

# Supporting Statement for a Request for OMB Review under the Paperwork Reduction Act

## Part A

### A1. Identification of the Information Collection

#### 1(a) Title of the Information Collection

**TITLE:** National-Scale Activity Survey

**EPA ICR No.:** 2293.01

**OMB Control No.:** 2060-NEW

#### 1(b) Short Characterization/Abstract

EPA supports the Air Quality Index (AQI), a program that uses data from air quality monitors to forecast pollution levels and to notify the public of health hazards associated with air pollution, primarily ozone and particulate matter pollution (PM). EPA, and specifically the Office of Air Quality Planning and Standards, which manages the AQI program, is interested in assessing the public's awareness, knowledge and both stated and actual behavioral response to AQI warnings. To address this need, OAQPS wishes to conduct the National-Scale Activity Surveys (N-SAS) to gather information on perceptions, awareness, attitudes, and stated and actual behaviors in response to AQI warnings.

EPA is requesting permission from OMB to conduct a survey of 1,600 individuals age 35 or older who meet minimal activity requirements living in Washington, D.C.; Sacramento (also other cities in San Joaquin Valley -- San Joaquin, Stanislaus, Merced, Madera, Fresno), Chicago, Dallas, Houston, Atlanta, Philadelphia, or St. Louis. The data will be collected through a web-based survey of members from Knowledge Network's web panel.

The N-SAS consists of a series of nine surveys. A screening survey at the beginning and a debriefing survey at the end will provide information on the research participants, their awareness and knowledge of air pollution and the Air Quality Index (AQI), risk perceptions regarding health effects, and reported behaviors on high ozone days. After the screening survey, research participants will be administered a set of seven activity diaries administered on both high and low ozone days to collect information on actual behavior.

The information obtained from N-SAS will be used by EPA to assess hypotheses for the N-SAS research participants regarding

- Extent of awareness of and knowledge about the AQI
- The effects of the AQI-based warnings on behavior in eight cities with significant pollution problems

- The correlation between awareness, knowledge, stated behavior on high pollution days and data on behavior reported in the activity diaries
- Differences in behavior, awareness and knowledge among different sub-samples of the N-SAS research participants

In addition to assessing the effectiveness of AQI-based ozone warnings, the data will also be used to supplement the limited data available to develop exposure profiles for older Americans.

The goal of N-SAS is to provide insights into awareness, knowledge and behavior related to the AQI. The N-SAS survey will be conducted using the Knowledge Networks web panel as the sampling frame and therefore, any observations or conclusions drawn from the survey are most relevant to that sampling frame. Although the Knowledge Networks panel is recruited using an RDD sampling frame, the final panel differs from the U.S. population along a number of key demographic dimensions and the unobserved characteristics of individuals who participate in web panels may differ from the overall U.S. population. Because of this, there would be significant uncertainty associated with extrapolation of the results of this analysis to a broader population beyond the Knowledge Networks panel members who meet the eligibility criteria for this study. This study is exploratory in nature and is not intended to be used as a formal program evaluation or to obtain generalizable estimates; however, EPA expects that it will provide some useful insights on the current AQI program.

## A2. Purpose and Use of the Information Collection

### **Need/Authority for the Collection**

The motivation for the National-Scale Activity Survey (N-SAS) originated with a desire to assess the impact of the U.S. Environmental Protection Agency (EPA) programs and regulations to improve air quality on the U.S. population. Both internal and external reviews recommended increasing the use of indicators that track changes in the health and well-being of individual citizens to supplement measures of ambient air quality that EPA has traditionally reported. To determine whether these information policy tools actually increase precautionary behaviors, the Clean Air Act Advisory Committee recommended that EPA “study effects of air quality index [AQI] advisories on exposure-reduction behaviors and whether behaviors lead to health benefits” (Air Quality Management Workgroup, 2004).

EPA also needs the information to improve exposure profiles of older Americans used to assess the impact of regulations. The data collected by this survey will be incorporated in EPA’s Consolidated Human Activity Database (CHAD).

### **Practical Utility/Users of the Data**

Currently, little data exists that can be used to systematically evaluate whether and how the information in AQI warnings is received, processed, understood, and used by the public to protect themselves against the health risks associated with ozone and as a prompt for emission reduction activities. The existing studies we have identified are discussed in Section A4 below.

The longitudinal N-SAS will provide data that will have a number of direct, practical uses for EPA and for policy makers at the state and local level.

- Assess the effectiveness of AQI-based warning systems
- Examine the correlation between awareness, risk perceptions, knowledge, stated behavior and actual behavior within our sample.
- Identify subgroups within the set of N-SAS research participants that may need more targeted education on air pollution risks.
- Supplement and update the sparse set of activity data on older Americans currently in CHAD.
- Metropolitan areas must report past ambient levels of criteria pollutants to EPA, but the forecasting data used for the AQI-based warnings is provided voluntarily. The data collected by N-SAS will help policy makers and other researchers better understand how the forecasted warnings are understood and where adjustments might be made to the information provided in the warnings.

This study is exploratory in nature and is not intended to be used as a formal program evaluation or to obtain generalizable estimates; however, EPA expects that it will provide some useful insights on the current AQI program.

### **A3. Use of Improved Technology and Burden Reduction**

The N-SAS survey data will be collected through a web-based survey. Utilization of the World Wide Web has the advantages of allowing respondents to complete as much of the survey as desired in one sitting and to continue the survey at another time, minimizing the possibility of respondent error by electronically skipping questions that are not applicable to a particular respondent, and creating the least burden to the respondent. In addition, respondents will be notified of the survey by email. In order to collect activity diary data on both high ozone days and other days with a sample of 1600, the activity diary surveys must be administered on specific days when appropriate weather and ozone conditions are forecast. Using email survey invitations and a web-based survey instrument, respondents can easily be notified of surveys on specific days. For N-SAS we plan to send an email two days before the activity diary will be sent and a reminder email after it is sent. Finally, we will use the web-based survey structure to minimize recall bias by limiting the time the respondent has to take the survey to 48 hours after the specified day.

