

# **Missoula City - County Health Department Environmental Health Survey**

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John Baldrige and Jim Sylvester  
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## Methodology

### Introduction

The Missoula City/County Health Department needed information about citizens' perceptions of environmental health issues in Missoula County. This information is an important first step toward developing systems that can track environmental health concerns. Bureau of Business and Economic Research (BBER) at The University of Montana-Missoula administered a survey of adult Missoula County residents to gather this information.

### Questionnaire Development

The Bureau designed the questionnaire in coordination with the Missoula City/County Health Department. BBER used an iterative process to design the questionnaire. After developing a list of study topics with the Health Department the first draft was completed. The Health Department reviewed the first draft and directed changes as needed. This draft was then tested using five cognitive interviews.<sup>1</sup> Cognitive interviews are an intensive, 1-1.5 hour examination of the cognitive processes respondents use to answer each question. The interviews employ retrospective and concurrent think aloud strategies in which respondents are asked to "think aloud" their answers. Some respondents make errors that are caused by habits of mind or question wording when reporting attitudes and behavior. Cognitive interviewing examines the common thinking habits respondents use when recalling and reporting attitudes and behaviors. This gives questionnaire designers the opportunity to tailor questions to the way people think.

Following revision based on cognitive interview results and consultation with the Health Department the questionnaire was further refined through a full-scale field test. The field test was administered to a convenience sample of 35 adult respondents. The field test verified all survey systems, including the Computer-Assisted Telephone Interview (CATI) program, data capture, and data export functions. BBER monitored field test interviews and debriefed interviewers to determine whether the questionnaire needed further modification. The Health Department was the final approval authority for the questionnaire.

### Sampling

Sampling was conducted using a stratified, random-digit dial (RDD) process. The study population was all non-institutionalized adult (age 18 and older) residents of Missoula County who live in households with land-line telephones. University of Montana students were included in the sample. This population should not be confused with all Missoula area residents since it excludes households without working land-line telephones and the institutional population. The 2000 Census found that approximately 1.8 percent of occupied housing units in Missoula County were without a land-line telephone.<sup>2</sup> This 1.8 percent undercoverage is not considered an inappropriately high degree of sample bias.<sup>3</sup>

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1 Presser, Stanley, et. al. eds. 2004. *Methods for Testing and Evaluating Questionnaires*. New York: John Wiley & Sons. p. 24.

2 U.S. Bureau of the Census: 2000 Census, Summary File 4, GCT-H8. Occupancy, Equipment, and Utilization of Occupied Housing Units: 2000.

3 Sudman, Seymour. 1976. *Applied Sampling*. San Diego: Academic Press, p. 6.

A randomized method of selecting one respondent within each household was also required to avoid a disproportionate number of females participating in telephone interviews. Respondents were selected within households using the Kish table method.<sup>4</sup> While this method is in theory equivalent to the “last birthday” method, BBER experience in Montana has discovered a tendency for the last birthday method to produce a greater proportion of female respondents (see also Groves and Lyberg, 1988).

The total sample size yielded 516 completed interviews. The sample was stratified by Missoula County regional planning area. This sample design was chosen to ensure that a sufficient number of rural residents were represented in the final data set. Stratification was accomplished by matching existing telephone exchanges to Missoula County regional planning boundaries. After examining the populations of the regional planning areas and the telephone exchanges, BBER combined regional planning areas to optimize sampling and data collection efficiency. Two sample strata were selected; the Missoula Urban Area, and all other portions of the County. The un-weighted number of completions and final sampling error estimates associated with each stratum are shown in the table below.

<b>Sampling Areas</b>	<b>Completions (N)</b>	<b>Sampling Error</b>
County Overall	516	+/- 5.1 %
Missoula Urban	415	+/- 5.4 %
Lolo, Frenchtown, Ninemile, Seeley Lake, Swan, Clinton, Potomac	101	+/- 13.8 %

The actual sampling error estimates presented here differ from those found under the conditions of simple random sampling due to the stratified sampling method used. Respondents in the two strata had different probabilities of selection, while by definition probabilities of selection under the conditions of simple random sampling are equal. Simple random sampling would have produced a sampling error rate of about +/- 4.3 percent for the overall sample, while the stratified design produced an estimated rate of +/- 5.1 percent. The sampling error rates and standard errors used throughout this analysis were produced by the Complex Samples routine of SPSS 13.0 for Windows released on September 1, 2004. All data reported in this analysis are weighted to account for respondents' differing probabilities of selection unless stated otherwise.

### **Survey Administration**

The questionnaire was administered using a Computer-Assisted Telephone Interviewing (CATI) process on May 4, 2005 through May 26, 2005. Bureau staff programmed and validated the CATI system prior to survey administration. The interviews were conducted in the dedicated telephone interview facility at BBER. This state of the art facility contains twelve sound insulated telephone interview stations plus viewing and monitoring capability for supervisors. The supervisor can visually observe each interviewer and monitor randomly

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<sup>4</sup> Dillman, Don, A. 2000. *Mail and Internet Surveys: The Tailored Design Method*. 2<sup>nd</sup> edition. New York: John Wiley & Sons. p. 203.

selected telephone calls. Call monitoring is a vital quality control mechanism that reinforces data quality.

Each station is equipped with a telephone, headset, and computer, allowing CATI operation. The interviewers read the survey from the computer screen and directly entered the pre-coded responses into the computer, speeding the data capture process and minimizing the opportunity for errors.

The interviews were conducted using the Bureau cadre of trained and experienced telephone interviewers and shift supervisors. There are five interviewers with more than one year of experience, and several have been with the Bureau for ten years or longer. The shift supervisors are themselves seasoned interviewers with years of experience conducting surveys for a variety of organizations, including the US Bureau of the Census. New interviewers receive classroom and “on the job” training, and are closely monitored by the shift supervisors.

