectively, the Winter Spare the Air campaign influenced more than 25% of eligible households to reduce their wood burning during the 2009-2010 winter season. This represents a dramatic increase of nearly 7% when compared to the 2007-2008 season (18% impacted), and a 23% increase when compared to the comparable figure in 2005 (2.4% impacted).

Are there any opportunities that the Program can take advantage of to be more successful in the future?

The real opportunity to further enhance the impact of the Winter Spare the Air campaign lies in greater penetration of Spare the Air day notifications. Although awareness of specific Spare the Air day alerts has increased significantly during the past three years, nearly two-thirds (66%) of Bay Area adults surveyed on the day after an alert reported that they were *not* aware that a Spare the Air alert had been issued. Regardless of how compelling the message may be, if the message does not reach large portions of the target audience then the Winter Spare the Air program will fall short of its potential for eliciting positive air-quality actions from the public on Spare the Air days.

A second clear opportunity for improvement can be found in public knowledge of the BAAQMD’s wood-smoke policy. Although support for the ‘no burn’ policy is strong (71%) and public awareness of the policy has increased in the past year, there remains a clear opportunity to

improve public awareness of the policy itself, as well as the specific rules that are components of the policy. For example, 37% of Bay Area adults were *not* aware of the ‘no burn’ policy prior to participating in the survey, just 26% of respondents felt well-informed about the rules that are part of the policy, and 55% had no idea how to find out whether today is a ‘no burn’ day. Specific areas where public knowledge is low include exceptions to the ‘no burn’ policy for households that rely exclusively on wood-burning for their heat, that EPA certified stoves are *not* excluded from the ‘no burn’ policy, and that burning certain types of wood—including driftwood, treated wood, moist wood, and used pallets—is never allowed.

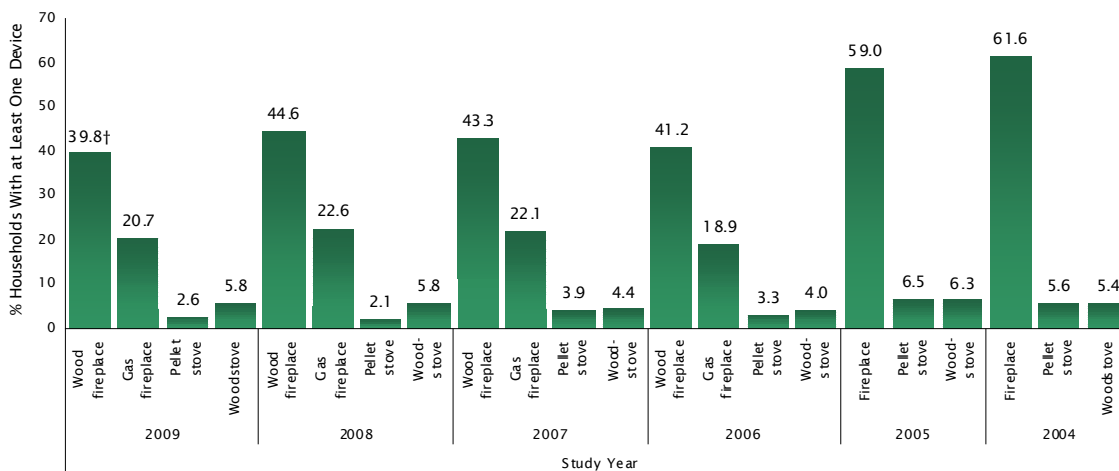
WINTER WOOD BURNING BEHAVIOR

One of the key objectives of the survey was to profile respondents' use of wood-burning heating devices, including fireplaces, pellet stoves and wood stoves. Accordingly, the first series of questions in the survey asked respondents about the types of wood-burning heating devices they have in their home, as well as their use of these devices during the 2009-2010 winter months of November through February. Whereas prior to 2005 the surveys did not distinguish between wood-burning fireplaces and those that use natural gas or propane at the outset of the interview, as shown in Figure 1 this distinction was added to Question 1 in the 2006 survey.

HEATING DEVICES The first question in this series simply asked respondents to identify how many wood-burning fireplaces, natural gas/propane burning fireplaces, wood stoves and pellet stoves their household contains. As shown in Figure 1 for 2009, 40% of households contain at least one wood-burning fireplace, 21% contain at least one fireplace that burns natural gas or propane, 3% contain at least one pellet stove, and 6% contain at least one wood stove. Collectively, 45% of respondents reported that their household contained at least one *wood-burning* fireplace, pellet stove or wood stove, whereas 55% of respondents indicated that their household does not contain a wood-burning heating device (see Figure 2 on page 12).⁵

Question 1 *Do you have a _____ in your home? If yes, ask: How many: _____s do you have in your home?*

FIGURE 1 HEATING DEVICES IN HOME: 2004 ~ 2009 (N = 3,000)⁶



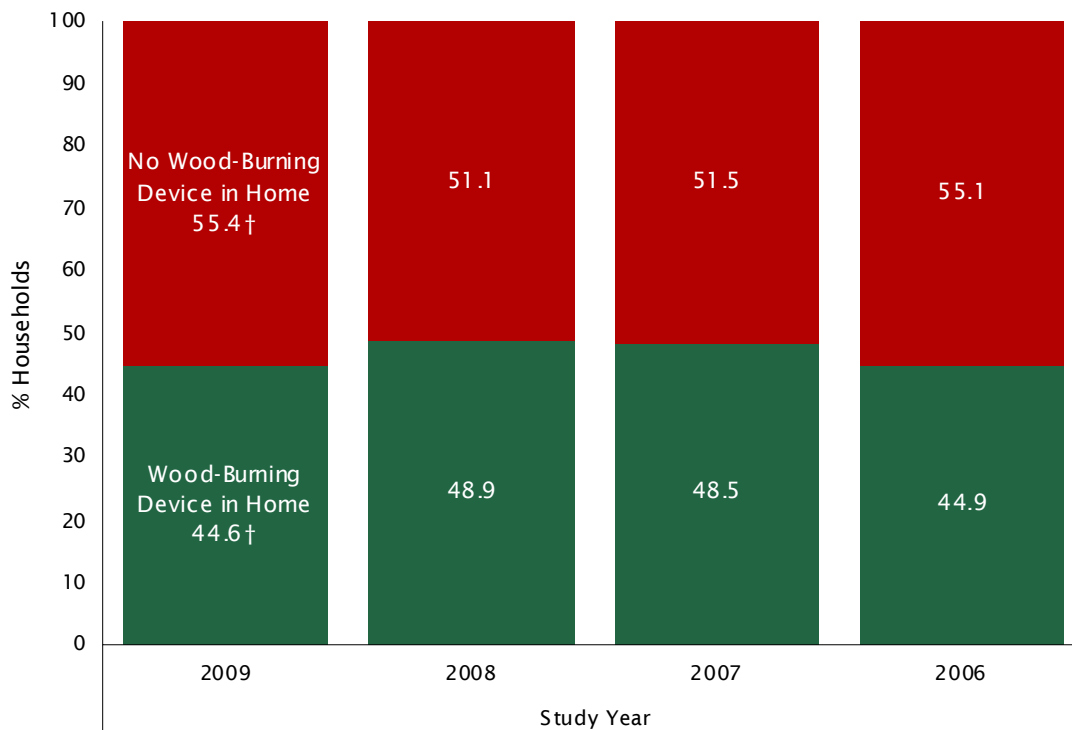
† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

5. Because some households contained more than one type of heating device—e.g., a fireplace *and* a wood stove—one can not simply add the percentages shown in Figure 1 to determine the percentage of households that have at least one type of heating device.
6. The $n = 3,000$ refers to the number of respondents who received this question. This convention will be followed throughout the report to allow the reader to identify how many respondents are included in each figure.

TABLE 1 NUMBER OF HEATING DEVICES IN HOME: 2004 ~ 2009 (N = 3,000)

	Number of Devices			
	One	Two	Three or more	
2009	Wood-burning fireplace	35.1	4.0	0.7
	Gas / Propane fireplace	16.1	3.8	0.9
	Pellet stove	2.1	0.3	0.2
	Woodstove	5.2	0.6	0.0
2008	Wood-burning fireplace	39.6	4.0	1.0
	Gas / Propane fireplace	19.7	1.6	1.2
	Pellet stove	1.8	0.3	0.0
	Woodstove	5.2	0.5	0.2
2007	Wood-burning fireplace	38.0	4.7	0.6
	Gas / Propane fireplace	18.6	3.0	0.5
	Pellet stove	3.8	0.1	0.0
	Woodstove	4.0	0.3	0.0
2006	Wood-burning fireplace	35.2	4.8	1.2
	Gas / Propane fireplace	15.0	3.3	0.6
	Pellet stove	2.8	0.0	0.4
	Woodstove	3.9	0.1	0.0
2005	Fireplace	50.5	7.4	1.0
	Pellet stove	5.8	0.2	0.5
	Woodstove	5.6	0.4	0.2
2004	Fireplace	50.4	8.9	2.3
	Pellet stove	4.7	0.6	0.3
	Woodstove	4.9	0.4	0.1

FIGURE 2 WOOD-BURNING DEVICE IN HOME: 2006 ~ 2009 (N = 3,000)



† Statistically significant change (p < 0.05) between the 2008 and 2009 studies.

For the interested reader, the following figures show how the presence of wood-burning fireplaces, wood stoves and pellet stoves varied by county (see Figure 3), home type, and age of home (see Figure 4).

FIGURE 3 WOOD-BURNING DEVICE IN HOME BY COUNTY OF RESIDENCE (N = 3,000)

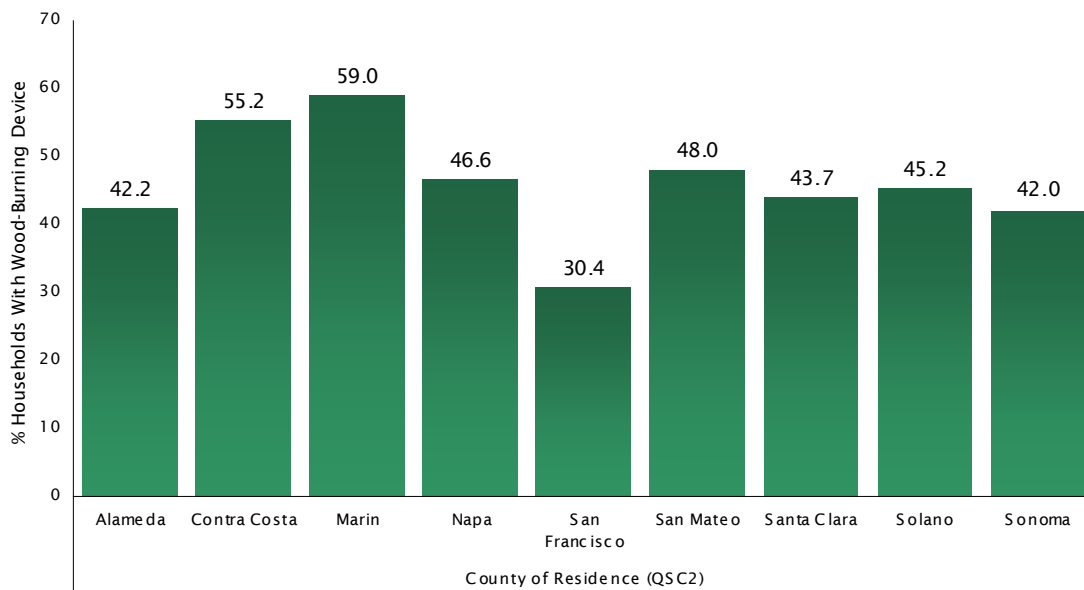
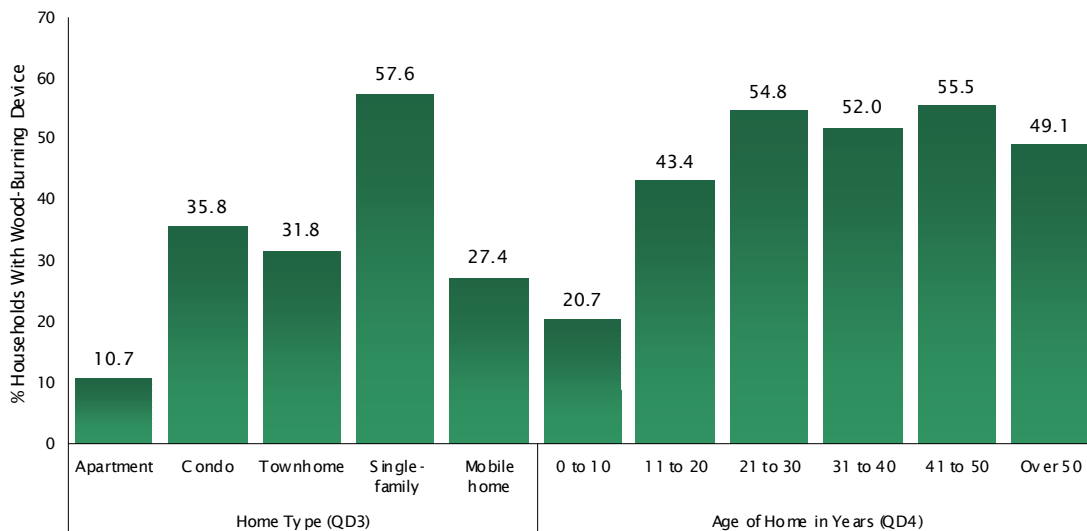


FIGURE 4 WOOD-BURNING DEVICE IN HOME BY HOME TYPE & AGE OF HOME IN YEARS (N = 3,000)

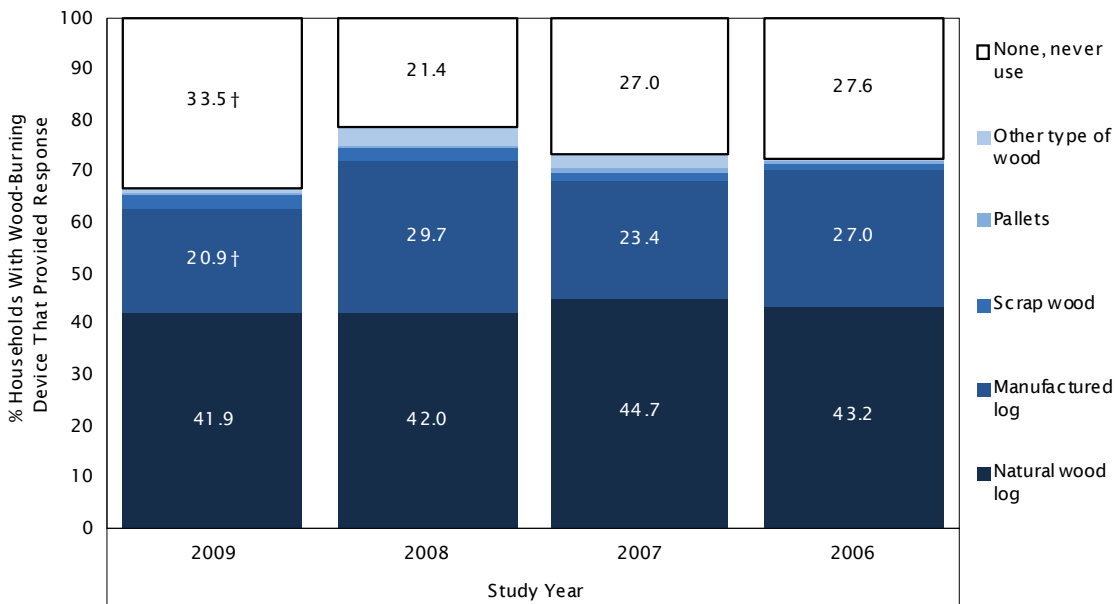


FUEL TYPE & SOURCE For the 45% of respondents who reported that their household contains a wood-burning fireplace or wood stove, the survey next inquired as to the type of wood that they *primarily* use in the fireplace or stove (see Figure 5). The most commonly used wood was natural wood logs (42%), followed by manufactured logs (21%), and scrap wood (2%).

Approximately 1% of respondents indicated that they use pallets or “other” wood, whereas 34% volunteered that they never use their wood-burning fireplace or wood stove. Figure 6 displays how the proportional use of natural wood versus manufactured logs varied by county among *all* households with a wood-burning fireplace.

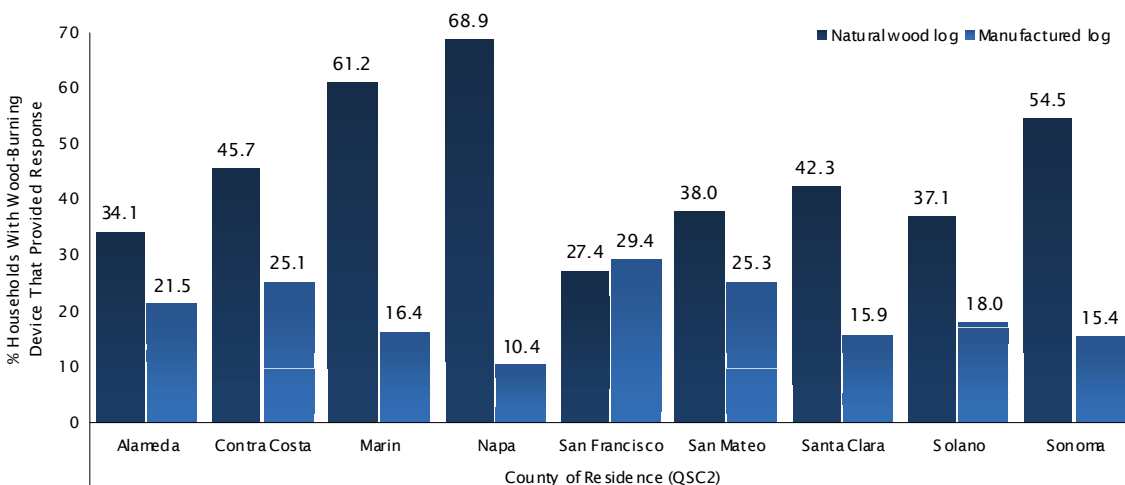
Question 2 *What type of wood do you primarily use in your wood-burning fireplace or wood stove: natural wood logs, manufactured logs such as Duraflame or Presto, scrap wood, pallets, or some other fuel?*

FIGURE 5 TYPE OF WOOD BURNED: 2006 ~ 2009 (N = 1,278)



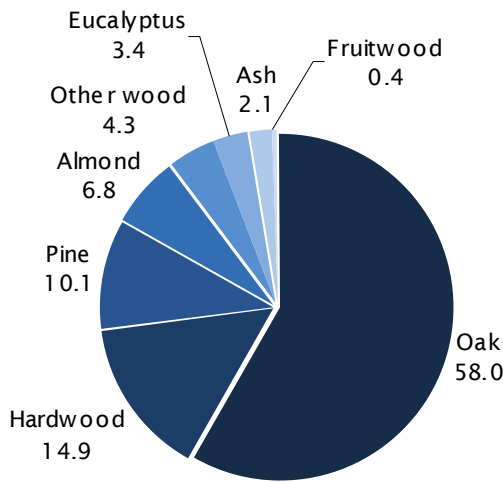
† Statistically significant change (p < 0.05) between the 2008 and 2009 studies.

FIGURE 6 TYPE OF WOOD BURNED BY COUNTY OF RESIDENCE (N = 1,278)



Question 3 What type of natural wood do you typically burn?

FIGURE 7 TYPE OF NATURAL WOOD BURNED (N = 492)

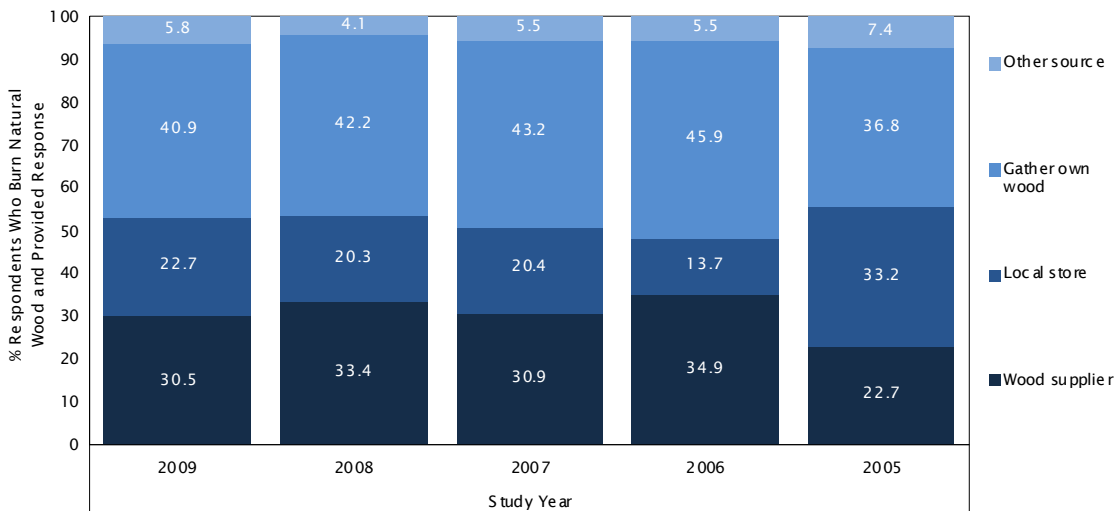


Households that reported they primarily burn natural wood logs were next asked a series of questions about the *type* of natural wood they burn (Question 3), from where they purchase their wood (Question 4), and the state of the wood they burn (Question 5). Approximately 20% of respondents in 2009 were unsure of the type of natural wood they burn. Figure 7 shows that among those who knew the type of wood, oak was the most common (58%), followed by hardwood in general (15%) and pine (10%).

When asked how they typically acquire their wood, respondents were split between those who gather their own (41%), those who purchase the wood from a local store (23%), and those who rely on a wood supplier (31%). Six percent (6%) mentioned an alternative source (Figure 8).

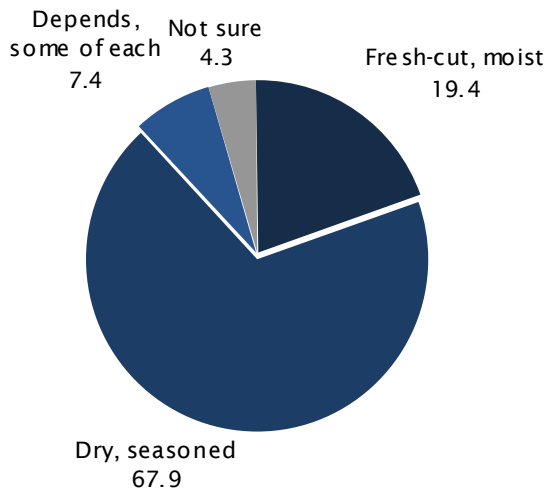
Question 4 Do you typically purchase your wood from a wood supplier, the local store, or do you gather your own wood?

FIGURE 8 SOURCE FOR NATURAL WOOD: 2005 ~ 2009 (N = 492)



Question 5 *At the point that you acquire your wood, is it fresh-cut and somewhat moist or is it already dry and seasoned?*

FIGURE 9 CONDITION OF WOOD AT POINT OF ACQUISITION: 2008 (N = 492)

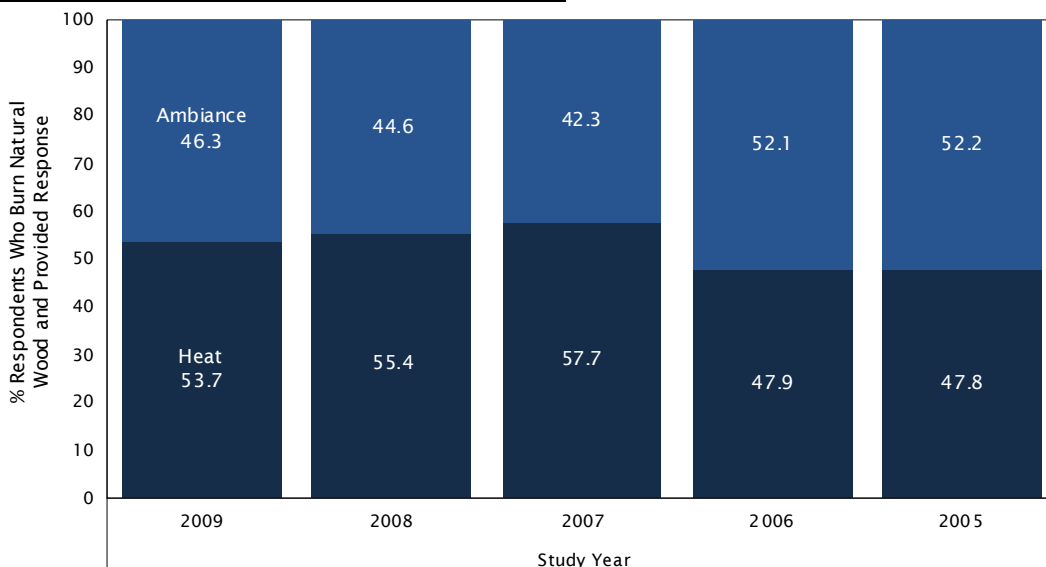


For those who primarily burn natural wood, the survey next inquired as to whether—at the point the respondent acquires their wood—the wood is fresh-cut and somewhat moist or if it is already dry and seasoned. As shown in Figure 9, two-thirds (68%) of respondents in 2009 stated that their wood is already dry and seasoned at the time they acquire it, whereas 19% reported that they typically acquire wood that is fresh-cut, 7% indicated that it depends or is a mixture, and 4% were unsure.

PRIMARY REASON FOR BURNING WOOD Households that have a wood-burning fireplace or wood stove and expected to use it during the winter were next asked to indicate the *primary* reason for why they use the device—to heat their home, or for the ambiance of having a fire? Figure 10 shows that residents, as a whole, were rather evenly divided between those who primarily burn for heat (54%) and those who primarily burn for ambiance (46%). The results for 2009 on this question are statistically similar to those found in 2008.

Question 6 *When you use your fireplace or wood stove, which of the following would you say is the primary reason you do so? For heating your home or for the ambiance of having a fire?*

FIGURE 10 PRIMARY PURPOSE OF WOOD BURNING: 2005 ~ 2009 (N = 492)



USE OF FIREPLACE, WOOD STOVE OR PELLET STOVE Respondents whose household contained at least one wood-burning fireplace, natural gas/propane fireplace, pellet stove or wood stove were next asked—for each device they own—whether they have or intend to use the device this winter between the months of November through February. As shown in Figure 11, 70% of households in 2009 that contain a pellet stove indicated that they would use the device this winter, which is a significant decrease over the expected rate of usage reported in 2008. The rate of use was somewhat lower for wood stoves (66%) and natural gas/propane fireplaces (63%), and significantly lower for wood-burning fireplaces (43%). The results for the 2008, 2007, 2006, 2005 and 2004 surveys are presented for comparison, but note that wood-burning fireplaces are combined with natural gas/propane devices in the figure for 2005 and 2004.

Question 7 Will you use your _____ this winter?