One alternative method considered was to conduct telephone surveys. Given the need to survey individuals based weather and ozone condition forecasts, the telephone survey method was unsuitable. According to companies that conduct telephone surveys, call centers typically do not have excess staff that can be mobilized with a day or two notice to phone a couple hundred respondents on a specific day. In addition, telephone surveys are conducted when the respondent answers the phone, rather than at the convenience of the respondent. The American Time Use Survey (ATUS) is conducted by phone. Unlike the N-SAS activity diaries, the ATUS does not need to be conducted on a specific day. The ATUS suffers from potential bias resulting from the difficulty of reaching people who are active and frequently out of the house by phone. Use of a web-based survey will help alleviate this source of bias because respondents can take

the survey when they want to. Finally, response rates for telephone surveys are decreasing as new technology (answering machines, voice mail, caller identification) becomes available, and non-locate rates in later waves of longitudinal telephone surveys are increasing, likely due to increased use of cellular phones and frequent switching of carrier companies. In sum, because of the disadvantages of alternate modes of administration and because our research objectives could not be fully met without a high response rate among selected respondents, we determined that the study design of collecting data via Web surveys was the best methodology.

#### **A4. Nonduplication**

RTI conducted a search of the literature to assess the availability of data on both awareness and knowledge of the AQI and activities on both high ozone days and other days. Relatively few surveys have measured awareness of the AQI, reported and actual behavior and air pollution risk perceptions. The surveys and research activities summarized below represent the most prominent related literature of which we are aware.

- STAR grant survey: Dr. Mansfield (RTI) and colleagues at RTI and UNC conducted the most similar survey (funded under the STAR grant program, EPA agreement 8295440). In addition to Dr. Mansfield, the project team included Dr. George Van Houtven (RTI), Dr. Zachary Pekar (before he left RTI to work at EPA), Dr. F. Reed Johnson (RTI) and Dr. Douglass Crawford-Brown (Environmental Sciences and Engineering, University of North Carolina). The project included a set of activity diaries, a baseline survey and a debriefing survey to measure awareness of the AQI. The sample for the survey included parents of young children, half of whom suffered from asthma, living in metro areas with high ozone pollution recruited from the Harris Interactive web panel (an opt-in web panel). Publications and presentations from this grant include (Mansfield et al. 2006, Mansfield 2006, Mansfield et al. 2005)
- EPA has included a small set of questions on the Roper Green Gauge Survey to measure awareness of the AQI.
- RTI International's 2000 Health and Aging Survey included a set of questions about the awareness of the AQI as part of a longer survey administered using Knowledge Network's web panel (Mansfield and Corey 2003).
- The 2006 BRFSS included a module with four questions about awareness of the AQI and reported behavior change. Seven states chose to administer the module.
- Bresnahan, Dickie, and Gerking (1997) collected activity data through telephone interviews from a panel of adults in the Los Angeles area who were contacted between 2 to 5 times over a 12-month period to study the impact of ambient pollution levels (not AQI-based alerts).
- Individual metropolitan areas have conducted surveys on awareness of the AQI or other air pollution campaigns.

- In addition to these surveys, some research has been done linking air quality alerts or warnings to aggregate daily changes in attendance at outdoor events, hospital admissions, health outcomes and driving (for example, Neidell 2004, Neidell 2005, Neidell 2007).

Overall, the research and other surveys suggest that some individuals, but not all, are aware of AQI-based warnings and respond by changing their behavior. In a series of studies, Neidell finds evidence consistent with behavioral response to AQI alerts by children and older adults. Neidell (2005) examined attendance at a selection of outdoor events in southern California (Los Angeles Zoo, Griffith Park Observatory, and the Los Angeles County Arboretum and Botanical Gardens). Neidell found that participation was 3% to 11% lower on days forecasted to be smog alerts, which was most significant in for children and older adults. The study used attendance at outdoor facilities as proxy for the amount of time spent outdoors. Neidell (2002) combines individual child asthma-related hospitalization data with ZIP-code-level population demographics, found a negative, significant relationship between health advisories (proxies for avoidance behavior) and hospitalizations. In similar work, Neidell (2004) found evidence that for children and older adults, but not adults, smog alerts lead to a decrease in asthma hospital admissions. Families of high socioeconomic status display particularly strong patterns of avoidance behavior.

Bresnahan, Dickie, and Gerking (1997) used data from a panel of adults in the Los Angeles area who were contacted between 2 to 5 times over a 12-month period. Their results indicated that the study individuals did change their behavior in response to poor air quality by reducing time spent outside on a day-to-day basis, however the study looked at the impact of ambient pollution levels rather than AQI-based alerts.

In the RTI Health and Aging Survey (see third bullet above) of over 6,000 respondents, 57% of individuals who were aware of the ozone alert system and lived in a county that experienced at least one red day over the previous summer reported reducing their outdoor time on high ozone days (Mansfield and Corey 2003). People who were not working at least part-time, including homemakers, the unemployed, students and retirees were more likely to report reducing the time they spent outdoors on high ozone days. Furthermore, people who reported excellent or good health were less likely to report reducing outside time on high ozone days compared to people with fair or poor health.