BBER documented case status in a manner that allowed calculation and reporting of a unit response rate using the American Association for Public Opinion Research (2004) standard definition (RR3).<sup>5</sup> The response rate for this survey was 54.8 percent. This response rate is typical for RDD surveys.<sup>6</sup>

2005 Missoula County Environmental Health Survey Respondents Un-weighted (%)		
	2005 Survey	2000 US Census
Male	47.5	49.5
Female	52.5	50.5
American Indian/ Alaskan Native	5.4	3.4
Asian/Pacific Islander, African American, Other	1.8	2.6
White	92.8	94.0
Mean Age (adults 18 +)	49.0	42.5
1-12 Grade	4.5	9.0
H.S. Diploma or Some College	58.7	58.2
B.A. or More	36.8	32.8

The table on this page summarizes the un-weighted demographic characteristics of the respondents to this survey. Each demographic group listed in the table responded at rates that are within the margin of sampling error of the corresponding 2000 Census proportions with the exception of those with less than a high school diploma and age. Somewhat fewer people who did not complete high school responded than were found in the 2000 Census. The un-weighted mean age of survey respondents is slightly older than the 2000 Census mean age for persons age 18 and older. A portion of The University of Montana student body may have left Missoula during data collection at the end of the spring semester. This may account for some of the age difference. In addition, recent research indicates that while about 7 percent of households across the United States are cell-phone only, up to 20 percent of persons aged 18-29 live in cell only households.<sup>7</sup> There is no research on patterns of cell-phone ownership in Montana or in Missoula County; however, there is little reason to believe that Missoula County is different from the nation with regard to patterns of cell phone

<sup>5</sup> American Association for Public Opinion Research. 2004. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 3<sup>rd</sup> edition. Lexana, Kansas: AAPOR. p. 29. e = .15.

<sup>6</sup> Groves, Robert, M. et. al. 2004. *Survey Methodology*. New York: John Wiley & Sons. pp. 184-187.

<sup>7</sup> Tucker, Clyde, Meekins, Brian, Brick, J. Michael, and Morganstein, David. May 2005. “Household Telephone Service and Usage Patterns in the United States in 2004.” Presentation at American Association for Public Opinion Research meeting, Miami, FL.

ownership. The post-stratification weights were thus calculated to compensate for this slight under-representation of younger adults in the final data set.

### **Data Set Preparation**

Following collection the data were inspected to insure no duplicate cases were included and to correct any interviewer miskeys. Appropriate data labels were added. Appropriate composite variables, post-stratification weights, and flags were also added to the data set to facilitate analysis. SPSS 13.0 for Windows, released on September 1, 2004, including the Complex Samples module and the Tables module, were used to conduct the analysis produced in this report.

Since the geographic location of a respondent's home was considered a key analytical variable, and since location was also vital for calculation of the post-stratification weights, BBER undertook an intensive effort to validate the location of each respondent's residence. Responses to location questions were validated by using reverse telephone directories to code respondent home addresses and then by assigning the address a geo-code. Geographic information system (GIS) software was then used to compare the respondents' reports of the location of their home to telephone directories. In cases where a respondent's telephone number was unlisted, their report of the nearest street or road intersection to their home was used to produce a geo-code. This process produced geographic variables of the highest quality available in RDD telephone surveys, which rarely ask respondents to reveal their exact address.

### **Reading this Report**

The remainder of this report is divided into four sections. The first section is the main narrative of the report. Next, in Appendix A, is a set of detailed tabulations for each question included in the study. The third section, Appendix B, presents the frequencies of responses to the open-ended questions. Appendix C includes the final questionnaire.

The detailed tabulations in Appendix A are a very powerful tool for those interested in the results of this study. Each table includes the exact question language used, the percentage of each response option chosen, and the number of responses for each question. In addition, each table provides a detailed cross-tabulation of the percentage of responses by selected demographic characteristics.

Differences cited in the remainder of this report are significant at the 95 percent confidence level. This means that if the survey were replicated 100 times, the difference cited would be found in at least 95 of the replications. Differences were evaluated by calculating the confidence intervals around point estimates or by using tests of independence. The percentage of respondents who answered "Don't Know" to questions in this study was quite low overall, so for the sake of brevity "Don't Know" percentages are excluded from the main narrative. While instances in which response differences within demographic groups are cited in the main body of the report the percentages of these differences are left to Appendix A, also for the sake of brevity.

## Overall Confidence in the Safety of Missoula County's Environment

Residents described their overall confidence in the safety of the Missoula County environment using four categories:

1. Very worried
2. Somewhat worried
3. Somewhat confident
4. Very confident

A majority of residents were confident in four of the five components of the environment studied. This is illustrated by Table 1 below. A graphic representation of these findings may be found in Figure 1 on the next page. A large majority of inhabitants were confident in the safety of their indoor environment, the food they eat, and the drinking water in their home. A smaller majority was confident in the safety of the outdoor air in Missoula County. Residents were equally divided in expressing confidence or worry about one aspect of the environment: the swimming and boating safety of the County's streams, rivers, and lakes from pollution.

The overall view on the confidence of the populace in the safety of the environment does not convey the intensity of their feelings. Nearly three in four (73.6 percent) residents are very confident in the safety from pollution of their home's indoor environment. In contrast, only 30.9 percent of inhabitants are very confident in the safety of Missoula County's outdoor air and only 24.4 percent are very confident in the safety from pollution of Missoula County's streams, rivers, and lakes.

	% Confident	95% Significance Interval		Total N
		Lower	Upper	
Safety of the indoor environment in R's home from pollution	88.1%	84.3%	91.1%	516
Safety of the food you eat	84.4%	80.3%	87.8%	514
Safety of the drinking water in R's home	81.9%	77.7%	85.5%	515
Safety of the outdoor air in Missoula County	56.9%	51.8%	61.8%	515
Missoula County's water safe for swimming and boating from pollution	47.7%	42.7%	52.8%	515

Demographics offer yet another perspective on people's confidence in the safety of their environment. Detailed demographic cross-tabulations for each questionnaire item may be found in Appendix A. The demographic differences cited in this study are significant at the 95 percent level.

