City of Fort Collins Air Quality Survey

2004

The purpose of this survey and report is to provide the City of Fort Collins with a bi-yearly assessment of the knowledge, attitudes, perceptions and behavior of a representative sample of residents concerning indoor and outdoor air quality.

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BACKGROUND

Air quality is an important issue for citizens of Fort Collins. Periodically, the City of Fort Collins performs a survey of the general population to (1) identify citizen's beliefs and attitudes about air quality and related issues; (2) gather input that will give direction to policy, planning, outreach and marketing efforts; (3) help staff assess current programs; and (4) address any current air quality issues.

In the 1990's four different surveys were used: indoor, outdoor, wood smoke, and a general air quality questionnaire. Beginning in 2002, after a thorough analysis and pilot of instrument validity and reliability, these surveys were condensed into one longer survey that is typically conducted biennially.

Typically, one can make changes in the home that will not have major effects on lifestyle and will be effective in increasing the quality of the indoor air. However, outside of the home, the major source of pollution, the automobile, cannot easily be forfeited without some major lifestyle changes, nor may one individual's efforts be perceived to be effective. In other words, indoor air quality is much easier to control by an "individual" than is outdoor air quality. Research tells us that a person's sense of perceived control is a powerful factor in the likelihood of both attitude and behavior change. Outdoor air quality is in the control of many, not just the respondent. Therefore, a community survey could ask what actions the respondent takes, but these can sometimes be better addressed using objective air quality and traffic monitoring techniques. To attempt to address perceived control and attitudes in addition to knowledge, this survey is designed to include perceptions and attitudes rather than actions that citizens take to improve air quality. A perception and attitude survey can inform policy makers and planners where their actions and programs might be most effective by measuring the respondent's individual (beliefs, knowledge), social (attitudes), cultural (community norms) and situational (amount of perceived control) variables that go into predicting the intent to act in either pro- or non pro-environmental ways in their community.

EXECUTIVE SUMMARY

Executive Summary

The Fort Collins Air Quality Survey was conducted in December of 2004. Of the 1,500 surveys sent to a random sample of residents of Fort Collins by mail, a very good response occurred for a total of 921 returned and completed, or 61%.

- To determine the effectiveness of the City's Air Quality information programs and events, respondents were asked if they recalled "hearing about" or "participating in" some of the current and recent programs. In response, residents said they were most familiar with (had either "heard of it" or "participated" in) the *Radon Certification for Builders* (48%), *Lawn Mower Rebate* (34%), and *Wood Smoke Response Line* (26%) programs/events.
- Twenty-six percent of respondents had either seen or heard of the new *Clean Air: It's up to us* television or radio commercials that debuted in Spring 2004.
- Almost half (45%) of the respondents had seen the billboards at railroad crossings that encouraged motorists to turn off their engines while a train passed.
- *Utility bill inserts* (49%) and the *local newspaper*s (38%) remained the main sources of information (the question didn't specify info from the City, just general AQ info sources) air quality information for residents. The least effective sources were found to be the *Internet* and *Air quality programs or events.*
- Most residents believe that they will act to positively influence the air quality in Fort Collins. The majority of the respondents believe the air quality does negatively influence health problems and the environment. Fewer believed air pollution in Fort Collins was bad enough to adversely impact the economy or the odor. Very few residents stated that indoor air pollution in their home was a problem.
- The most frequently chosen response regarding *where* residents believe the City should focus efforts to best address air quality issues in Fort Collins was to *Improve Traffic Light Timing to Reduce Vehicle Idling at Lights* (72% "Strongly Agree").
- The biggest concern around the adverse impacts of poor air quality is visibility, evidenced by the higher percentage of respondents that either "strongly agree" or "agree" that air pollution in Fort Collins C*auses a "Brown Cloud*" (70%) and *Obscures Mountain Views* (56%). The percentages impacted are lower than results from the 2002 survey: at 76 and 70 percent, respectively.
- On average, forty-five percent of respondents state that air pollution in Fort Collins affects them in some negative way (allergies, respiratory, visually, indoor air).
- The top action residents would be willing to take to help reduce air pollution in Fort Collins is to keep their *vehicles tuned up* "consistently" (79%).
- Approximately one third have experienced unacceptable air quality in Fort Collins. This number has decreased from the previous two surveys.
- Most rated the overall air quality in Fort Collins as either "very good" or "good."
- The majority believe that Fort Collins' air quality will be worse in five years.
- Approximately half of the respondents do not warm up their car at all, a quarter of the respondents warm it up for 1-2 minutes, and very few warm it up more than five minutes.
- Almost half of the respondents will occasionally turn their vehicle motor off while they are waiting for a train to pass.

- Approximately three quarters (69%) of the respondents do not have a wood-burning stove/fireplace/insert in their homes.
- 18% of homes have wood-burning fireplaces (18%) and 16% have gas fireplaces.
- The type of heating unit used most for supplemental heating needs was the *gas fireplace* (51 percent of respondents used gas fireplaces for less than 25% of the total heating needs).
- Only the *gas stove* and the *pellet stove* were considered to provide over 50 percent of the heating needs by 10 and 11 percent (respectively) of the respondents.
- The heating units checked or cleaned most often are the *wood-burning stove, gas stove, pellet stove, and gas fireplace.*
- Most respondents either burned no wood or a very small amount of wood in their stoves or fireplace.
- Many homes (40%) have been tested for radon compared to the 2000 results where only 23 percent had been tested.
- Seventeen percent of respondents report having a radon mitigation system in their homes.
- Only 44 percent of those who purchased a home in the past 12 months recalled receiving a radon information brochure compared to 2000 where 60 percent of the respondents who had purchased their homes after 1997 reported receiving a radon brochure.
- Most of the respondents (56%) were not aware that new construction homes in Fort Collins are required to have radon mitigation systems installed starting in 2005.
- Residents rated *Diesel Vehicles* (82%) and *Gasoline Vehicles* (79%) as the outdoor pollutants they were most concerned about as they related to theirs and their family's day-to-day health and environment.
- Residents perceive *Carbon Monoxide* (64%), *second-hand smoke* (55%), and *radon* (52%), to be the most serious indoor air pollutants that affect their day-to-day health and environment.
- 62% believe the current vehicle emissions testing program plays an important role in maintaining or improving air quality in Fort Collins.
- Most respondents …
  - are in support of keeping a vehicle emissions testing program in Fort Collins to improve air quality even if the federal government no longer requires it (62%)
  - rated the vehicle emissions testing program as either "very inconvenient" (11%) or "somewhat inconvenient" (44%).
  - stated the existing vehicle emissions testing program was not a personal economic burden (62%).
  - are willing to continue to pay the fee to provide support for programs to help reduce vehicle emissions even if not required by law (64%).

Respondents to this survey were equally represented by males and females. The majority fall between 36 and 65 years of age, and were part of two-member households. Twenty-eight percent stated that there was a member of the household suffering from asthma, emphysema, heart disease, or other respiratory ailments. Thirty-six percent have lived in Fort Collins over 20 years, most are college educated, and earn a median family income over $40,000. Most respondents are employed outside the home (55%). Homeowners were the majority (88%).

Objectives

This survey was designed to address the following objectives:

Objective One:

Provide knowledge of the programs, ads, commercials or events reaching the public.

Program, Event or Commercial	Percent "Heard of" or "Participated In" or "Seen"
1. Radon Certification for Builders	48
2. Billboards encouraging drivers to turn off engine while a train passes.	45
3. Lawn-Mower Rebate	34
4. Wood Smoke Complaint Line	26
5. Clean Air: Its Up to Us	26
6. ClimateWise	14
7. CarCare Maintenance	10
8. Top Tech Awards	9

Objective Two:

Be a measure of where citizens obtain air quality information

Common Source	Percent
Utility Bill Insert	49
Local Newspaper	38
TV	15
Radio	13
Fliers/Brochures	12
Infrequent Source	**Percent**
Word of mouth	9
Air Quality Program or Event	6
Internet	3

Objective Three: Use an attitude scale to (1) predict residents' feelings of "personal obligation to help improve air quality in Fort Collins," and which factors are more important in the decision

The response, "I feel a personal obligation to help improve the Air Quality in Fort Collins" was used as the predictor in a regression equation to measure the intent to behave pro-environmentally and which factors weigh heavier in that decision. The results are listed in the following table. The higher the R^2, the more important this statement is to whether or not respondents intend to make personal pro-environmental decisions. In other words, this table shows that when the respondent understands that "small changes" they make will improve the air quality, they are more likely to feel a personal obligation to make changes. This helps planners understand where and how to address education programs. Only knowledge and feelings about the respondent's own behavior predicted their degree of personal obligation to help improve the air quality in Fort Collins. No other factors, such as social norms or knowledge of larger scale environmental impacts predict potential behavior.

Statement "I feel a personal obligation to help improve Fort Collins' air quality", vs.	R^2
I feel that small changes I make *can* affect the air quality in Fort Collins.	.17
I know what small changes I *could* make in my life to help air quality.	.13
Many of the people I personally know in Fort Collins will NOT be willing to change their day-to-day transportation habits to improve air quality.	.00
Mountain views are obscured by the air pollution in Fort Collins.	.02
Air pollution in fort Collins hurts the local economy.	.05
Air pollution in Fort Collins makes the air smell bad.	.03
Air pollution in fort Collins is significant enough to cause human health problems, for at least some of the residents.	.01
Air pollution in Fort Collins is significant enough to hurt the environment.	.01

Objective Four:

Tell planners where to focus programmatic efforts that will be most readily accepted.

Source	"Strongly Agree" and "Somewhat Agree" (%)
Improve traffic light timing to reduce vehicle idling at lights.	95
Promote the use of alternative fuel vehicles.	83
Do more to reduce the "Brown Cloud" and improve visibility.	82
Prohibit wood-burning on high-pollution days.	80
Do more to control outdoor air pollution in Fort Collins.	80
Encourage drivers to turn off vehicles at any wait longer than 3 minutes.	78
Do more to reduce local greenhouse gas emissions.	68
Require non-certified wood stoves to be removed/replaced at time of sale.	58
Do more to control indoor air pollution in Fort Collins.	40

Objective Five:

Determine the perceived negative affects of air pollution to the respondents.

Negative Impact	"Strongly Agree" and "Somewhat Agree"
Causes a "brown cloud."	70
Obscures mountain views.	56
Triggers allergies/respiratory problems.	44
Causes long-term respiratory problems.	42
Causes burning/itchy eyes, nose.	38
Affects my indoor air quality.	36
Causes health problems for a member of my household.	30

Objective Six:

Use an attitude, belief and perceived control scale to predict residents' intent to "reduce the number of miles I drive my vehicle" and some factors that are more likely than others to predict this. The next table shows which factors may predict the respondent's intent to *reduce the daily miles driven in their vehicle.* Results show that making *small changes in my life, ride a*

bike for errands and/or work, and *take the bus for errands and/or work*, are good predictors of whether or not a respondent would reduce the number of miles that they drive their vehicle each day. Keeping their *vehicle tuned up* does not predict individual behavior change in reducing daily miles driven (.03).