FIGURE 11 HEATING DEVICE USAGE THIS WINTER: 2004 ~ 2009 (WOOD-BURNING FIREPLACE N = 1,200; GAS FIREPLACE N = 631; PELLET STOVE N = 80; WOOD STOVE N = 178)

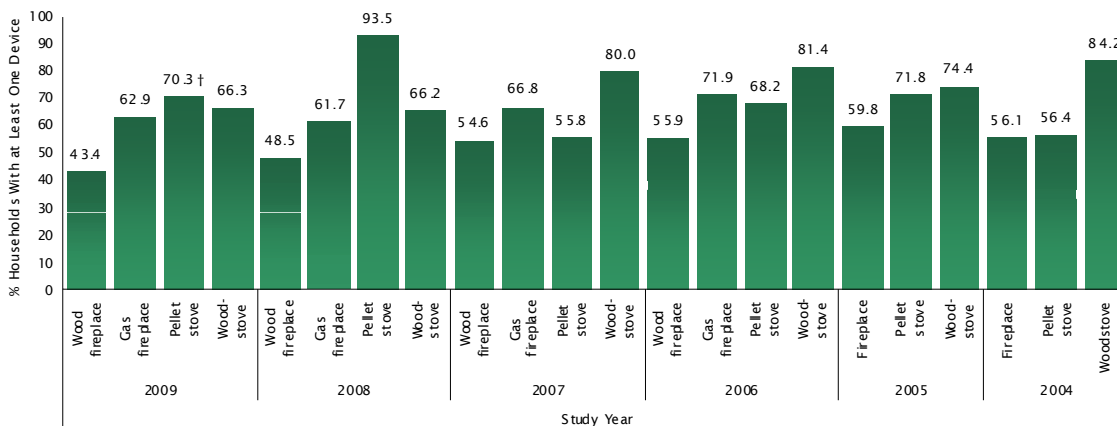


FIGURE 12 OVERALL WOOD-BURNING DEVICE USAGE THIS WINTER BY COUNTY OF RESIDENCE (N = 1,336)

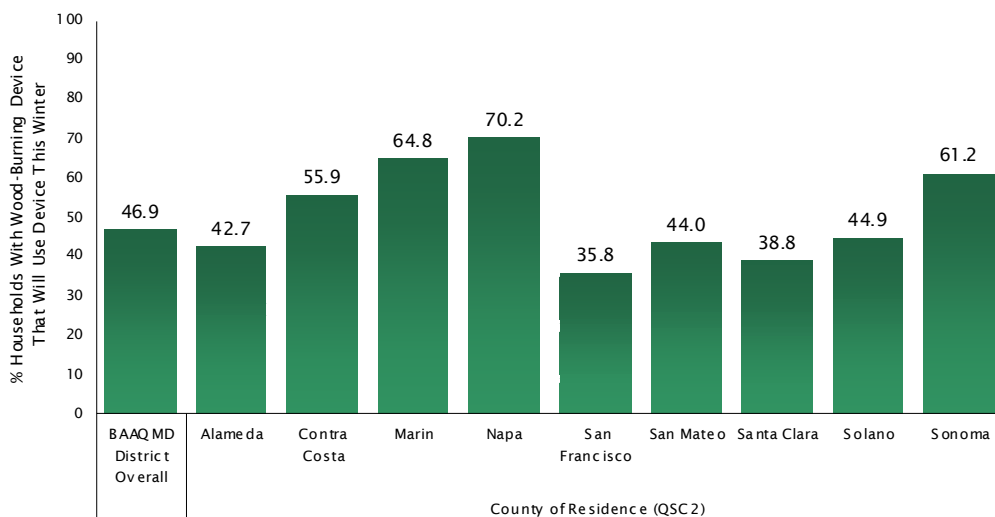
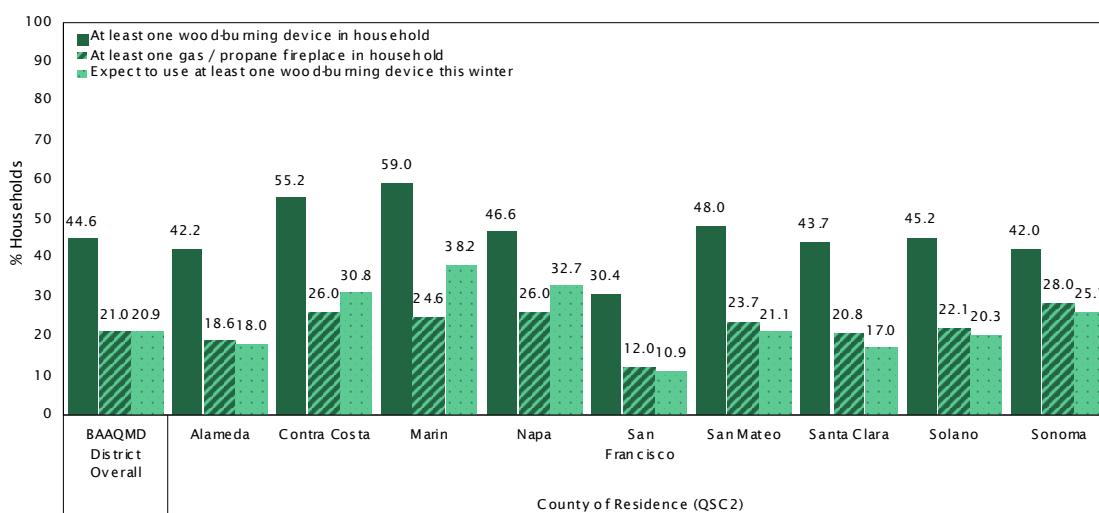


Figure 12 summarizes the information collected in Question 7 among all households with a wood-burning device—overall and by county. Overall, 47% of households with at least one wood-burning device indicated that they would use the device this winter. The reported rate of expected use in 2009 among households with a wood-burning device was highest in Napa County (70%) and lowest in San Francisco County (36%).

Figure 13 provides a more detailed summary of the presence and expected use of wood-burning heating devices for the District as a whole, as well as by the nine member counties. Among *all households in the District*, 45% own a wood-burning fireplace, pellet stove or wood stove, 21% own a natural gas/propane fireplace, and 21% expected to use their wood-burning device this winter. Ownership (59%) and expected use (38%) was highest in Marin County.

FIGURE 13 WOOD-BURNING DEVICE USAGE THIS WINTER BY COUNTY OF RESIDENCE (N = 3,000)



Respondents who indicated that they do not expect to use their fireplace, wood stove or pellet stove this winter in Question 7 were next asked to indicate *why* they do not intend to use the device. Figure 14 summarizes the results of those who offered campaign-related reasons. Approximately 17% of wood-burning fireplace owners who did not intend to use the device this winter offered a reason related to air quality and an additional 30% mentioned a specific health-related reason. Approximately 30% of natural gas/propane fireplace owners mentioned air quality or health-related reasons, whereas the corresponding percentage among pellet stove owners was 38% and among wood stove owners was 28%. The remaining respondents offered a reason unrelated to air quality or health.

Figure 15 displays the percentage of households that own a wood-burning fireplace, wood stove or pellet stove and indicated that they will not use the device this winter for reasons that can be attributed to the Winter Spare the Air campaign.⁷ Overall, 10% of households District-wide reported that they would not use their wood-burning heating device at all during the winter due

7. That is, they mentioned air quality and/or health-related reasons for not using the wood-burning device this winter *and* they were aware of the Winter Spare the Air campaign. Note that this figure does not include households that intend to use their wood-burning device, but did refrain from burning wood on at least one occasion due to the campaign (see Figure 35 on page 32 for figure on full campaign impacts).

to the campaign. Among the nine member counties, San Francisco had the highest percentage of wood-burning device-owning households that fit this description, whereas San Mateo had the lowest (see Figure 16).

Question 8 Why do you not expect to use your _____ this winter?

FIGURE 14 REASON FOR NOT USING HEATING DEVICE THIS WINTER (WOOD-BURNING FIREPLACE N = 628; GAS FIREPLACE N = 208; PELLET STOVE N = 22; WOOD STOVE N = 50)

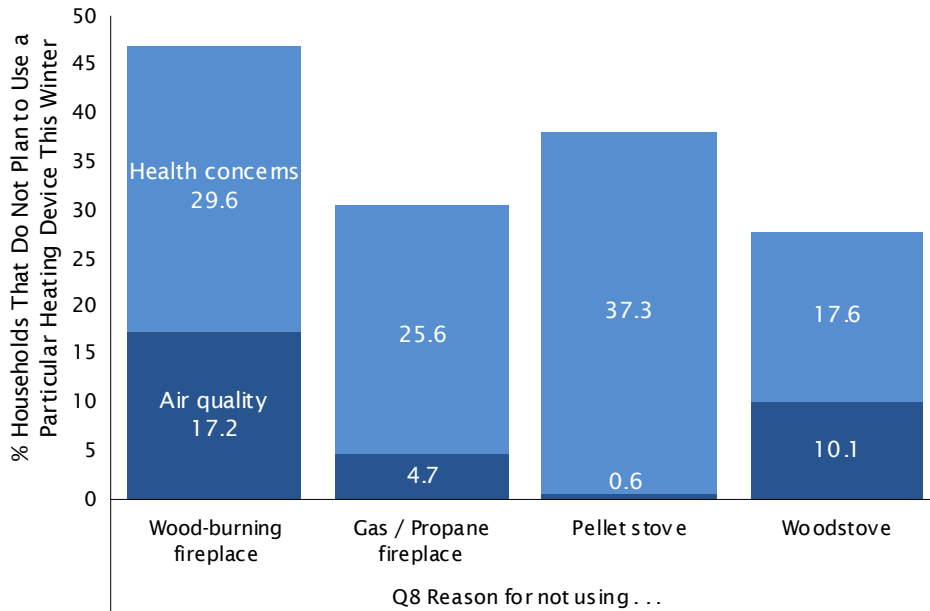


FIGURE 15 NOT BURNING WOOD THIS WINTER BECAUSE OF WINTER SPARE THE AIR CAMPAIGN: 2006 ~ 2009 (N = 1,336)

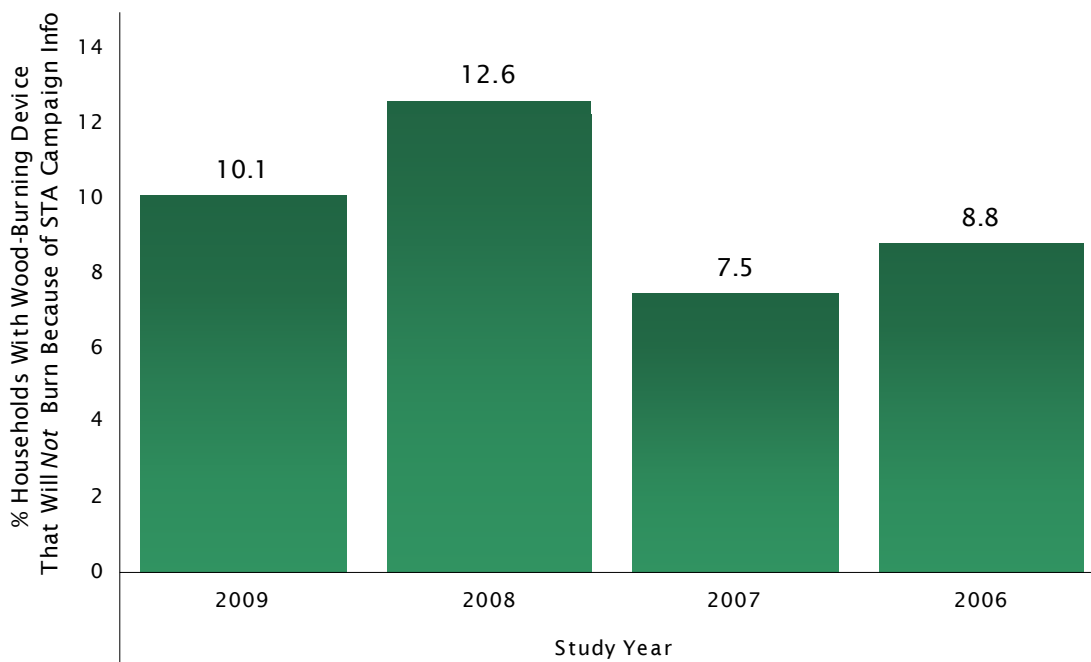
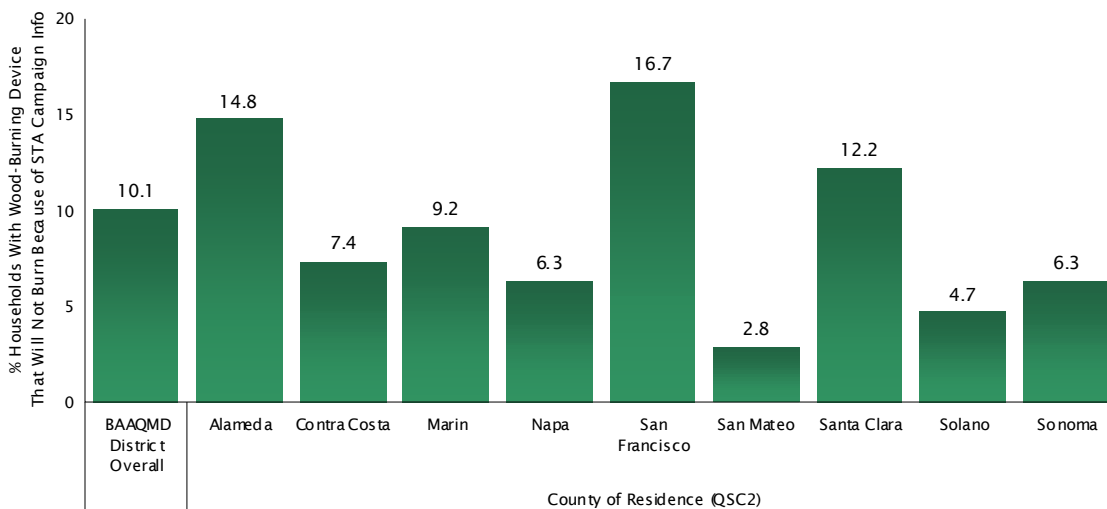


FIGURE 16 NOT BURNING WOOD THIS WINTER BECAUSE OF WINTER SPARE THE AIR CAMPAIGN BY COUNTY OF RESIDENCE (N = 1,336)



SEASONAL WOOD BURNING BEHAVIOR The next series of questions were only asked of respondents who owned at least one wood-burning fireplace, pellet stove or wood stove *and* indicated that they will burn wood during the 2009-2010 winter months.

The first question (Question 9) asked each respondent how often they expected that they would burn wood this winter—at least once per week or less often? Respondents who indicated that they expected to burn wood less often than once per week were next asked to be more specific as to how often they expected to burn wood—two to three times per month, once per month, or less often than once per month? For respondents who indicated that they expected to burn wood weekly, Question 11 asked how many days they expected to burn wood in a typical winter week. The results to all three questions are combined in Figure 17 on page 21.

Overall, just under half (45%) of respondents indicated that they expected to burn wood on a weekly basis, although most (27%) stated that they would burn wood three days or less per week. Overall, 16% indicated that they expected to burn wood two to three times per month, 20% once per month, and 15% expected to burn wood less often than once per month.

When compared to 2008, there were several statistically significant changes in the expected frequency of wood-burning among households that own a wood-burning device and expected to use it this winter (see Table 2 on page 21).

Question 9 How often do you expect to burn wood this winter? At least once per week or less often than that?

Question 10 Would you say that you will burn wood about two to three times per month, once per month, or less often than once per month?

Question 11 In a typical winter week, how many days do you expect to burn wood?

FIGURE 17 FREQUENCY OF WOOD BURNING THIS WINTER (N = 627)

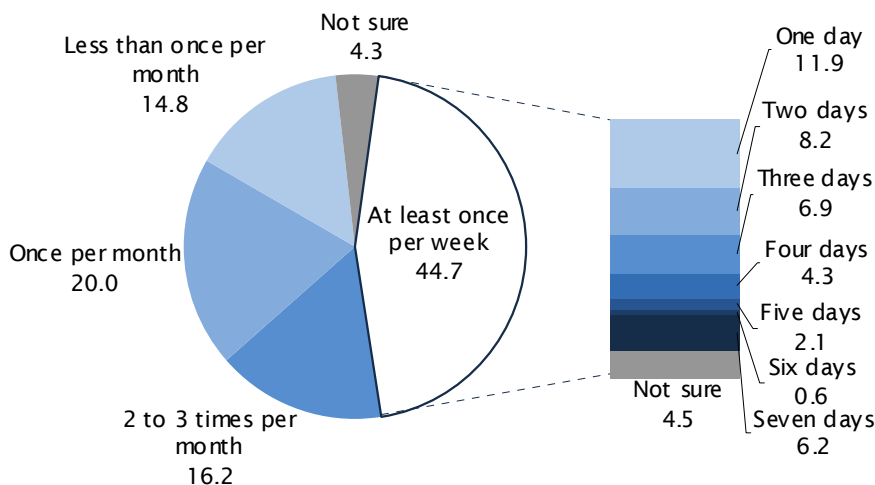


TABLE 2 FREQUENCY OF WOOD BURNING THIS WINTER: 2004 ~ 2009 (N = 627)

	Study Year					
	2009	2008	2007	2006	2005	2004
At least once per week	44.7%†	48.7%	54.3%	52.9%	48.9%	34.2%
One day	11.9%	10.3%	10.4%	10.0%	9.3%	11.2%
Two days	8.2%	16.2%	8.6%	17.2%	11.5%	5.6%
Three days	6.9%	6.0%	10.1%	8.0%	10.4%	6.1%
Four days	4.3%	2.2%	6.6%	3.5%	4.3%	1.0%
Five days	2.1%	4.0%	8.3%	3.8%	3.2%	2.6%
Six days	0.6%	0.5%	0.2%	1.9%	0.8%	1.5%
Seven days	6.2%	5.9%	8.9%	7.2%	7.2%	6.1%
Not sure # of days	4.5%	3.6%	1.3%	1.3%	2.2%	0.0%
2 to 3 times per month	16.2%†	19.8%	14.9%	15.0%	18.5%	28.1%
Once per month	20.0%†	15.2%	18.0%	15.0%	17.0%	15.8%
Less than once per month	14.8%	13.2%	11.4%	16.4%	11.7%	18.4%
Not sure of frequency	4.3%	3.1%	1.4%	0.6%	4.0%	3.6%

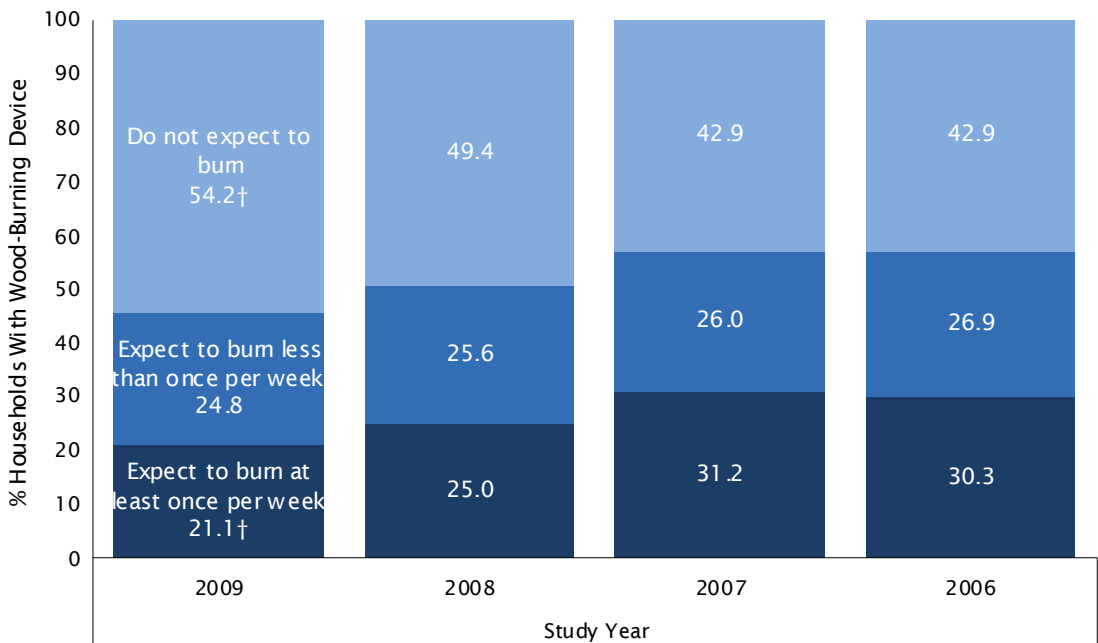
† Statistically significant change (p < 0.05) between the 2008 and 2009 studies.

Figures 18 and 19 provide a useful summary of wood burning behavior among households that own a wood-burning heating device in the District overall, as well as by county. Overall, 21% of households in 2009 expected to burn wood weekly, 25% expected to burn wood less frequently than once per week, and 54% own a wood-burning heating device but indicated that they do not expect to burn wood this winter. When compared to 2008, the percentage of households that

expected to burn wood on a weekly basis decreased significantly, whereas the percentage that did not expect to burn wood at all increased significantly.

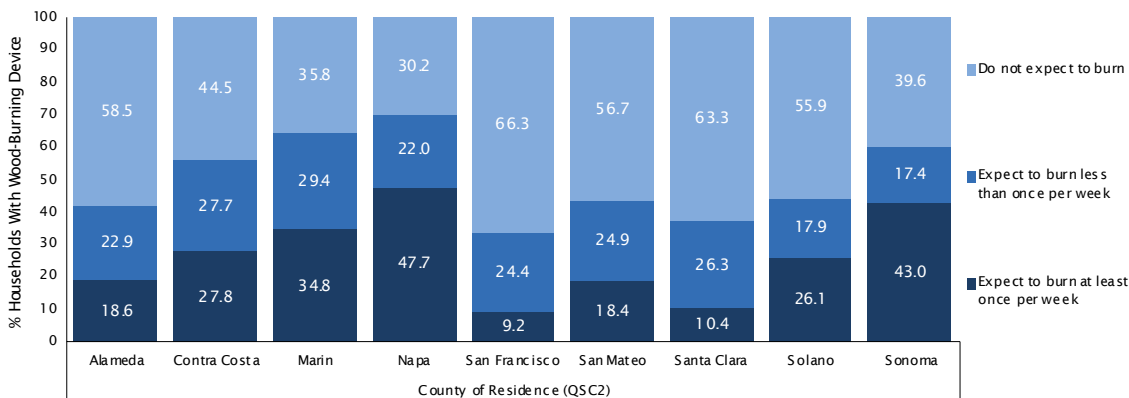
Among the nine member counties, Napa County had the highest percentage of wood-burning device-owning households that expected to burn wood weekly (48%), whereas San Francisco had the lowest (9%).

FIGURE 18 FREQUENCY OF WOOD BURNING THIS WINTER AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS: 2006 ~ 2009 (N = 1,336)



† Statistically significant change (p < 0.05) between the 2008 and 2009 studies.

FIGURE 19 FREQUENCY OF WOOD BURNING THIS WINTER AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS BY COUNTY OF RESIDENCE (N = 1,336)



WOOD BURNING BEHAVIOR IN PAST WEEK Respondents were also asked whether they burned wood in the past week and—if yes—if they burned wood the day or evening prior to the interview. The results to these two questions are combined in Figure 20. Thirty-five percent (35%) of respondents whose household includes at least one wood-burning fireplace, pellet stove and/or wood stove *and* expected to burn wood during the winter months indicated that they had burned wood during the week prior to the interview. Moreover, approximately 14% had burned wood the day prior to the interview.

When compared to the 2008 season, there were no statistically significant changes in the percentage of households that reported they had burned wood in the week prior to the interview (see Table 3).

Question 12 *Did you burn wood in the past seven days?*

Question 13 *Did you burn wood yesterday or last night?*

FIGURE 20 BURNED WOOD IN PAST SEVEN DAYS (N = 627)

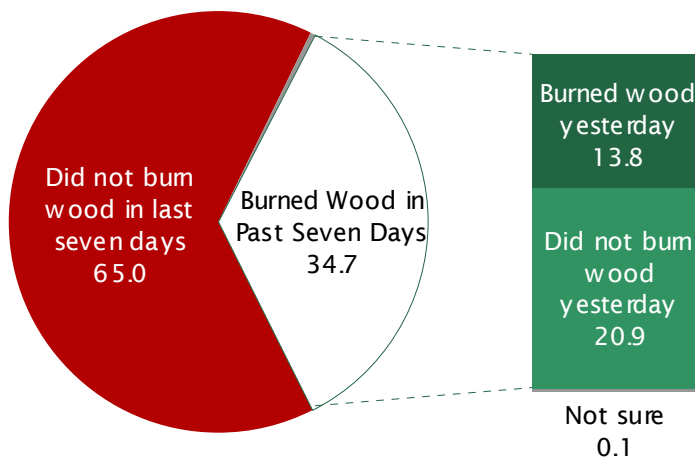


TABLE 3 BURNED WOOD IN PAST SEVEN DAYS: 2004 ~ 2009 (N = 627)

	Study Year					
	2009	2008	2007	2006	2005	2004
Burned wood in past seven days	34.7%	38.3%	53.1%	51.0%	43.0%	32.1%
Burned wood yesterday	13.8%	15.1%	27.2%	22.3%	21.7%	12.8%
Did not burn wood yesterday	20.9%	23.2%	25.9%	28.7%	21.1%	19.4%
Not sure of burning yesterday	0.1%	0.1%	0.4%	0.0%	0.2%	0.0%
Did not burn wood in last seven days	65.0%	61.5%	45.8%	49.0%	56.6%	67.3%
Not sure of burning in past seven days	0.2%	0.0%	0.7%	0.0%	0.4%	0.5%

The following figures show the percentage of wood-burning device-owning households that burned wood in the seven days prior to the interview (Figures 21 & 22) and on the day prior to the interview (Figures 23 & 24) for the District as a whole, as well as by the nine member counties.