Residents were relatively united in their confidence in the safety from pollution of their home's indoor environment. However, younger residents, those ages 18 – 29, were significantly more confident in the safety of the food they eat in Missoula County compared with other residents.

When examining views on the safety of drinking water, differences emerge among age groups, urban-rural residence, health status, and water sources. Older residents were more confident than others in the safety of their drinking water. Confidence among residents increased as one traveled away from the Missoula City limits. While 46.8 percent of Missoula City residents were very confident in the safety of their drinking water, this increased to 66.3 percent among urban County residents, and to 74.3 percent among rural county residents.

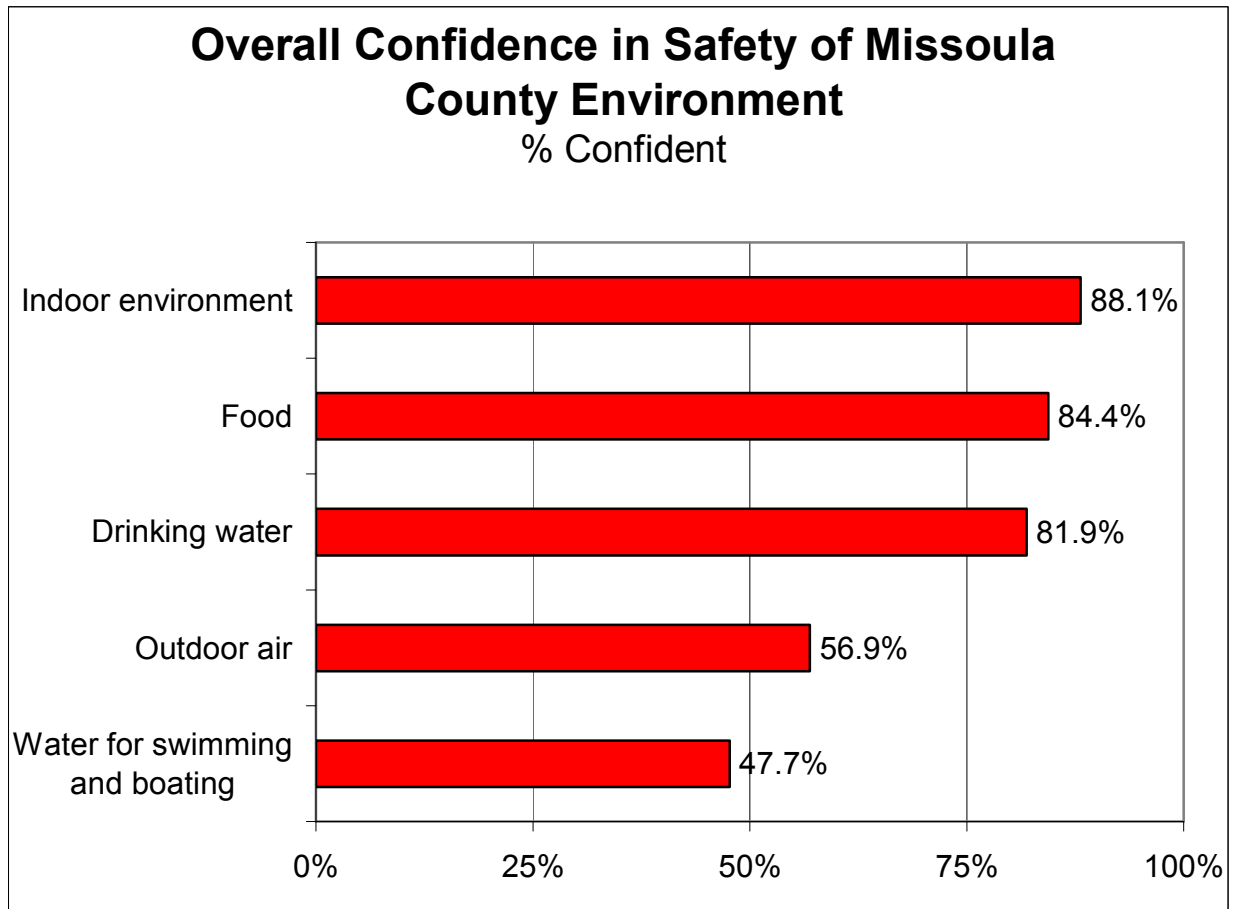


Figure 1

A plurality of males was very confident in the safety of outdoor air in Missoula County, while a plurality of females was somewhat worried. Only 26.5 percent of Missoula City residents were very confident in the safety of the outdoor air, while 45.5 percent of rural County residents were very confident. Three in five inhabitants with less than a high school education were very confident in Missoula County's outdoor air, while only 18.3 percent of those with at least a Bachelor's degree concurred.

Three in ten rural County residents were very confident in the safety from pollution of Missoula County's streams, rivers, but only 18.3 percent of Missoula City residents held this view.

## Safety of the Environment from Possible Sources of Pollution

### Drinking Water

The next four sections of this report explore residents' views on specific possible sources of pollution. Readers should not compare the specific pollution source percentages expressed in the following four sections with those that describe overall confidence in the previous section. This is due to a context effect found in questionnaire pre-testing. However, the reports on specific pollution sources are very useful when compared with each other.

	% Confident	95% Significance Interval		Total N
		Lower	Upper	
Fertilizers as a source of drinking water pollution	66.0%	61.0%	70.7%	515
Pesticides as a source of drinking water pollution	63.0%	58.0%	67.8%	514
Naturally occurring arsenic as a source of drinking water pollution	61.8%	56.7%	66.7%	515
Industrial sources of drinking water pollution	60.1%	55.0%	64.9%	513
Waste water treatment or septic discharge as sources of drinking water pollution	60.0%	55.1%	64.8%	514

Cognitive interviews conducted in the questionnaire design phase of this study revealed that some respondents became more likely to express worry as they progressed through the questionnaire. A copy of the questionnaire may be found in Appendix C. Cognitive interview subjects said that this was because they had not thought much about each specific possible source of contamination or pollution until they were asked to in the

interview. To avoid inflating the number of worry reports in other items, like the overall confidence items described above, the questions about possible specific sources of pollution were moved to the end of the final questionnaire. This minimized the question order effect on responses in the data collected for the main study.