The STAR grant project (PI Dr. Mansfield, described in the first bullet above) found that parents with asthmatic children were more likely to say they checked the air quality forecast more frequently, and the more severe the asthma the more frequently the parents said they checked the forecast. Families with more young children stated that on average they checked the forecast less frequently, as did white parents. In the debriefing survey parents were asked what they do if they hear that high levels of air pollution are forecast, including (1) whether they have their child spend less time outdoors or (2) whether they have their child do less strenuous activities. Over two-thirds said they spend less time outdoors and 39 percent said they have their child do less strenuous activities. Again, analysis of the data suggests that the presence of an asthmatic child has a positive and significant effect on both stated averting behaviors. In addition, both behaviors were more likely in areas with a history of air pollution problems and in cities with higher summer temperatures. Households with more young children were significantly less likely to say they stayed indoors on days with high air pollution. Looking at whether the child spent time outdoors on any day, children with more severe asthma are less

likely to have spent time outdoors. Families with more children aged 2 to 12 are more likely to spend time outdoors. Finally, children who parents own their house are more likely to spend time totally outdoors.

The surveys and research projects described above provide resources for the design of N-SAS, but none provide a detailed picture of risk perceptions, reported behavior and AQI awareness along with actual behavior (as reported in activity diaries) proposed for N-SAS. In addition, several of the studies are out of date or were collected from small samples.

## **A5. Impact on Small Businesses or Other Small Entities**

This section is not applicable for our survey, since it will not involve or be administered to small businesses, governments, or organizations.

## **A6. Consequences of Collecting the Information Less Frequently**

N-SAS consists of a total of nine surveys. All the surveys will be administered over a three to four month period. Based on previous activity diaries and sample size calculations, it is estimated that as many as seven activity diaries may be needed to obtain the desired level of precision in the estimates of outdoor time because of day-to-day variation in activity patterns. To detect a 15 to 30 minute change in time outdoors on Code Red and non-Code Red days with 95% confidence level, we estimate that we need at least two of each type of day per respondent.

## **A7. Special Circumstances Relating to the Guidelines of 5 CFR 1320.5**

As described in section A6, respondents will report information more often than quarterly, with all nine surveys occurring within three or four months. Summer is the ozone season, so the data need to be collected during the season. There are no other special circumstances that require the data collection to be conducted in a manner inconsistent with 5 CFR 1320.5 (d)(2).

## **A8. Comments in Response to the Federal Register Notice and Efforts to Consult Outside the Agency**

### **Comments**

In accordance with the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*), EPA published a notice in the Federal Register on February 28, 2008, announcing that the proposed survey. A copy of the Federal Register notice is attached at the end of this document in Appendix A.

No comments were received from the public.

### **Consultations**

The content of the N-SAS surveys was developed through extensive consultation with content experts from both inside and outside EPA. The specific wording of the questions was reviewed by various content and survey design specialists and pretested to make sure the

questions were understood correctly and the design of the survey was not difficult for respondents to understand. Finally, Knowledge Networks reviewed the survey instruments for length and burden on their panel. They found that the length of the surveys was average to shorter than average compared to typical surveys administered to their panel.

### **Consultations with Individuals**

1. **Dr. Carol Mansfield** at RTI International is assisting EPA in the planning, design and administration of N-SAS through work assignments under EPA agreement 8295440. Dr. Mansfield was the PI on a STAR grant entitled “Behavioral Reactions to Ozone Alerts: What Do They Tell Us About Willingness-to-Pay for Children=s Health?” (see above) that collected data on outdoor activities and AQI awareness among parents of young children. She also designed questions about awareness of the AQI for the 2000 Health and Aging Study conducted jointly by RTI and Knowledge Networks, which were summarized in a report to EPA (Mansfield and Corey 2003). Dr. Mansfield and her colleagues at RTI have drawn on their experience with these and other environmental public health surveys to provide EPA with guidance on N-SAS. Dr. Mansfield worked with experts in risk communication, survey design, survey administration, sample statistics, non-response analysis, exposure analysis at RTI for the project.
2. **Dr. V. Kerry Smith** (W. P. Carey Professor of Economics, Arizona State University) provided consultation in the fall of 2005 during the planning stage of the survey on the content and administration plan through EPA Contract Number 68-D-00-265 (to E.H. Pechan and Associates, Inc.).
3. **Joan Rohlfs** (Chief, Air Quality Planning, Department of Environmental Programs, Metropolitan Washington Council of Governments) attended a focus group in Washington, D.C., to provide consultation on the survey design and content.

### **Advisory Panel**

An advisory panel consisting of EPA staff and individuals from outside EPA was created in the fall of 2006 to provide advice on the design of N-SAS. In addition to Dr. Mansfield, the group consists of three representatives from outside EPA. EPA staff represented OAR/OAQPS, NERL, NCEA, NCER, and NHEERL. The following individuals participated in advisory group meetings

#### **Team Leaders**

Susan Stone  
Environmental Health Scientist  
EPA/OAQPS

Zachary Pekar, PhD  
Environmental Health Scientist  
EPA/OAQPS

Carol Mansfield, PhD  
Senior Economist  
Research Triangle Institute

#### **Team**

Bryan Hubbell, PhD  
Senior Advisor for Science and Policy  
Analysis  
Health and Environmental Impacts Division  
EPA/OAQPS

Janice J, Kim, MD, MPH  
Air Toxicology and Epidemiology  
Branch  
Office of Environmental Health Hazard

Assessment  
California EPA

Jee Young Kim, ScD  
Epidemiologist  
EPA/NCEA

Dinah Koehler, ScD  
Social Scientist  
EPA/NCER

John Langstaff  
Environmental Scientist  
EPA/OAQPS

Danelle Lobdell, PhD  
Epidemiologist  
EPA/NHEERL

Thomas McCurdy  
Research Physical Scientist;  
Human Exposure Modeling Branch  
EPA/NERL

Randy Mosier

Chief, Air Regulations Development  
Division  
(oversaw episodic surveys of public  
participation)  
Maryland Department of the Environment

Harvey Richmond  
National Super Expert  
Human Exposure Analysis and Non-cancer  
Health Risk Assessment  
EPA/OAQPS

Debbie Stackhouse  
Leader, Innovative Programs and Outreach  
Group  
EPA/OAQPS

Richard Wayland  
Acting Division Director  
Air Quality Analysis Division  
EPA/OAQPS

Barbara Weller, PhD  
Manager, Populations Studies Section  
California Air Resources Board

The group met five times to discuss all aspects of the survey including topics, questions, sample population, geographic coverage of the survey, and mode of administration. This group reviewed the survey instrument and survey administration plan in February 2008 and provided comments that were incorporated into the final design of N-SAS.