FIGURE 21 BURNED WOOD IN PAST SEVEN DAYS AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS: 2006 ~ 2009 (N = 1,336)

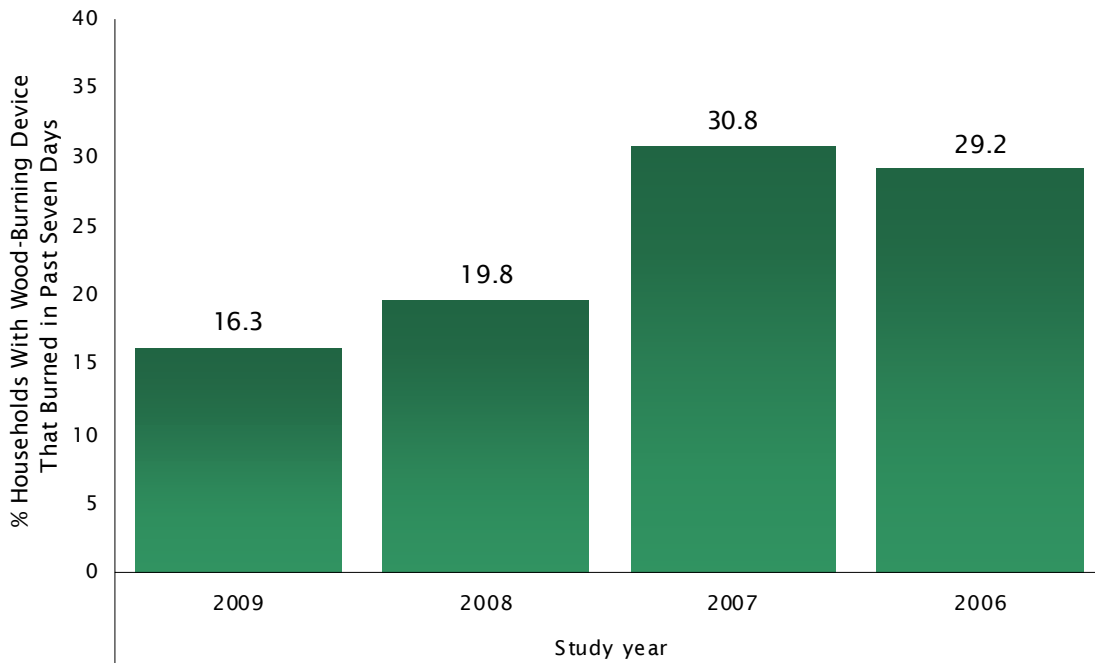


FIGURE 22 BURNED WOOD IN PAST SEVEN DAYS AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS BY COUNTY OF RESIDENCE (N = 1,336)

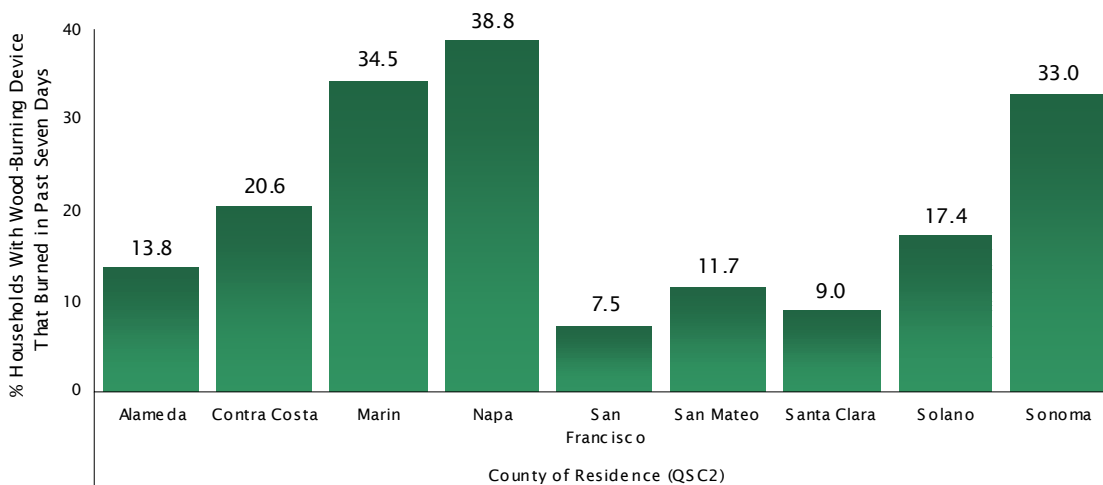


FIGURE 23 BURNED WOOD YESTERDAY AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS: 2006 ~ 2009 (N = 1,336)

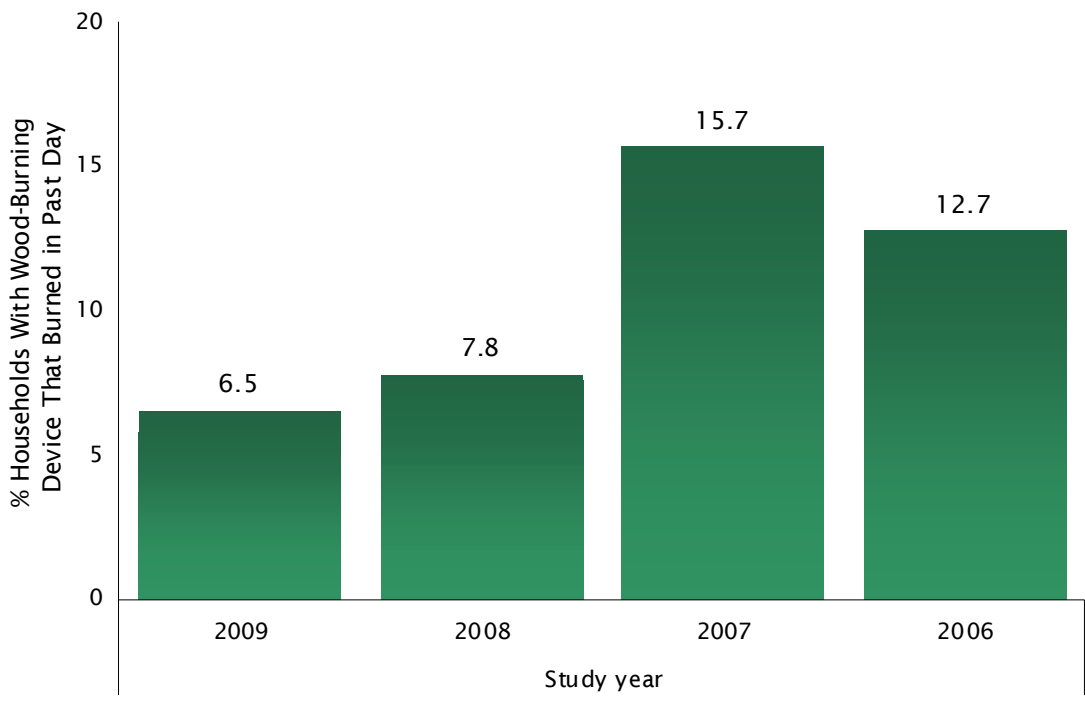
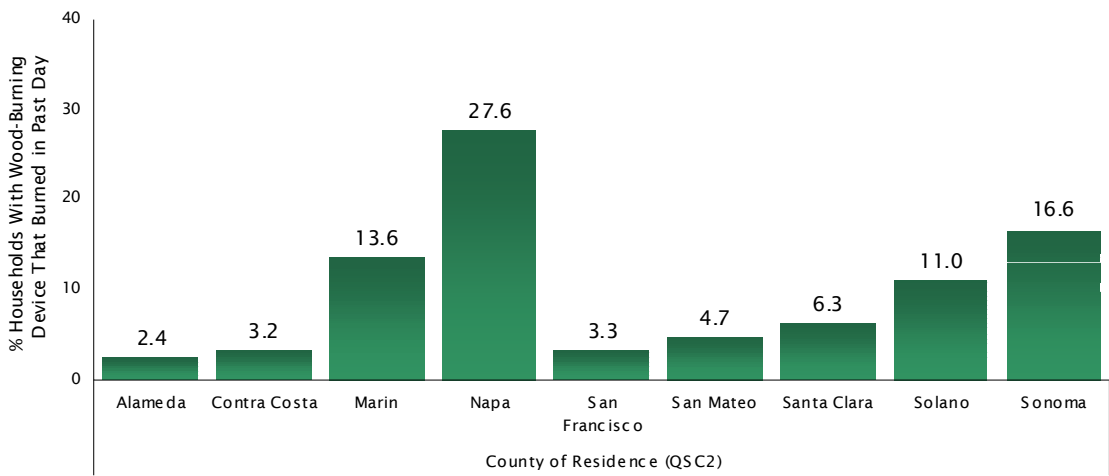


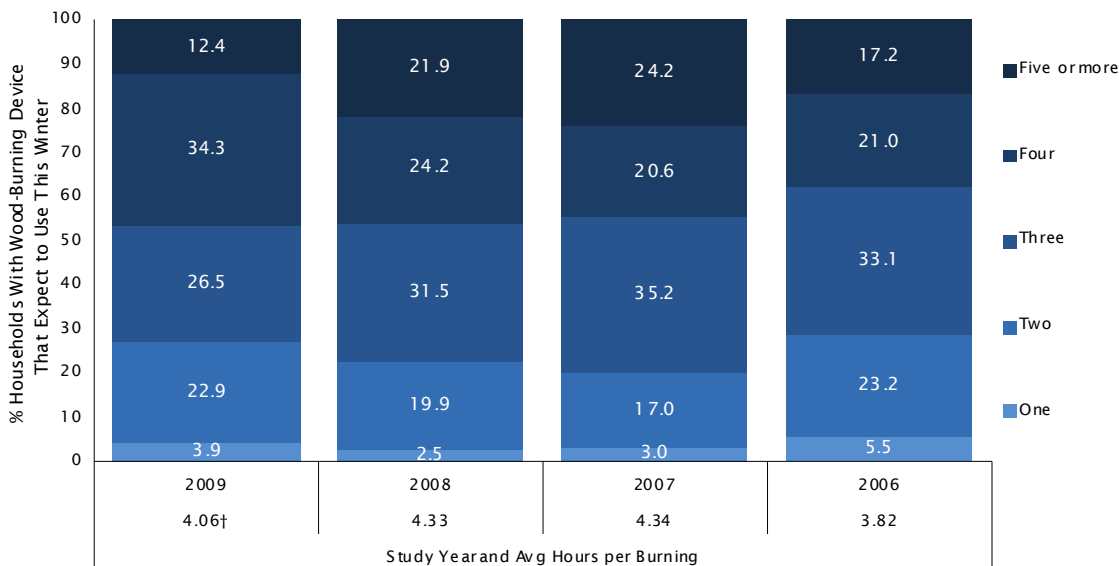
FIGURE 24 BURNED WOOD YESTERDAY AMONG ALL WOOD-BURNING DEVICE HOUSEHOLDS BY COUNTY OF RESIDENCE (N = 1,336)



DURATION & VOLUME OF WOOD BURNING Questions 14 and 15 asked respondents with wood-burning devices who also expected to use the device this winter to estimate the number of hours they have a fire burning—as well as the number of logs they burn—on a typical day that they burn wood. In terms of hours, respondents were split between those who burn at least four hours on a typical day (47%), those who burn approximately three hours per day (27%), and those who burn less than three hours (27%). The average duration among all respondents who received this question in 2009 was 4.06 hours, which is significantly lower than the 4.33 hours reported in 2008. Among the nine member counties, respondents from Napa County reported the highest average hours burned per burn day at 6.82 hours (Figure 26). Frequent burners also reported a longer duration (4.89 hours) for a typical burn day when compared to those who burn less than once per week (3.23 hours).

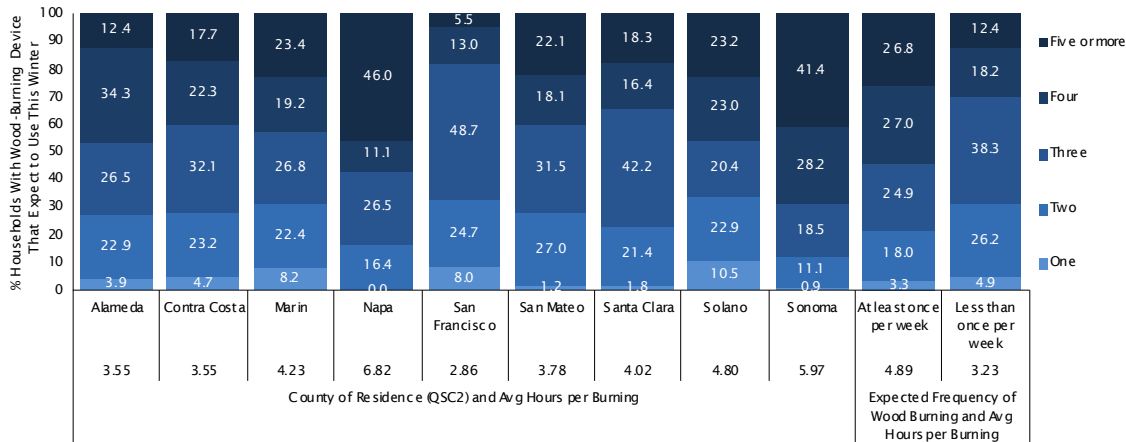
Question 14 *In a typical day that you burn wood, how many hours of the day do you have a fire burning?*

FIGURE 25 DISTRIBUTION AND AVERAGE HOURS OF BURNING IN TYPICAL DAY OF WOOD-BURNING: 2006 ~ 2009 (N = 627)



† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

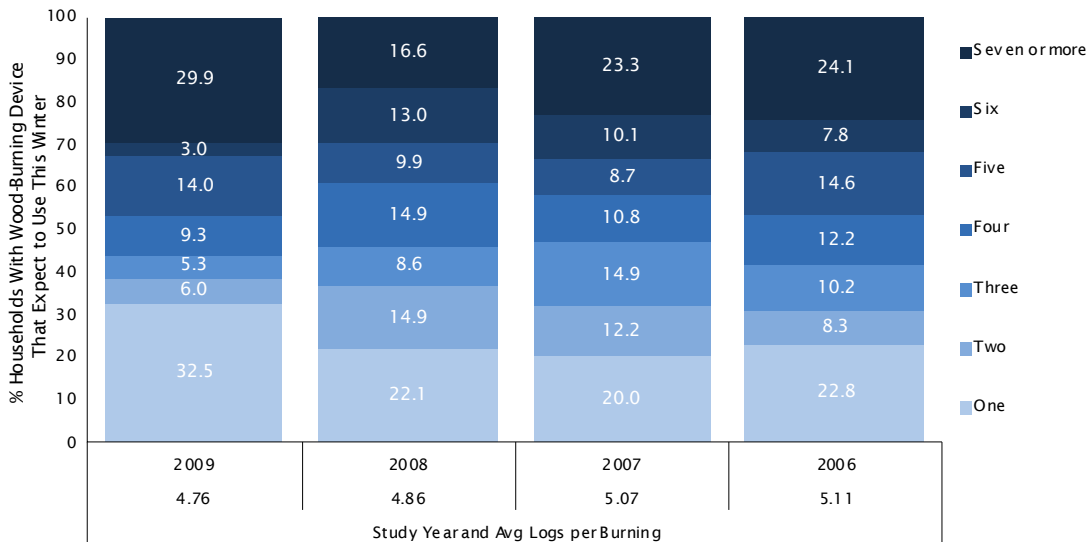
FIGURE 26 DISTRIBUTION AND AVERAGE HOURS OF BURNING IN TYPICAL DAY OF WOOD-BURNING BY COUNTY OF RESIDENCE & EXPECTED FREQUENCY OF WOOD BURNING (N = 627)



In terms of volume, respondents were split in 2009 between those who burn one or two logs per typical burn day (39%), those who estimated that they burn three to five logs (29%), and those who reported burning more than five logs per day (33%). The average number of logs reported per burn day in 2009 was 4.76 (Figure 27).

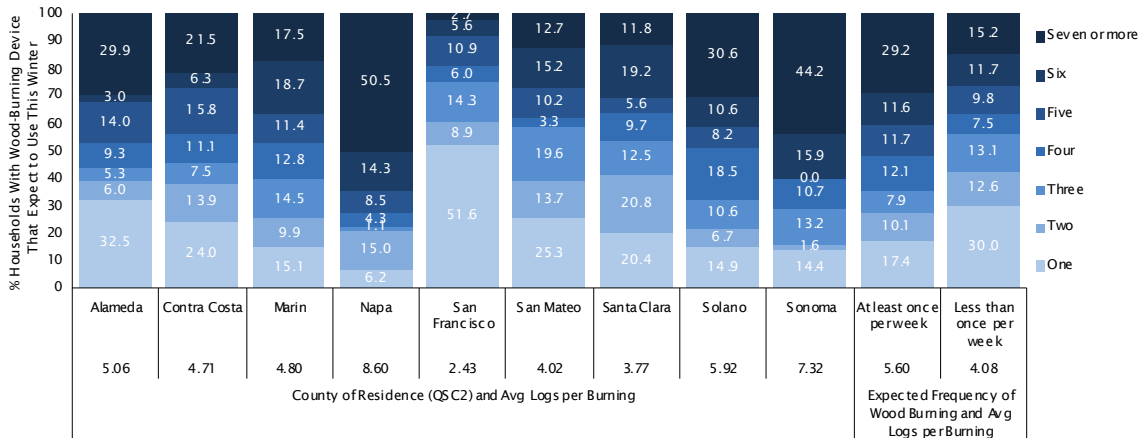
Question 15 *In a typical day that you burn wood, how many logs do you burn throughout the entire day?*

FIGURE 27 DISTRIBUTION AND AVERAGE NUMBER OF LOGS BURNED IN TYPICAL DAY OF WOOD-BURNING: 2006 ~ 2009 (N = 583)



As shown in Figure 28, counties that reported longer than average burn durations on a typical burn day also tended to report higher than average volumes of logs burned per burn day. Frequent burners also reported a higher number of logs burned (5.60) per burn day when compared to their counterparts (4.08) who burn less frequently than once per week.

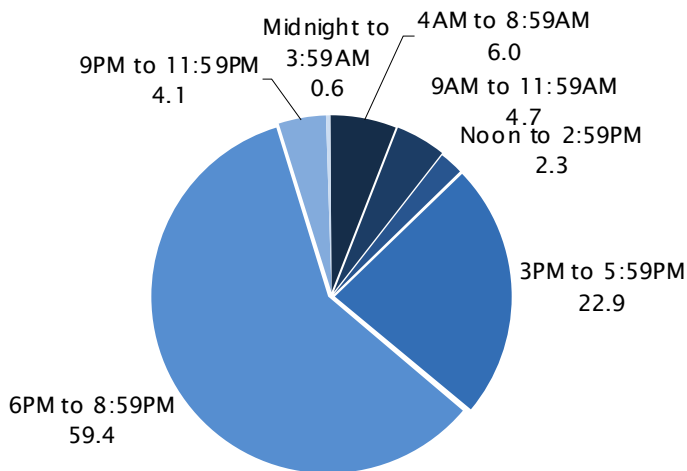
FIGURE 28 DISTRIBUTION AND AVERAGE NUMBER OF LOGS BURNED IN TYPICAL DAY OF WOOD-BURNING BY COUNTY OF RESIDENCE & EXPECTED FREQUENCY OF WOOD BURNING (N = 583)



The final question in this series asked respondents to identify the time of day that they first lit their most recent fire. More than half (59%) of respondents indicated that they started their most recent fire between 6PM and 8:59PM, and an additional one-quarter (23%) started their fire a bit earlier between 3PM and 5:59PM (see Figure 29).

Question 16 *Thinking back to your most recent fire, approximately what time of the day did you first light the fire?*

FIGURE 29 TIME OF LIGHTING MOST RECENT FIRE (N = 627)



CHANGES IN WOOD BURNING BEHAVIOR

Having measured respondents' basic wood burning behavior, the survey next focused on whether respondents had made changes in their wood burning behavior during the 2009-2010 winter season in response to the Winter Spare the Air campaign or other factors.

GENERAL CHANGES IN WOOD BURNING BEHAVIOR The first question in this series simply asked the respondent if they expected that they would burn wood more frequently, less frequently, or at about the same frequency as the prior winter season. Overall, 59% of households that own a wood-burning heating device and expected to burn wood this season reported that they anticipated burning wood at about the same frequency this season as last (Figure 30). Approximately 22% expected to burn less often this season, whereas 12% expected to burn more frequently. Among the nine member counties, San Francisco contained the highest proportion of households that expected to burn more frequently this season, whereas San Mateo contained the largest percentage who expected to burn less frequently (see Figure 31 on page 30).

Question 17 *This winter, do you expect that you will burn wood more often, less often, or about the same frequency as you did last winter?*

FIGURE 30 EXPECTED FREQUENCY OF WOOD BURNING THIS WINTER COMPARED TO LAST WINTER: 2005 ~ 2009 (N = 627)

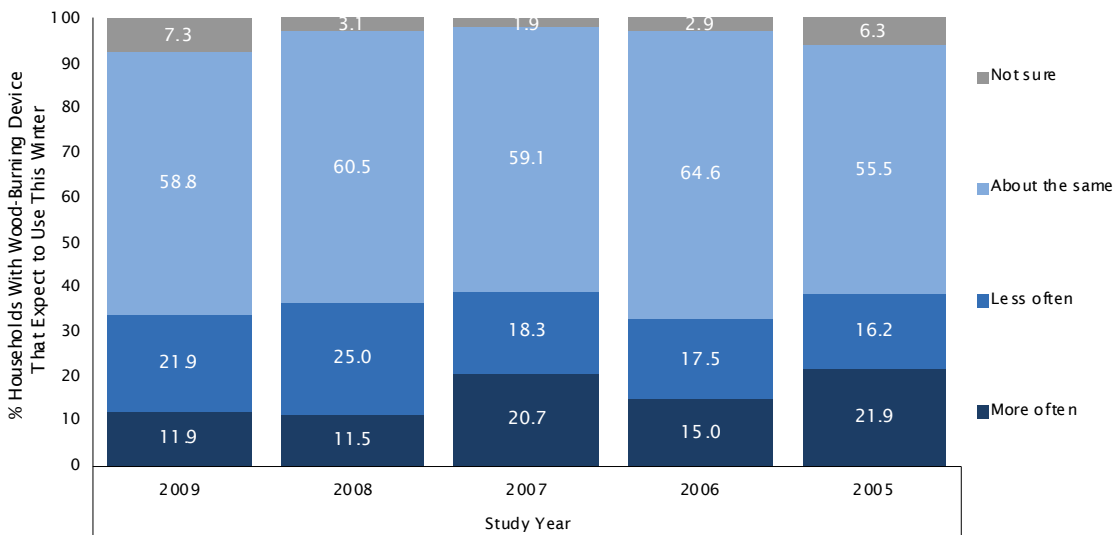
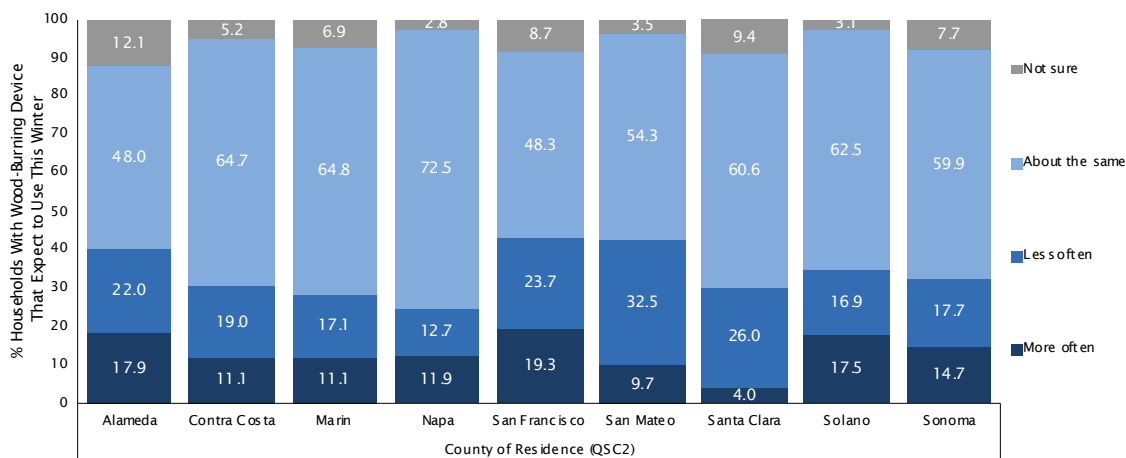


FIGURE 31 EXPECTED FREQUENCY OF WOOD BURNING THIS WINTER COMPARED TO LAST WINTER BY COUNTY OF RESIDENCE (N = 627)



SEASONAL CHANGES IN WOOD BURNING BEHAVIOR Households that burned wood this winter (or anticipated doing so) were next asked whether there were occasions when they normally would have burned wood, but refrained from doing so. For those who answered in the affirmative, the survey next asked in an open-ended manner *why* they decided not to burn wood on these occasions.

The manner in which these questions were asked, as well as their placement in the survey relative to specific questions about the Winter Spare the Air Campaign, was changed in 2004 from prior surveys. Previous surveys first introduced the Winter Spare the Air Program and then asked if individuals responded to the Program by reducing the amount of wood they burned. Asking the question in this manner is likely to prompt a *socially desirable* response from some respondents that they had reduced their wood burning even if they had not—which leads to artificially high estimates of the campaign’s impact. To more accurately measure reductions in wood burning that can be attributed to the campaign, the 2004-2009 surveys employed an indirect approach similar to that used in the CARB/EPA Method for estimating reductions in driving due to the summer Spare the Air Campaign.

As shown in Figure 32, 55% of respondents who have a wood-burning fireplace, wood stove and/or pellet stove *and* expected to burn wood during the 2009-2010 winter season indicated that—on at least one occasion this season—they refrained from burning wood. When asked *why* they chose not to burn wood on these occasions, 28% specifically mentioned the Winter Spare the Air campaign and an additional 5% offered an air quality or health-related reason (see Figure 33).⁸ When compared to 2008, the proportion who cited the Winter Spare the Air campaign as the reason for why they refrained from burning wood increased a statistically significant 5%. For the interested reader, the proportion of respondents who mentioned the campaign or air quality and/or health reasons as a reason for not burning wood at least once this winter is shown by county in Figure 34 on page 32.

8. Among those who refrained from burning wood due to Winter Spare the Air, air quality and/or health-related reasons, the average number of occasions they refrained from burning wood during the season prior to taking the interview was 4.29.