Approximately three in five Missoula County residents were confident that the drinking water in their home was safe when asked about all five specific possible pollution sources examined (see Table 2). There was no statistical difference in the proportion of residents who expressed confidence among the five sources explored. Similar unanimity was observed when the intensity of inhabitants' feelings was analyzed. For each of the five possible sources of pollution, about 40 percent said they were very confident and about 20 percent said they were somewhat confident.

Differences do emerge when demographic characteristics are examined. The two most common demographic characteristics that reveal differences within groups are urban – rural residence and source of drinking water. Missoula City residents and residents who get their drinking water from a system like Mountain Water were less likely to be very confident than were County residents or people who get their drinking water from an individual well. These differences were observed across all five drinking water pollution sources.

American Indian residents were more likely to be very worried about naturally occurring arsenic, industrial sources, and waste water/septic systems than were Whites. Residents with a Bachelors’ degree or higher were more likely to be very worried about pesticides, fertilizers, and waste water/septic systems than were those with less than a Bachelors’ degree.

**Food**

Missoula County residents are equally confident in the safety of the food they eat in Missoula County across the three sources of food pollution or contamination explored (see Table 3). There is also very little difference in the overall intensity of inhabitants’ opinions about the safety of food preparation, safety from food borne illness, and safety from pesticides.

When examining demographic characteristics, the personal health status of residents varies somewhat with their opinion about the safety of the food they eat. The likelihood that residents were very worried about all three sources increased somewhat as their self-described health status declined. People who attained at least a bachelors’ degree were less likely to be very confident in the safety of their food from pesticides and food-borne illness than were those with less education. Younger Missoula County residents were much more likely than others to be very confident that their food was safe from food borne illness. More American Indians were very worried about the cleanliness and safe preparation of restaurant food in Missoula County than were Whites.

	% Confident	95% Significance Interval		Total N
		Lower	Upper	
Pesticides in food	66.4%	61.5%	71.0%	514
Restaurants’ food preparation	65.3%	60.4%	70.0%	515
Food borne illnesses	64.5%	59.5%	69.3%	515

**Outdoor Air**

There were significant differences in the level of confidence Missoula County residents expressed when asked about five possible sources of outdoor air pollution (see Table 4). A strong majority of residents were confident that outdoor air in Missoula County was safe from wood smoke and road dust. A smaller majority was confident that the outdoor air was safe from pesticides. In contrast, only four in ten residents were confident that Missoula County’s outdoor air was safe from industrial and commercial sources of pollution. Even fewer inhabitants, about three of ten, were confident in the safety of Missoula County’s outdoor air from vehicle emissions.

One positive note sounded by Missoula County inhabitants involved the change in outdoor air quality over time. People said outdoor air quality has stayed the same or improved over the time they lived in the County. There was no statistical difference in the fraction of

residents who said air quality has stayed the same (43.1 percent) and those who said it has improved (35.7 percent). Only 18.3 percent said air quality has worsened over their tenure in Missoula County. Older residents and those with longer tenure in the County were more likely to say air quality has improved when compared with younger residents and new arrivals.

Table 4: Confidence in the safety of outdoor air in Missoula County from possible sources of pollution

	% Confident	95% Significance Interval		Total N
		Lower	Upper	
Wood smoke from residential wood stoves and fireplaces	71.8%	67.0%	76.3%	515
Road dust	64.9%	60.0%	69.5%	514
Pesticides	57.6%	52.5%	62.5%	512
Industrial and commercial sources	44.4%	39.5%	49.5%	514
Vehicle emissions	30.0%	25.5%	34.9%	514

Given the significant differences in the confidence expressed by residents with regard to specific sources of outdoor air pollution, it follows that there are also differences in the intensity of the opinions expressed. A plurality (43 percent) of residents was somewhat worried about vehicle emissions, while only 15 percent were very confident. A plurality (44.5 percent) was very confident

about safety from wood smoke, while only 6.9 percent were very worried.

Educational attainment, urban – rural residence, and age were the demographic characteristics most likely to reveal group differences. Fewer people with less than a high school diploma or General Education Diploma (GED) were very worried about vehicle emissions, industrial and commercial sources, and wood smoke than were those with at least a Bachelors’ degree. Significantly more rural County residents were very worried about dusty roads than were urban County or Missoula City residents. In contrast, fewer rural county residents were worried about pesticides than were Missoula City residents. More inhabitants age 60 and older were very confident in the safety of outdoor air from industrial and commercial sources of pollution than were their younger neighbors. More young residents were very confident about the safety of outdoor air from road dust than were older residents.

**Indoor Environment**

Missoula County residents expressed high levels of confidence that their home was safe from each of the sources of pollution examined (see Table 5). There were almost no significant differences in people’s confidence among the sources. People were somewhat more confident in the safety of their home from household chemical pollution than they were in its safety from mold. However, the practical impact of this difference is small.