Statement "To help reduce air pollution in Fort Collins, I reduce the number of miles I drive my vehicle" vs.	**R^2**
Have made small changes in my life.	.39
Willing to continue paying a $2.20 fee at vehicle registration for the administration of the vehicle emissions testing program if it went toward programs designed to reduce vehicle emissions even if the current emissions program is no longer federally required by law?	.22
Ride a bike for errands and/or work.	.21
Take the bus for errands and/or work.	.21

Objective Seven:

Measure current and expected perception of the air quality in Fort Collins.

Statement	**%**
Current rating of air quality in Fort Collins as "very good" or "good"	72%
Expected air quality in Fort Collins in five years as "better" or "no change"	35%

Objective Eight:

Compare beliefs that something "should", "can" and "will" be done to improve the air quality in Fort Collins.

Statement	**%**
Something **"can"** be done to improve the air quality in Fort Collins.	71%
Something **"will"** be done to improve the air quality in Fort Collins.	28%
Something **"should"** be done to improve the air quality in Fort Collins.	74%

Objective Nine:

Determine percent who let their engines idle in the winter or while waiting for a train.

Statement	**%**
Do not warm up their car.	54%
"Always" or "occasionally" turn off their vehicle while waiting for a train to pass.	71%

Objective Ten:

Determine the number and kind of "other" types of heat, especially wood stoves or wood-burning fireplaces; are they certified; what percentage of heating they are used for; and, how often the unit is cleaned or checked.

Secondary sources of heat

Wood burning fireplaces	18%
Gas fireplaces	16%
Wood burning stoves	6%
Wood burning inserts	4%

*All other types of secondary heat sources were under one percent.

Percent of units certified

Coal-burning stove	100%
Pellet stove	100%
Coal burning stove	100%
Electric fireplace	64%
Gas fireplaces	43%
Gas stove	30%
Wood burning stoves	27%
Wood burning inserts	24%
Wood burning fireplaces	12%

Percent of units providing at least 25% of heating

Wood burning stoves	59%
Gas fireplaces	56%
Wood burning inserts	28%
Wood burning fireplaces	22%

Percent of units cleaned or checked at least "every 2 or 3 years"

Pellet stoves	100%
Gas stoves	74%
Wood burning stoves	66%
Gas fireplaces	57%
Wood burning fireplaces	48%
Wood burning inserts	43%

Objective Eleven:

Determine the amount of wood burned by those with wood-burning fireplaces or stoves.

< 1/4 cord	30%
1/4 -1/2 cord	8%
1/2 – 1 cord	9%
1-2 cords	6%
2-3 cords	2%
> 3 cords	1%

Objective Twelve:

Measure percent of homes tested for radon; percent with radon mitigation systems; percent of respondents that have received radon information; and, the percent of respondents who are aware of the new law requiring radon mitigation systems in Fort Collins in new construction homes.

Percent of homes tested for radon	40%
Percent of homes with radon mitigation systems	17%
Percent received a radon brochure at home purchase in past 12 months	44%
Percent aware of new law requiring radon mitigation systems in new construction homes	34%

Objective Thirteen:
Measure of perception of seriousness of outdoor air pollutants.

Source	Percent "Very Serious" or "Serious"
Diesel Vehicles	82
Gasoline Vehicles	79
Fine Particulates	67
Industrial Emissions	62
Ozone	59
Wood Smoke	55
Greenhouse Gases	54

Objective Fourteen:
Measure of perception of seriousness of indoor air pollutants; and

Source	Percent "Very Serious" or "Serious"
Carbon Monoxide	64
Biological pollutants	56
Second-hand smoke	55
Radon	52
Asbestos	49
Lead	47
Formaldehyde	46
Household products	44
Stoves/heaters/fireplaces/chimneys	43

Objective Fifteen:
Measures of perceptions of the vehicle emission testing program.

Existing vehicle emissions plays important role in air quality.	62%
Would continue to support a vehicle emissions program, even if not required.	62%
Rate emissions program as either "very" or "somewhat" inconvenient.	55%
Rate emissions programs as a "big" or "some" burden.	34%
Willing to pay $2.20 fee to support vehicle emissions program.	64%

Survey Sample

Response Rate

The City of Fort Collins Air Quality Survey was conducted in December of 2004. The survey used a non-experimental design (survey) with a stratified (by zip code) random sampling of 1,500 residents of the city of Fort Collins. The survey was a mail survey using the Total Design Method (Dillman, 1978) of surveying in order to achieve a higher response rate. Data were read into a Scantron scanner for accuracy, and results were analyzed using SPSS for Windows. A total of 921 completed surveys were returned, for a response rate of 61%.

Selecting the Sample

The method used to select a sample for the surveys was stratified random sampling. In random stratified sampling, there is some sub-group in a population that is of interest and can be identified. The sub-groups in a community survey are frequently identified by zip codes. The zip codes in Fort Collins represent various regions of the city. If we had selected a simple random sample of 1,500 residents, we might not have obtained a representative sample from one or more of the zip codes, or regions of the City. Fort Collins has five zip codes and two post office box zip codes. Four of the zip codes (80521, 80524, 80525, 80526, 80528) are approximately equally represented in population numbers. The two post office box zip codes are 80522 in the old post office building downtown, and 80527 in the newer post office building on the south end of town. There is another zip code in Fort Collins (80523) that is exclusive to Colorado State University. No surveys were mailed to 80523. This does not mean the survey excluded students. The only students excluded were ones living on campus in resident halls, dormitories or campus housing. Students living off campus had an equal chance to be included in the survey. Surveys were mailed proportionately to each zip code (excluding 80523).

Table 3. Stratified Random Sampling of 1,500 Surveys by City of Fort Collins' Zip Codes

Zip Codes	Number of Surveys Mailed
80521	300
80524	300
80525	300
80526	300
80528	300

An up-to-date, accurate "resident" mailing list was obtained through a reputable local mailing list company. The mailing list company was directed to randomly sample from the above zip codes. A computer based record system was used to generate the random list.

Determining Sample Size

The following formula was used to determine the size of sample necessary to meet the above criteria:

$$n = (t)^2(p)(q)/d^2$$

$$(1.96)^2(.5)(1-.5)/.04^2 = \mathbf{600}$$

Where:

n = sample size needed

t = 1.960 for a 95% confidence limit

p = the proportion estimate (e.g., .50)

q = (1 - p)

d = margin of error (degree of precision, or 4%)

In other words, a sample of 600 returned surveys would be an adequate sample at a confidence level of 95%, a margin of error of 4%, and a probability of 0.5. In this example, the survey's response rate was 48%.

The response rate for the 2004 Fort Collins Air Quality survey, 921 responses, was well over the calculated 600 sample size.

The actual margin of error based on a sample size of 921 was 3.2%.

$$(1.96)^2(.5)(1-.5)/.032^2 = 921$$

There are approximately 134,000 residents of the City of Fort Collins. A good rule of thumb when accepting a representative sample is to attempt to actually survey one percent of the population. One percent of the population is 1,340 citizens. This survey received completed surveys from 921 respondents, or 0.69 percent.

METHOD

Survey Procedure

The framework for implementing the 2002 Outdoor Air Quality survey followed a modified Total Design Method (TDM) developed by Don Dillman (1978). Among other techniques, this method makes use of mailings that both inform potential respondents of forth-coming surveys and remind them to answer and return the survey materials. Typical response rates using this method range from 60% to 99%, depending on the perceived importance to the respondent, and the length of the questionnaire. These rates meet established standards of "very good" (Babbie, 1973; as cited in Edwards, Thomas, Rosenfeld & Booth-Kewley, 1997).

Outline of Survey Procedure

A. Tasks completed before sending out the survey:
    1. Chose random sample and determined sample size
    2. Developed surveys, scanning software, and database to score surveys
    3. Ordered surveys and address labels
    4. Ordered envelopes, postcards, letters (cover, introductory, and second letters)
    5. Generated address label database to keep track of respondents
    6. Developed database for survey responses
    7. Sent introductory letter (see Appendix A)
B. Sending out the survey (see Appendices B, C and D):
    1. Prepared return envelopes
    2. Prepared survey packet
    3. Sent survey packet
C. Sending out reminder letters:
    1. Sent reminder postcard (see Appendix E)
    2. Sent second copy of the survey with a follow-up cover letter on to non-respondents (see Appendix F)
D. Established a final date to accept completed surveys.

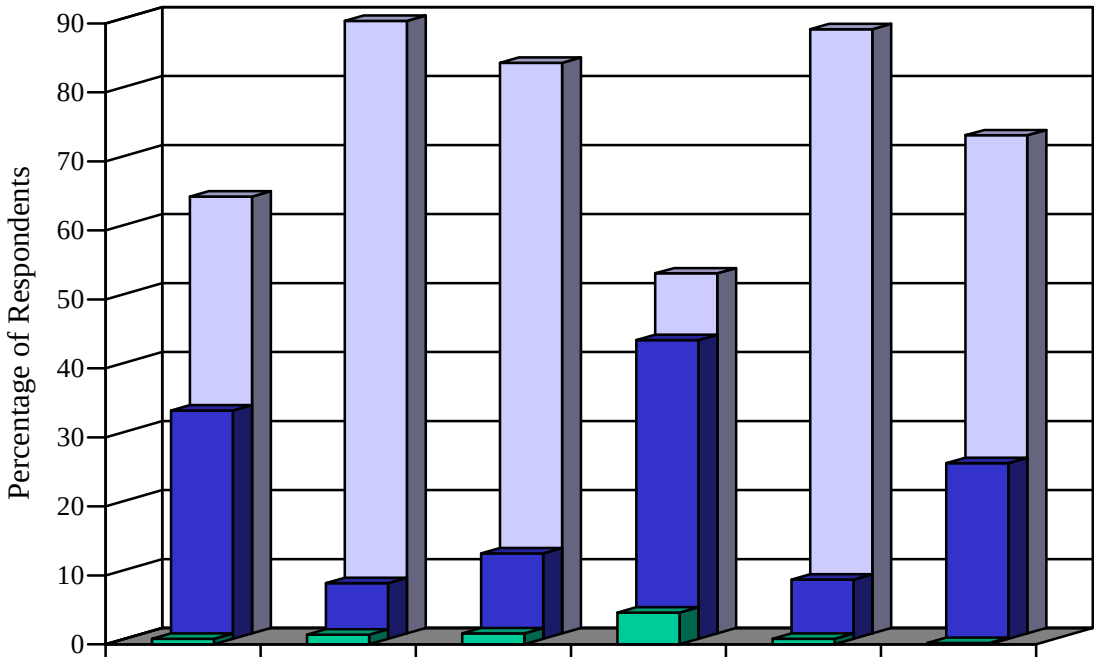
Detailed Results

Air Quality Survey Results

Q1. In order to address air quality issues, the City focuses on a variety of specific programs and events. Do you recall hearing about, or participating in any of the following?