Question 18 *Were there occasions this winter when you normally would have burned wood, but decided not to?*

Question 19 *Why did you decide not to burn wood on these occasions?*

FIGURE 32 CHOSE NOT TO BURN THIS WINTER (N = 627)

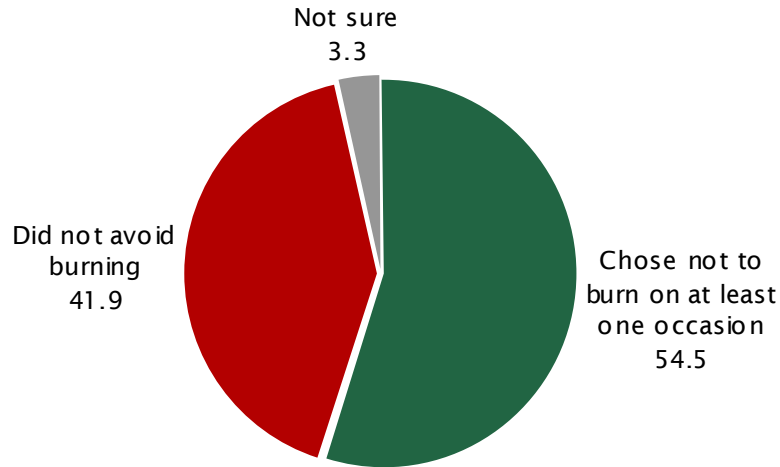
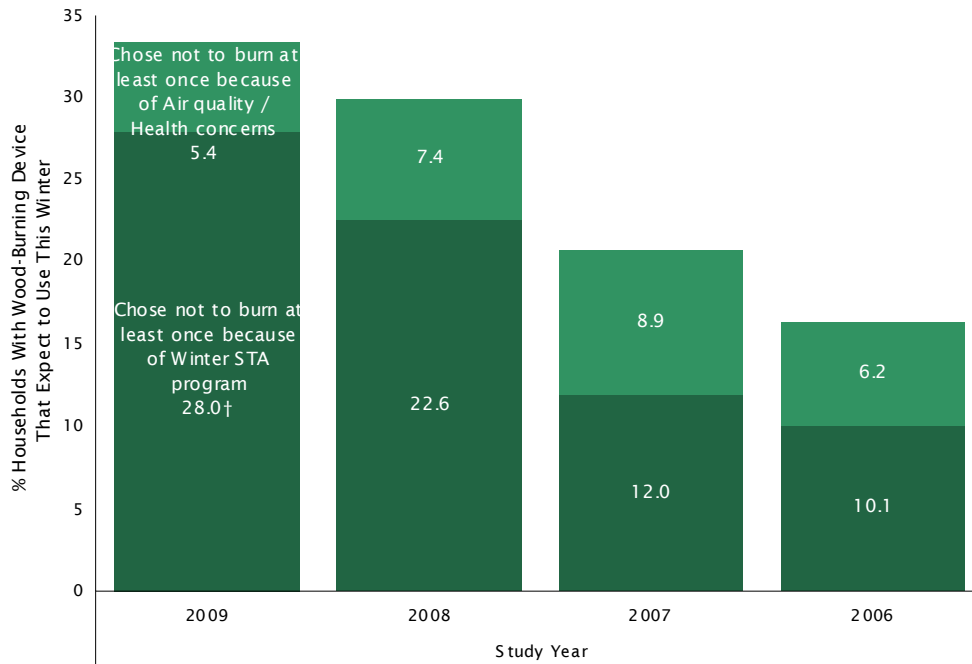
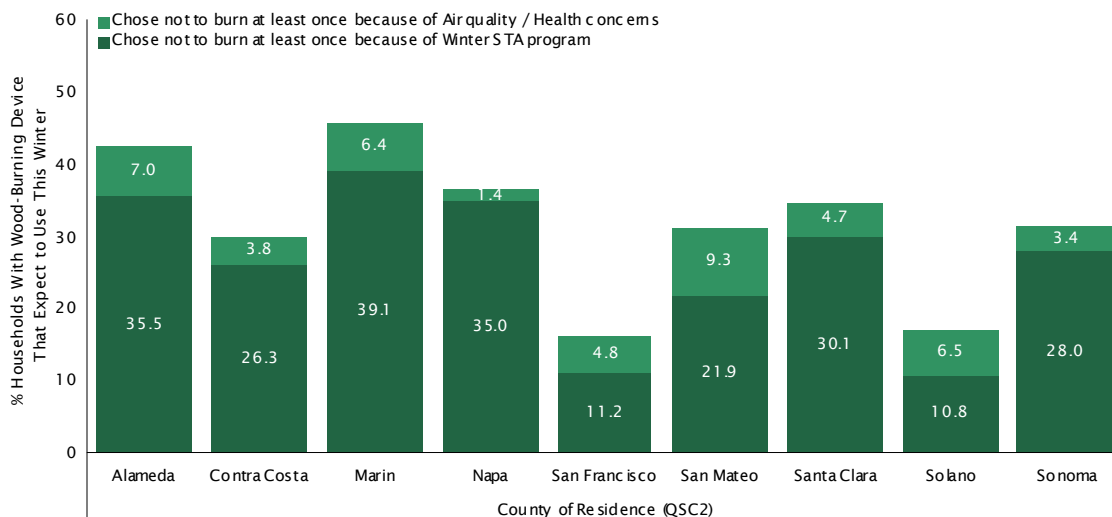


FIGURE 33 CHOSE NOT TO BURN THIS WINTER BECAUSE OF WINTER SPARE THE AIR CAMPAIGN INFO OR AIR QUALITY / HEALTH CONCERNS: 2006 ~ 2009 (N = 627)



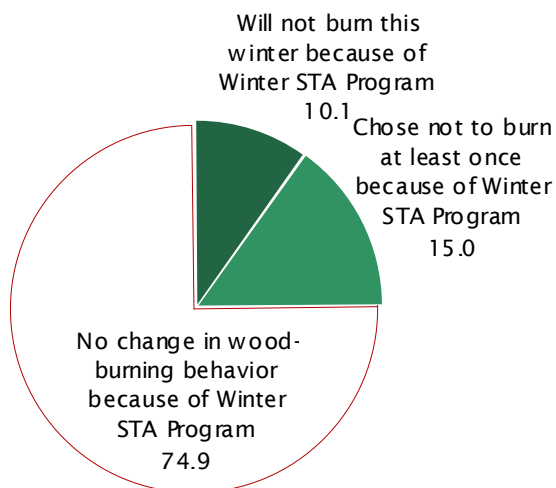
† Statistically significant change (p < 0.05) between the 2008 and 2009 studies.

FIGURE 34 CHOSE NOT TO BURN THIS WINTER BECAUSE OF WINTER SPARE THE AIR CAMPAIGN INFO OR AIR QUALITY / HEALTH CONCERNS BY COUNTY OF RESIDENCE (N = 627)



SEASONAL CAMPAIGN IMPACTS ON WOOD BURNING To estimate the proportion of adults in the District who reduced the amount of wood that they burned during the winter season in response to the campaign, one must combine the responses from several questions in the survey. Naturally, respondents who do not live in a household that contains a wood-burning fireplace, wood stove or pellet stove (Question 1) should not be included in the analysis since they could not respond to the campaign by reducing their wood burning behavior. Respondents who chose not to burn wood *at all* during the winter (Question 7), did so because of air quality or health related reasons (Question 8), *and* were aware of the Winter Spare the Air Program (Question 36) can be considered a Spare the Air (STA) reducer. So too can respondents who indicated that although they did burn wood, they refrained from doing so on occasion (Question 18), did so because of the campaign and/or for air quality/health reasons (Question 19), *and* were aware of the Winter Spare the Air Program (Question 36).

FIGURE 35 SPARE THE AIR REDUCERS (N = 1,336)



Among all households with a wood-burning fireplace, pellet stove or wood stove, 10% chose not to burn *at all* during the winter season because of the Winter Spare the Air campaign, and an additional 15% refrained from burning on at least one occasion for the same reason. Collectively, the Winter Spare the Air campaign influenced more than 25% of households with a wood-burning fireplace, pellet stove or wood stove to reduce their wood burning during the 2009-2010 winter season (Figure 35).

Table 4 shows that of the 1,336 respondents in the survey who were eligible to respond to the campaign, 335 (25%) reduced their wood burning behavior on at least one occasion during the 2009-2010 winter in response to the Winter Spare the Air Program.⁹ This represents 271,973 households out of the estimated 1,084,857 households with a wood-burning heating device. In terms of the reliability of the estimate, we can be 95% confident that the actual proportion of Winter Spare the Air reducer households this season was between 22.75% and 27.39%.

TABLE 4 SPARE THE AIR REDUCERS: CONFIDENCE INTERVAL

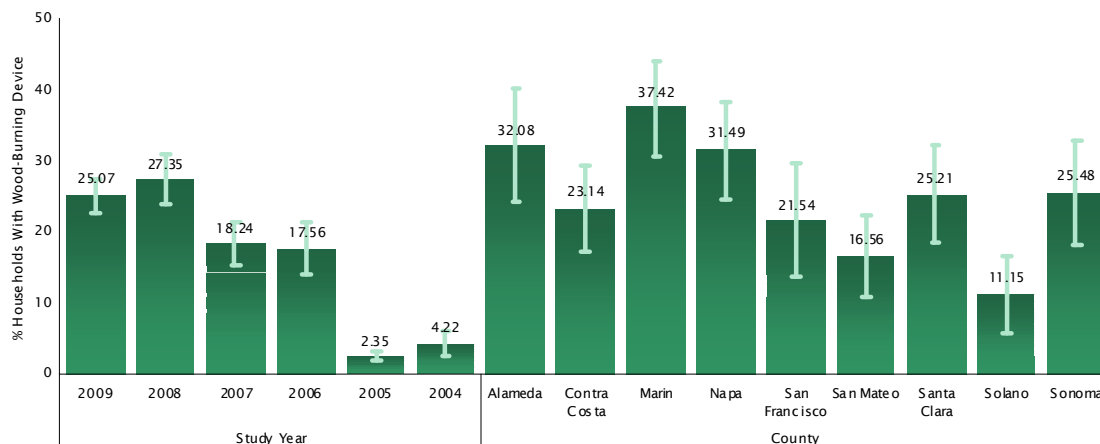
Winter Spare the Air Alert Reducers		
Universe Estimate (households with heating device)		1,084,857
Sample Size (surveyed households with heating device)		1,336
STA Reducers		335
Non-STA Reducers		1001
Proportion of STA Reducers		25.07%
Proportion of Non-STA Reducers		74.93%
Maximum Margin of Error (95% confidence)		2.32%
Confidence Interval for Proportion of Winter STA Reducers	Lower Bound	22.75%
	Upper Bound	27.39%

Figure 36 displays the estimated percentage of wood-burning fireplace, wood stove and pellet stove owning households that reduced their wood burning on at least one occasion due to the Winter Spare the Air Program by study year, as well as by county for 2009. For reference, the confidence intervals are also shown to provide a sense for the reliability of the estimates.¹⁰ The most striking result in the figure is the dramatically larger impact that the Winter Spare the Air campaign had in 2008 and 2009 when compared to prior years. At the extremes, just 2.35% of eligible households reduced their wood burning in response to the campaign in 2005, whereas the corresponding value in 2008 was 27%, and in 2009 was 25%.

9. The survey included a follow-up question (Question 20) which asked respondents who refrained from burning wood for campaign-related reasons (Question 19) how many times they refrained from burning wood for air quality or health-related reasons during the winter season. The average response was 3.79 times, although the small sample size for this question means that the statistical margins of error around the estimate are large. Moreover, respondents who did not burn wood at all during the winter were not asked this question, so the figure represents the average reduction among individuals who normally burn wood.

10. The confidence intervals indicate the range within which one can be 95% confident that the true value exists.

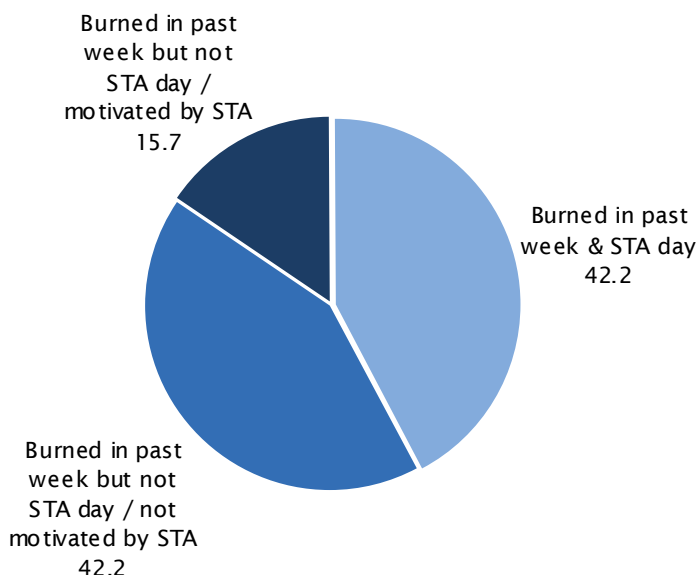
FIGURE 36 SPARE THE AIR REDUCERS BY STUDY YEAR & COUNTY OF RESIDENCE SHOWING CONFIDENCE INTERVALS (N = 1,336)



EPISODIC IMPACTS OF CAMPAIGN ON WOOD BURNING Whereas the prior section discussed changes to wood-burning on a *seasonal* basis, the 2009 study also sought to identify the impact that occurs when specific Spare the Air alerts are issued. To accurately characterize the impacts, it is important to isolate the target market for the alert: households that are inclined to burn on the Spare the Air day. Figure 37 shows that among households that burned during the week prior to a Spare the Air alert (and thus had demonstrated an inclination to burn), 16% chose not to burn on the Spare the Air day in response to the campaign. An additional 42% refrained from burning on the Spare the Air day, but for reasons that were not related to the campaign. Approximately 42% of households that had burned in the week prior to the Spare the Air day also burned on the Spare the Air day.

Question 21 *You previously indicated that you chose not to burn wood yesterday or last night. Why did you decide not to burn wood yesterday or last night?*

FIGURE 37 ANALYSIS OF WOOD BURNING ON STA EVENINGS: BURNED THIS SEASON AND IN PAST WEEK (N = 70)



RECALL AND AWARENESS OF WINTER SPARE THE AIR MESSAGING

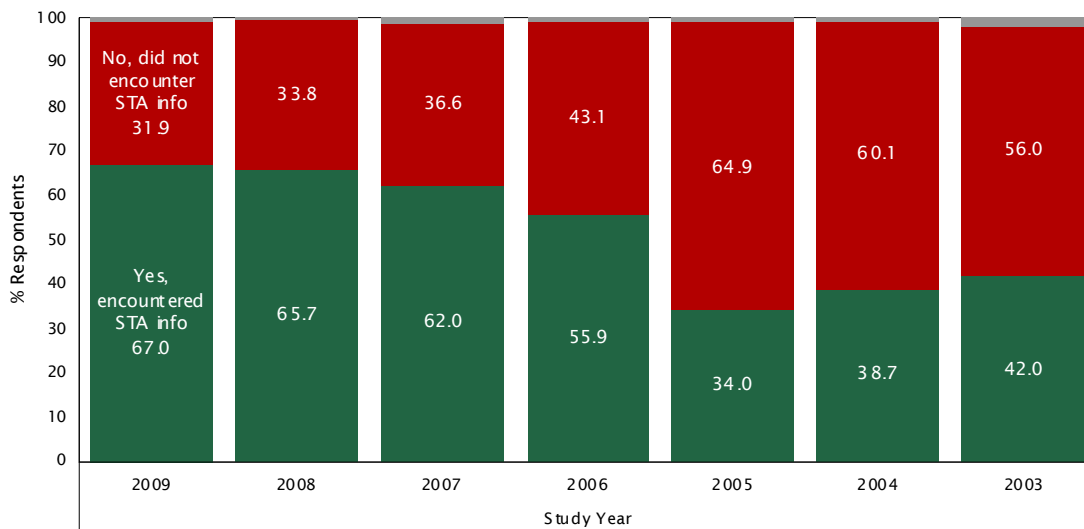
Although the ultimate goal of the Winter Spare the Air Campaign is to persuade individuals to reduce the amount of wood that they burn and to replace wood-burning devices with cleaner alternatives, there are a series of related objectives which must be met in order for this to occur. For example, regardless of how compelling the message may be, if the message does not reach the target audience then the campaign can not succeed in its primary goal. Thus, an instrumental objective of the campaign is to simply increase awareness of the Winter Spare the Air Program and related events.

RECALL EXPOSURE TO SPARE THE AIR MESSAGING Accordingly, a series of questions was asked of respondents about their recall of Winter Spare the Air messaging. The first of these questions asked: *During this winter, have you heard, read, or seen any new stories, advertisements or public service announcements about the Winter Spare the Air Alert Program, poor air quality, or requests not to use your fireplace, pellet stove or wood stove?*

Figure 38 presents the results to this question for the study years 2003 through 2009. In 2009, 67% of respondents recalled being exposed to news stories, advertisements or public service announcements related to the Winter Spare the Air Program during the winter months. Recalled exposure to campaign messaging has grown steadily since 2005.

Question 22 *During this winter, have you heard, read, or seen any news stories, advertisements, or public service announcements about the Winter Spare the Air Alert Program, poor air quality, or requests not to use your fireplace, pellet stove, or woodstove?*

FIGURE 38 ENCOUNTED WINTER SPARE THE AIR INFORMATION: 2002 ~ 2009 (N = 3,000)



† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

For the interested reader, Figures 39 and 40 display the percentage of respondents who recalled being exposed to news stories, advertisements or public service announcements related to the Winter Spare the Air Program during the 2009 winter months by county, gender, age and household income. When compared to their respective counterparts, those in Marin County, those between the ages of 55 and 64, and those who enjoy annual family incomes of \$100,000 to \$149,999 were the most likely to recall being exposed to the Winter Spare the Air Program.

FIGURE 39 ENCOUNTERED WINTER SPARE THE AIR INFORMATION BY COUNTY OF RESIDENCE (N = 3,000)

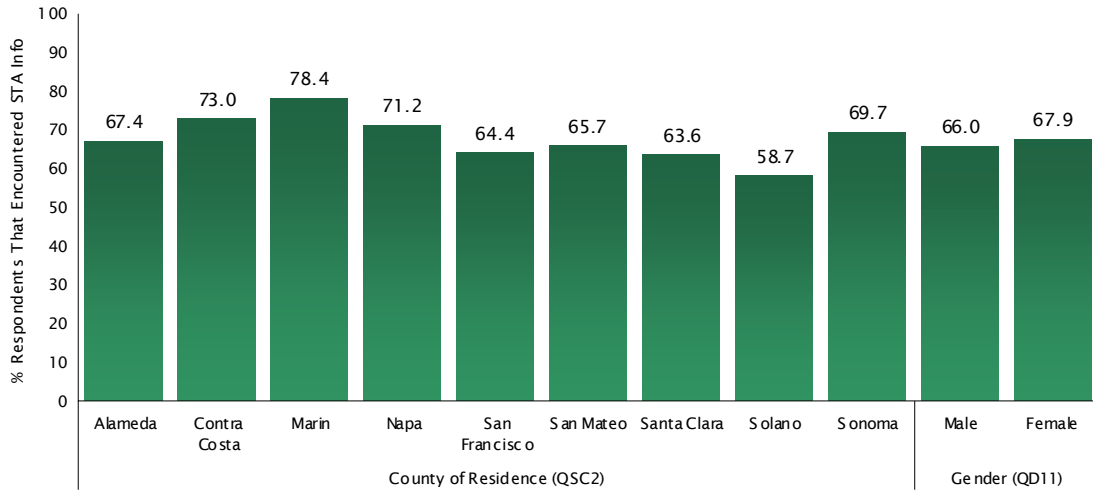
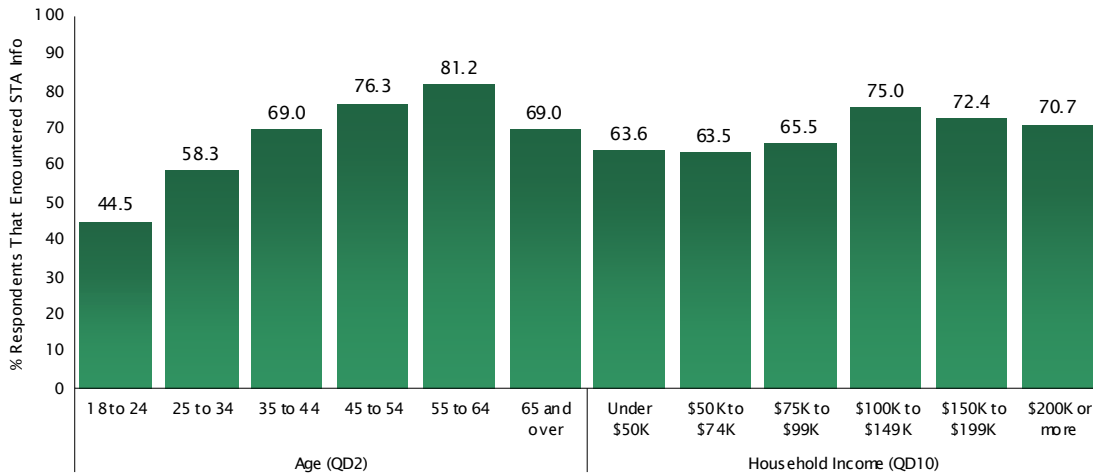


FIGURE 40 ENCOUNTERED WINTER SPARE THE AIR INFORMATION BY AGE & HOUSEHOLD INCOME (N = 3,000)



INFORMATION SOURCE Those who indicated that they recalled hearing, reading, or seeing Winter Spare the Air related information during the winter were next asked where they obtained the information. Multiple responses to the question were allowed, so the percentages shown in Figure 41 represent the percentage of respondents who mentioned a particular source and thus add to more than 100%. Because this question was asked in an identical manner in past surveys dating back to 2002, the results from these surveys are also included in Table 5 for comparison.

As in the previous surveys, the most popular methods of obtaining information related to Winter Spare the Air and air quality during the winter of 2009-2010 were television (55%), radio (33%), and newspaper (19%). There was a significant shift away from radio in 2009, however, as the source for Winter Spare the Air related messages.

Question 23 *Where did you see or hear the news story, advertisement or public service announcement?*

FIGURE 41 SOURCE FOR WINTER SPARE THE AIR INFORMATION (N = 2,009)

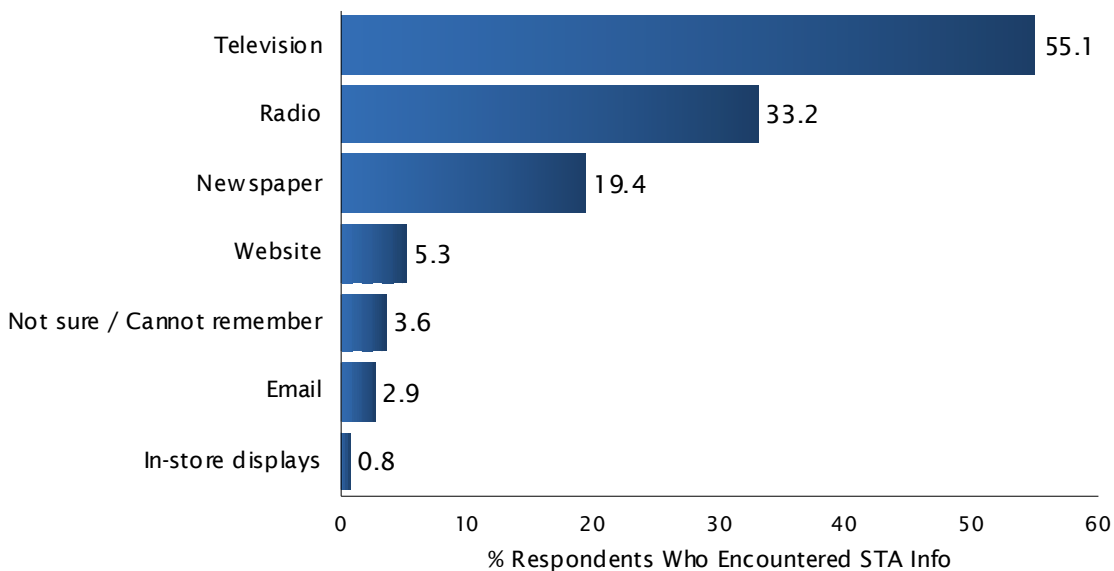


TABLE 5 SOURCE FOR WINTER SPARE THE AIR INFORMATION: 2002 ~ 2009 (N = 2,009)

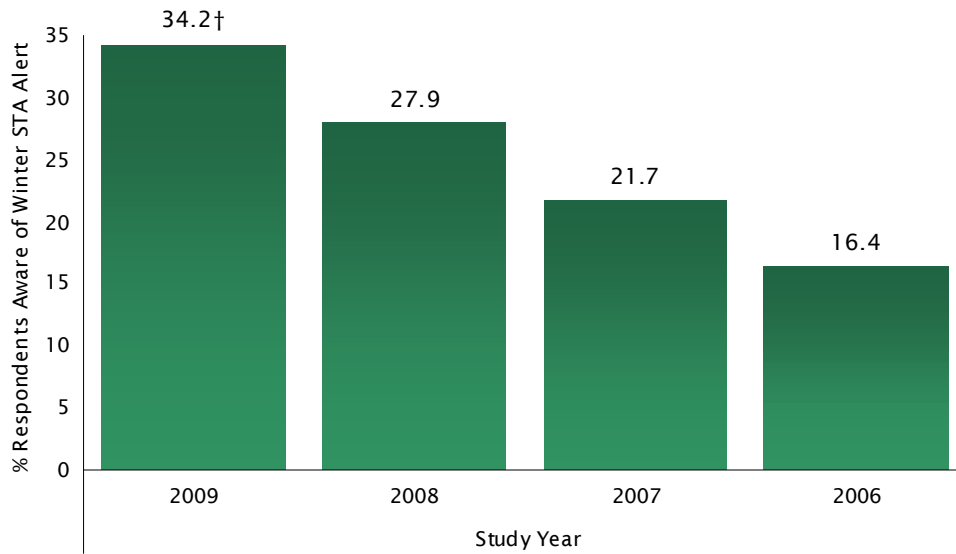
	Study Year							
	2009	2008	2007	2006	2005	2004	2003	2002
Television	55.1	55.7	52.0	56.6	45.0	49.4	35.0	49.0
Radio	33.2†	38.4	33.4	40.0	38.2	38.4	49.0	29.0
Newspaper	19.4	21.8	17.6	9.9	17.4	17.3	16.0	27.0
Email Alert	2.9	3.0	2.8	3.0	1.0	0.7	1.0	3.0
Website	5.3	2.2	3.3	2.3	2.7	1.1	1.0	0.4
In-store display	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0

† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

AWARE OF SPARE THE AIR DAY The final question in this series asked all respondents who received the interview on the day after a Winter Spare the Air episode if, prior to taking the survey, they were aware that a Winter Spare the Air advisory had been issued the day before. As shown in Figure 42, 34% of respondents in 2009 answered this question in the affirmative, which is significantly higher than the proportion found in 2008. When compared to their respective counterparts, awareness was highest among Marin County residents, seniors, and individuals whose households earn between \$50,000 and \$74,999 annually (see Figures 43 and 44).