## **Focus Groups and Cognitive Interviews**

Two focus groups and nine cognitive interviews were conducted to design and test the N-SAS instrument. The first focus group was held in Raleigh, North Carolina, with nine individuals. The purpose was to identify basic attitudes and awareness of air quality problems. The group was asked to discuss their perceptions of air quality, risk perceptions and possible strategies for mitigating the impacts of air pollution. The questions were organized around health behavior theory to assess perceptions of the overall magnitude of the health risk and the individual's personal risk followed by strategies for reducing the risk and perceived effectiveness. In general, the group was not very worried about air pollution as a health risk to themselves, except for a mother with an asthmatic child. They were able to discuss emission reduction tactics individuals could undertake, but had given very little thought to reducing their own exposure to pollution. The results from this group were used to begin creating the survey instrument.

The second focus group was held in Bethesda, Maryland, with nine individuals. Unlike the first focus group, which involved a general discussion of air quality, the purpose of the focus group was to test reactions to sections of the draft survey instrument including a list of specific risks that might result from exposure to air quality, emission reduction activities and exposure reduction activities. The group was much more knowledgeable about air pollution than the first group. However, they also did not feel that they faced much personal risk from air pollution and were much more familiar with emission reduction activities than exposure reduction activities. The results from this group were used to refine the list of risks and activities, as well as design questions to elicit motivations for or barriers to action.

After the focus groups, the survey instrument was developed and reviewed by RTI and EPA staff including survey methodologists and a specialist in health behavior and risk communication. The instrument was tested on nine individuals using cognitive interviews (five from Raleigh, North Carolina, and four from Atlanta, Georgia). The interviews were conducted by survey methodologists at RTI. The interviews tested the wording of the questions and the flow of the instrument. The feedback from the first seven interviews was used to revise the instrument prior to the final two interviews.

## **Presentations**

1. 2008 National Air Quality Conferences, April 6-9, 2008: Presented the design, sample, and questions for the N-SAS to an audience of EPA staff, local and regional air quality regulators, and others (contractors, researchers). Conference participants provided feedback and several local air quality staff expressed interest in participating.
2. EPA's Workshop on Environmental Behavior and Decision-Making, February 13-14, 2008: Presented on the design, sample, and questions for N-SAS to academic researchers and EPA staff interested in evaluating voluntary programs and information-based programs. Conference participants provided feedback and suggestions for questions.

## **Peer Review**

The draft survey instrument was peer reviewed by two academic experts, Dr. Mathew Neidell (Mailman School of Public Health, Columbia University) and Dr. Debbie Bennett (U. of California, Davis). The peer reviewers were asked to provide written comments on the topics included in the survey, the question wording, the proposed sample (age 35 and over), and the administration method (Knowledge Networks' web panel). The comments from these reviewers included specific comments on the questions included and the wording of the questions, as well as questions about the choice of days for the activity diaries. The comments were incorporated into the final design of N-SAS.

## **Peer Review of Final Report**

1. A final report summarizing the results from the data collection will be peer reviewed by three outside experts in fields such as economics, public health, risk communication, or risk/exposure analysis.
2. Publication plans: EPA intends to publish the results from the survey in peer-reviewed journals.

## **A9. Explanation of Any Payment or Gift to Respondents**

Upon agreeing to be a Knowledge Networks panel member, Knowledge Networks respondents are given free hardware, free Web access, free e-mail accounts for each panel member, and ongoing technical support. While these products/services are provided to facilitate the data collection methodology, respondents are given free usage of the products for personal use, and these benefits are also used as an incentive for recruiting potential panel members.

N-SAS research participants in the study will be offered a small cash incentive to complete all the activity diaries and the debriefing survey. The total amount for completing all nine surveys will be \$36. The honorarium is intended to recognize the time burden placed on the participants, encourage their cooperation, and to convey appreciation for contributing to this important study. Numerous empirical studies have shown that honoraria can significantly increase response rates (e.g., Abreu & Winters, 1999; Shettle & Mooney, 1999). The decision to use honoraria for this study is based on findings reported in current research publications and several projects conducted by Knowledge Networks and RTI, which found that use of an honorarium increases response rates among adults.

## **A10. Confidentiality**

Knowledge Networks maintains the web panel from which the sample will be recruited. Appendix B contains a description of Knowledge Network's security. Identifying information including names, address, and other personal information about the panel members will not be included in the data released to EPA staff or staff from RTI International, the contractor coordinating the survey and analysis. The RTI's Institutional Review Board (IRB) reviewed all

instruments, informed consent materials, and procedures to ensure that the rights of individuals participating in the study are safeguarded. RTI maintains restricted access to all data. All data files on multi-user systems will be under the control of a database manager, with access limited to project staff on a “need-to-know” basis only. Knowledge Networks has developed a secure transmission and collection protocol, including the use of system passwords and two separate sets of firewalls to prevent unauthorized access to the system. Neither questionnaires nor survey/screener responses are stored onto the WebTV box installed in Knowledge Networks respondents’ homes; questionnaires are administered dynamically over the Internet. Survey and screener responses are written in real-time directly to Knowledge Networks’ server and are then stored in a local Oracle database. The database is protected primarily through firewall restrictions, password protection, and 128-bit encryption technology. Individual identifying information will be maintained separately from completed screeners and questionnaires and from computerized data files used for analysis. Data on ineligible will be destroyed. No respondent identifiers will be contained in reports, and results will only present data in aggregate.