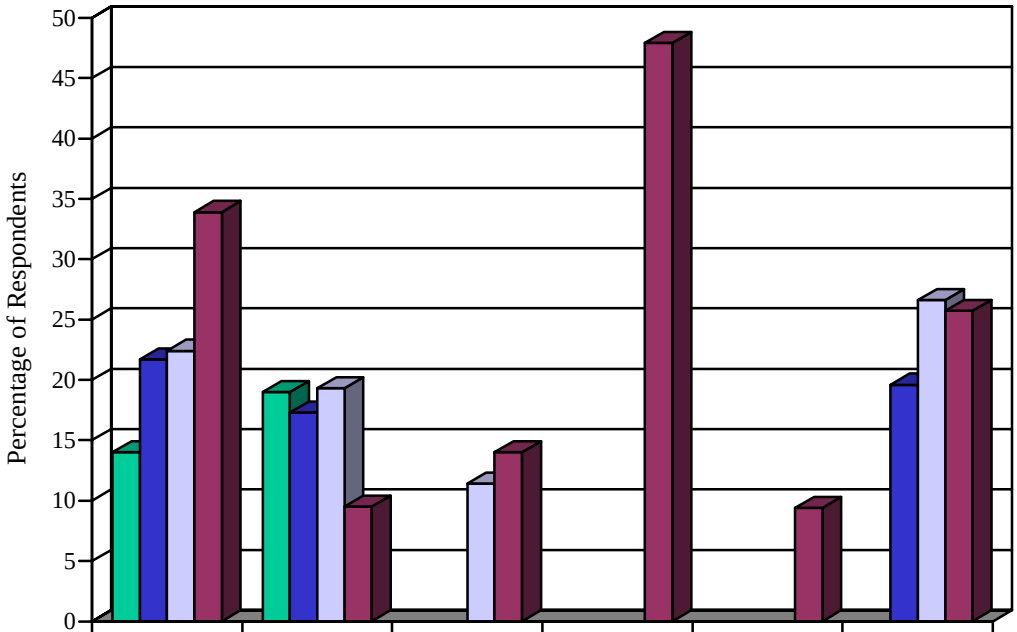
The first set of questions focused on specific air quality programs or campaigns currently in place at the City. As a check on marketing success, the responses can assist in determining *where* money and time was well spent and where it was not well spent. This list is updated as needed for each survey year. The *Radon Certification for Builders, ClimateWise,* and *CarCare Maintenance* were the programs/events most people had participated in. *Radon Certification for Builders, Lawn Mower Rebate,* and the *Wood Smoke Complaint Line* were highest rated programs in the "heard of it" category.

Percentage of Respondents Reached Through Programs and Events: 2004



	Lawn Mower Rebate	CarCare Maintenance	ClimateWise	Radon Certification for	Top Tech Awards	Wood Smoke Complaint
Participated	0.8	1.4	1.6	4.6	0.8	0.2
Heard of it	33.1	8.1	12.4	43.3	8.6	25.5
Never Heard of it	63.3	88.8	82.7	52.2	87.6	72.2

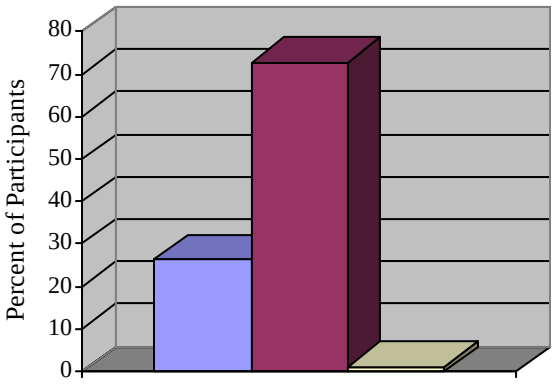
Either "Heard Of" or "Participated In" Programs and Events Comparison for 1999, 2001, 2002, and 2004



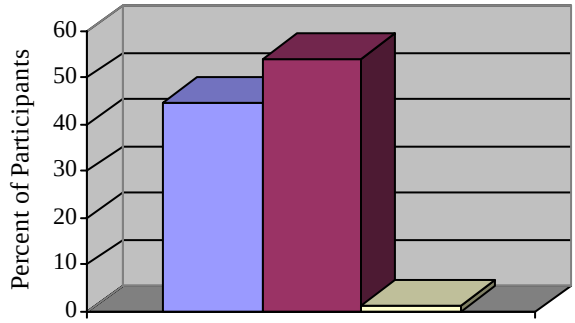
	Lawn Mower Rebate	CarCare Maintenance	ClimateWise	Radon Certification for Builders	Top Tech Awards	Wood Complaint Line
1999	14	19	-	-	-	-
2001	21.7	17.3	-	-	-	19.6
2002	22.4	19.3	11.4	-	-	26.6
2004	33.9	9.5	14	47.9	9.4	25.7

Q2. Did you see or hear the <u>Clean Air: Its Up to Us</u> television and/or radio commercials?

Twenty-six percent of the respondents had heard or seen the *Clean Air: Its up to us* television or radio commercials that debuted in Spring 2004. The median annual income of those that had seen or heard the "Clean Air Its Up to Us" television and/or radio commercials was between $40,000 and $60,000; they were between 35 and 54 years old; they had some college education; and they were 57 percent female.



Yes	26.2
No	72.9
Missing	1

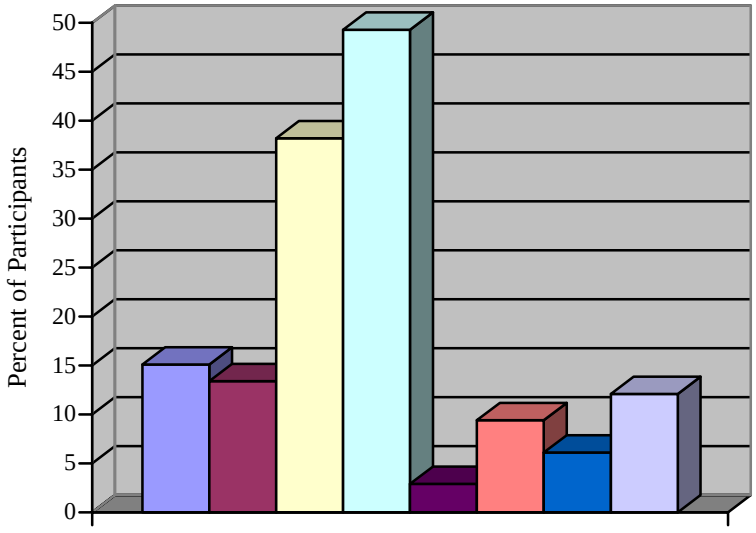


Yes	44.7
No	54
Missing	1.3

Q3. Did you see or hear about the billboards at railroad crossings encouraging you to turn off your engine while a train passes?

Almost half (45%) of the respondents had seen the billboards at railroad crossings that encouraged motorists to turn off their engines while a train passed.

Q4. If you recall seeing any information about air quality issues in Fort Collins from the following sources, please indicate. (Mark all that apply.)



TV	15.1
Radio	13.4
Local Newpaper	38.2
Utility Bill insert	49.3
Internet	2.9
Word of Mouth	9.4
Air Quality Program/Event	6.1
Fliers/Brochures	12.1

This question gives an indication of the success of some recent programs and events the City has been using to address air quality issues. This question is also updated each survey year as appropriate. Residents were asked how they recalled receiving information about air quality

issues in Fort Collins. *Utility bill inserts* (49%) and the *local newspaper*s (38%) were the main sources of information about air quality information. The least effective sources were found to be the *Internet* and *air quality programs or events.*

Comparing years 1997, 1999, 2001 and 2004 we find that local newspapers and utility bill inserts have remained as the top source of information about air quality issues (Table 1).

Table 1. Sources of Air Quality Information Comparisons: 1997, 1999, 2001, 2004

Source of Information				
	1997 (%)	**1999 (%)**	**2001 (%)**	**2004 (%)**
TV	22	20	22	15
Radio	27	15	27	13
Local Newspaper	64	49	67	38
Denver Newspaper	16	11	8	-
Internet	5	2	4	3
Utility Bill Insert	58	57	61	49
Environmental Group	19	10	8	-
Environmental News	16	10	10	-
City Line	6	3	2	-
Displays	*	7	13	-
Presentations	*	2	3	-
Flyers/Brochures	*	12	14	12
Friends	30	8	10	-
Children	13	4	3	-
Jobs/School	15	7	11	-
Other	7	3	6	-
Air Quality Programs/Events	-	-	-	6
Word of Mouth	-	-	-	9

Q5. Please indicate how strongly you agree/disagree with each of the following:

Table 2.Participants'Attitudes, Beliefs, Norms and Perceived Control of Air Quality in Fort Collins

Statement	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Don't Know
I feel a personal obligation to help improve the air quality in Fort Collins.	42	49	5	2	2
I know what small changes I *could* make in my life to help air quality.	29	47	12	5	7
I feel that small changes I make *can* affect the air quality in Fort Collins.	32	46	13	5	4
Many of the people I personally know in Fort Collins will NOT be willing to change their day-to-day transportation habits to improve air quality.	33	41	13	4	9
Mountain views are obscured by the air pollution in Fort Collins.	23	33	25	17	2
Indoor air pollution is a problem in my home.	3	15	28	45	9
Air pollution in Fort Collins hurts the local economy.	8	28	28	17	19
Air pollution in Fort Collins makes the air smell bad.	14	27	31	22	6
Air pollution in Fort Collins is significant enough to cause human health problems for at least some of the residents.	20	37	19	10	14
Air pollution in Fort Collins is significant enough to hurt the environment.	20	34	19	14	13

Most residents believed that they can and will act to positively influence the air quality in Fort Collins. However, they believe that the people they personally know will "NOT be willing to change their day-to-day transportation habits to improve air quality" (74% "strongly agree" or "agree"). A majority feel air pollution in Fort Collins is significant enough to cause health problems at least for some residents, to obscure mountain views, and to hurt the environment. Fewer respondents believed that the air pollution in Fort Collins was bad enough to make the air smell bad or hurt the economy. In addition, very few residents stated that indoor air pollution was a problem for them.