Table 5: Confidence in the safety of the indoor environment in a resident’s home from possible sources of pollution

	% Confident	95% Significance Interval		Total N
		Lower	Upper	
Household chemicals	89.2%	85.5%	92.1%	515
Second-hand tobacco smoke	89.1%	85.3%	92.1%	514
Lead	88.0%	84.2%	91.0%	515
Asbestos	84.9%	80.9%	88.2%	515
Radon	82.2%	77.9%	85.8%	515
Mold	77.5%	72.9%	81.6%	515

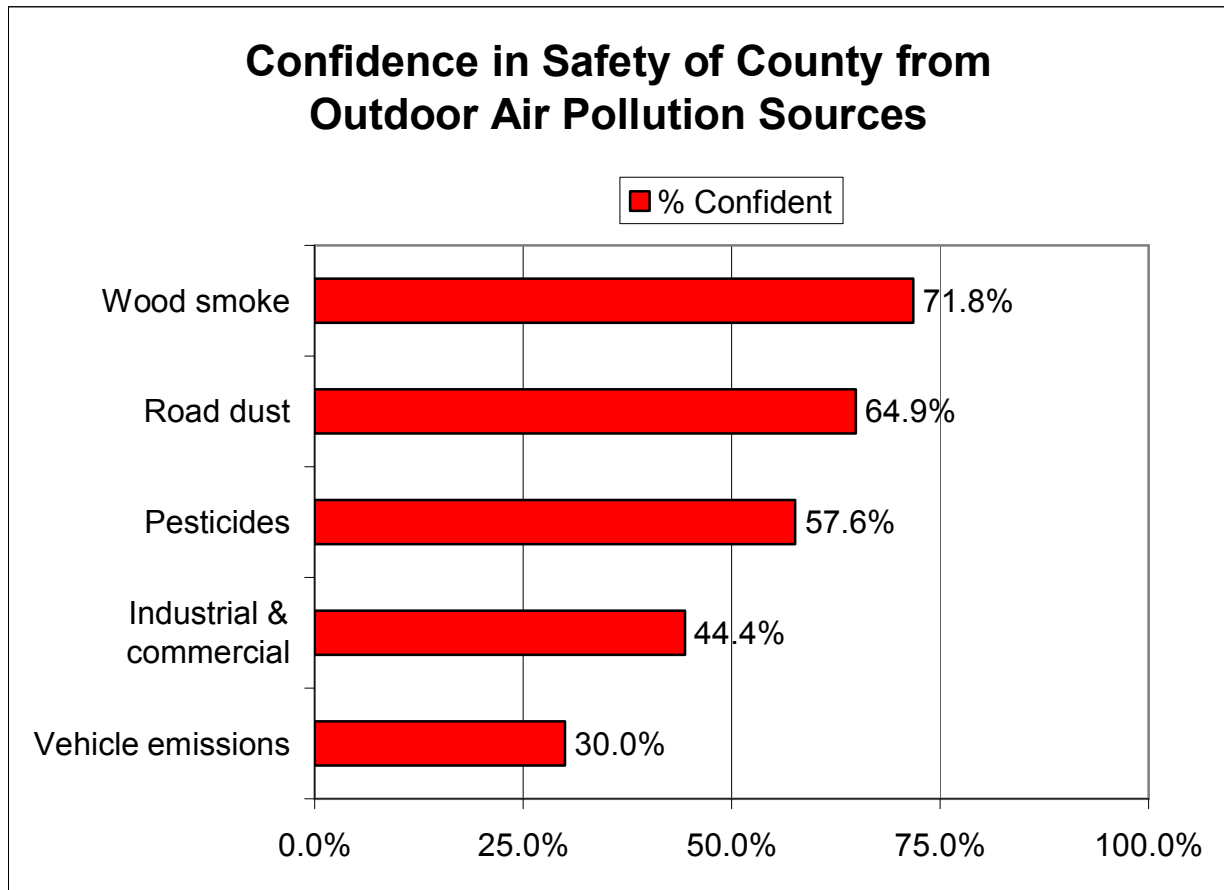


Figure 2

There were differences in the intensity of inhabitants' opinions about the safety of their home from each of these sources of pollution. While 83.5 percent of residents were very confident in the safety of their home from second-hand tobacco smoke, only 66 percent were very confident in the safety of their home from radon, and just 56.6 percent shared their neighbors' positive opinion about mold.

Examining demographics reveals several confidence differences among groups. Missoula's poorest residents were much more likely to be very worried about second-hand smoke in their home than were other residents. American Indians were also more likely than Whites to be worried about second-hand tobacco smoke.

Missoula County residents were asked to report whether or not they had ever smoked a cigarette and how often they smoked. 26.4 percent (+/- 4.9 percent) of Missoula County residents reported smoking a cigarette in the last year and 21.7 percent (+/- 4.7 percent) reported smoking within the last 30 days. This compares with the 2003 national prevalence rate of 21.6 percent (+/- 0.6 percent)<sup>8</sup> and the 2003 Montana rate of 19.9 percent (+/- 1.7 percent).<sup>9</sup> More inhabitants who reported not smoking in the last year were confident in the safety of their home from second hand smoke (92.9 percent), than were those who reported smoking in the last year (80.2 percent).

Older residents and residents with the longest tenure in the County were more likely to be very confident in the safety of their home from mold than were younger residents and more recent arrivals. County residents, both urban and rural, were also more likely to be very confident that their home was safe from mold than were Missoula City residents.

People with less than a high school diploma or GED were more likely to be very confident in the safety of their home from household chemicals when compared with other groups.

City residents were less likely than County residents to be very confident in the safety of their home from lead. Residents with the least tenure in the County were also somewhat less likely to be very confident in the safety of their home from lead.

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8 "Cigarette Smoking Among Adults — United States, 2003." Released on Friday, May 27, 2005, in the Centers for Disease Control and Prevention's *Morbidity and Mortality Weekly Report*.

9 "State-Specific Prevalence of Current Cigarette Smoking Among Adults --- United States, 2003." Released on November 12, 2004 in the Centers for Disease Control and Prevention's *Morbidity and Mortality Weekly Report*.

**Milltown Reservoir Superfund Site**

Missoula County residents were asked two questions about their level of worry concerning aspects of the Milltown Superfund Site. Similar questions were asked by University of Montana’s Bureau of Business and Economic Research in June 2001. The results of these items are summarized in Table 6 below and Figure 3 on the next page.