Question 24 *Prior to taking this survey, were you aware that there was a “Winter Spare the Air Alert” yesterday?*

FIGURE 42 AWARE OF WINTER SPARE THE AIR ALERT: 2006 ~ 2009 (N = 703)



† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

FIGURE 43 AWARE OF WINTER SPARE THE AIR ALERT BY COUNTY OF RESIDENCE & GENDER (N = 703)

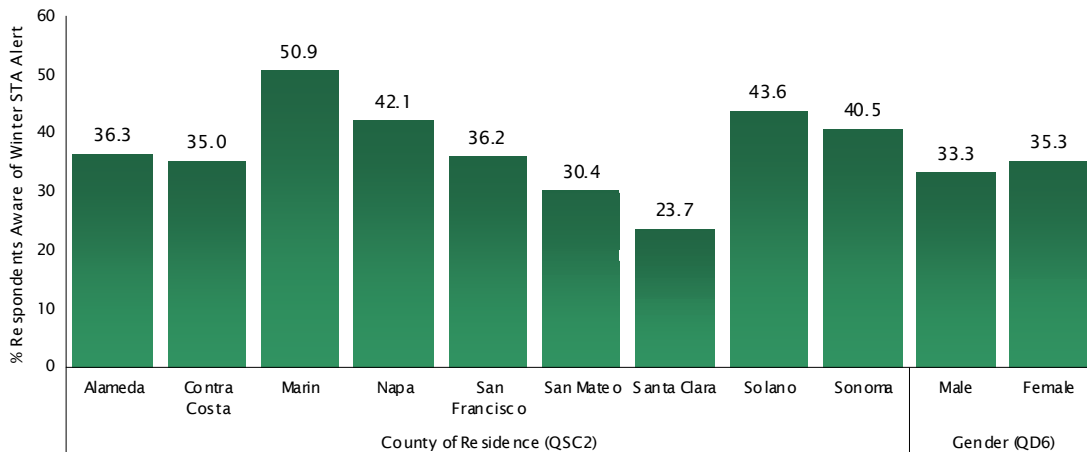
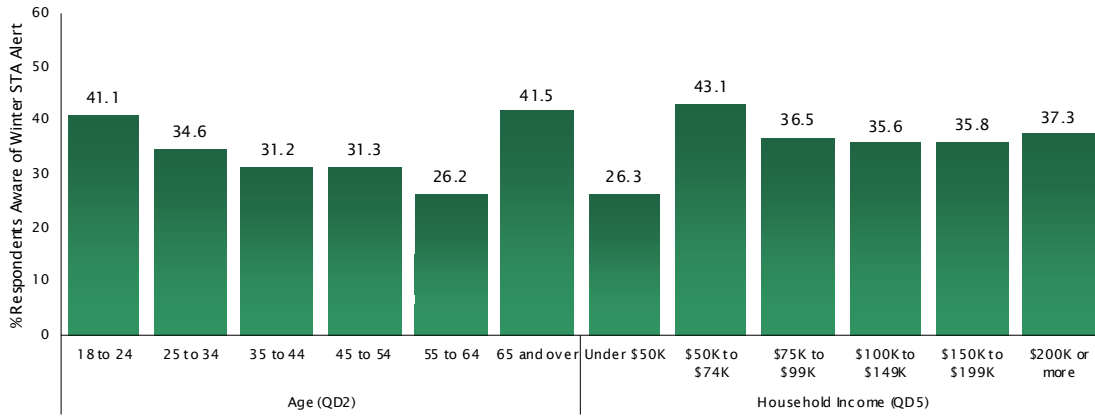


FIGURE 44 AWARE OF WINTER SPARE THE AIR ALERT BY AGE & HOUSEHOLD INCOME (N = 703)



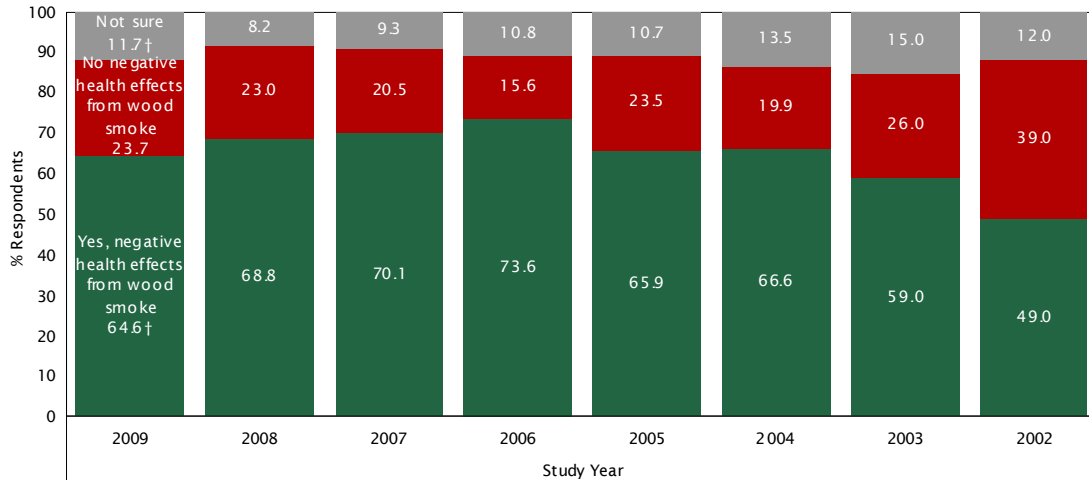
ATTITUDES ABOUT WOOD SMOKE

In addition to changing wood burning behavior, one of the goals of the Winter Spare the Air Program is to change how residents think about wood smoke and its impact on public health. To track how effective the Program has been in achieving this goal, the survey included several measures of residents' opinions and perceptions about wood smoke.

The first of these questions simply asked the respondent whether they think there are any negative health effects associated with breathing wood smoke. As shown in Figure 45, approximately 65% of adults in the Bay Area do perceive wood smoke to have negative health impacts. Moreover, public opinion on this matter has changed substantially in the past seven years—in part due to the Winter Spare the Air Program. The proportion of adults that perceive wood smoke to have negative health impacts has increased by 16% since 2002.

Question 25 *Do you think there are any negative health effects associated with breathing wood smoke?*

FIGURE 45 PERCEIVE NEGATIVE HEALTH EFFECTS ASSOCIATED WITH WOOD SMOKE: 2002 ~ 2009 (N = 3,000)



† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

FIGURE 46 PERCEIVE NEGATIVE HEALTH EFFECTS ASSOCIATED WITH WOOD SMOKE BY COUNTY OF RESIDENCE, STA REDUCER WITHIN WOOD-BURNING HOUSEHOLDS & ENCOUNTERED STA INFO (N = 3,000)

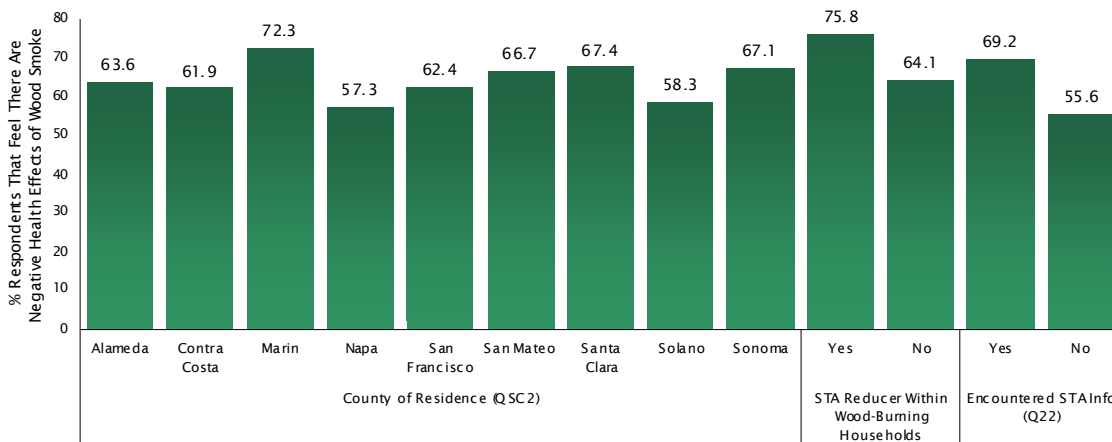
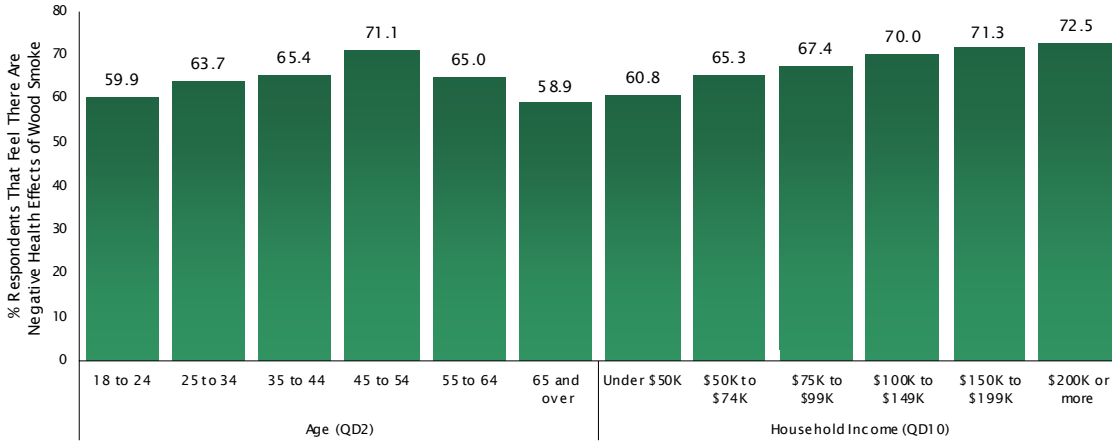


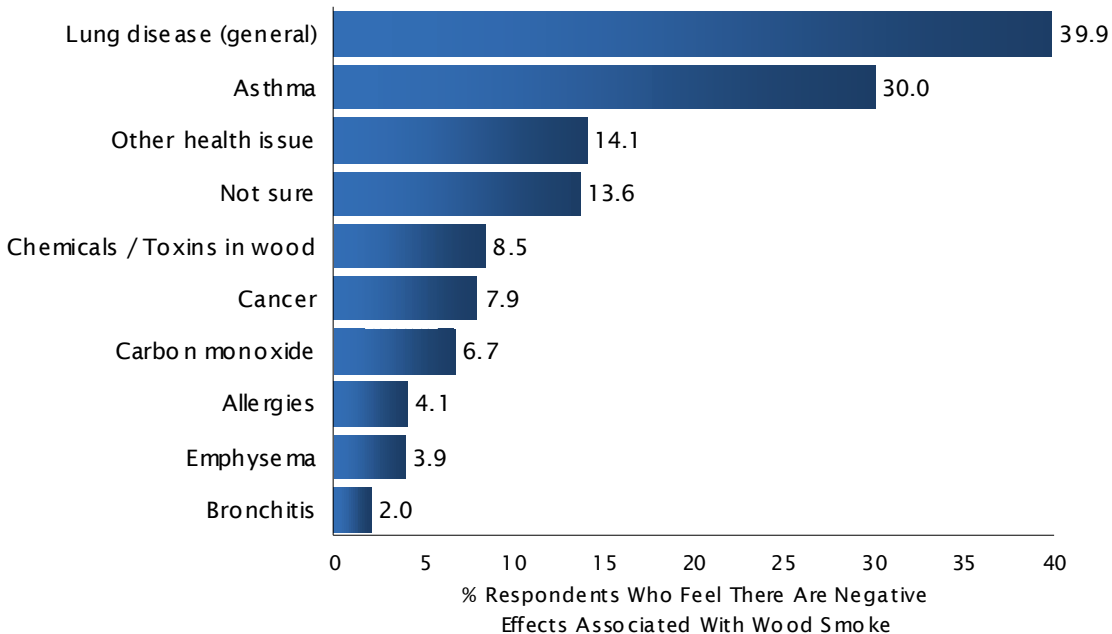
FIGURE 47 PERCEIVE NEGATIVE HEALTH EFFECTS ASSOCIATED WITH WOOD SMOKE BY AGE & HOUSEHOLD INCOME (N = 3,000)



Respondents who perceived wood smoke to have negative health impacts (Question 25) were next asked to identify what the specific health effects are of breathing wood smoke. This question was asked in an open-ended manner which allowed respondents to mention any health impact that came to mind without being prompted by—or restricted to—a particular list of options. Multiple responses were also allowed for this question, so the percentages shown in Figure 48 represent the percentage of respondents who mentioned a particular health effect. The most common response (40%) was a general reference to lung disease, followed by a specific reference to asthma (30%). Approximately 14% of respondents mentioned some “other” general health impact.

Question 26 *What are the negative health effects associated with breathing wood smoke?*

FIGURE 48 PERCEIVED NEGATIVE HEALTH EFFECTS ASSOCIATED WITH WOOD SMOKE (N = 1,938)



WOOD SMOKE A NEIGHBORHOOD PROBLEM? Most adults recognize that there are negative health impacts due to wood smoke. But do they think that *their* neighborhood has a wood smoke problem? To answer this question, the survey first informed respondents that different neighborhoods in the Bay Area experience different levels of air pollution from wood smoke. Respondents were then asked to indicate whether, in their opinion, their neighborhood periodically experiences air pollution from wood smoke. Those who perceived their neighborhood to have an occasional wood smoke problem were asked in a follow-up question to identify the magnitude of the problem. The answers to both of these questions are combined in Figure 49.

Overall, 17% of adults surveyed indicated that their neighborhood periodically experiences air pollution from wood smoke. Ten percent (10%) stated that the problem was a small one, 4% indicated it was a moderate or medium problem, and 2% felt that air pollution due to wood smoke was a big problem in their neighborhood. When compared to 2008, there were no statistically significant changes in the perceived magnitude of their neighborhoods' woodsmoke problem among those who held an opinion (see Figure 50).

Question 27 *Different neighborhoods in the Bay Area experience different levels of air pollution from wood smoke. In your opinion, does your neighborhood periodically experience air pollution from wood smoke?*

Question 28 *Would you say that periodic air pollution from wood smoke in your neighborhood is a big problem, medium problem, or a small problem?*

FIGURE 49 PERCEPTION OF PERIODIC WOOD SMOKE PROBLEM IN NEIGHBORHOOD (N = 3,000)

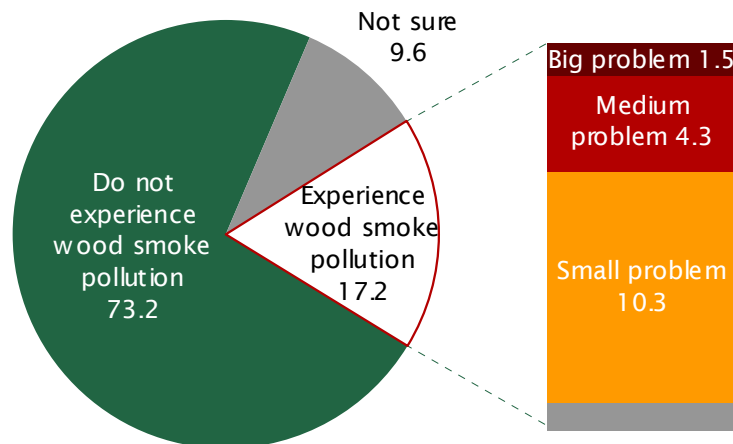
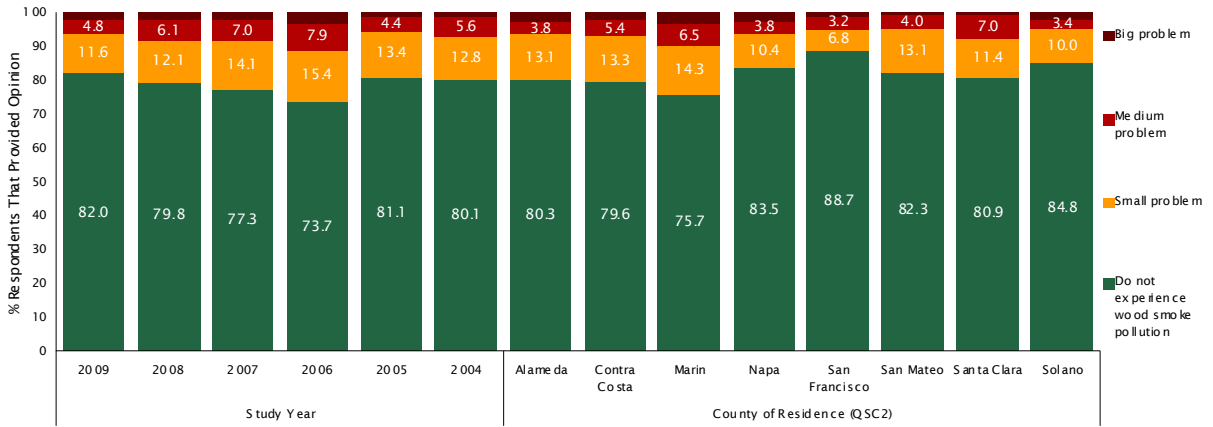


FIGURE 50 PERCEPTION OF PERIODIC WOOD SMOKE PROBLEM IN NEIGHBORHOOD BY STUDY YEAR & COUNTY OF RESIDENCE (N = 3,000)



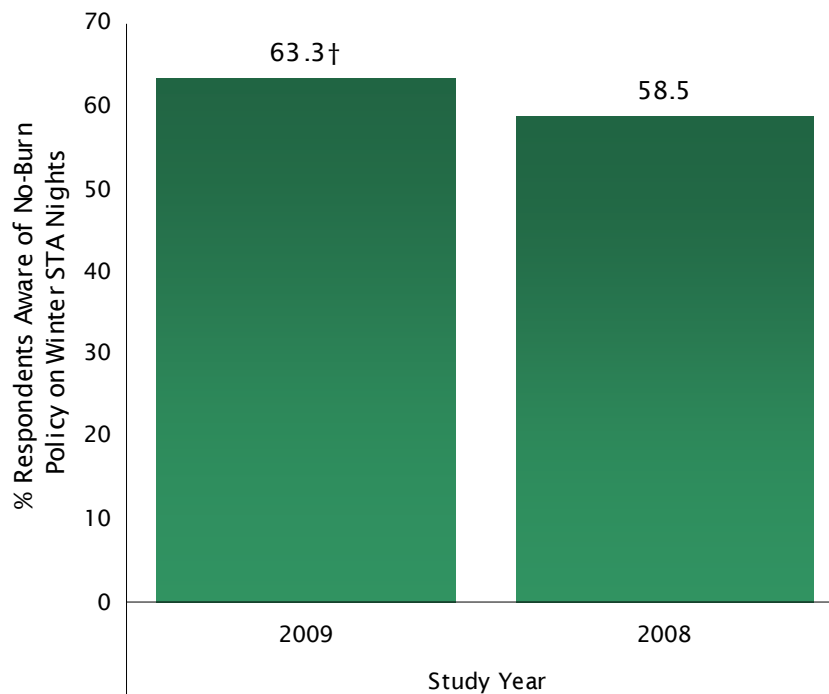
WOOD SMOKE RULE

In 2008, the BAAQMD adopted *Regulation 6, Rule 3: Wood-burning Devices* to reduce the harmful emissions that come from wood smoke. The new rule restricts wood burning when air quality reaches unhealthy levels and a Spare the Air advisory is issued, places limits on excessive smoke, requires that only cleaner burning EPA certified stoves and inserts be sold or installed in new construction/remodels, and prohibits the burning of garbage and other harmful materials. This section of the report presents the results of a series of questions designed to measure public awareness, knowledge, and attitudes as they relate to the new rule.

AWARENESS The first question in this series simply asked respondents whether—prior to taking the survey—they were aware that the BAAQMD recently passed a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels. As shown in Figure 51, most respondents (63%) indicated that they were aware of the policy in 2009, which is significantly higher than the 59% recorded in 2008. Awareness of the rule was strongly and positively related to respondent age, and was highest among those who reside in Marin County and those whose household contains a wood-burning device (see Figures 52 & 53).

Question 29 *Prior to taking this survey, were you aware that the Bay Area Air Quality Management District recently passed a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels?*

FIGURE 51 AWARENESS OF NO-BURN POLICY ON WINTER SPARE THE AIR ALERT NIGHTS: 2008 ~ 2009 (N = 3,000)



† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

FIGURE 52 AWARENESS OF NO-BURN POLICY ON WINTER SPARE THE AIR ALERT NIGHTS BY COUNTY OF RESIDENCE (N = 3,000)

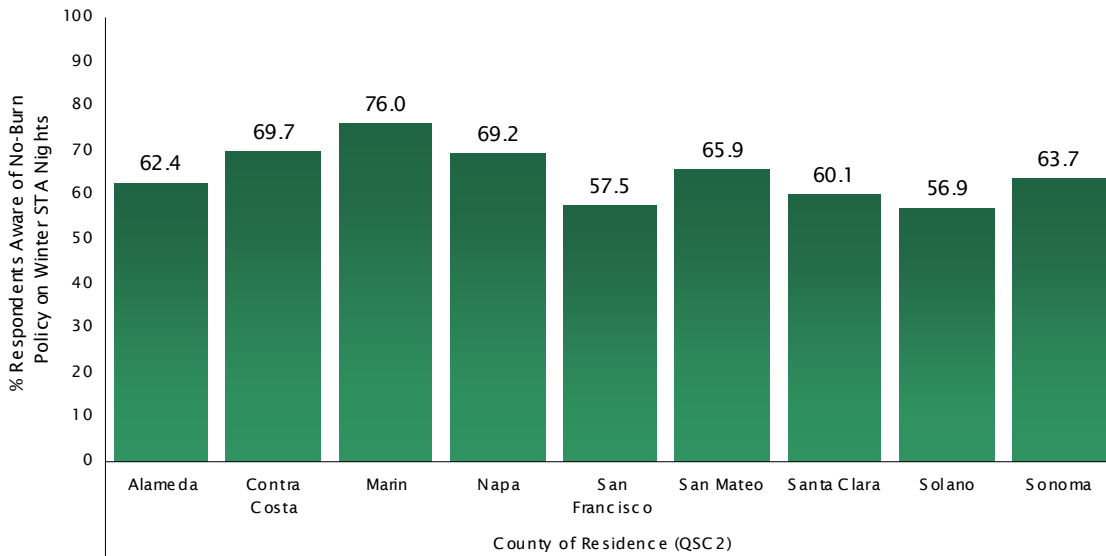
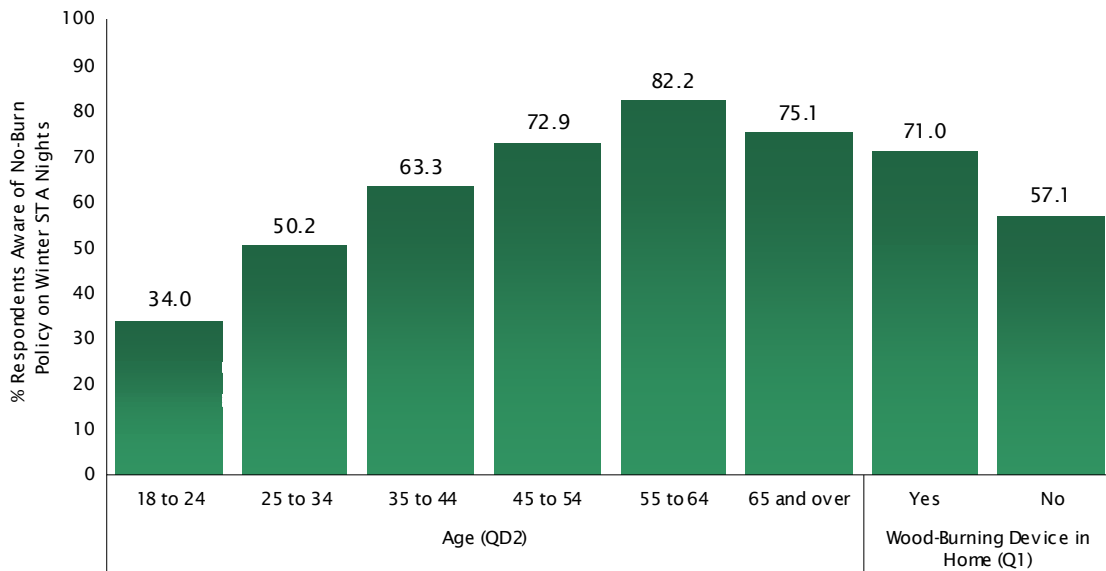


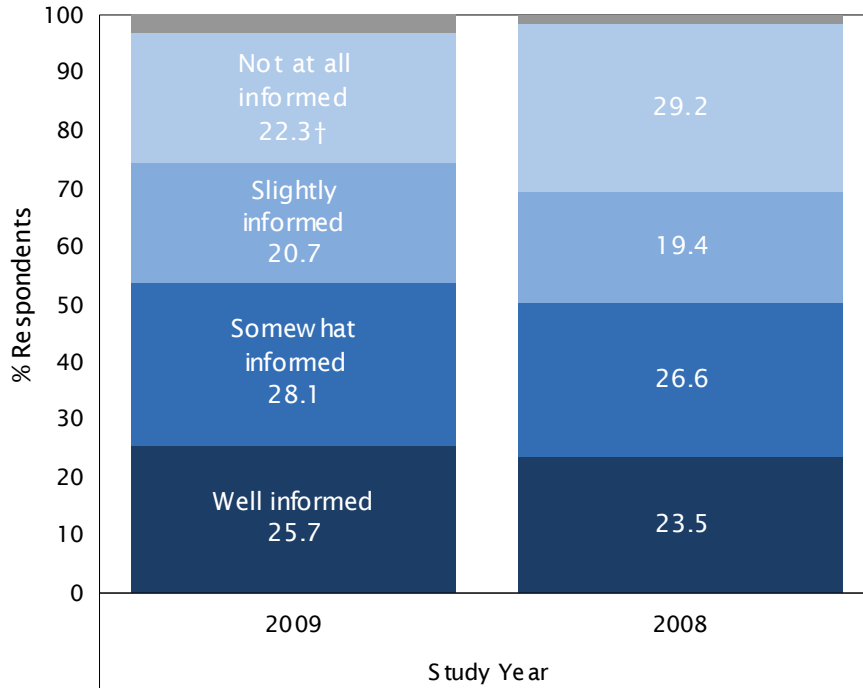
FIGURE 53 AWARENESS OF NO-BURN POLICY ON WINTER SPARE THE AIR ALERT NIGHTS BY AGE & WOOD-BURNING DEVICE IN HOME (N = 3,000)



Respondents were next asked how informed they felt about the rules that are part of the new wood-burning policy. Overall, residents were clearly mixed in how informed they felt, with 26% feeling well-informed, 28% somewhat informed, 21% slightly informed, and 22% feeling not at all informed about the rules that are part of the policy. It should be noted that in the past year, the percentage who indicated that they were not at all informed about the rules that are part of the wood burning policy declined significantly. Marin County residents, seniors, and those whose household contains a wood-burning device were the most likely to report feeling at least somewhat informed about the rules that are part of the new policy (see Figures 55 & 56).

Question 30 Overall, how informed do you feel about the rules that are part of this new wood-burning policy? Would you say you feel well informed, somewhat informed, slightly informed, or not at all informed?

FIGURE 54 HOW INFORMED ABOUT NO-BURN POLICY ON WINTER SPARE THE AIR ALERT NIGHTS: 2008 ~ 2009 (N = 3,000)



† Statistically significant change (p < 0.05) between the 2008 and 2009 studies.