Q6. To help improve air quality, City air quality programs and plans should:

Table 3. Participants' Belief of What the City Should Do To Improve The Air Quality

Statement	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Don't Know
Do more to control indoor air pollution in Fort Collins.	8	32	29	18	13
Do more to control outdoor air pollution in Fort Collins.	36	44	12	5	3
Improve traffic light timing to reduce vehicle idling at lights.	72	23	3	-	2
Encourage drivers to turn off vehicles at any wait longer than 3 minutes.	44	34	12	7	3
Promote the use of alternative fuel vehicles.	45	38	10	4	3
Require non-certified wood stoves to be removed/replaced at time of home sale.	30	28	15	21	6
Do more to reduce local greenhouse gas emissions.	33	35	13	7	3
Prohibit wood-burning on high-pollution days.	46	34	10	7	3
Do more to reduce the "Brown Cloud" and improve visibility.	45	37	10	4	4

The main focus of Question 6 is to determine where citizens believe the City should focus air quality programs and plans. Responses should help planners and staff focus efforts where they will be easily and readily accepted. Clearly, *improving traffic light timing* was selected as the top action the City should take (see Table 3). Other actions highly supported by citizens included: *promoting the use of alternate fuel vehicles; prohibit wood-burning on high-pollution days;* and *do more to reduce the "Brown Cloud" and improve visibility; and encouraging drivers to turn off vehicles at any wait longer than 3 minutes.*

Q7. Air pollution in Fort Collins affects me because it…

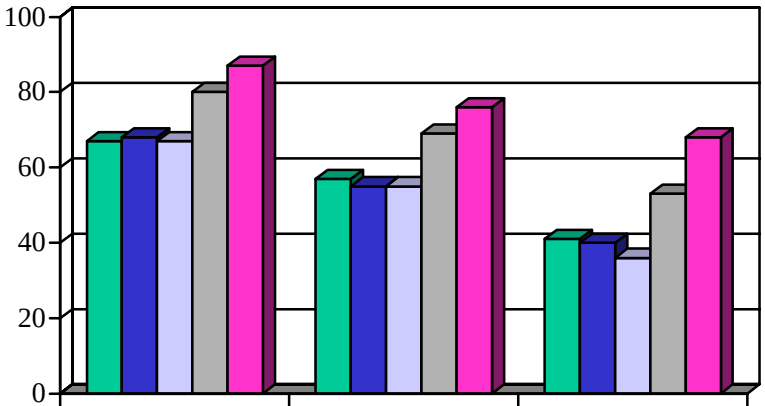
Table 4. Perceived Affect of Air Pollution to the Respondent

Statement	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Don't Know
Triggers allergies/respiratory problems.	16	28	16	30	10
Causes long-term respiratory problems.	14	28	20	22	16
Causes health problems for a member of my household.	11	19	20	37	13
Causes burning/itchy eyes, nose.	13	25	22	30	10
Obscures mountain views.	22	34	20	19	5
Causes a "brown cloud."	32	38	14	11	5
Affects my indoor air quality.	12	24	26	23	14

Question 7 provides the respondent with a set of statements that were designed to measure their opinion or belief of how the air quality of Fort Collins affects their lives. On average, forty-five percent of the residents "strongly agree" or "somewhat agree" that air pollution in Fort Collins (Table 4) affects them in some negative way (allergies, respiratory, visually, indoor air).

In looking closely at the comparisons from 2001, 2002 and 2004, "obscuring mountain views" and "creating a brown cloud" were consistently rated by the respondents to have the worst adverse affects. Still, every survey year the percentages have decreased. The following graph charts the percent of respondents that chose "Strongly Agree" and "Somewhat Agree" to each of the listed adverse affects of air pollution.

Perceived Adverse Affects of Air Pollution: Changes From 2001 to 2004



	2001	2002	2004
Triggers Allergies/Respiratory Problems	67	57	44
Causes Long-Term Respiratory Problems	68	55	42
Causes Burning/Itchy Eyes, Nose	67	55	30
Obscures Mountain Views	80	69	56
Causes a "Brown Cloud"	87	76	70

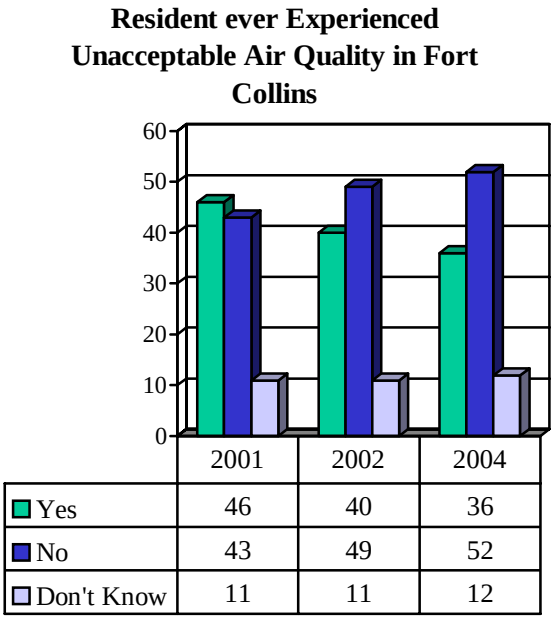
Q8. To help reduce air pollution in the City of Fort Collins, I…

Table 5. Percent of Stated Individual Actions to Reduce Air Pollution in Fort Collins

Statement	Consistently	On Occasion	Rarely	Never	Would not Help Improve Air Quality
Have made small changes in my life.	22	53	17	4	4
Reduce the number of miles I drive my vehicle.	25	40	19	13	3
Keep my vehicle tuned up.	79	15	3	2	1
Ride a bike for errands and/or work.	11	22	20	45	2
Take the bus for errands and/or work.	1	5	11	81	2

When asked the question of what residents actually do to help reduce air pollution in Fort Collins, the top action residents report taking is to keep their *vehicles tuned up*. Other top actions many residents state they do is *reduce the number of miles they drive their vehicle,* and *ride a bike for work or errand.* (Table 5).

Q9. Have You Ever Experienced Unacceptable Outdoor Air Quality in Fort Collins?

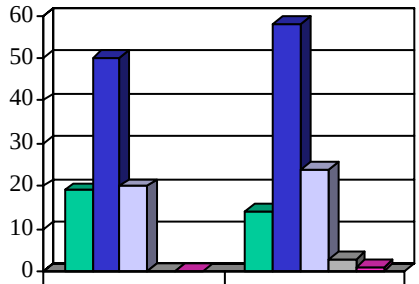


Approximately one third of the respondents have at some time or another experienced unacceptable air quality in Fort Collins. This number has decreased from the previous two surveys where 46 percent (2001) and 40 percent (2002) stated they had experienced unacceptable air in Fort Collins.

Q10. Overall, How Would You Rate the Quality of Outdoor Air in Fort Collins?

Most respondents rated the overall air quality in Fort Collins as either "very good" or "good" (72%). Comparing the 2004 and 2002 results show that the perceived quality of the air may have worsened very slightly.

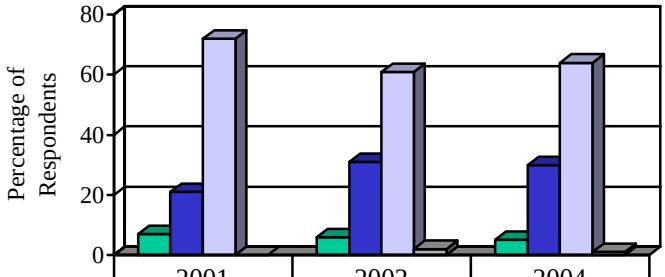
Rating of Overall Air Quality in Fort Collins



	2002	2004
Very Good	19	14
Good	50	58
Fair	20	24
Poor	0	3
Not Sure	0	1

Q11. What Do You Think Fort Collins' Air Quality will be Like in Five Years?

What Will Fort Collins'Air Quality Be Like In Five Years From Now?



	2001	2002	2004
Better Than Now	7	6	5
No Change From Now	21	31	30
Worse Than Now	72	61	64
Missing Values	0	2	1

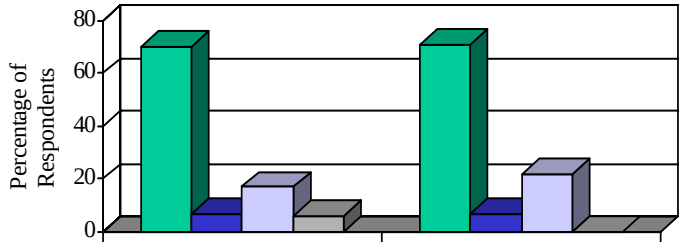
Most respondents believe that Fort Collins' air quality will be worse (64%) in five years, while 30 percent believe it will not change, and only 5 percent believe it will be better than it is now. Considering that 72 percent consider the current air quality in Fort Collins to be "very good" or "good" and 35 percent expect the air quality in five years to be either "better" or "no change," these results indicate that the respondents believe the air quality is going to not remain at "good."

The next few questions attempt to measure the respondent's view of the chance anything will or can be done to maintain or improve the air quality in Fort Collins. Results show that residents do, in general, believe that something can (71%) and should (74%) be done to improve

or maintain the air quality in Fort Collins; however, only 28 % believe anything will be done. Whether the respondent believed anything "should" be done is a new question for 2004.

Q12. Do you think anything <u>can</u> be done to improve the air quality in Fort Collins?

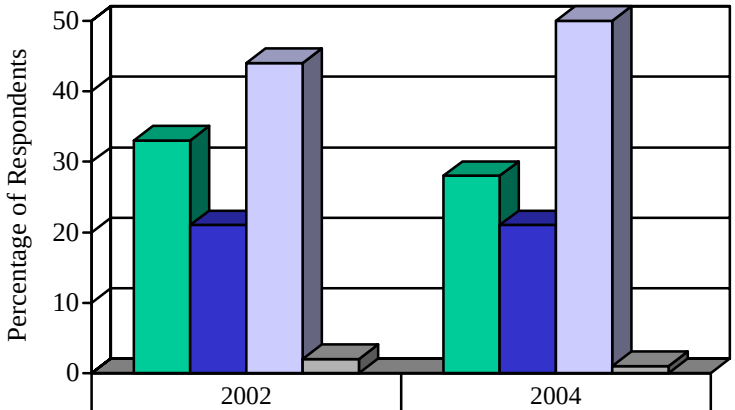
Can Something Be Done To Maintain or Improve the Air Quality in Fort Collins?



	2002	2004
Yes	70	71
No	7	7
Don't Know	17	22
Missing Values	6	0

Q13. Do you think anything <u>will</u> be done to improve the air quality in Fort Collins

Will Something Be Done To Improve or Maintain the Quality of Air in Fort Collins?

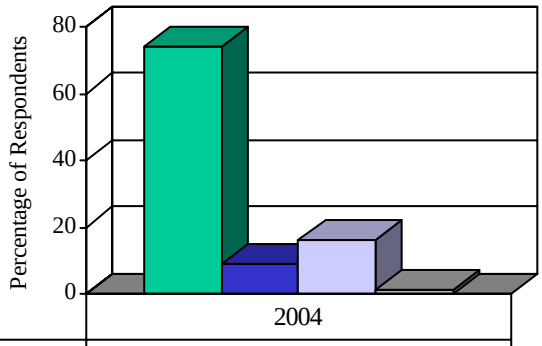


	2002	2004
Yes	33	28
No	21	21
Don't Know	44	50
Missing Values	2	1

Half of the respondents answered "don't know" to this question. Though it is difficult to definitively understand what each respondent means when they choose "don't know" as a response; in this case, because we know from the previous question that 70 percent believe something *can* be done, this "don't know" most likely means the respondent really does not know whether or not anything will be done even though they believe something can and should be done.