Table 6: Worry about Milltown Superfund Site – 2001 and 2005						
	A great deal	A fair amount	Only a little	Not at all	Don't Know	N
2005 worry about metals if the site is not cleaned up	30.5%	29.9%	19.1%	14.3%	6.3%	515
2001 worry about metals if the site is not cleaned up	35.1%	33.1%	16.7%	10.5%	4.6%	517
2005 worry about release of pollutants by clean up	25.8%	32.0%	26.0%	10.7%	5.4%	516
2001 worry about release of pollutants by clean up	40.5%	32.3%	14.3%	7.1%	5.9%	515

A majority of 2005 Missoula County residents were worried at least a fair amount about both the presence of pollutants at the Milltown Site and by the potential release of pollutants in a clean up. The difference in the proportion that, in

2005, was worried at least a fair amount about either condition was not statistically significant. In contrast, a significantly lower proportion of 2005 Missoula County residents were worried at least a fair amount (57.8 percent) about pollutants that might be released by a clean up of the Milltown Site than were residents in 2001 (72.8 percent). People who attained at least a Bachelors’ degree were more likely to be worried a great deal if the reservoir is not cleaned up when compared to those with less formal education.

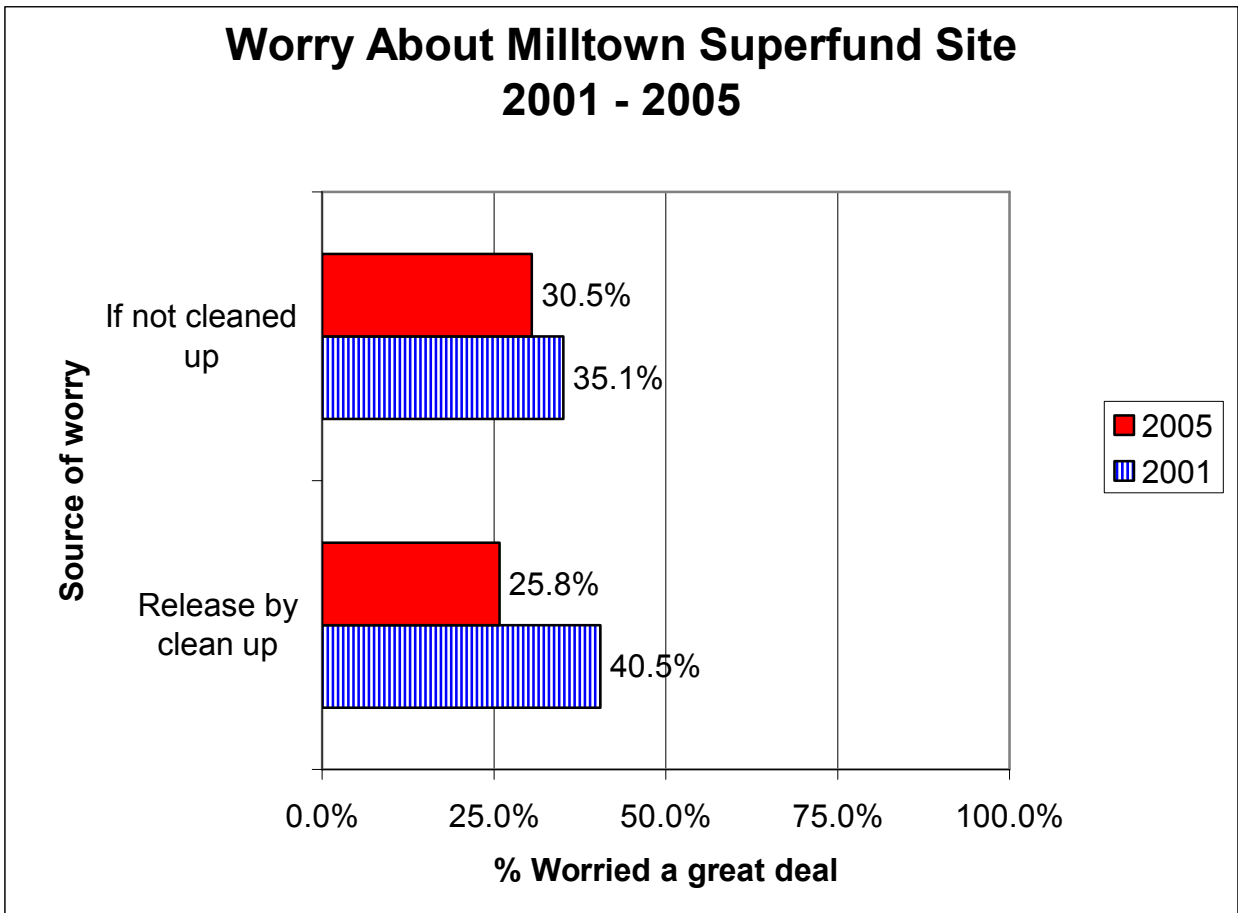


Figure 3

### Population Growth and Its Perceived Health Impacts

People were asked whether the population growth of Missoula County has affected their overall, personal health. About three-fourths of Missoula County residents (77.4 percent) said their health was about the same or that population growth had no impact on their health. Almost sixteen percent (15.7 percent) said their overall health had become worse as a result of population growth, while only 2.4 percent said their health improved. The remaining 4.5 percent said they did not know enough about the topic to provide an answer. The various demographic groups studied held similar views about the affect of population growth on their overall health. Only the proportion of American Indians who said their overall health had become worse as a result of growth approached being greater than that of Whites who said population growth made their overall health worse.