### **A11. Justification for Sensitive Questions**

No sensitive questions pertaining to private or personal information, such as sexual behavior or religious beliefs, will be asked in the survey.

### **A12. Estimates of Annualized Burden Hours and Costs**

Respondent burden is presented in Table A1. We anticipate that email invitations will be sent to approximately 3,266 Knowledge Network panel members who meet the age and city requirements for N-SAS based on profile data Knowledge Networks maintains on panel members. Based on previous studies, Knowledge Networks estimates that 30% of the emails will not be opened (or 980 people will not open the survey invitation). 2,286 panel members are expected to open the email and take the screener.

The screening question on activity in the last month used in the screening survey comes from the BRFSS, and based on the results from the BRFSS, 30% of adults in the targeted age groups will not qualify for N-SAS (or 686 people out of 2,286). We estimate it will take 0.05 hours (or 3 minutes) to take the screener. The remaining 1,600 panel members who qualify for the study will take the screener and the baseline survey, which we estimate will take 0.25 hours (or 15 minutes) altogether.

We estimate that 60% of the 1,600 research participants (or 960 people) will complete each activity diary. The activity diaries are estimated to take 0.25 hours (or 15 minutes) to complete. The response rate among the sample taking N-SAS is expected to be lower for the activity diaries than normal Knowledge Networks surveys because the activity diaries will only be in the field for approximately 56 hours (8 hours the day the invitation is sent and 48 hours afterwards).

Finally, we estimate that 70% of the 1,600 research participants will complete the debriefing survey. We expect the debriefing survey will take approximately 0.33 hours (or 20

minutes) to complete.

In total, we expect 1,600 respondents to complete 10,126 surveys total for a total burden of 2,484 hours (0.26 hours per survey per respondent or 1.6 hours per respondent for all surveys completed).

**Table A1. Respondent Hour Burden Estimates for the N-SAS Surveys**

Survey Component		Average time per respondent (hours)	Number of respondents per survey component	Total person hours per survey component
<b>Invitation email</b>	Panel members who receive an initial email invitation to take the survey		3266	
<b>Do not open invitation email</b>	Panel members who do not open email		980	
<b>Open email and take screening, do not qualify</b>	Complete screening survey, but do not qualify for the survey	0.05	686	34
<b>Screening and baseline</b>	Complete screening and baseline surveys	0.25	1600	400
<b>Activity Diary 1</b>	Complete diary	0.25	960	240
<b>Activity Diary 2</b>	Complete diary	0.25	960	240
<b>Activity Diary 3</b>	Complete diary	0.25	960	240
<b>Activity Diary 4</b>	Complete diary	0.25	960	240
<b>Activity Diary 5</b>	Complete diary	0.25	960	240
<b>Activity Diary 6</b>	Complete diary	0.25	960	240
<b>Activity Diary 7</b>	Complete diary	0.25	960	240
<b>Debriefing Survey</b>	Complete debriefing survey	0.33	1120	370
Total Burden (hours)				2484

### Estimating Respondent Cost

Based on an average hourly wage of \$27.54 (including employer costs of all employee benefits)<sup>1</sup> and the burden hours described above, the survey authors expect that the total respondent cost \$68,409 (or \$6.76 per response for 10,126 responses).

<sup>1</sup> U.S. Department of Labor, Civilian Employee Compensation , December 2006 at [www.bls.gov/ncs](http://www.bls.gov/ncs)

## **A13. Estimates of Other Total Annual Cost Burden to Respondents and Record Keepers**

### **Estimating Labor Costs**

The proposed survey is of individuals in households, so the respondent burden will not entail any labor costs for employers.

### **Estimating Capital and Operations and Maintenance Costs**

The proposed survey will not entail any capital or O&M costs.

### **Capital/Start-up vs. Operating and Maintenance (O&M) Costs**

The proposed survey will not entail any capital or O&M costs.

### **Annualizing Capital Costs**

The proposed survey will not entail any capital costs.

## **A14. ESTIMATING AGENCY BURDEN AND COST**

EPA will hire a contractor to administer the N-SAS surveys and to assist in the analysis, summary, and dissemination of the survey data. In addition, EPA estimates that, from its own personnel, it will use two senior scientists for a total of 200 hours to oversee the survey administration and conduct analysis at a cost of \$10,000 (based on an average annual salary of \$100,000). Approximations of the expected costs to the Agency of these activities are summarized in Table A2.

**Table A2. Estimated Agency Cost**

<b>Survey Component</b>		<b>Total Burden</b>
<b>EPA Agency Labor</b>		
Survey Administration	20 hours	\$1,000
Data Analysis	140 hours	\$7,000
Summary Report	40 hours	\$2,000
<b>Contractor Support</b>		
Survey administration		\$265,000
Survey management		\$20,000
Summary report		\$15,000
<b>Total</b>		<b>\$310,000</b>