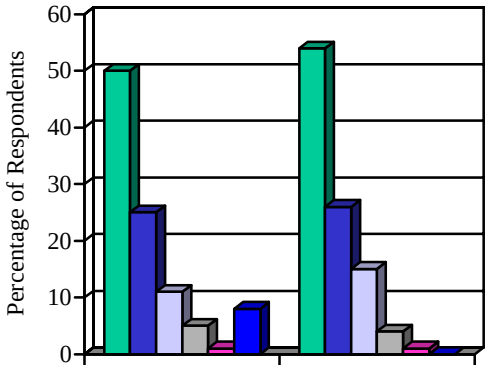
Q14. Do you think anything <u>should</u> be done to improve the air quality in Fort Collins?

Should Something Be Done To Improve or Maintain the Quality of Air in Fort Collins?



	2004
Yes	74
No	9
Don't Know	16
Missing Values	1

Amount of Time Respondent Warms up Car on Cold Days

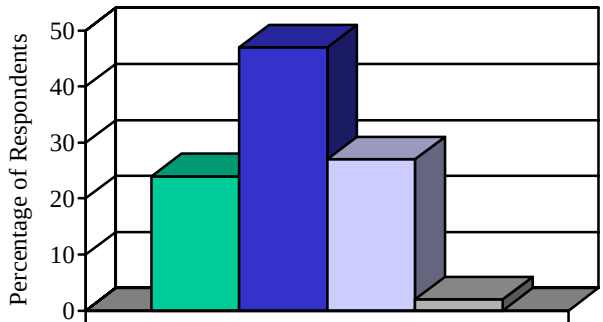


	2002	2004
Do NOT warm up car	50	54
1-2 Minutes	25	26
3-5 Minutes	11	15
5-10 Minutes	5	4
> 10 Minutes	1	1

Q15. How long do you typically warm up your car on winter mornings before driving away?

For both 2002 and 2004, results show that approximately half of the respondents do not warm up their car at all, a quarter of the respondents warm it up for 1-2 minutes, and very few participants warm their car up more than five minutes.

Percent of Respondents Who Turn Their Vehicle Off While Waiting for a Train to Pass



	2004
Always	24
Occasionally	47
Never	27
Missing Values	2

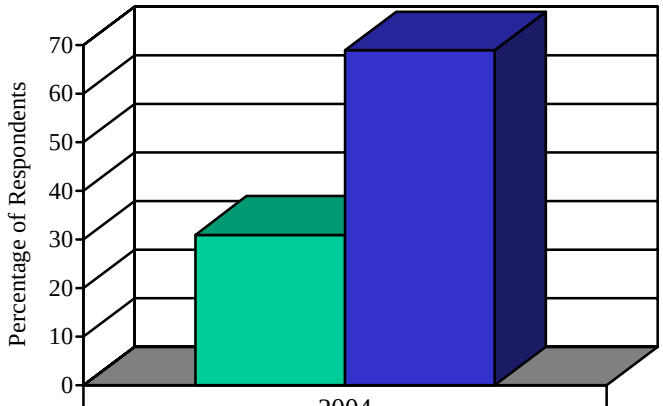
Q16. Do you turn off your vehicle while stopped and waiting for a train to pass?

This is a new question for this year's survey. Respondents report that almost half will occasionally turn their motor off on their vehicle while they are waiting for a train to pass and an equal percentage will "always" or "never" turn their engines off.

Q17. Do you have a wood-burning stove/fireplace/insert in your home?

Most (69%) respondents do not have wood burning devices in their homes.

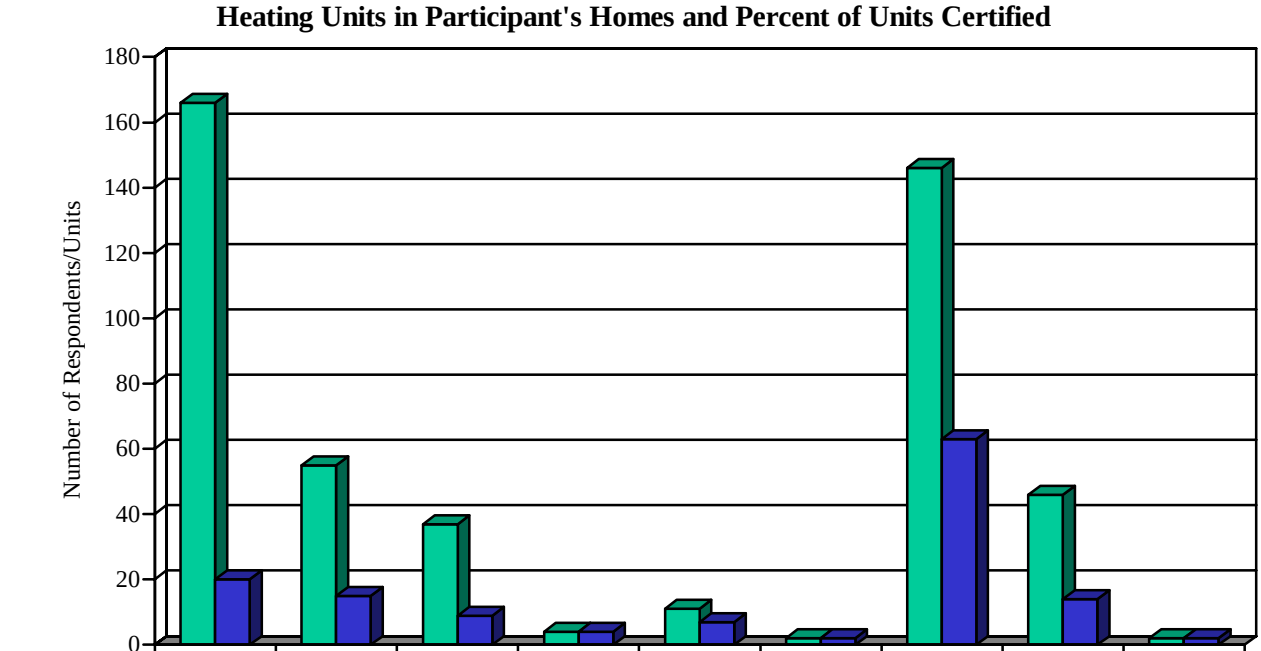
Percent of Respondents Who Have a Wood Burning Stove/Fireplace/Insert in Their Home



	2004
Yes	31
No	69

Q18. Please indicate if your home has any of the units listed and if that unit is certified.

The most common heating units in homes are wood-burning fireplaces (18%, n=166) or gas fireplaces (16%, n=146). The number of certified units were calculated only from the respondents checking they had that particular heating unit. The following graph shows numbers and not percentages.



	Wood-burning fireplace	Wood-burning stove	Wood-burning insert	Coal-burning	Electric fireplace	Masonry heater	Gas fireplace	Gas stove	Pellet stove
Unit	166	55	37	4	11	2	146	46	2
Certified?	20	15	9	4	7	2	63	14	2

Cross-tabs were performed on the type of wood burning appliance used and the amount of wood burned last winter. From the cross tabulation, findings show the majority of homes with wood burning sources did not burn any wood last year. Homes with either a wood insert or stove burned more wood than those with a fireplace.

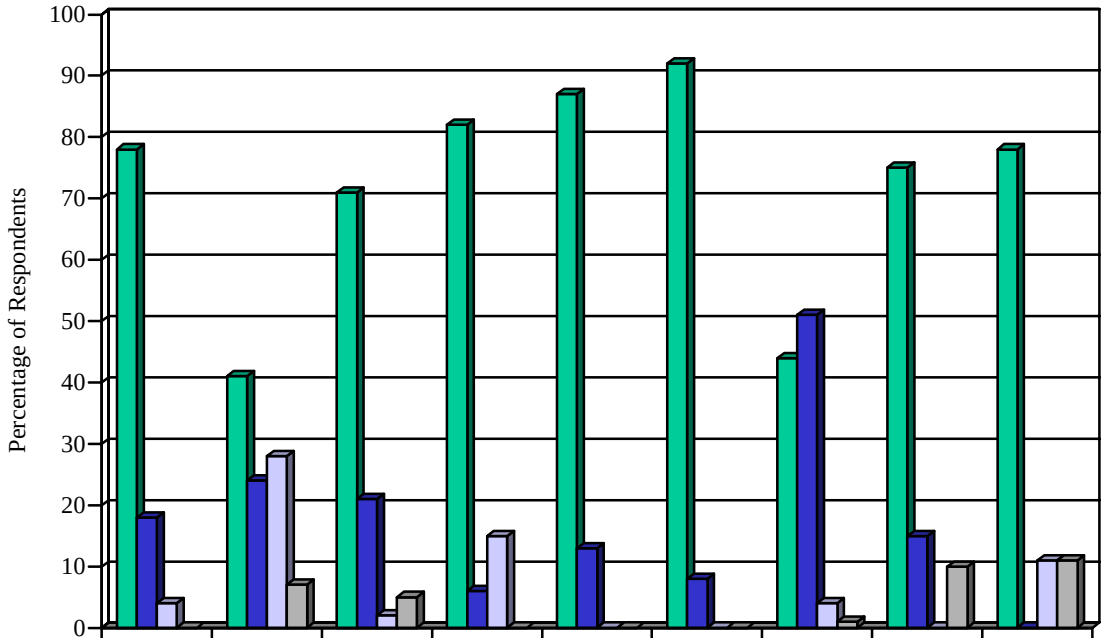
Table 6. Type of Wood Burning Appliance used and Amount of Wood Burned Last Winter

		Wood-Burning Fireplace		**Wood-Stove**		**Wood-Burning Insert**	
		# Responses to Q18					
# Responses to Q21		166		55		37	
		%	**Number**	**%**	**Number**	**%**	**Number**
106	**None-did not use**	39	63	26	14	53	19
72	**Less than ¼ cord**	35	57	26	14	28	10
18	**¼ to ½ cord**	8	12	8	4	6	2
22	**½ to 1 cord**	8	12	17	9	3	1
14	**1 to 2 cords**	8	12	15	8	11	4
4	**2 to 3 cords**	3	4	4	2	0	0
2	**More than 3 cords**	0	0	4	2	0	0

Q19. Please indicate the percentage of your heating needs that each unit supplies.