Table 7: Most important positive or negative factor in population growth-related health change

	Most Important	95% Significance Interval	
		Lower	Upper
1. Traffic	30.8%	21.2%	42.5%
2. Outdoor air pollution	25.3%	16.2%	37.2%
3. Overcrowding	9.2%	4.8%	16.6%
4. Stress in general	5.5%	1.9%	15.0%
5. Pollution in general	3.3%	1.2%	9.0%
1. Better economic opportunity	3.0%	1.0%	9.2%
2. Better streets/ traffic flow	2.9%	0.9%	8.8%
3. More socially conscious people	1.2%	0.3%	5.2%
4. Better medical care and access	1.1%	0.3%	4.6%
5. More affordable housing	0.8%	0.2%	3.3%

Of the relatively small proportion of residents who said that their health was negatively impacted by population growth, traffic and outdoor air pollution were most often cited as the main environmental factors that negatively influenced their health (see Table 7). Overcrowding, stress in general, and pollution in general were mentioned less often by residents as population growth-related factors that hurt their health. The very small number of people who said population growth improved their health mentioned influences like better economic opportunity.

Table 8: Perceived effect of neighborhood design on physical and mental health

	At least somewhat	95% Significance Interval		Total N
		Lower	Upper	
Neighborhood design affects physical health	30.8%	26.2%	35.9%	515
Neighborhood design affects mental health	43.3%	38.3%	48.4%	509

A majority of Missoula County residents said neighborhood design has little effect on their physical and mental health (see Table 8). However, somewhat more Missoula County inhabitants reported that neighborhood design affects their mental health at least somewhat when compared with their physical health.

People with a higher level of educational attainment were more likely to say that neighborhood design affects both their physical and mental health than were those with less schooling. Residents of the City of Missoula were less likely to say that neighborhood design

does not affect their mental then were County residents. Missoula County's poorest residents were also less likely to say that neighborhood design affects their mental health "a lot" when compared to residents with higher household incomes.

### Perceived Likelihood of Getting Diseases Relative to Other Places

Missoula County residents were asked whether the current environment in Missoula County increases the likelihood of getting various diseases more, less, or about the same as other places. A brief summary of their opinions about each cluster of diseases can be found in Table 9 below.

	More than other places	95% Significance Interval		Total N
		Lower	Upper	
Respiratory diseases like asthma	34.9%	30.1%	39.9%	516
Brain diseases like Alzheimer's, Parkinson's, or multiple sclerosis	7.3%	5.0%	10.6%	510
Cancer	6.8%	4.9%	9.5%	514
Birth defects	6.4%	4.1%	9.7%	513
Heart disease	5.8%	3.9%	8.6%	514
Stroke	4.8%	3.0%	7.4%	511

The dominant finding in this set of questions is that more than one-third of Missoula County residents (34.9 percent) said that the current environment in Missoula County increases the likelihood of getting respiratory disease more than other places. This proportion cannot be distinguished statistically from those who said that Missoula County is about the same as other places (37.1 percent), but it is nearly twice as large as the fraction who

said respiratory diseases are less likely in the County's environment (18.6 percent). In fact, the proportion of people who said the Missoula County environment increases the likelihood of getting respiratory disease more than other places was nearly five times larger than it was for the next largest disease cluster. Only a small proportion of people said the remaining five disease clusters were more likely in Missoula County as a result of the environment. When viewed along side the findings described earlier in the report; that County residents' confidence in the safety of outdoor air is lower than in other parts of the environment, and that people are particularly worried about vehicle emissions and industrial/commercial sources of pollution, it is safe to conclude that outdoor air quality is a salient health issue for Missoula County residents.

Age and tenure in Missoula County are related to people's views on the influence of the environment on the likelihood of getting respiratory disease. Younger residents and new residents were more likely than older or long-time residents to say the County environment affects the likelihood of getting respiratory disease less than other places. People with at least a Bachelors' degree were more likely than others to say the County environment increases the likelihood of getting respiratory disease more than other places.

Males were more likely than females to say Missoula County's environment affects the likelihood of getting heart disease less than other places. American Indians were more likely than Whites to say Missoula County increases the likelihood of getting heart disease more than other places. People who were in excellent health were more likely than those in fair health to say Missoula County affects the likelihood of getting heart disease less than other places.

A resident's health status was related to their opinions about brain disease and stroke. Those who were in fair health more often said the County environment increased the likelihood of getting brain disease or stroke when compared to healthier residents.

Males were more likely than females to assert that the County environment makes getting birth defects less likely than other places.

### **Environmental Justice**

Residents were asked whether poor people in Missoula County were exposed to more things in the environment that could harm them, or whether most everyone was exposed to about the same amount of things. At a nearly two to one ratio, 62.5 percent vs. 32.2 percent, Missoula County residents said everyone is exposed to about the same amount of harmful things.

People were mostly unanimous in their opinions about this issue across the demographic spectrum. Educational attainment was the exception. Inhabitants with at least a Bachelor's degree were considerably more likely than others to say the poor were exposed to more harmful things in the environment. The converse was also true. Residents with less than a high school diploma or GED were more likely than those with a Bachelor's degree to say everyone has about the same exposure.

### **Health Department Involvement in Global Environmental Issues**

Missoula County residents were almost evenly divided when asked whether the Health Department should be involved in global environmental issues like climate change, or whether the Department should focus strictly on local issues (see Figure 4 on the next page). While 52.4 percent of residents (+/- 5.1 percent) said the Department should focus strictly on local issues, a statistically indistinguishable 43.3 percent (+/- 5.1 percent) said the Department should work on both sets of issues.

Missoula County's young adults, those age 18 – 29, were more likely than others to say the Department should focus on both global and local environmental issues. Similarly, new in-migrants were more likely than those who have lived in the County longest to say the Department should focus on both sets of issues.