## A15. Explanation for Program Changes or Adjustments

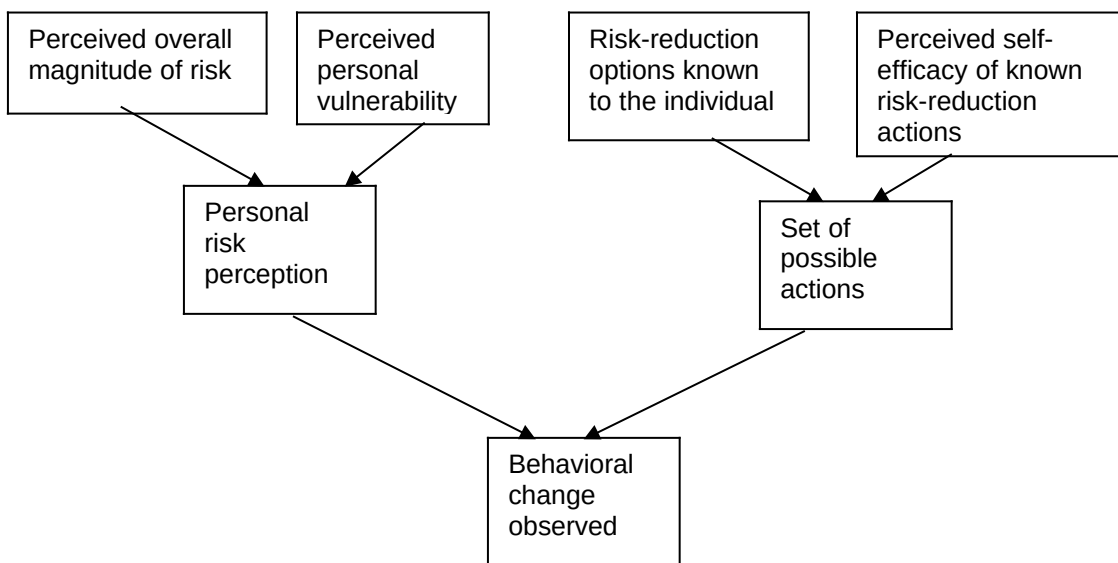
This neither a renewal nor a modification of an existing ICR; therefore, this section is not applicable for this ICR.

## A16. Plans for Tabulation and Publication and Project Time Schedule

To measure and understand awareness, knowledge and behavior change related to the AQI, analysis will be guided by the predictions from health risk behavior theory and from the results from past studies. Figure 1 displays the relationship between an individual's perceptions and the likelihood that the individual adopts health-promoting behaviors as modeled in health risk behavior theory. The likelihood that an individual changes their behavior depends on the individual's (1) perception of the overall magnitude of the risk, (2) perception of their own vulnerability to the risk, (3) knowledge of risk averting behaviors, and (4) assessment of the self-efficacy of the averting behaviors (are the behaviors effective, can the individual actually adopt the behavior).

We hypothesize that an individual's assessment of the overall magnitude of the risks posed by air pollution will depend on variables such as their knowledge of air pollution, demographic characteristics (including education, age, gender, race, income), attitudes toward the environment and the level of air pollution in the city where they live. Their own vulnerability to

**Figure 1. Factors that Influence the Adoption of Health Behaviors**



air pollution is hypothesized to be a factor of their health status, activity patterns, as well as knowledge, demographic characteristics, attitudes, and surroundings.

An individual's knowledge of the actions one might take to reduce health risks is hypothesized to be a function of knowledge of the AQI or some other sources of information on

air pollution such as their doctor, health status, and demographic characteristics. Finally, the individual’s decision about what, if any, action to take will depend on whether the individual considers the action effective and whether the individual has the flexibility in their schedule or budget to carry out the action. In addition to the individual’s appraisal of the action’s effectiveness, demographic characteristics, health status, employment conditions, commuting options and neighborhood characteristics are hypothesized to affect the final decision to take action.

Modeling behavior change in response to an AQI alert using the data from the activity diaries also requires data to control for other factors that affect the amount of time an individual spends outside and the flexibility of their schedule. If these factors are associated with activity patterns, then failure to control for them may bias the estimated coefficients or test statistics and/or reduce the efficiency of the estimates (inflate the standard errors). Important factors include

- neighborhood characteristics
  - N-SAS includes urban/suburban/rural distinction
  - Information on research participant’s Census Block (provided by Knowledge Networks) provides approximate measures of distance to city center and major roadways, population density, dominant housing type, lot size, and amount of open space nearby
- employment status and job characteristics
  - N-SAS includes employment status, number of jobs and hours worked, physical requirements of the job, and approximate time outdoors at job
- health
  - N-SAS includes general health and specific respiratory and heart conditions
- demographic characteristics such as age, gender, income
  - N-SAS includes income, household size, language spoken at home
  - Knowledge Networks’ profile includes age, gender, race, education, and marital status
- household composition and care-giving responsibilities
- and climate variables such as temperature, humidity, precipitation, ozone level and other pollutant levels
  - Information on weather will be obtained from NOAA weather data and information on ozone and PM will be obtained from EPA monitoring data

The choice of variables included in N-SAS reflects the trade-off between research participant burden and the utility of the information. Table A3 lists the questions in the surveys (screening, baseline, activity diary and debriefing) and the reason the questions were included.

**Table A3. Survey Questions and Reason for Inclusion**

<b>Survey Questions</b>	<b>Reason for Inclusion</b>
<b>From Screener Survey</b>	
Screening Q. 2 (activity level in last month)	Focus sample on individuals who are active, do not want large number of individuals who are not active