Interestingly, the type of heating unit used most for supplemental heating needs was the *gas fireplace* (51 percent of respondents for less than 25% of the total heating needs). Possibly,

Percentage of Heating Needs Each Type of Unit Supplies



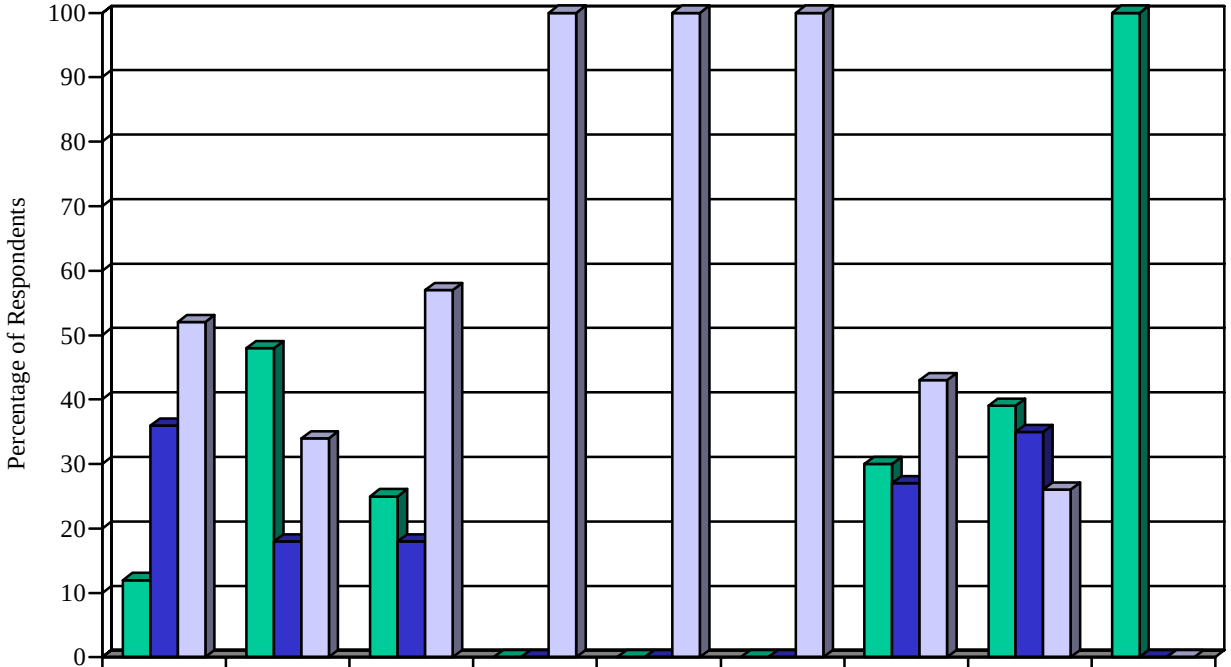
	Wood-burning fireplace	Wood-burning stove	Wood-burning insert	Coal-burning	Electric fireplace	Masonry heater	Gas fireplace	Gas stove	Pellet stove
None	78	41	71	82	87	92	44	75	78
<25%	18	24	21	6	13	8	51	15	0
25-50%	4	28	2	15	0	0	4	0	11
>50%	0	7	5	0	0	0	1	10	11

the gas fireplace was used by the respondents to help to warm up a room. The *wood-burning stove* was chosen by 28 percent of the respondents as fulfilling 25-50 percent of their heating needs. Again, the stove was possibly used to help to warm up parts of the residence, while still not considered the main source of heat. Only the *gas stove* and the *pellet stove* were considered to provide over 50 percent of the heating needs by 10 and 11 percent (respectively) of the respondents.

In 2002, the percentage of heating each "other source of heat" provided showed the gas fireplace was used more often (19.4%) at least 25% of the time to provide the "other heat source" for respondents. Wood fireplaces (7.8%) and wood stoves (6.1%) were the next most frequently used other sources of heat at least 25% of the time.

Q20. Please indicate how often the unit is checked or cleaned.

The heating units checked or cleaned most often are the *wood-burning stove, gas stove, gas fireplace* and the *pellet stove.* Of the three wood-burning heating units, the *wood-burning fireplace* is the type of heating unit least likely to be checked or cleaned on a regular basis. These percentages are calculated only on those surveys where respondents indicated they had one of these heating units.

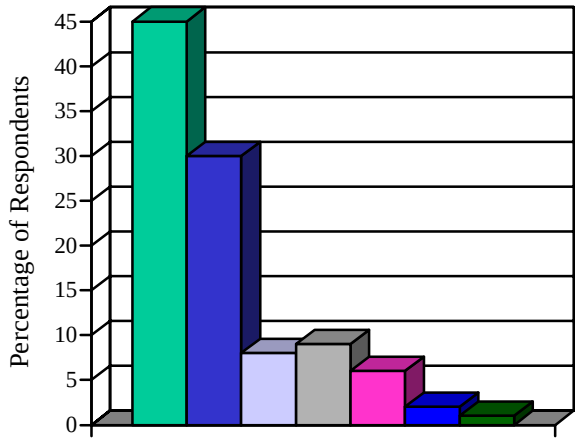


	Wood-burning fireplace	Wood-burning stove	Wood-burning insert	Coal-burning	Electric fireplace	Masonry heater	Gas fireplace	Gas stove	Pellet stove
At Least Once/Year	12	48	25	0	0	0	30	39	100
Every 2 or 3 Years	36	18	18	0	0	0	27	35	0
Never; or > Every 3 Years	52	34	57	100	100	100	43	26	0

Q21. About how much wood did you burn this past winter in your fireplace or heating stove? (Responses to this question are based ONLY on those that had wood-burning fireplaces, stoves, or inserts.)

These results are basically unchanged from the 2002 survey whereas most respondents either burned no wood or a very small amount of wood in their stoves or fireplace.

Amount of Wood Burned in Fireplace or Stove

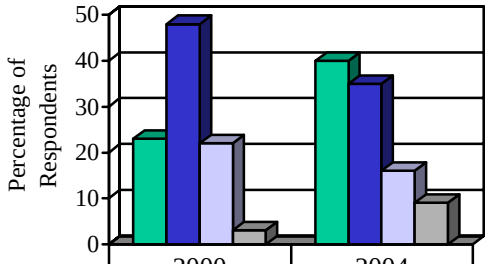


None	45
< 1/4 Cord	30
1/4-1/2 Cord	8
1/2-1 Cord	9
1-2 Cords	6
2-3 Cords	2
>3 Cords	1

Q22. Has your current home been tested for radon?

Many homes (40%) have been tested for radon compared to the 2000 results where only 23 percent had been tested.

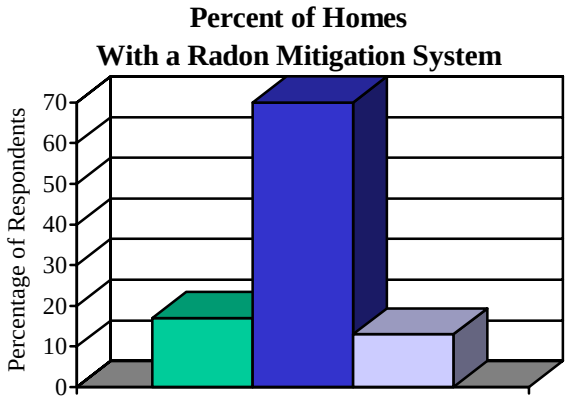
Percent of Homes Tested for Radon



	2000	2004
Yes	23	40
No	48	35
Don't Know	22	16
Missing	3	9

Q23. Does your home have a radon mitigation system?

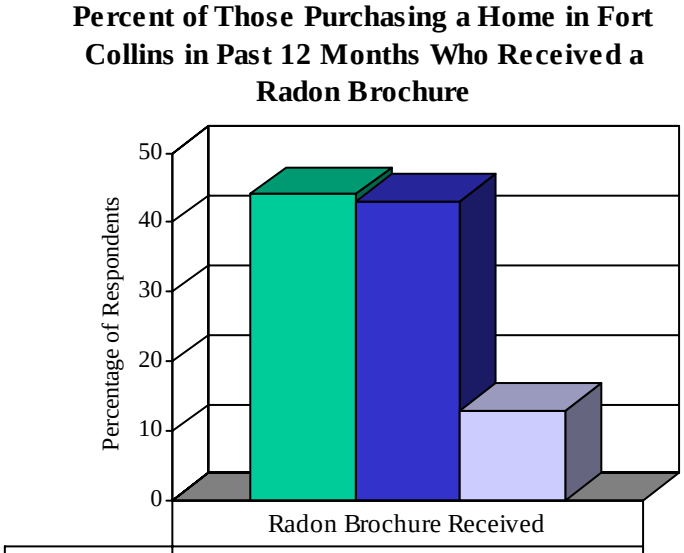
Most homes do not have a radon mitigation system installed (70%).



Yes	17
No	70
Don't Know	13

Q24. Did you purchase a home in the past 12 months in the Fort Collins area? If yes, did you receive a brochure with radon information?

Only 44 percent of those who purchased a home in the past 12 months recalled receiving a radon information brochure. In 2000, 60 percent of the respondents who had purchased their homes after 1997 reported receiving a radon brochure.

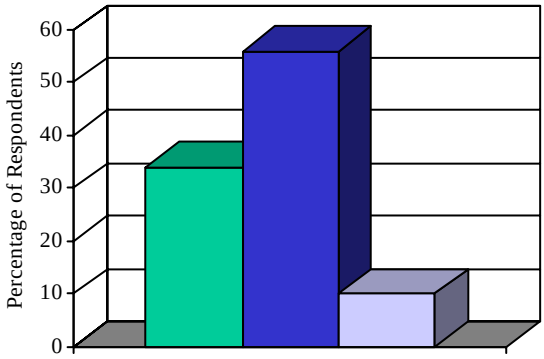


Yes	44
No	43
Don't Know	13

Q25. Are you aware that, starting in 2005, new construction homes in Fort Collins are required to have radon mitigation systems?

Most of the respondents to this survey were not aware that new construction homes in Fort Collins were required to have radon mitigation systems installed.

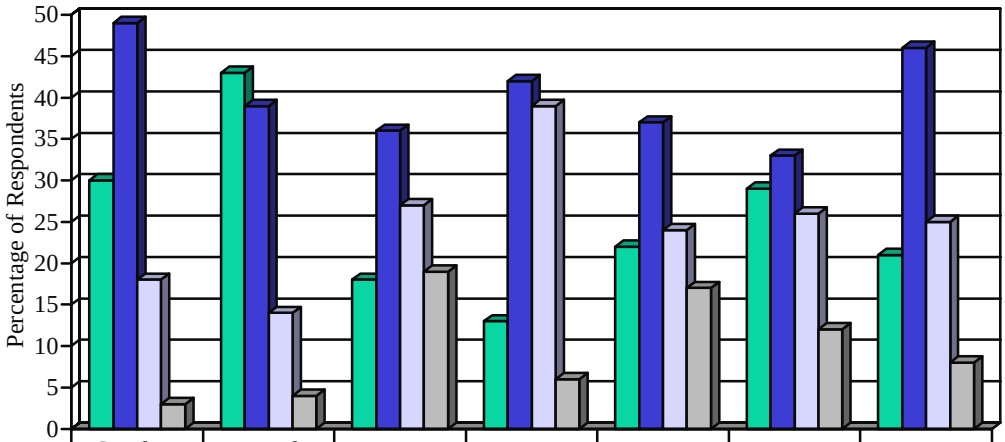
Percent of Respondents Aware New Construction Homes in Fort Collins Required to Have a Radon Mitigation System



Yes	34
No	56
Missing	10

Q26. Please rate your concern for the OUTDOOR pollutants listed as they relate to you and your family's day-to-day health and environment.