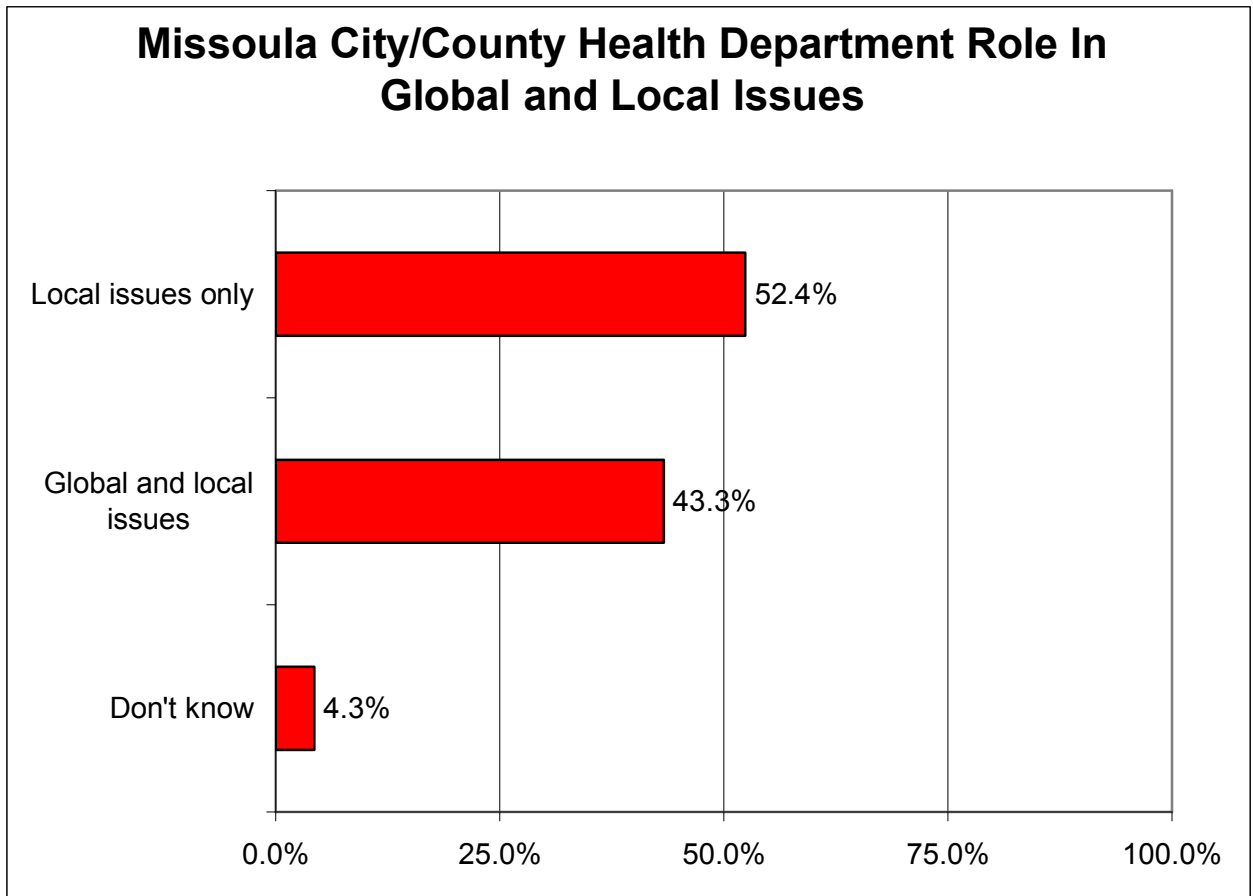


Figure 4

### Most Important Environmental Health Concerns

The most important environmental health concerns for Missoula County residents were traffic, vehicle emissions, and outdoor air quality in general (see Table 10). About 16 percent of Missoula County residents mentioned traffic or vehicle emissions when asked to name the most important environmental health concern in Missoula County. Another 13.9 percent cited outdoor air pollution in general. The remaining eight responses, of the top 10, were not statistically distinguishable from each other. Readers will notice that it is possible to further collapse the response categories presented in Tables 10 and 11. While this is a legitimate and informative step, the authors chose not to do so in the tables in order to present a more finely grained portrait of peoples' views. When response categories are collapsed to their most basic level it becomes apparent that residents were most concerned about outdoor air quality and water quality.

Table 10: Top 10 most important environmental health concerns

	Most Important	95% Significance Interval	
		Lower	Upper
1. Traffic/emissions	16.1%	12.7%	20.2%
2. Outdoor air quality	13.9%	10.8%	17.7%
3. General water quality	5.7%	3.7%	8.8%
4. Increased population/sprawl	5.4%	3.5%	8.3%
5. Forest fire smoke	3.9%	2.3%	6.3%
6. River, stream, lake pollution	3.8%	2.1%	6.7%
7. Milltown Dam	3.5%	2.0%	5.9%
8. Milltown Dam removal	2.9%	1.6%	5.4%
9. Pollution in general	2.2%	1.2%	3.7%
10. Pesticides/ herbicides	2.1%	1.0%	4.2%

### Most At-Risk Aspects of the County Environment

Missoula County inhabitants were also asked to name the part of the County environment that they felt was most at risk (see Table 11). One in three said outdoor air quality is the aspect of Missoula County's environment that is most at risk. An additional 17 percent mentioned Missoula County's water quality as being most at risk.

Table 11: Top 10 parts of the County environment that are most at risk

	Most At Risk	95% Significance Interval	
		Lower	Upper
1. Outdoor air quality	34.1%	29.3%	39.1%
2. General water quality	17.0%	13.4%	21.3%
3. Rivers, streams, lakes	4.6%	2.9%	7.4%
4. Open space/ forests/ timber	4.6%	3.0%	7.0%
5. Parts affected by traffic/emissions	3.9%	2.6%	5.9%
6. Parts affected by population growth/overcrowding	2.4%	1.3%	4.5%
7. Aquifer	1.9%	1.0%	3.4%
8. Water quality due to Milltown sediment	1.3%	0.6%	3.0%
9. Food from processing or food-borne illnesses	1.2%	0.5%	2.6%
10. Air quality due to forest fires	0.8%	0.3%	2.2%

**Appendix A: Detailed Response Tables**



**Appendix B: Open-Ended Question Response Frequencies**



**Appendix C: Questionnaire**