FIGURE 55 HOW INFORMED ABOUT NO-BURN POLICY ON WINTER SPARE THE AIR ALERT NIGHTS BY COUNTY OF RESIDENCE (N = 3,000)

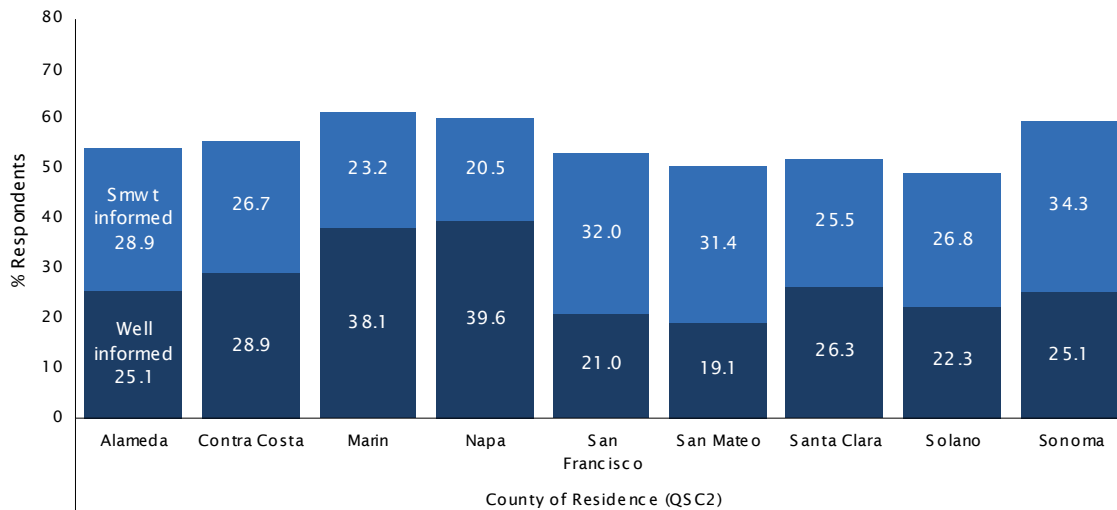
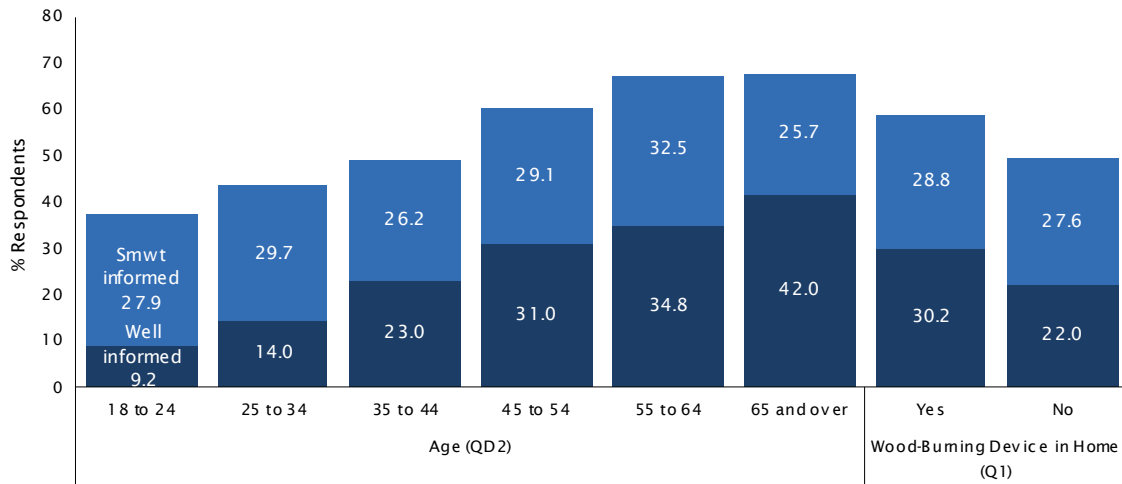


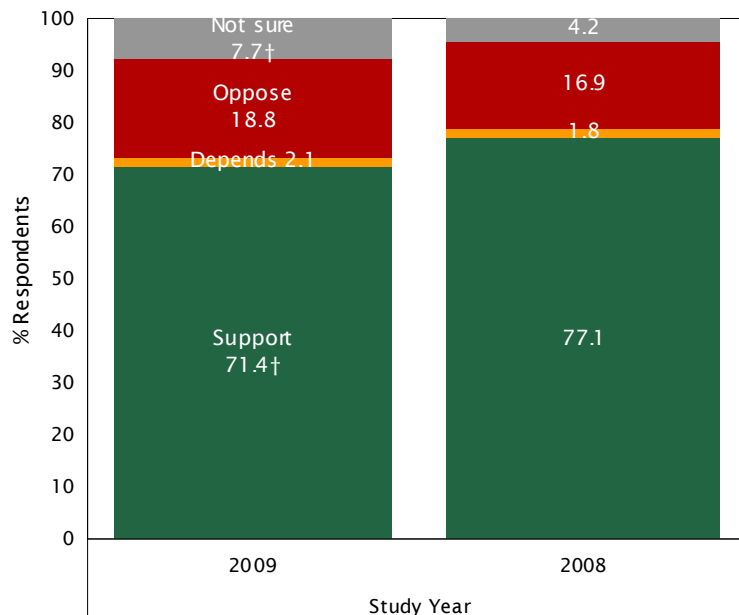
FIGURE 56 HOW INFORMED ABOUT NO-BURN POLICY ON WINTER SPARE THE AIR ALERT NIGHTS BY AGE & WOOD-BURNING DEVICE IN HOUSEHOLD (N = 3,000)



DO YOU SUPPORT THE POLICY? Regardless of how informed they felt about the policy, all respondents were next asked whether they generally support or oppose a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels. As shown in Figure 57, approximately three-quarters (71%) of Bay Area residents indicated that they support the no-burn policy on nights when air pollution is expected to reach unhealthy levels. Approximately 19% opposed the policy, 2% stated that it depends, and 8% were unsure or offered no opinion. For the interested reader, Figures 58 and 59 display how support for the no-burn policy varied across a host of demographic subgroups.

Question 31 *In general, do you support or oppose a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels?*

FIGURE 57 SUPPORT FOR NO-BURN POLICY ON WINTER SPARE THE AIR ALERT NIGHTS: 2008 ~ 2009 (N = 3,000)



† Statistically significant change (p < 0.05) between the 2008 and 2009 studies.

FIGURE 58 SUPPORT FOR NO-BURN POLICY ON WINTER SPARE THE AIR ALERT NIGHTS BY COUNTY OF RESIDENCE & AGE (N = 3,000)

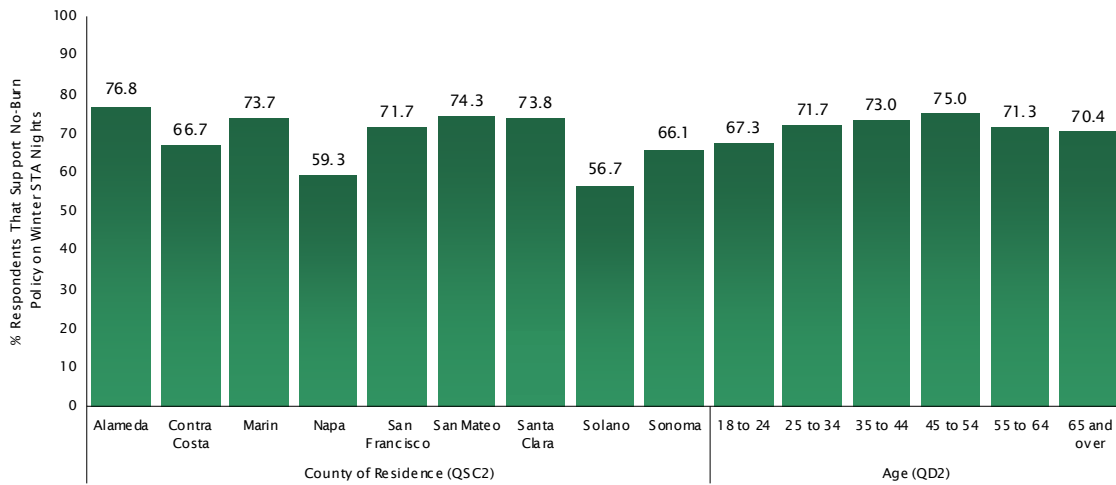
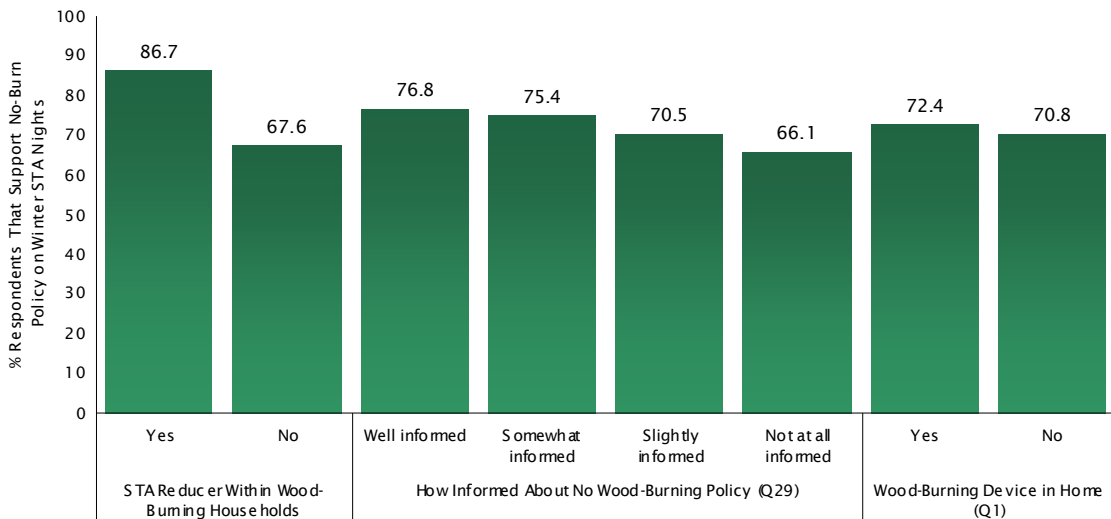


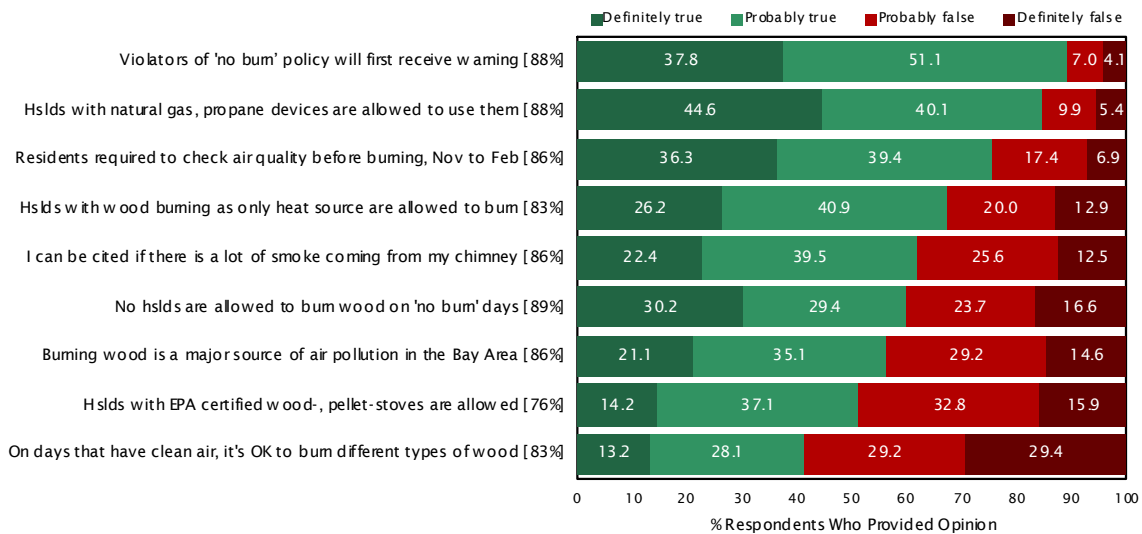
FIGURE 59 SUPPORT FOR NO-BURN POLICY ON WINTER SPARE THE AIR ALERT NIGHTS BY STA REDUCER WITHIN WOOD-BURNING HOUSEHOLDS, HOW INFORMED ABOUT NO WOOD BURNING POLICY & WOOD-BURNING DEVICE IN HOME (N = 3,000)



KNOWLEDGE ABOUT NO-BURN POLICY The next question in this series (Question 32) was designed to test respondents’ knowledge of the rules associated with the new wood smoke regulation. For each of the statements shown to the left of Figure 60, respondents were simply asked to indicate whether they thought the statement was true or false. To avoid a systematic position bias, the statements were administered in random order for each respondent. Only those who held an opinion are factored into the responses shown in Figure 60—the percentage with an opinion is shown in brackets next to each statement in the figure.

Question 32 Next, I'm going to read a series of statements. For each statement, I'd like to know whether you think the statement is true or false.

FIGURE 60 STATEMENTS ABOUT NO-BURN POLICY (N = 3,000)



Overall, three-quarters or more of the public appear correctly informed regarding the fact that violators of the 'no burn' policy will receive a warning prior to citations (89%), that households with natural gas/propane fireplaces are still allowed to burn on designed 'no burn' days (85%), and that residents are required to check the status of air quality prior to burning wood between November and February (76%). Approximately two-thirds of respondents also held the correct opinion that households for which wood burning is their only source of heat are still allowed to burn wood on 'no burn' days (67%), and that they can be cited at any time of the year if there is a lot of visible smoke coming from their chimney (62%).

Public knowledge regarding the remaining aspects of the wood burning rule was far more mixed, however. Just 56% agreed that wood burning is a major source of pollution in the Bay Area contributing up to one-third or more of the airborne particle pollution on many winter days, 60% incorrectly assumed that *no* households are allowed to burn wood on no burn days, half (51%) of respondents felt that households with EPA certified stoves would still be allowed to burn on 'no burn' days, and 41% believed that it's OK to burn different types of wood—including driftwood, treated wood, moist wood, and used pallets—as long as it is a clean air day.

When compared to the 2008 survey results, the only statistically significant change in knowledge was an increase in the percentage of respondents who thought (incorrectly) that it is OK to burn wood of different types—including driftwood, treated wood, moist wood, and pallets - as long as it is a clean air day (see Table 6).

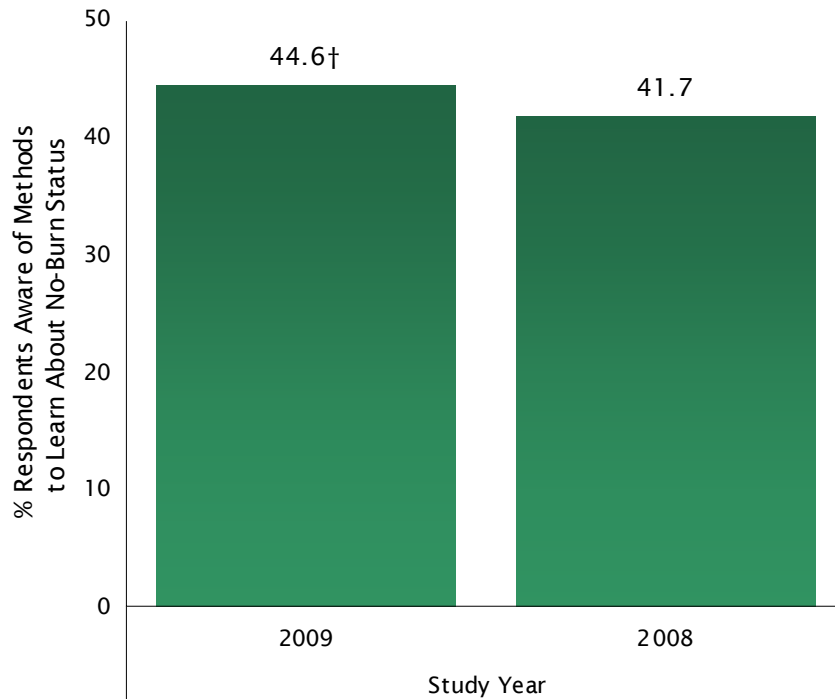
TABLE 6 STATEMENTS ABOUT NO-BURN POLICY SHOWING % TRUE: 2008 ~ 2009 (N = 3,000)

	Study Year	
	2009	2008
Violators of 'no burn' policy will first receive warning	88.9	87.8
Hslds with natural gas, propane devices are allowed to use them	84.7	84.2
Residents required to check air quality before burning, Nov to Feb	75.7	74.2
Hslds with wood burning as only heat source are allowed to burn	67.1	68.5
I can be cited if there is a lot of smoke coming from my chimney	61.9	64.1
No hslds are allowed to burn wood on 'no burn' days	59.7	56.8
Burning wood is a major source of air pollution in the Bay Area	56.2	59.2
Hslds with EPA certified wood-, pellet-stoves are allowed	51.3	47.6
On days that have clean air, it's OK to burn different types of wood	41.4†	35.3

† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

HOW TO FIND OUT ABOUT 'NO BURN' STATUS The final questions in this series were designed to measure how informed the public is about how they can find out the day's 'no burn' status. Overall, 45% of respondents indicated that they do know how to find out whether today is a 'no burn' day (Figure 61), which is significantly higher than the 42% recorded in 2008. Residents in Marin County, those between the ages of 55 and 64, and those with a wood-burning device in the home being the most likely to report being aware (see Figures 62 & 63). When asked what sources they would turn to for this information (see Figure 64 on page 52), the most commonly mentioned were a website in general (62%), newspaper (23%), telephone hotline (18%), radio (17%), and BAAQMD web site (14%)

Question 33 *Do you know how you could find out whether today is a 'no burn' day?*

FIGURE 61 AWARE OF METHODS TO LEARN ABOUT NO-BURN STATUS: 2008 ~ 2009 (N = 3,000)

† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

FIGURE 62 AWARE OF METHODS TO LEARN ABOUT NO-BURN STATUS BY COUNTY OF RESIDENCE (N = 3,000)

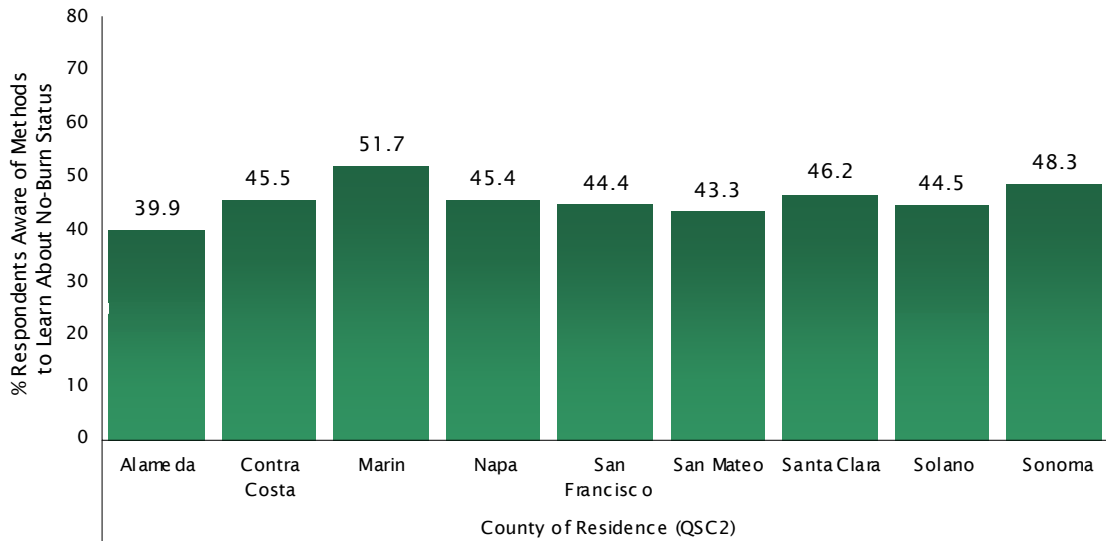
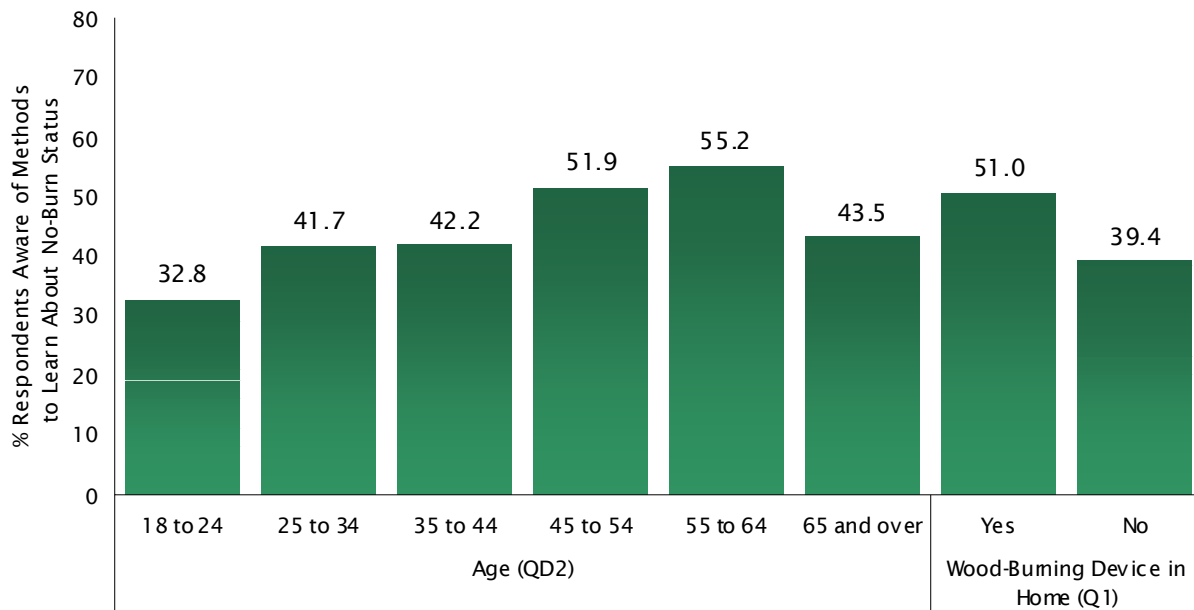


FIGURE 63 AWARE OF METHODS TO LEARN ABOUT NO-BURN STATUS BY AGE & WOOD-BURNING DEVICE IN HOME (N = 3,000)



Question 34 *How can you find out?*

FIGURE 64 SOURCES FOR LEARNING ABOUT NO-BURN STATUS (N = 1,337)

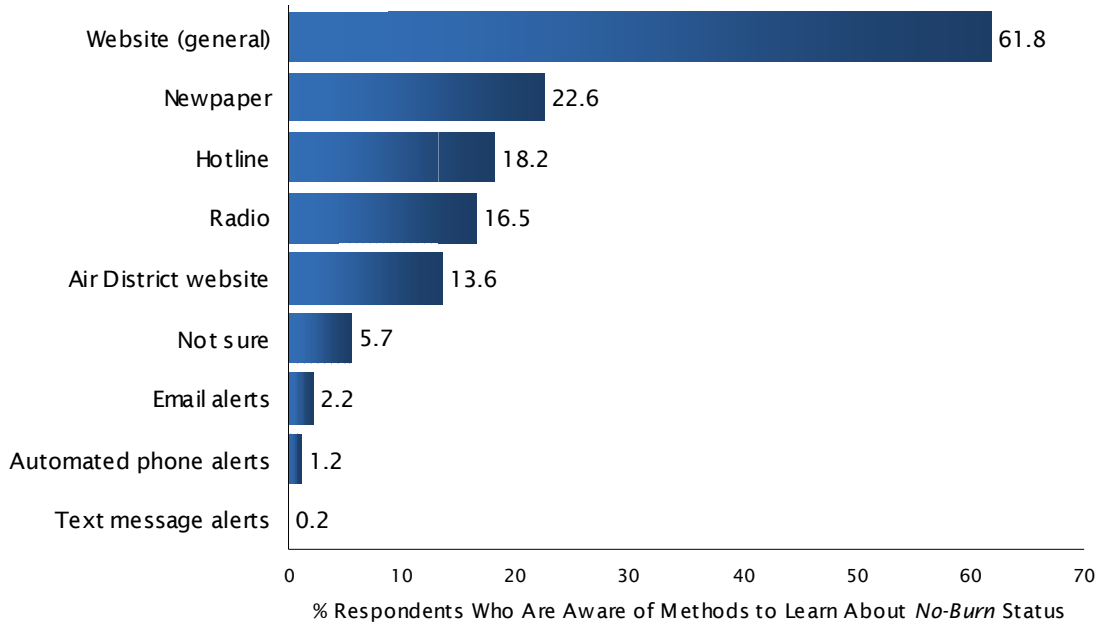


TABLE 7 SOURCES FOR LEARNING ABOUT NO-BURN STATUS: 2008 ~ 2009 (N = 1,337)

	Study Year	
	2009	2008
Website (general)	61.8	59.2
Newspaper	22.6	24.2
Hotline	18.2	16.4
Radio	16.5	16.2
Air District website	13.6†	17.5
Not sure	5.7	5.6
Email alerts	2.2	4.9
Automated phone alerts	1.2	2.1
Text message alerts	0.2	0.2

† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

FIREPLACE & POLLUTION KNOWLEDGE

In addition to measuring respondents' awareness, knowledge and opinions regarding the 'no burn' policy, the survey continued a question series first implemented in 2007 that measured knowledge with respect to fireplaces and pollution.

For each of the statements shown to the left of Figure 65, respondents were simply asked to indicate whether they thought the statement was true or false. To avoid a systematic position bias, the statements were administered in random order for each respondent. Only those who held an opinion are factored into the responses shown in Figure 65—the percentage with an opinion is shown in brackets next to each statement in the figure.

A clear majority of respondents correctly labeled as false the statements *It is okay to burn materials other than firewood in my fireplace* (82% false), and *A fireplace is an efficient source of heat* (70%). The percentage who correctly identified as false the final two statements was much lower, however, with just 50% disagreeing that *All fires in my fireplace should produce visible smoke from the chimney* and 40% disagreeing that *Manufactured logs burn cleaner than seasoned firewood*. When compared to 2008, the percentage of respondents who believed that *It is OK to burn materials other than firewood in my fireplace* increased significantly (Table 8).

Question 35 Next, I'm going to read a series of statements. For each statement, I'd like to know whether you think the statement is true or false.

FIGURE 65 STATEMENTS ABOUT FIREPLACES & POLLUTION (N = 604)

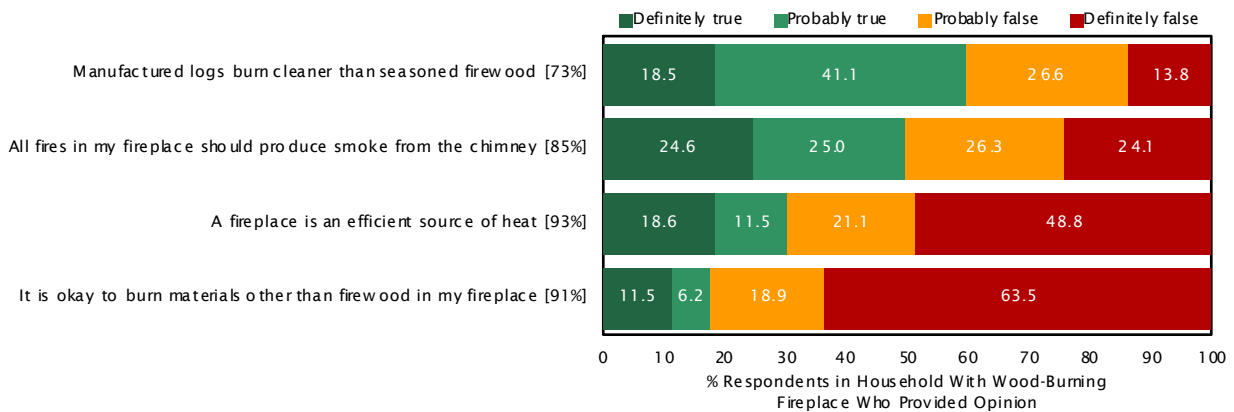


TABLE 8 STATEMENTS ABOUT FIREPLACES & POLLUTION: 2007 ~ 2009 (N = 604)

	Study Year		
	2009	2008	2007
Manufactured logs burn cleaner than seasoned firewood	59.6	57.9	53.0
All fires in my fireplace should produce smoke from the chimney	49.6	48.8	48.9
A fireplace is an efficient source of heat	30.1	30.6	34.1
It is okay to burn materials other than firewood in my fireplace	17.7†	13.6	14.0

† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

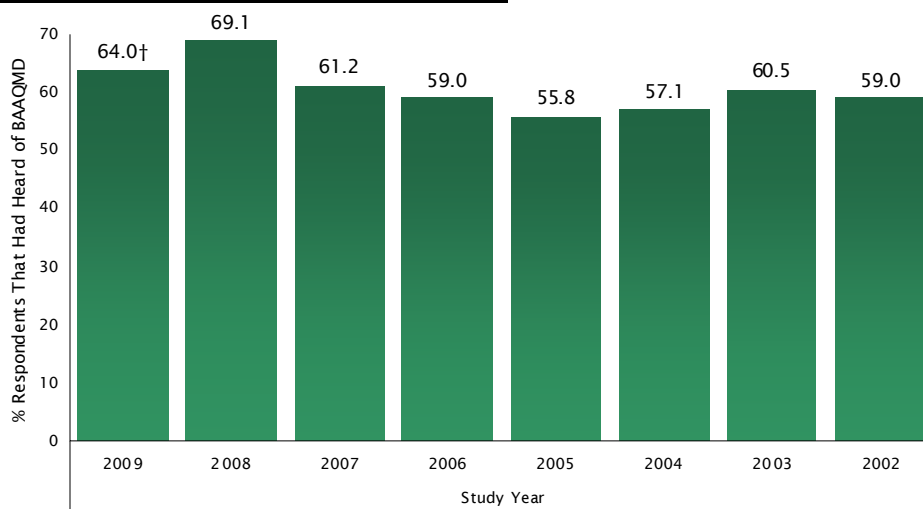
PERCEPTIONS OF ENTITIES

To identify and track perceptions of the BAAQMD and the Winter Spare the Air Campaign, a series of three questions was presented to respondents to measure their awareness and opinions of the agency and the program, as well their recent exposure to information about each. Because these questions were asked in an identical manner in past winter surveys dating back to 2002, the results from these studies are also shown for comparison.