Seriousness Rating of Outdoor Pollutants

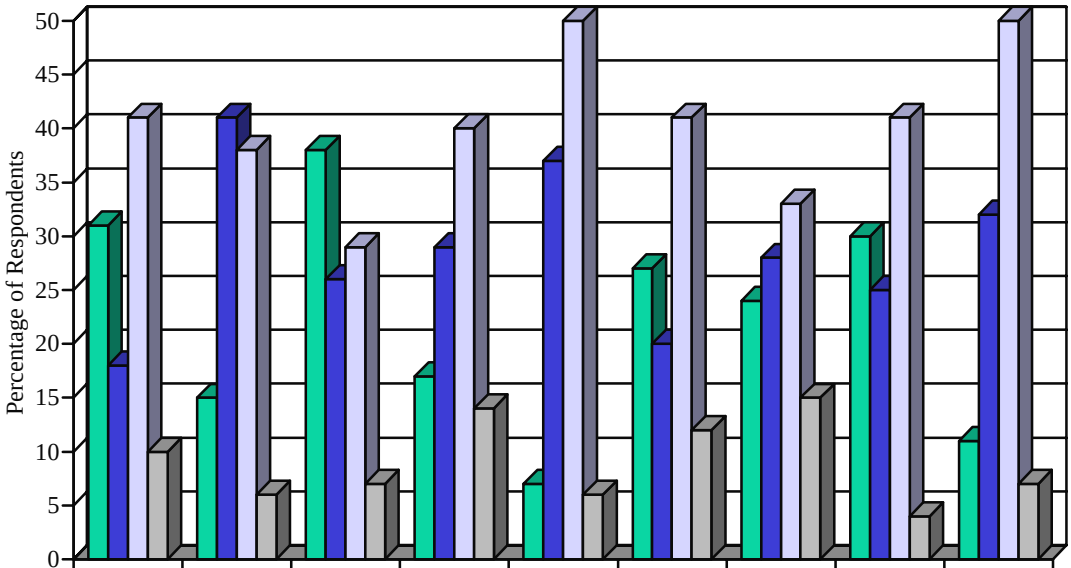


	Gasoline Vehicle Emissions	Diesel Vehicle Emissions	Greenhouse Gases	Wood Smoke	Ozone	Industrial Emissions	Fine Particulates
Very Serious	30	43	18	13	22	29	21
Somewhat Serious	49	39	36	42	37	33	46
Not Serious	18	14	27	39	24	26	25
Don't Know	3	4	19	6	17	12	8

This is a new question for this year. Diesel (82%) and vehicle (79%) emissions rate the highest in seriousness as an outdoor pollutant to the most respondents. Other outdoor pollutants rated as "serious" or "very serious" by at least 50 percent of the respondents include: *Green house Gases; Wood smoke; Ozone; Industrial emissions;* and *fine particulates* (all options were at least 50 %).

Q27. Please rate your concern for the INDOOR pollutants listed as they relate to you and your family's day-to-day health and environment.

Seriousness Rating of Indoor Pollutants



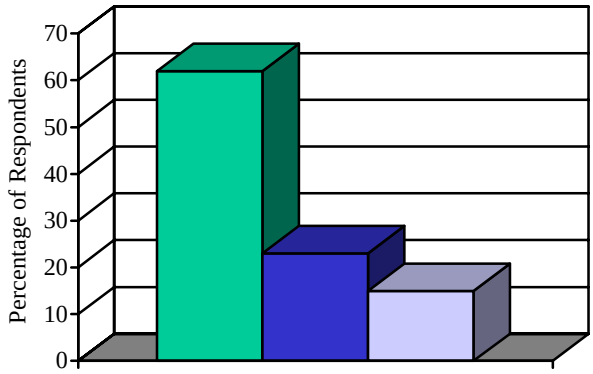
	Asbestos	Biological Pollutants	Carbon Monoxide	Formaldehyde	Household Products	Lead	Radon	Second-hand Smoke	Stoves/heaters/fireplaces/chimney
Very Serious	31	15	38	17	7	27	24	30	11
Somewhat Serious	18	41	26	29	37	20	28	25	32
Not Serious	41	38	29	40	50	41	33	41	50
Don't Know	10	6	7	14	6	12	15	4	7

Carbon Monoxide (64%), *second-hand smoke* (55%), and *radon* (52%) were rated as serious by at least half of the respondents as an indoor pollutant. Most people do not find *asbestos* (41%), *stoves/heaters/fireplaces/chimneys* (50%); *formaldehyde* (40%); *household products* (50%); or *lead* (41%) to be serious indoor pollutants.

Q28. Do you feel the existing vehicle emissions testing program plays an important role in maintaining or improving air quality in Fort Collins?

Most of the respondents (62 %) believed that the current vehicle emissions testing program plays an important role in maintaining or improving air quality in Fort Collins.

Percent of Respondents Who Feel the Existing Vehicle Emissions Testing Program Plays an Important Role in Air Quality

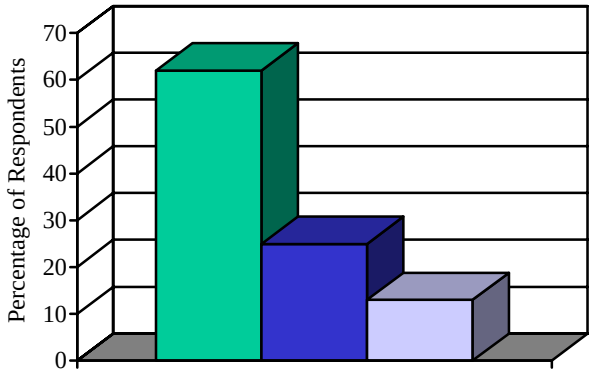


Yes	62
No	23
Not Sure	15

Q29. Would you support keeping a vehicle emissions testing program in Fort Collins to improve air quality even if the federal government no longer requires it?

Again, most (62%) respondents were in support of keeping a vehicle emissions testing program in Fort Collins to improve air quality even if the federal government no longer requires it.

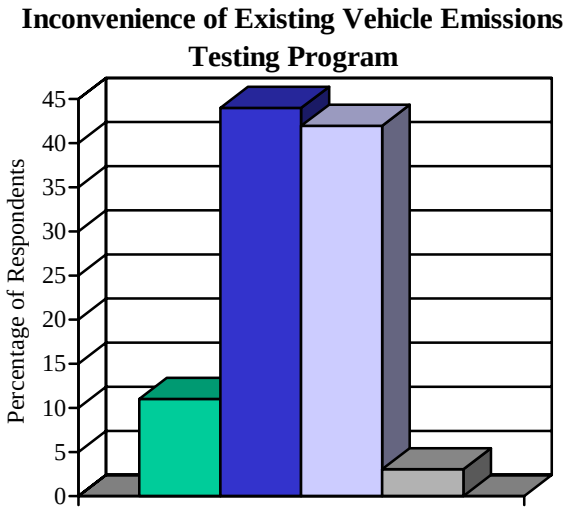
Percent of Respondents In Support of a Vehicle Emission Testing Program to Improve Air Quality in Fort Collins Even if Not Required by Federal Law



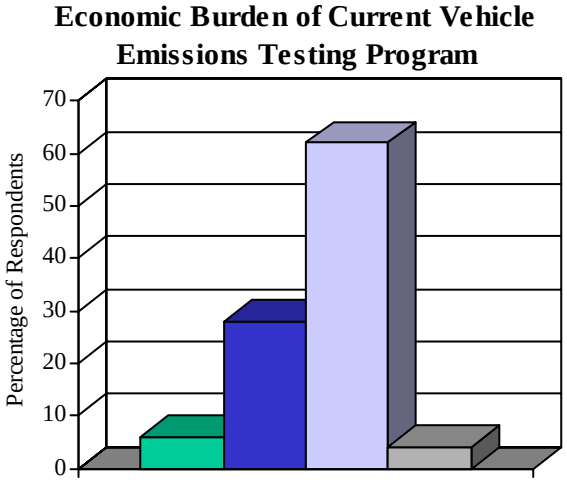
Yes	62
No	25
Not Sure	13

Q30. How much of an inconvenience is the existing vehicle emissions testing program for you?

Most of the respondents (55%) rated the vehicle emissions testing program as either "very inconvenient" or "inconvenient." Over one –tenth (11%) of the respondents stated that the vehicle Emissions testing program was "very inconvenient."



Very Inconvenient	11
Somewhat Inconvenient	44
Not convenient	42
Not applicable	3



Big Burden	6
Some Burden	28
Not a Burden	62
Not Applicable	4

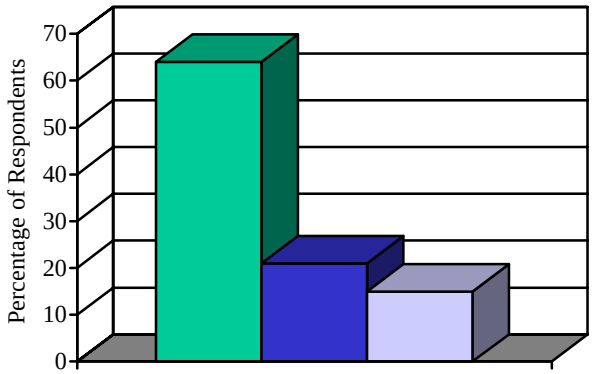
Q31. How much of an economic burden is the existing vehicle emissions testing program for you?

Most respondents (62%) stated the existing vehicle emissions testing program was not a personal economic burden.

Q32. Currently, residents of Fort Collins pay $2.20 at vehicle registration for the administration of the vehicle emissions testing program. Would you be willing to continue paying the fee if it went toward programs designed to reduce vehicle emissions even if the current emissions program is no longer federally required by law?

Well over half of the respondents (64%) were willing to continue to pay the fee to provide support for programs to help reduce vehicle emissions even if not required by law.