Screener Q. 3-5	Presence of others in the household affects behavior patterns, Knowledge Networks profile data can be up to a year old, so need to ask households for updates
<b>From Baseline Survey</b>	
Baseline Q. 1 – 12 (Outdoor time and activity yesterday)	To compare with activity diary data and to compare individuals who complete all or most diaries with those who do not
Baseline Q13 (Time in vehicle yesterday)	To compare with activity diary data and to compare individuals who complete all or most diaries with those who do not
Baseline Q14 - 16 (exercise in typical week in summer)	To compare with activity diary data and to compare individuals who complete all or most diaries with those who do not
Baseline Q. 17-26 (chronic health conditions)	Past research has found differences in AQI awareness and in activity patterns between individuals with chronic health conditions or generally poor health and those who are in good health
Baseline Q 27 (type of vehicle)	Assess AQI awareness and behavior change among those who drive low mileage vehicles (minivans, vans, SUV, pickup) and those who drive higher mileage vehicles.
Baseline Q 28 (live in urban, suburban or rural area)	Assess AQI awareness and behavior change among those who live in urban versus suburban or rural areas. Past research has found differences in activity patterns between urban, suburban and rural areas.
Baseline Q29 (years in city)	Assess AQI awareness for individuals who have lived in the city for different amounts of time.
Baseline Q. 30-31 (language spoken at home)	Assess AQI awareness for individuals who do not speak English at home.
Baseline Q. 32-36 (employment status and job characteristics)	AQI awareness and activity patterns have been found to vary based on employment status and job characteristics.
Baseline Q. 37-39 (commute)	Activity patterns have been found to vary based on commuting patterns.
Baseline Q. 40 (ownership of various emission sources)	To assess AQI awareness and time outdoors for individuals who own recreational equipment or wood burning stoves and fireplaces and to compare ownership of these items across respondents who complete all or most of the diaries and those who do not
Baseline Q. 41 (housing type)	Activity patterns have been found to vary based on the built environment in which an individual lives, including their housing type
Baseline Q. 42 (income)	Provide an update to information on income in Knowledge Networks' profile variables.
Baseline Q. 43 (questions to check for potential for providing socially acceptable responses)	Questions taken from a measure of the likelihood that individuals provide “socially acceptable” survey responses, these have been used in other research and found to be significant predictors.



<b>From Activity Diaries</b>	
Diary Q. 1-14 (time spent on each activity, activity category, location, exertion level)	Test for changes in behavior, provide activity data for the Consolidated Human Activity Database (CHAD)
Diary Q 15-17 (more or less time outdoors than usual and reasons)	To control for reasons unrelated to air quality that the individual spent more or less time outdoors and to calculate correlation between perceptions of air quality and actual air quality.
Diary Q. 18-19 (Symptoms and medications)	To control for symptoms and medication use that can affect time outdoors.
Diary Q. 20 (Windows open)	To better estimate exposure.
<b>From Debriefing Survey</b>	
Q. 1- 5 (air pollution sources and seasons in city)	To measure knowledge of local air pollution conditions and perception of air pollution problem (Health risk behavior model)
Q. 6, 8 (general impact of air pollution on quality of life and health)	Measure perception of the overall magnitude of the air pollution problem (Health risk behavior model)
Q 7, 9, 10-12 (impact of air pollution on individual)	Measure perception of personal vulnerability to air pollution risks
Q. 13-16 (changes in life due to air pollution)	Measure reported behavior in response to perception of air pollution
Q 17-22 (actions to reduce personal emissions and exposure)	Measure knowledge of actions an individual can take to reduce emissions and exposure (Health risk behavior model)
Q. 23-24 (actions individual reports taking and why)	Measure reported behavior by individual to compare with behavior reported in the diary and for health risk behavior model
Q. 25-35 (awareness of AQI warning systems, reported use of warning systems)	Measure awareness and knowledge of AQI warning systems and reported use of the warnings
Q. 36-37 (questions about pollution in city)	Measure knowledge of pollutants in city and AQI forecast

A number of the questions used in N-SAS have been used in other surveys, and so the wording of these questions has been tested and validated. Appendix A lists the questions have been taken from other surveys. In most cases we used the exact wording of the question to take advantage of the survey instrument testing that has already been conducted for the other survey, although in some cases we modified the response categories or wording of the question to fit the mode of administration and flow of N-SAS instruments.

Analysis of the N-SAS data will consist of several parts. An initial report on the surveys will be produced when the data have been collected. The analyses for the survey report will consist of descriptive statistics (frequencies, crosstabs, t-tests, and Chi-squares) to examine the characteristics of the research participants, explore the potential for inferential analyses, and test for potential between-group differences. After this basic analysis, the data from the baseline, activity diaries and debriefing surveys will be used to assess hypotheses about differences in

awareness, knowledge and actual behavior within the N-SAS sample.

Table A4 lists the primary measures that will be estimated, the basic data needed for the estimation and the analysis approach.

**Table A4. Measures, Data and Analysis for N-SAS**

<b>Measure</b>	<b>Data</b>	<b>General Analysis Approach</b>
<b>Accountability</b>		
Extent of awareness of the AQI	Debriefing survey, questions asking name of AQI warning system, familiarity with systems	Calculate means, medians, range
Extent of knowledge about air pollution, actions to reduce exposure and emissions, health impacts	Debriefing survey, questions about air pollution in their city, actions people can take, health impacts	Calculate means, medians, range
Difference in awareness and knowledge across sub-groups of the research participants	Baseline data on the characteristics of the research participants and debriefing questions on awareness and knowledge	Statistically significant differences in means between sub-groups of the research participants
Behavior change -- Reduction in time outdoors on high ozone days (or time outdoors during peak ozone hours)	Activity diaries - total time outdoors (or outdoors during peak ozone hours) in minutes for each day, high ozone day indicator variable (versus low), weather, individual and city variables	Random effects panel regression, test for significant negative coefficient on “high ozone day” variable indicating total time outdoors lower on high ozone days, controlling for other factors
Behavior change – Reduction in exertion level during the day (or during peak ozone hours)	Activity diaries – exertion level for outdoor activities, minutes of outdoor time at each exertion level, high ozone day indicator variable (versus low), weather, individual and city variables	*Create a continuous variable by converting exertion categories into average “mets”, use a random effects panel regression, test for significant negative coefficient on “high ozone day” *Create an exertion-weighted time outdoors and estimate model to test for significant effect of “high ozone day” variable on exertion-weighted time outdoors
Behavior change – Reduction in time spent driving a personal car on high ozone days (or during peak ozone hours)	Activity diaries – Total time driving personal vehicle in minutes, high ozone day indicator variable, weather, individual and city variables	Random effects panel regression, test for significant negative coefficient on “high ozone day” variable indicating total time in car lower on high ozone days, controlling for other factors
Differences in behavior change across sub-groups of the research participants	Activity diaries, baseline and debriefing surveys.	Test the significance of coefficients in the random effects panel regressions for differences across sub-groups in behavior.
<b>Exposure Modeling</b>		
Provide activity data for the	Activity diaries – time spent on	Activity data added to data in

Consolidated Human Activity Database (CHAD)	each activity, activity category, location, exertion level	CHAD to create exposure profiles
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An estimated collection and reporting schedule for N-SAS is summarized in Table A5.