AWARENESS Figure 66 shows that awareness of the BAAQMD (64%) decreased significantly between 2008 and 2009, but is still higher than the historical average. Awareness of the Winter Spare the Air Campaign (61%) has also increased substantially over the past five years, although the change in the past 12 months was not statistically significant.

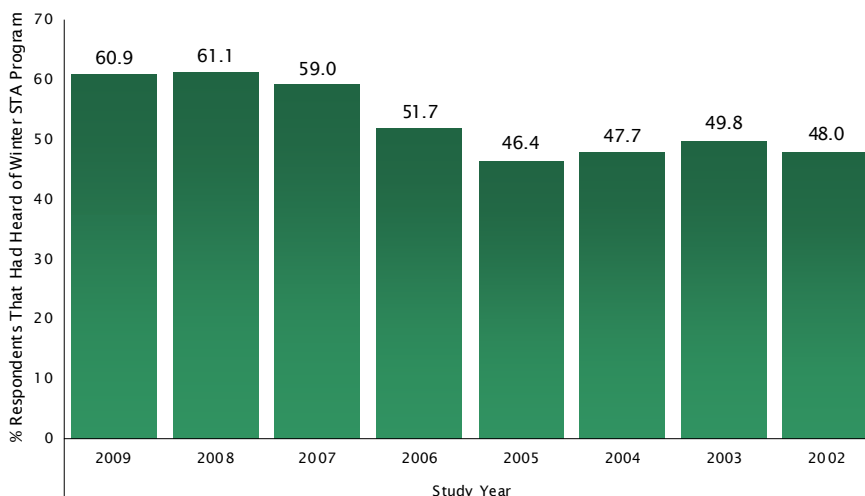
Question 36 *Let's change gears a bit. Have you ever heard of the _____?*

FIGURE 66 AWARENESS OF BAAQMD: 2002 ~ 2009 (N = 3,000)



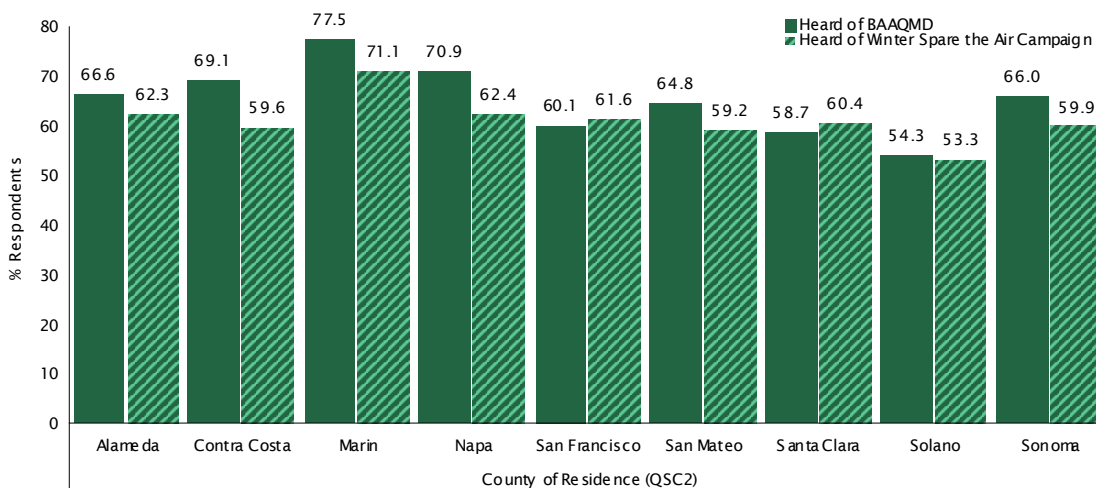
† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

FIGURE 67 AWARENESS OF WINTER SPARE THE AIR CAMPAIGN: 2002 ~ 2009 (N = 3,000)



Across the nine member counties, awareness of the BAAQMD was highest in Marin County (78%) in 2009, and lowest in Solano County (54%). Awareness of the Winter Spare the Air Program, on the other hand, ranged from a high of 71% in Marin County to a low of 53% in Solano County (see Figure 68).

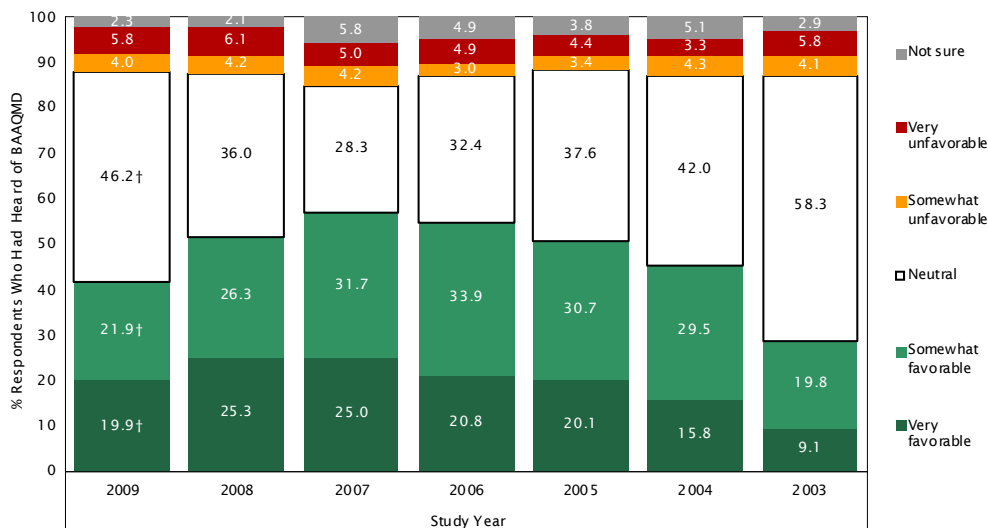
FIGURE 68 AWARENESS OF BAAQMD & WINTER SPARE THE AIR CAMPAIGN BY COUNTY OF RESIDENCE (N = 3,000)



OPINIONS Respondents who had heard of an entity were next asked whether their opinion of the entity was favorable, unfavorable, or neutral. Figures 69 and 70 display the findings of these questions in 2009, as well as the findings from the 2003-2008 studies.¹¹

Question 37 *Generally speaking, would you say you have a favorable or unfavorable opinion of the _____, or do you have no opinion either way?*

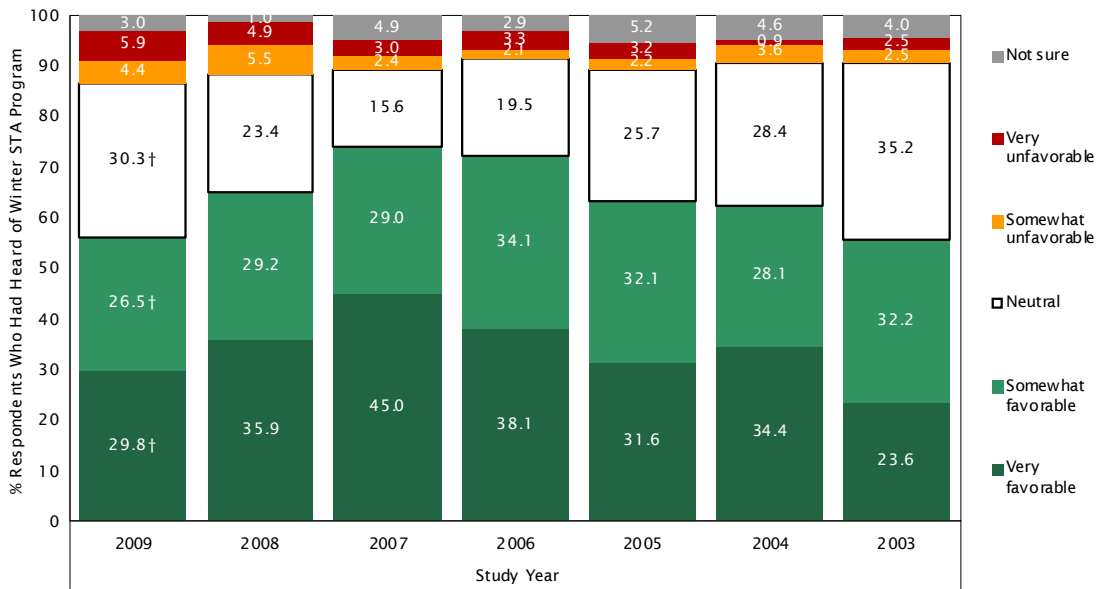
FIGURE 69 OPINIONS OF BAAQMD: 2003 ~ 2009 (N = 1,919)



† Statistically significant change (p < 0.05) between the 2008 and 2009 studies.

11. The response options for these questions were more limited in the 2002 study, so comparisons are not provided in Figure 69.

FIGURE 70 OPINIONS OF WINTER SPARE THE AIR CAMPAIGN: 2003 ~ 2009 (N = 1,826)



† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

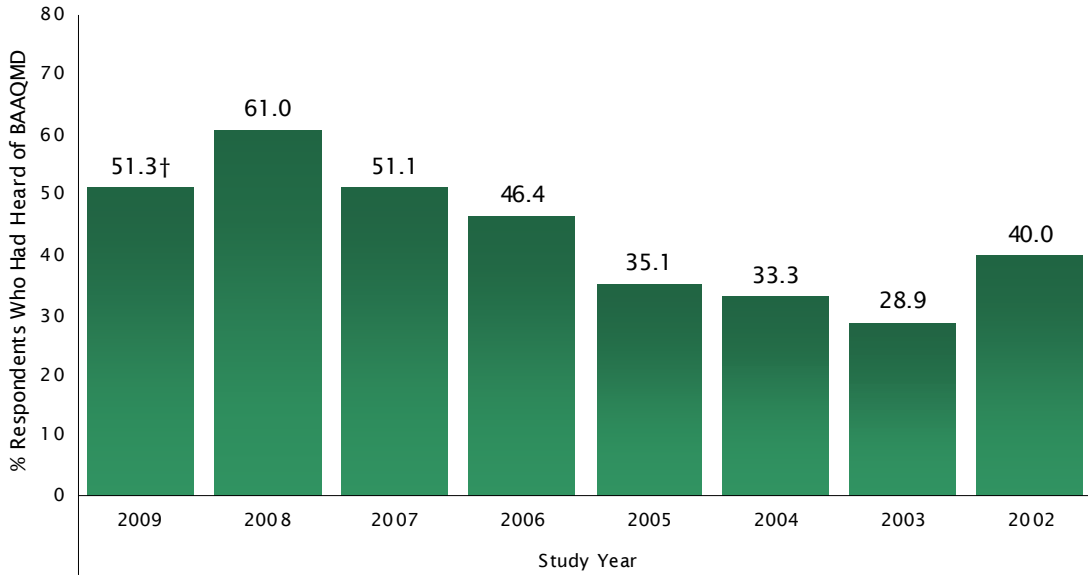
Of the individuals who received the question in 2009, 42% held a favorable opinion of the BAAQMD, whereas 46% held a neutral opinion and just 10% held an unfavorable opinion. When compared to the opinions recorded in 2008, opinions of the BAAQMD became increasingly neutral—from 36% neutral in 2008 to 46% neutral in 2009.

The same is also true of public opinion regarding the Winter Spare the Air Campaign, although the trend is less pronounced. Whereas 65% of respondents who had heard of the campaign held a favorable opinion of it in 2008, the corresponding percentage for 2009 was significantly lower at 56%. It should be noted, however, that the percentage who reported neutral opinions regarding the Program account for most of the difference, increasing significantly in the past year from 23% to 30%.

EXPOSURE TO INFORMATION The last question in this series asked respondents whether they recalled hearing, reading or seeing any news stories, advertisements or public service announcements about the BAAQMD and/or the Winter Spare the Air Program in the six months prior to the interview. As shown in Figure 71 on the next page, the proportion of respondents who recalled being exposed to information about the BAAQMD during this period was 51%, down significantly from 61% in 2008, but similar to the levels recorded in 2007. The proportion of respondents who recalled exposure to the Winter Spare the Air Program was slightly lower in 2009 (66%) when compared to 2008 (71%).

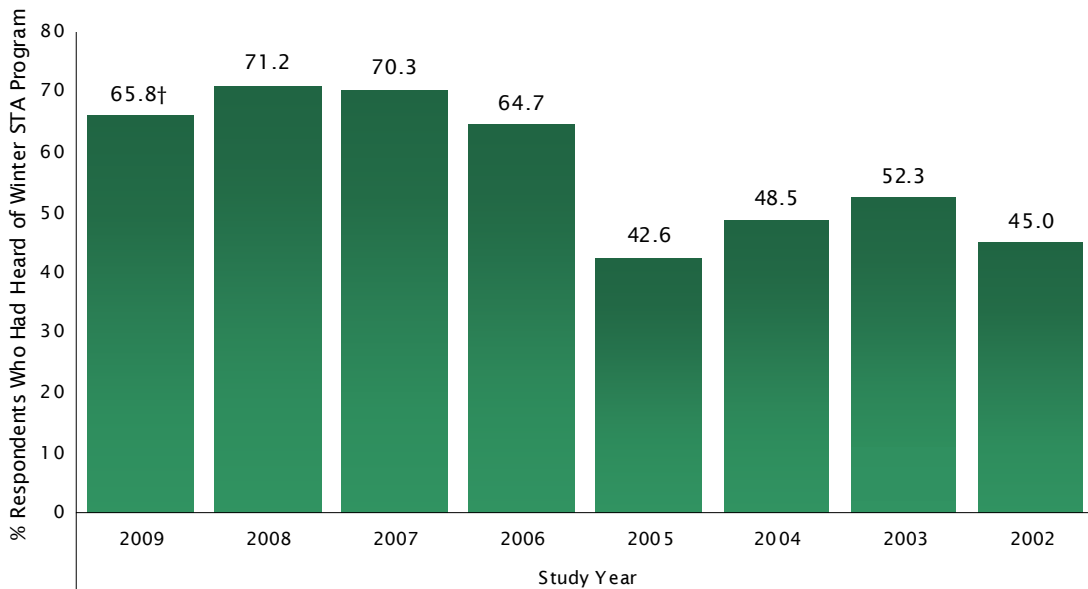
Question 38 *In the past six months, have you heard, read, or seen any news stories, advertisements, or public service announcements about the _____?*

FIGURE 71 ENCOUNTERED INFORMATION ABOUT BAAQMD IN PAST SIX MONTHS: 2002 ~ 2009 (N = 1,919)



† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

FIGURE 72 ENCOUNTERED INFORMATION ABOUT WINTER SPARE THE AIR CAMPAIGN IN PAST SIX MONTHS: 2002 ~ 2009 (N = 1,826)



† Statistically significant change ($p < 0.05$) between the 2008 and 2009 studies.

For the interested reader, Figures 73 and 74 display the percentage of *all* respondents who recalled hearing, reading or seeing information about the BAAQMD and the Winter Spare the Air Program—not just among those who had heard of the agency or program as shown in Figure 71. Among all respondents, recalled exposure was greatest for the agency among Marin County residents, those with wood-burning heating devices in the home, and respondents between the ages of 55 and 64. Recalled exposure to information about the Winter Spare the Air program was also highest among Marin County residents, those with wood-burning heating devices in the home, and respondents between the ages of 55 and 64.

FIGURE 73 ENCOUNTERED INFORMATION ABOUT BAAQMD & WINTER SPARE THE AIR CAMPAIGN IN PAST SIX MONTHS BY COUNTY OF RESIDENCE (N = 3,000)

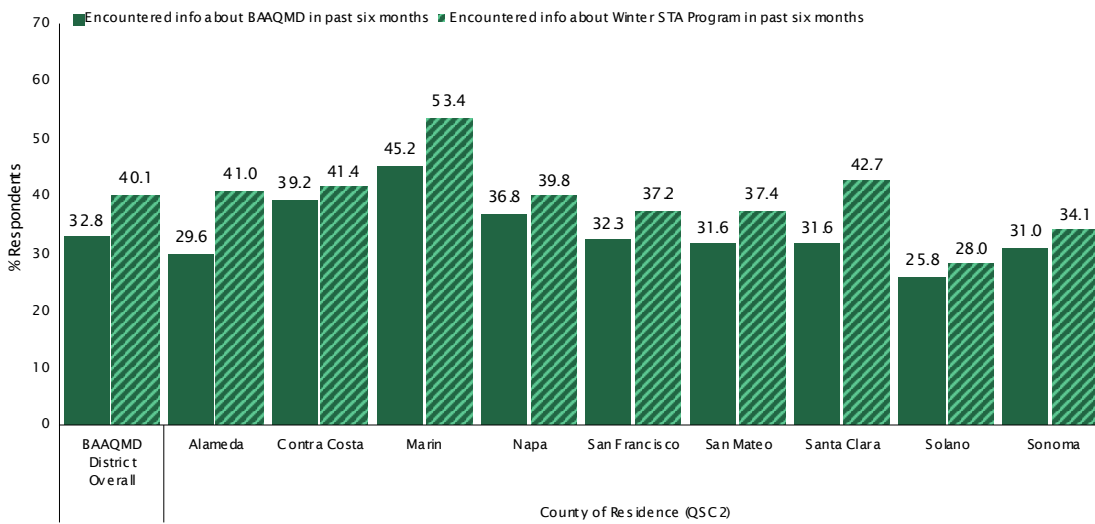
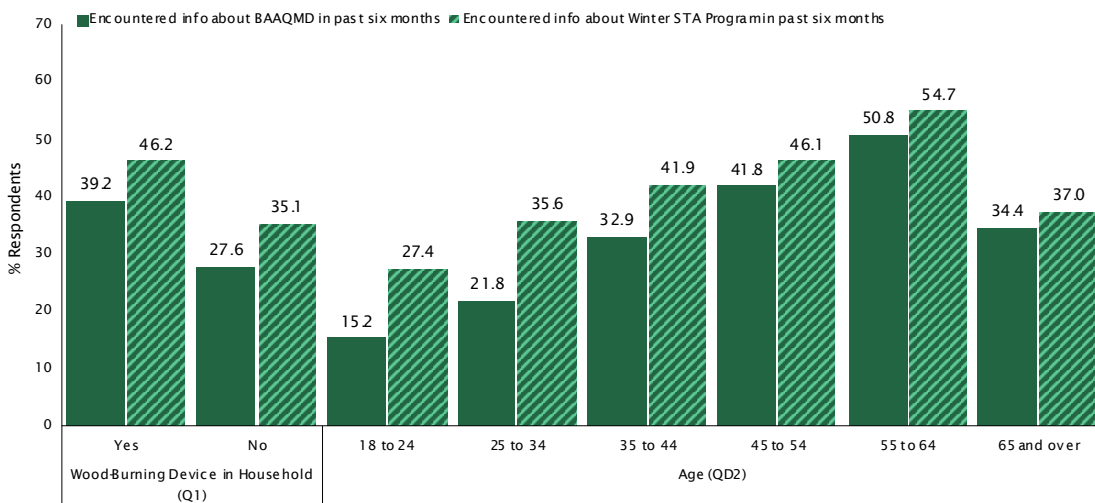


FIGURE 74 ENCOUNTERED INFORMATION ABOUT BAAQMD & WINTER SPARE THE AIR CAMPAIGN IN PAST SIX MONTHS BY WOOD-BURNING DEVICE IN HOUSEHOLD & AGE (N = 3,000)





BACKGROUND & DEMOGRAPHICS

TABLE 9 DEMOGRAPHICS OF SAMPLE: 2002 ~ 2009

	Study Year							
	2009	2008	2007	2006	2005	2004	2003	2002
Total Respondents	3,000	1,200	1,200	988	2,625	700	400	400
Age								
18 to 29	18	15	19	19	20	11	16	15
30 to 39	21	23	21	25	22	19	19	18
40 to 49	18	19	20	18	20	23	21	18
50 to 64	19	22	19	21	19	18	25	27
65 and over	13	14	15	14	14	21	13	18
Refused	10	7	6	3	5	8	7	5
Home Type								
Apartment	19	16	20	20	21	20	21	16
Condo	7	4	6	5	6	4	5	2
Town home	6	4	6	7	8	8	5	4
Single-family detached	61	68	63	63	60	63	66	73
Mobile home	2	3	2	3	2	2	2	4
Refused	5	4	3	2	4	3	3	1
Age of Home								
0 to 10 years	12	15	13	12	11	10	14	20
11 to 20 years	12	12	12	10	14	10	9	18
21 to 30 years	13	16	14	12	13	12	14	20
31 to 40 years	14	12	16	15	13	13	15	10
41 to 50 years	11	13	10	13	10	11	14	8
Over 50 years	23	23	26	28	27	30	18	10
Not sure / Refused	16	9	11	11	13	14	16	15
Household Income								
Under \$50,000	21	16	20	20	21	22	24	33
\$50,000 to \$74,999	13	14	16	16	16	18	17	20
\$75,000 to \$99,999	12	15	12	15	15	16	16	13
\$100,000 to \$149,999	14	16	17	16	17	14	15	9
\$150,000 to \$199,999	8	10	8	7	6	6	3	3
\$200,000 or more	9	9	7	8	7	4	6	2
Not sure / Refused	22	20	19	18	18	19	20	21
Gender								
Male	50	44	50	52	48	43	45	44
Female	50	56	50	48	52	57	55	56
County								
Alameda	20	21	21	21	21	23	22	-
Contra Costa	14	14	14	13	14	15	14	-
Marin	5	4	4	4	4	4	4	-
Napa	3	2	3	2	2	2	2	-
San Francisco	13	12	12	13	13	14	14	-
San Mateo	11	10	10	11	11	10	11	-
Santa Clara	24	25	24	24	24	23	23	-
Solano	6	6	5	6	6	3	5	-
Sonoma	5	5	5	6	5	5	6	-

Table 9 displays the demographic and background information collected during the survey. The demographic and background information was used to monitor the sample during data collection, as well as provide insight into how the results of the substantive questions of the survey vary across important subgroups of adults.



M E T H O D O L O G Y

This section of the report outlines the methodology and protocols used when conducting this study, as well as the motivation for employing certain techniques.

QUESTIONNAIRE With the questionnaire used in 2008 as a starting point, Dr. McLarney of True North Research worked closely with the BAAQMD to develop and refine an improved survey instrument for the 2009 study. In the interest of improving the *validity* and *reliability* of select opinion and behavior measures, the 2009 study continued several questionnaire changes that were first implemented in the 2004 season. The most notable of these changes addressed how the questionnaire measured the impacts of the Winter Spare the Air Program. The changes were made so that the impacts of the winter program on wood burning behavior would be measured using the same basic methodology employed by the BAAQMD—and recommended by CARB and EPA¹²—to measure the impacts of the summer Spare the Air Program on driving behavior.¹³

A key change in the 2009 questionnaire was the addition of a Question 21, which was designed to identify and measure changes in wood-burning behavior on Spare the Air Alert episodes.

CATI & PRE-TEST Before fielding the survey, the questionnaire was CATI (Computer Assisted Telephone Interviewing) programmed to assist the live interviewers when conducting the interviews. The CATI program automatically navigates the skip patterns, randomizes the appropriate question items, and alerts the interviewer to certain types of keypunching mistakes should they happen during the interview. The integrity of the questionnaire was pre-tested internally by True North and by dialing into random homes within the District prior to formally beginning the survey. Two training sessions were conducted to familiarize interviewers with the study and to answer questions and clarify details of the study.

SAMPLE & WEIGHTING Because the primary focus of the study was to gather information from adults who reside within the District, households were chosen for this study using a random digit dial (RDD) sampling method. An RDD sample is drawn by first selecting all of the active phone exchanges (first three digits in a seven digit phone number) and working blocks that service the area. After estimating the number of listed households within each phone exchange that are located within the area, a sample of randomly selected phone numbers is generated with the number of phone numbers per exchange being proportional to the estimated number of households within each exchange in the area. This method ensures that both listed and unlisted households are included in the sample. It also ensures that new residents and new developments have an opportunity to participate in the study, which is not true if the sample were based on a telephone directory.

12. The CARB/EPA Method is summarized in the Transportation Research Board's (TRB) journal—*Transportation Research Record*—for 2004 in an article entitled *Development of a Quantification Method for Measuring the Travel and Emissions Impacts of Episodic Ozone Alert Programs* (pages 153-159). It is described in detail in the following air resources guidance report: CARB, "Quantification Method Reference Manual: A Method to Measure Travel and Emissions Impacts of Ozone Action Public Education Programs," April 2003. In addition to Eric Schreffler, Dr. Timothy McLarney and Richard Sarles, the TRB paper and guidance report were co-authored by Joann Lu and Jeff Weir of CARB, as well as Thomas Higgins and Dr. Will Johnson of K.T. Analytics.

13. For a detailed description of the updated CARB/EPA Method and its application to the BAAQMD's summer Spare the Air Program, see the *Spare the Air Study: 2008 Summer Ozone Season* report prepared for the BAAQMD by True North & ESTC.

Although the RDD method is widely used for local and regional surveys, the method also has several known limitations that must be adjusted for to ensure representative data. Research has shown, for example, that individuals with certain demographic profiles (e.g., older women) are more likely to be at home and are more likely to answer the phone even when other members of the household are available. If this tendency is not adjusted for, the RDD sampling method will produce a survey that is biased in favor of women—particularly older women. To adjust for this behavioral tendency, the survey included a screening question which initially asked to speak to the youngest male adult available in the home. If a male adult was not available, then the interviewer was instructed to speak to the youngest female adult currently available. This protocol was followed—to the extent needed—to ensure a representative sample of adults. In addition to following this protocol, the sample demographics were monitored as the interviewing proceeded to make sure they were within certain tolerances. Because the District is composed of seven complete counties and two partial counties, respondents were initially asked the ZIP code of their residence so that only those within the District’s boundaries were included in the study.

Because wood-burning is far more common in certain counties than in others, strategic oversampling was used to increase the sample size in counties for which the ‘no burn’ policy would likely affect a substantial percentage of households. The final raw data were weighted by age groups within each county to exactly match updated demographic projections for 2009 based on Census and California Department of Finance estimates. The results presented in this report are the weighted results, which are representative at the District-wide level, as well as within the nine member counties.

MARGIN OF ERROR By using an RDD probability-based sample and monitoring the sample characteristics as data collection proceeded, True North ensured that the sample was representative of adults and households in the District. The results of the sample can thus be used to estimate the opinions of *all* adults—and characteristics of *all* households—in the District. Because not every adult or household in the District participated, however, the results have what is known as a statistical margin of error due to sampling. For household characteristics, the margin of error refers to the difference between what was found in the survey of 3,000 households for a particular question and what would have been found if all of the estimated 2,432,147 households in the District had been interviewed.