Percent of Respondents Willing to Continue to Pay $2.20 (Current Fee) To Support Programs Designed to Reduce Vehicle Emissions



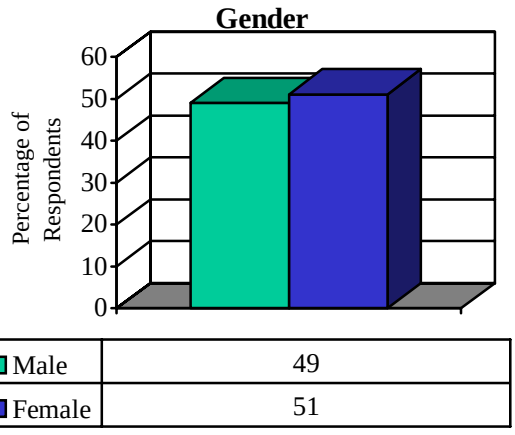
Yes	64
No	21
Not Sure	15

Demographics

Demographics of the respondents to this survey were very closely aligned with the demographics of the community of Fort Collins as a whole. Most Fort Collins residents are between 35 and 54 years old, while this survey shows that the majority of the respondents were between 36 and 55 years old. Survey respondents mirror census demographics in that most have some college. The median income of Fort Collin's residents is $54,000 and the survey respondents' was over $40,000.

D1. Gender of Respondent

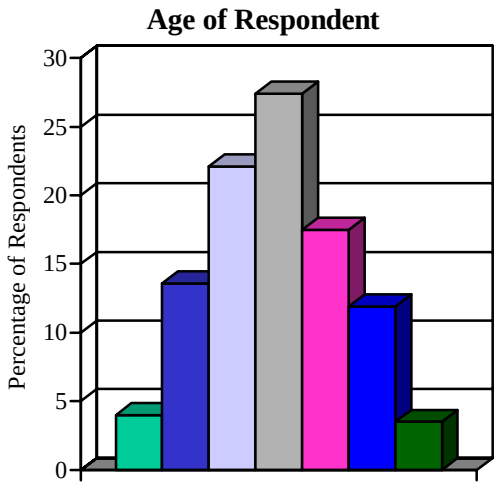
There were very slightly more females than males taking part in the survey.



Male	49
Female	51

D2. Age of Respondents

Most respondents fell between the ages of 36 and 65 (67%).

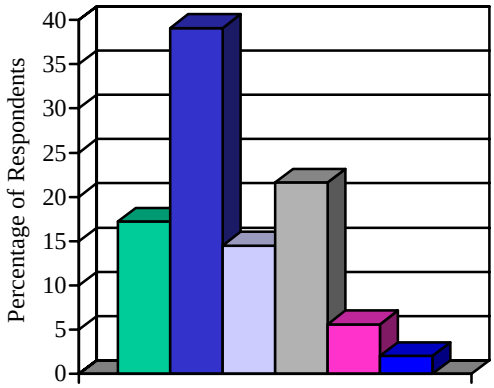


18-24	4
25-35	13.6
36-45	22.1
46-55	27.4
56-65	17.5
66-75	11.9
>75	3.5

D3. Number of people in your household (including yourself).

Most households were a two-person (39%) household with 22 percent of the respondent household numbering four.

Number of People in Respondent Household (including self)

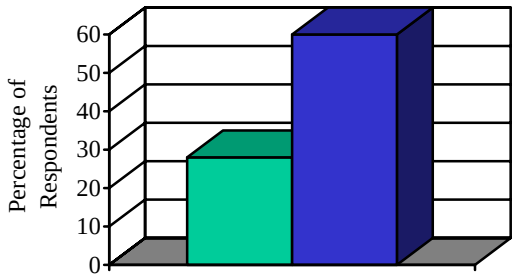


1	17.2
2	39.1
3	14.5
4	21.6
5	5.6
6	2

D4. Does anyone in your household suffer from asthma, emphysema, heart disease, or other respiratory ailments?

Just over one quarter of the respondents stated that they have a household members suffered from asthma, emphysema, heart disease of other respiratory ailments. Affirmative responses to this question have ranged between 26 and 32% since 1997.

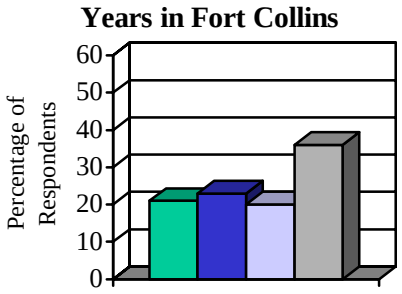
Household Members with Respiratory Ailments



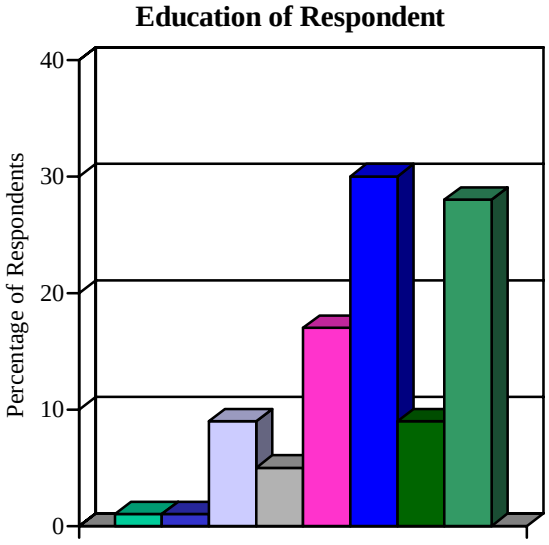
Yes	28
No	72

D5. Approximately how many years have you lived in Fort Collins?

Most of the respondents (36%) for this particular survey lived in Fort Collins over 20 years. However, the distribution was fairly evenly disbursed.



1-5 Years	21
6-10 Years	23
11-20 Years	20
>20 Years	36



Grade School	1
Some High School	1
High School/GED	9
Tech/Voc. School	5
Some College	17
College Degree	30
Some Graduate School	9

D6. Education level of respondent.

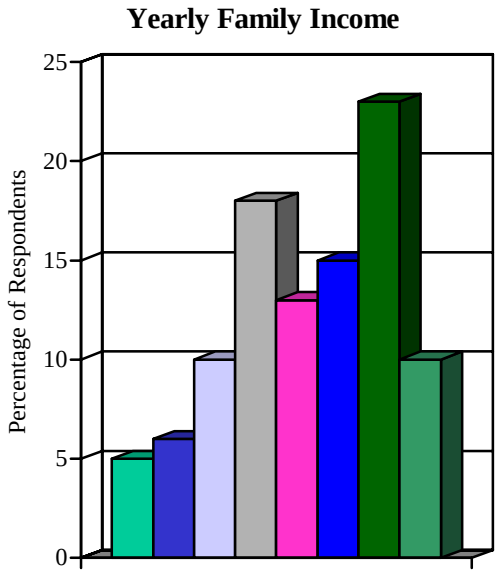
Most of the respondents for this survey had either a college degree (30%) or a graduate degree (28%).

These are very similar results to previous survey.

Table 7. Respondent's Education Level Comparison: 1994, 1995, 1997, 2001, 2002, 2004

Education Level	1994	1995	1997	2001	2002	2004
Grade school		*	0	1	.5	1
Some high school	1.9	5	1	1	2.3	1
High school diploma/GED	34	5	10	7.1	9.1	9
Technical/vocational school	*	*	3	1.9	2.8	5
Some college	*	23	23	21	22.3	17
College degree	38	27	30	30.9	27.9	30
Some graduate degree	*	*	9	10	7.2	9
Graduate degree	26	32	23	27.1	27.8	28

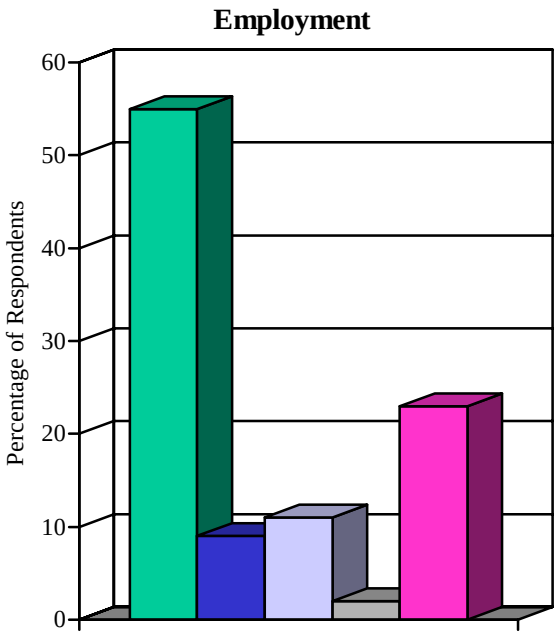
D7. Total yearly family income.
Respondents to this survey were mainly earning over $40,000 per year (79%).



<$15,000	5
$15,000-$24,999	6
$25,000-$39,999	10
$40,000-$59,999	18
$60,000-$74,999	13
$75,000-$99,999	15
>$100,000	23
Missing	10

D8. Which of the following best describes your situation?

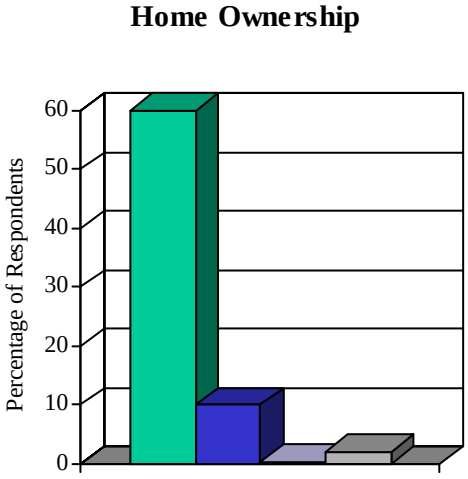
The majority of respondents (55%) were employed outside of home while 23% were retired.



Employed outside home	55
Home business	9
Business owner, outside home	11
Other	2
Retired	23

D9. Home ownership.

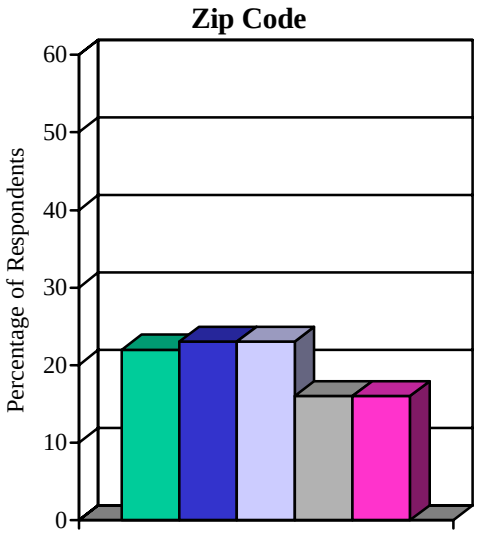
Most (88%) of the respondents to this survey own their own home. The distribution has not changed for the past two surveys.



Own	88
Rent/Lease	10
Other	0.2
Missing	2

D10. Respondent's Zip Code

A nice distribution of respondents from each zip code took part in this survey.



80521	22
80524	23
80525	23
80526	16
80528	16