For example, in estimating the percentage of District households that have a woodstove (Question 1), the margin of error can be calculated if one knows the number of households in the District, the size of the sample, a chosen confidence level, and the distribution of responses to the question. The appropriate equation for estimating the margin of error, in this case, is shown below.

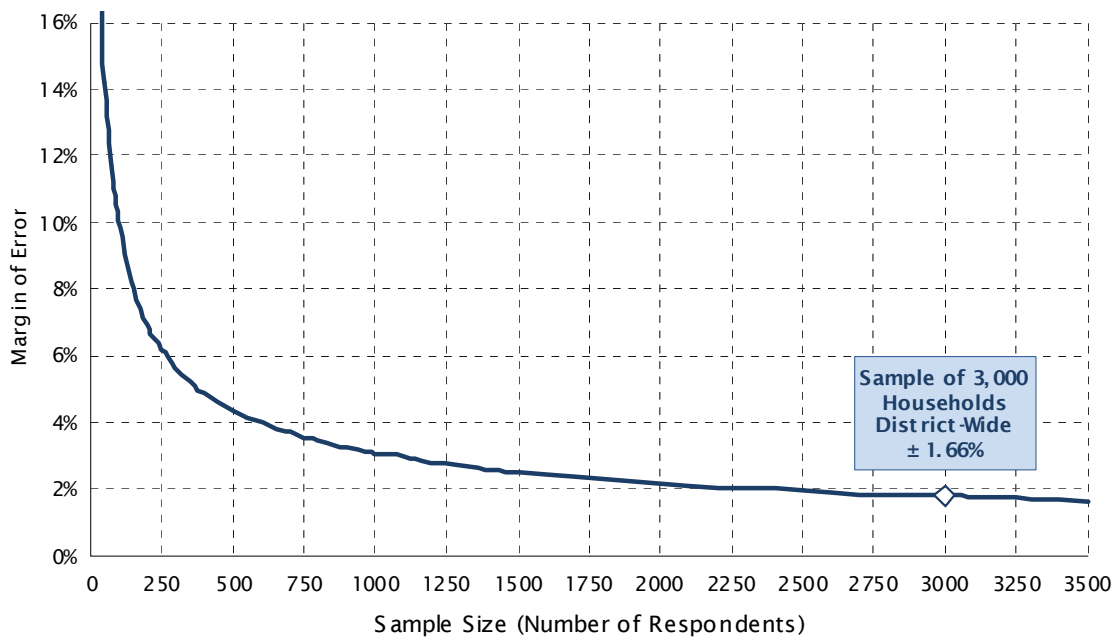
$$\hat{p} \pm t \sqrt{\left(\frac{N-n}{N}\right) \frac{\hat{p}(1-\hat{p})}{n-1}}$$

where \hat{p} is the proportion of households that indicated they possess a woodstove (0.6 for 6% in this example), N is the total number of households in the District (2,432,147), n is the sample size that received the question (1,200), and t is the upper $\alpha/2$ point for the t-distribution with $n - 1$ degrees of freedom (1.96 for a 95% confidence interval). Solving this equation using these

values reveals a margin of error of $\pm 0.85\%$. This means that with 6% of sampled households indicating they own a woodstove, one can be 95 percent confident that the actual percentage of all households in the District with a woodstove is between 5% and 7%.

Figure 75 provides a graphic plot of the *maximum* margin of error in this study. The maximum margin of error for a dichotomous percentage result occurs when the answers are evenly split such that 50% provide one response and 50% provide the alternative response (i.e., $\hat{p} = 0.5$). For this survey, the maximum margin of error is 1.66% for District-wide estimates.

FIGURE 75 MAXIMUM MARGIN OF ERROR PLOT



Within this report, figures and tables show how responses to certain questions varied by county, as well as by demographic characteristics such as presence of a heating device, respondent age, etc. Because the margin of error grows exponentially as the sample size decreases (see the left side of Figure 75), the reader should use caution when generalizing and interpreting the results of questions received by only a small percentage of the sample or when comparing results within subgroups of respondents.

DATA COLLECTION Interviews were conducted via telephone during weekday evenings (5:30PM to 9PM) and on weekends (10AM to 5PM) between November 12, 2009 and February 28, 2010. Interviews were conducted on randomly selected evenings ($n = 2,297$), as well as targeted for Winter Spare the Air Alert episodes throughout the season ($n = 703$). It is standard practice not to call during the day on weekdays because most working adults are unavailable and thus calling during those hours would bias the sample. Interviewing was also suspended on Thanksgiving, Christmas, and New Year's Day.

DATA PROCESSING Data processing consisted of checking the data for errors or inconsistencies, coding and recoding responses, categorizing open-end responses, and preparing frequency analyses and crosstabulations. Because the research objectives involved comparing the 2008 results with those of prior studies, where appropriate, True North also accessed and processed data from the 2008, 2007, 2006, 2005, 2004, 2003 and 2002 winter season surveys to allow for meaningful comparisons.

STATISTICAL SIGNIFICANCE Many of the figures and tables in this report present the results of questions asked in 2009 alongside the results found in prior years for identical questions. In such cases, True North conducted the appropriate tests of statistical significance to identify changes that likely reflect actual changes in public opinion or behavior over time—as opposed to being due to chance associated with selecting two cross-sectional samples independently and at random. Differences between studies are identified as *statistically significant* if we can be 95% confident that the differences reflect an actual change in public opinion or behavior between the two studies. Statistically significant differences within response categories over time are denoted by the † symbol which appears in the figure next to the appropriate response value for 2009.

ROUNDING Numbers that end in 0.5 or higher are rounded up to the nearest whole number, whereas numbers that end in 0.4 or lower are rounded down to the nearest whole number. These same rounding rules are also applied, when needed, to arrive at numbers that include a decimal place in constructing figures and charts. Occasionally, these rounding rules lead to small discrepancies in the first decimal place when comparing tables and pie charts for a given question.

QUESTIONNAIRE & TOPLINES



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

Winter 09-10 Spare the Air Tonight Survey
Designed by True North Research
Final Toplines
3,000 Respondents

Section 1: Introduction to Study

Hi, my name is _____ and I'm calling on behalf of TNR, a public opinion research firm. We're conducting a survey concerning issues of importance to residents in the Bay Area region and we'd like to get your opinions.

If needed: This is only a survey about important issues in the Bay Area. I'm NOT trying to sell anything.

If needed: The survey should take about 12 minutes to complete.

If needed: If now is not a convenient time, can you let me know a better time so I can call back?

If the person says they are an elected official or is somehow associated with the survey, politely explain that this survey is designed to measure the opinions of those not closely associated with the study, thank them for their time, and terminate the interview.

Section 2: Screener for Inclusion in the Study

For statistical reasons, I would like to speak to the youngest adult male currently at home that is at least 18 years of age. *If there is no male currently at home that is at least 18 years of age, then ask:* Ok, then I'd like to speak to the youngest female currently at home that is at least 18 years of age.

If there is no adult currently available, then ask for a callback time.

NOTE: Adjust this screener as needed to match sample quotas on gender & age

The number of respondents that received each question is shown in brackets following the question wording.

SC1 To begin, what is the ZIP code of your residence? *Read zip code back to respondent to confirm before submitting. Terminate those that fall outside District.* [3,000]

Record 5-digit ZIP code

Data on file

SC2 What county do you live in? [3,000]

1	Alameda	20%
2	Contra Costa	14%
3	Marin	5%
4	Napa	3%
5	San Francisco	13%
6	San Mateo	11%
7	Santa Clara	24%
8	Solano	6%
9	Sonoma	5%

Section 3: Heating Device Use

I'd like to begin by asking you a few questions about heating devices that you may have in your home.

Q1 Do you have a: _____ in your home? *If yes, ask: How many: _____s do you have in your home?*

A	Wood-burning fireplace* [3,000]	
	None	59%
	One	35%
	Two	4%
	Three or more	1%
	Not sure / Refused	1%
B	Natural gas or propane fireplace [3,000]	
	None	77%
	One	16%
	Two	4%
	Three or more	1%
	Not sure / Refused	2%
C	Pellet stove* [3,000]	
	None	91%
	One	2%
	Two	0%
	Three or more	0%
	Not sure / Refused	6%
D	Woodstove or woodstove insert* [3,000]	
	None	92%
	One	5%
	Two	1%
	Three or more	0%
	Not sure / Refused	2%

If Q1.1a, Q1.1b, Q1.1c AND Q1.1d = (2, 98), skip to Q22.

Only ask Q2 if Q1.1a = 1 OR Q1.1d = 1, otherwise skip to instructions preceding Q3.

*45% of households reported at least one wood-burning device.

Q2 What type of wood do you primarily use in your wood burning fireplace or woodstove - Natural wood logs, manufactured logs such as Duraflame or Presto, scrap wood, pallets, or some other fuel? If 'other', ask: what type? [1,278]			
1	Natural wood log	42%	Ask Q3
2	Manufactured log/Duraflame/Presto	20%	Skip to Q7
3	Scrap wood	2%	Skip to Q7
4	Pallets (not pellets)	0%	Skip to Q7
5	Never use fireplace	27%	Skip to Q7
6	Other	1%	Skip to Q7
98	Not sure	6%	Skip to Q7
99	Refused	3%	Skip to Q7
<i>Only ask Q3 if (Q1.1a = 1 and Q20 = 1) OR (Q1.1d = 1 and Q2 = 1), otherwise skip to introduction preceding Q7.</i>			
Q3 What type of natural wood do you typically burn? [492]			
1	Ash	2%	
2	Eucalyptus	3%	
3	Oak	46%	
4	Pine (Cedar)	8%	
5	Almond	5%	
6	Fruitwood	0%	
7	Hardwood (general)	12%	
8	Other wood	3%	
98	Not sure	20%	
99	Refused	0%	
Q4 Do you typically purchase your wood from a wood supplier, the local store, or do you gather your own wood? [492]			
1	Wood supplier	30%	
2	Local store	22%	
3	Gather own wood	40%	
4	Other source	6%	
98	Not sure	2%	
99	Refused	0%	

Q5	At the point that you acquire your wood, is it fresh-cut and somewhat moist or is it already dry and seasoned? [492]				
	1	Fresh-cut & moist	19%		
	2	Dry & seasoned	68%		
	3	Depends/mixed	7%		
	98	Not sure	4%		
	99	Refused	1%		
Q6	When you use your fireplace or woodstove, which of the following would you say is the primary reason you do so? For heating your home, or for the ambiance of having a fire? [492]				
	1	Heat	51%		
	2	Ambiance	44%		
	98	Not sure	4%		
	99	Refused	1%		
For the next series of questions, when I refer to "winter" I mean the months of November through February.					
<i>Only ask Q7 for each appliance where Q1.1 = 1.</i>					
Q7	Will you use your: _____ this winter?				
<i>Do Not Randomize</i>		Yes	No	Not Sure	Refused
A	Wood-burning fireplace [1,200]	43%	52%	4%	0%
B	Natural gas or propane fireplace [631]	63%	33%	4%	0%
C	Pellet stove [80]	70%	28%	2%	0%
D	Woodstove [178]	66%	28%	5%	1%
<i>Only ask Q8 for each appliance where Q7 = 2.</i>					
Q8	Why do you not expect to use your _____ this winter? <i>Do Not Read Responses. Multiple Responses OK.</i>				
<i>Do Not Randomize</i>		Air Quality Reasons	Too Much Hassle	Health Reasons	Other
A	Wood-burning fireplace [628]	17%	30%	11%	49%
B	Natural gas or propane fireplace [208]	5%	26%	4%	68%
C	Pellet stove [22]	1%	37%	0%	62%
D	Woodstove [50]	10%	18%	11%	62%

Read the following instruction if Q1.1c = 1.				
For the remainder of this interview, when I refer to 'burning wood' I mean burning any type of wood product, including wood pellets for a pellet stove.				
Only ask Q9 if Q7a = 1, Q7c = 1 or Q7d = 1. Otherwise, skip to Q22.				
Q9	How often do you expect to burn wood this winter? At least once per week or less often than that? <i>If unsure, ask them to estimate.</i> [627]			
	1	At least once per week	44%	Skip to Q11
	2	Less often than once per week	52%	Ask Q10
	98	Not sure	3%	Skip to Q12
	99	Refused	1%	Skip to Q12
Q10	Would you say that you will burn wood about two to three times per month, once per month, or less often than once per month? <i>If unsure, ask them to estimate.</i> [324]			
	1	Two to three times per month	31%	Skip to Q12
	2	Once per month	39%	Skip to Q12
	3	Less often than once per month	29%	Skip to Q12
	98	Not sure	1%	Skip to Q12
	99	Refused	0%	Skip to Q12
Q11	In a typical winter week, how many days do you expect to burn wood? <i>If unsure, ask them to estimate.</i> [275]			
	1	One day	27%	
	2	Two days	19%	
	3	Three days	16%	
	4	Four days	10%	
	5	Five days	5%	
	6	Six days	1%	
	7	Seven days	14%	
	98	Not sure	8%	
	99	Refused	1%	
Q12	Did you burn wood in the past seven days? [627]			
	1	Yes	35%	Ask Q13
	2	No	65%	Skip to Q14
	98	Not sure	0%	Skip to Q14
	99	Refused	0%	Skip to Q14

Q13	Did you burn wood yesterday or last night? [218]	
	1	Yes 40%
	2	No 60%
	98	Not sure 0%
	99	Refused 0%
Q14	In a typical day that you burn wood, how many hours of the day do you have a fire burning? <i>If unsure, ask them to estimate.</i> [627]	
	One	4%
	Two	21%
	Three	30%
	Four	21%
	Five or more	19%
	Not sure	5%
<i>Only ask Q15 if Q7a = 1 or Q7d = 1</i>		
Q15	In a typical day that you burn wood, how many logs do you burn throughout the entire day? <i>If unsure, ask them to estimate.</i> [583]	
	One	21%
	Two	11%
	Three	10%
	Four	8%
	Five	9%
	Six	10%
	Seven or more	19%
	Not sure	11%
Q16	Thinking back to your most recent fire, approximately what time of the day did you first light the fire? <i>If unsure, ask to estimate.</i> [627]	
	1	4AM to 8:59AM 6%
	2	9AM to 11:59AM 4%
	3	Noon to 2:59PM 2%
	4	3PM to 5:59PM 22%
	5	6PM to 8:59PM 56%
	6	9PM to 11:59PM 4%
	7	Midnight to 3:59AM 1%
	99	Not sure / Refused 5%

Section 4: Changes in Wood Burning Behavior				
Only ask Q17 if Q7a = 1, Q7c = 1 or Q7d = 1. Otherwise, skip to Q22.				
Q17	This winter, do you expect that you will burn wood more often, less often, or about the same frequency as you did last winter? [627]			
	1	More often	12%	
	2	Less often	22%	
	3	About the same	58%	
	98	Not sure	7%	
	99	Refused	1%	
Q18	Were there occasions this winter when you normally would have burned wood, but decided not to? [627]			
	1	Yes	54%	Ask Q19
	2	No	42%	Skip to Q22
	98	Not sure	3%	Skip to Q22
	99	Refused	0%	Skip to Q22
Q19	Why did you decide not to burn wood on these occasions? Do NOT Read Response Options. Multiple Responses OK. [342]			
	1	Winter Spare the Air Alert Program/ Advertisements and notices asking people not to burn wood/Laws against burning wood	51%	Ask Q20
	2	Air quality reason/health reason	10%	Ask Q20
	3	Other reason	36%	Skip to Q22
	98	Not sure	6%	Skip to Q22
	99	Refused	0%	Skip to Q22
Q20	So far this winter, how many times did you choose not to burn wood because of air quality alerts or health-related reasons? If respondent is unsure, ask them to estimate. [208]			
	One		19%	
	Two		21%	
	Three		14%	
	Four		12%	
	Five or more		20%	
	Not sure		14%	

25.1% of households with at least one wood-burning device reported not burning wood this winter (Q7) or a reduction in burning wood this winter (Q18, Q21) because of Winter STA Program / Air quality info, or because of health concerns paired with encountering Winter STA Program / Air quality info.

Only ask Q21 if Q13 = 2.		
Q21	You previously indicated that you chose not to burn wood yesterday or last night. Why did you decide not to burn wood yesterday or last night? <i>Do NOT Read Response Options. Multiple Responses OK.</i> [131]	
	1	Winter Spare the Air Alert Program/ Advertisements and notices asking people not to burn wood/Laws against burning wood
		16%
	2	Air quality reason/health reason
		0%
	3	No need/not cold
		30%
	4	Other reason
		51%
	98	Not sure
		4%
	99	Refused
		0%

Section 5: Awareness of Campaign			
Q22	During this winter, have you heard, read, or seen any news stories, advertisements, or public service announcements about the Winter Spare the Air Alert Program, poor air quality, or requests not to use your fireplace, pellet stove, or woodstove? [3,000]		
	1	Yes	67%
			Ask Q23
	2	No	32%
			Skip to Q24
	98	Not sure	1%
			Skip to Q24
	99	Refused	0%
			Skip to Q24
Q23	Where did you see or hear the news story, advertisement or public service announcement? <i>Don't read choices. Multiple responses OK.</i> [2,009]		
	1	Television	55%
	2	Radio	33%
	3	Newspaper	19%
	4	Website	5%
	5	Milk cartons	0%
	6	E-mail/E-mail Air Alert	3%
	7	Fax/Fax Alert	0%
	8	In store displays/signs	1%
	9	Other source	8%
	98	Not sure	4%
	99	Refused	0%

<i>Only ask Q24 if interviewing the day after a Winter STA Alert. Otherwise, skip to Q25.</i>			
Q24	Prior to taking this survey, were you aware that there was a "Winter Spare the Air Alert" yesterday? [703]		
	1	Yes	33%
	2	No	64%
	98	Not sure	3%
	99	Refused	0%

Section 6: Attitudes about Wood Smoke			
Q25	Do you think there are any negative health effects associated with breathing wood smoke? [3,000]		
	1	Yes	65% Ask Q26
	2	No	24% Skip to Q27
	98	Not sure	12% Skip to Q27
	99	Refused	0% Skip to Q27
Q26	What are the negative health effects associated with breathing wood smoke? <i>Don't read options. Multiple response OK.</i> [1,938]		
	1	Lung Disease (general reference)	40%
	2	Asthma	30%
	3	Allergies	4%
	4	Bronchitis	2%
	5	Cancer	8%
	6	Emphysema	4%
	7	Chemicals/Carcinogens/Toxins in wood	8%
	8	Carbon monoxide	7%
	9	Other health issue	14%
	98	Not sure	14%
	99	Refused	0%
Q27	Different neighborhoods in the Bay Area experience different levels of air pollution from wood smoke. In your opinion, does your neighborhood periodically experience air pollution from wood smoke? [3,000]		
	1	Yes	17% Ask Q28
	2	No	73% Skip to Q29
	98	Not sure	9% Skip to Q29
	99	Refused	0% Skip to Q29

Q28	Would you say that periodic air pollution from wood smoke in your neighborhood is a big problem, medium problem or a small problem? [516]		
	1	Big problem	9%
	2	Medium problem	25%
	3	Small problem	60%
	98	Not sure	5%
	99	Refused	1%

Section 8: Policy Attitude

Q29	Prior to taking this survey, were you aware that the Bay Area Air Quality Management District recently passed a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels? [3,000]		
	1	Yes, was aware	63%
	2	No, was not aware	35%
	98	Not sure	2%
	99	Refused	0%
Q30	Overall, how informed do you feel about the rules that are part of this new wood-burning policy? Would you say you feel well informed, somewhat informed, slightly informed, or not at all informed? [3,000]		
	1	Well informed	26%
	2	Somewhat informed	28%
	3	Slightly informed	21%
	4	Not at all informed	22%
	98	Not sure	3%
	99	Refused	0%
Q31	In general, do you support or oppose a policy that prohibits wood burning on nights when air pollution is expected to reach unhealthy levels? [3,000]		
	1	Support	71%
	2	Oppose	19%
	3	Depends	2%
	98	Not sure	7%
	99	Refused	0%

<i>Split-Sample. Sample A (half) gets Q32.</i>							
Q32	Next, I'm going to read a series of statements. For each statement, I'd like to know whether you think the statement is true or false.						
	Here is the first one: ----- Do you think this statement is true or false? Would that be definitely (true/false) or probably (true/false)? [1,539]						
	<i>Randomize</i>		Definitely True	Probably True	Probably False	Definitely False	Not sure Refused
A	No households are allowed to burn wood on designated 'no burn' days. There are no exceptions.	27%	26%	21%	15%	10%	1%
B	Households for which wood burning is their only source of heat are still allowed to burn wood on designated 'no burn' days.	22%	34%	17%	11%	16%	2%
C	Households that use natural gas or propane heating devices are still allowed to use them on 'no burn' days.	39%	35%	9%	5%	10%	2%
D	Households that have EPA certified woodstoves or pellet stoves are still allowed to use them on 'no burn' days.	11%	28%	25%	12%	23%	1%
E	People who violate the 'no burn' policy will receive a warning first, and then citations for future violations.	33%	45%	6%	4%	10%	2%
F	Between November and February, residents are required to check the status of air quality prior to burning wood.	31%	34%	15%	6%	13%	1%
G	On days that have clean air, it's OK to burn different types of wood, including driftwood, treated wood, wood that is still a bit wet, and used pallets.	11%	23%	24%	24%	16%	1%
H	At any time of the year, I can receive a citation if there is a lot of visible smoke coming from my chimney.	19%	34%	22%	11%	13%	1%
I	Burning wood is a major source of air pollution in the Bay Area, contributing up to one-third or more of airborne particle pollution on many winter days.	18%	30%	25%	12%	13%	1%
Q33	Do you know how you could find out whether today is a 'no burn' day? [3,000]						
	1	Yes	45%		Ask Q34		
	2	No	50%		Skip to Q35		
	98	Not sure	5%		Skip to Q35		
	99	Refused	1%		Skip to Q35		

Q34	How can you find out? <i>Probe: Are there any other ways to find out? Do NOT read options. Check all mentions.</i> [1,337]	
	1	Check the newspaper 23%
	2	Listen to radio 17%
	3	Call a hotline 18%
	4	Check the Air District's website 14%
	5	Check a website (general reference) 62%
	6	Sign-up for email alerts 2%
	7	Sign-up for text message alerts 0%
	8	Sign-up for automated telephone calls/robo-call notification 1%
	98	Not sure 6%
	99	Refused 0%

Section 9: Fireplace & Pollution Knowledge

Split-Sample. Sample B (half) gets Q35, but only ask Q35 if Q1.1a = 1. Otherwise, skip to Q36.

Q35	Next, I'm going to read a series of statements. For each statement, I'd like to know whether you think the statement is true or false. Here is the first one: _____. Do you think this statement is true or false? Would that be definitely (true/false) or probably (true/false)? [604]						
	<i>Randomize</i>	Definitely True	Probably True	Probably False	Definitely False	Not sure	Refused
A	A fireplace is an efficient source of heat	17%	11%	20%	45%	4%	2%
B	All fires in my fireplace should produce visible smoke from the chimney	21%	21%	22%	21%	13%	2%
C	It is okay to burn materials other than firewood in my fireplace	10%	6%	17%	57%	7%	2%
D	Manufactured logs burn cleaner than seasoned firewood	13%	30%	19%	10%	25%	2%

Section 10: BAAQMD and Winter Spare the Air Alert Program Recognition							
Q36	Let's change gears a bit. Have you ever heard of the _____? Code 'Not sure' as 'No'.						
Randomize		Yes		No			
A	Bay Area Air Quality Management District [3,000]	64%		36%			
B	Winter Spare the Air Alert Program [3,000]	61%		39%			
Only ask Q37 and Q38 for each item in Q36 that respondent had heard of.							
Q37	Generally speaking, would you say you have a favorable or unfavorable opinion of the _____, or do you have no opinion either way? Get answer and ask: Would that be very or somewhat favorable / unfavorable?						
		Very Favorable	Somewhat Favorable	Neutral/ No Opinion Either Way	Somewhat Unfavorable	Very Unfavorable	Not sure
A	Bay Area Air Quality Management District [1,919]	20%	22%	46%	4%	6%	2%
B	Winter Spare the Air Alert Program [1,826]	30%	27%	30%	4%	6%	3%
Q38	In the past six months, have you heard, read, or seen any news stories, advertisements, or public service announcements about the _____?						
		Yes		No		Not sure	
A	Bay Area Air Quality Management District [1,919]	51%		43%		5%	
B	Winter Spare the Air Alert Program [1,826]	66%		31%		3%	
Section 12: Background & Demographics							
Thank you so much for your participation. I have just a few background questions for statistical purposes.							
D1	Including yourself, how many adults live in your household? [3,000]						
	One	20%					
	Two	51%					
	Three or more	25%					
	Refused	4%					

D2	In what year were you born? Year recoded into age categories shown below. [3,000]	
	18 to 24	10%
	25 to 34	20%
	35 to 44	20%
	45 to 54	17%
	55 to 64	10%
	65 and over	13%
	Refused	10%
D3	Do you live in an apartment, condo, townhome, single-family detached home, or mobile home? [3,000]	
	1 Apartment	19%
	2 Condo	7%
	3 Townhome	6%
	4 Single-family detached home	61%
	5 Mobile home	2%
	99 Refused	5%
D4	Approximately how many years ago was your home built? [3,000]	
	1 0 to 10 years	12%
	2 11 to 20 years	12%
	3 21 to 30 years	13%
	4 31 to 40 years	14%
	5 41 to 50 years	11%
	6 Over 50 years	23%
	98 Not sure	13%
	99 Refused	3%
<i>Only ask D5 if Q1d = 1. Otherwise skip to instructions preceding D6.</i>		
D5	Is your woodstove or woodstove insert EPA certified? <i>If not sure, clarify: Most woodstoves manufactured after 1992 are EPA certified, while older ones are not.</i> [115]	
	1 Yes, EPA certified	38%
	2 No, not EPA certified	24%
	98 Not sure	30%
	99 Refused	8%
<i>Only ask D6-D8 if [(Q1a = 1, Q1c = 1, or Q1d = 1) and (Q1b = (2, 98))]. Otherwise skip to D9.</i>		

D6	Do you have natural gas service at your home? [1,123]		
	1	Yes	78%
	2	No	14%
	98	Not sure	4%
	99	Refused	4%
D7	Do you pay for propane delivery at your home? [245]		
	1	Yes	10%
	2	No	72%
	98	Not sure	0%
	99	Refused	18%
D8	Besides your fireplace, do you have any other form of permanently installed devices to heat your home, such as a gas furnace, radiator, propane heater, or electric heaters? [1,123]		
	1	Yes	75%
	2	No	20%
	98	Not sure	1%
	99	Refused	4%
D9	Do you have an outdoor fireplace, firepit or chiminea (chim-uh-nay-uh)? [3,000]		
	1	Yes	15%
	2	No	81%
	98	Not sure	1%
	99	Refused	3%
D10	This last question is for statistical purposes only. As I read the following income categories, please stop me when I reach the category that best represents your household's total annual income before taxes. [3,000]		
	1	Under \$50,000	21%
	2	\$50,000 to \$74,999	13%
	3	\$75,000 to \$99,999	12%
	4	\$100,000 to \$149,999	14%
	5	\$150,000 to \$199,999	8%
	6	\$200,000 or more	9%
	7	Not sure / Refused	22%
Those are all of the questions that I have for you. Thanks very much for participating. This survey is sponsored by the Bay Area Air Quality Management District.			

Post-Interview Items			
D11	Gender [3,000]		
	1	Male	50%
	2	Female	50%