**Table A5. Collection Schedule for N-SAS**

<b>Activity</b>	<b>Duration of Each Activity (in days)</b>	<b>Total Elapsed Time Following OMB Approval (in days)</b>
Finalize revisions and programming of survey instruments	20	20
Administer screening surveys	15	35
Administer activity diaries	90	125
Administer debriefing survey	20	145
Basic survey report (review, summarize and analyze final data)	90	235
Manuscript to submit to peer reviewed journal (at least one)	180	415

**17. Reason(s) Display of OMB Expiration Date is Inappropriate**

We do not seek approval to eliminate the expiration date.

**18. Exceptions to Certification for Paperwork Reduction Act Submissions**

There are no exceptions to the certification statement.



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# Survey Systems Infrastructure

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**Network, Data-Center  
Infrastructure, Data Lifecycle  
Management & Security  
Practices**

**Effective June 7, 2007  
Authored by : Jeremy Launier**

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## Contacts

For questions or comments about this document's content or to request changes to the document, contact:

Name	Responsibility	Email	Phone Number
Michel Floyd	Chief Technical Officer	<a href="mailto:mfloyd@knowledgenetworks.com">mfloyd@knowledgenetworks.com</a>	(650) 289-2098
Jeremy Launier	Vice President, IT	<a href="mailto:jlaunier@knowledgenetworks.com">jlaunier@knowledgenetworks.com</a>	(650) 289-2103
Arpit Joshi	Senior Database Admin	<a href="mailto:ajoshi@knowledgenetworks.com">ajoshi@knowledgenetworks.com</a>	(650) 289-2016
Vince Parras	Senior Systems/Network Admin	<a href="mailto:vparras@knowledgenetworks.com">vparras@knowledgenetworks.com</a>	(650) 289-2055
Ramesh Kan	Director of CRM Solutions	<a href="mailto:rkan@knowledgenetworks.com">rkan@knowledgenetworks.com</a>	(650) 289-2032

## Network Summary

### WAN

Knowledge Networks' Wide Area network ([WAN](#)) is setup as a [fully-meshed](#) cloud, which means that any site can directly connect to any other site without additional routing or single points of failure. Each office location is designed to automatically fail over to a secondary Internet connection if there is any disruption of service with the primary WAN. In practice, this has given us close to 100% uptime. [See appendix 1a for Knowledge Networks' WAN diagram.](#)

### Co-location Facility

Most of Knowledge Networks' critical services, including all of the servers used for online surveys, are hosted at a physically secured co-location facility in the San Francisco Bay area. This facility incorporates the latest physical security through biometric readers and mobile cameras to ensure that physical access is restricted to authorized personnel only. In addition, this facility maintains N+2 redundant power through diesel power generators and [UPS](#) systems. The LAN at the facility is setup with redundancy wherever possible. The edge of our network is protected by fully redundant, clustered Cisco [firewalls](#). These firewalls protect against incoming access from the Internet and help to ensure that only authorized connections to our web servers are allowed. The rest of the LAN is segmented into, secured Virtual LANs ([VLANs](#)) to separate out the different tiers of our services. These VLANs host connections to over 50 servers, including a completely load-balanced online survey system, a fully redundant

Network Appliance storage system, and a fully redundant IBM Bladecenter. [See appendix 1b for Knowledge Networks' co-location facility diagram.](#)

## Survey Data Information Life-cycle

### Data Collection

Survey data is collected by a web-based survey system that we internally refer to as “Dimensions”. This application runs on top of a secured Windows environment that has been hardened through various network and hosted-based security techniques. Our panelists take online surveys by using a web-browser to access a unique, secured web URL that is both emailed to them and made available through a secured web-portal. The URL provides access to click through to a highly-available load-balanced farm of web servers that hosts the online survey. This survey URL can be exposed via either standard http or over SSL and TLS encrypted https, depending on the client requirements. KN employs HTTP as the default; however, SSL is available upon request from the client. Throughout the interview process, questionnaire data is copied to a secured, centralized database for data processing.

### Data Processing

Survey data is extracted from Dimensions through a secured, internal web-portal. While it is being cleaned up and analyzed, it is typically stored on secured file servers, local workstations, and email within our internal network. In all cases, access to these storage locations is restricted to authorized access by specific groups and individuals through role-based security.

### Data delivery

While data can be delivered by a variety of different means, our default method is to send an unencrypted file as an attachment via email. If required by the client, we can offer the following alternatives: in person delivery, delivery via CD-ROM, FTP download, password protected zip file, https web portal downloads.

### Data Retention

In most cases client data is left in place on our primary storage systems until we reach physical space limits. At that time, data is archived to a secondary storage system with the same security restrictions in place. Survey data is also backed up on a nightly basis to a disk-based backup system. Nightly backups are maintained for up to 90 days before the data is purged and the space is reused. This system is restricted to authorized IT staff.

All the survey data are permanently archived. On a case by case basis, we can purge the survey data if a client requests this of us.

# Security Policy

## Identifiable versus Non-identifiable Data

Identifying and non-identifying data has been separated into two different databases, using a [role-based security](#) model. Internal research analyst access is solely restricted to survey data, with absolutely no access to identifying information, while our panel management team has access to identifying data but absolutely no access to survey data. If needed, survey data can be further restricted to individual research analysts so that analysts working on a specific client projects won't have access to data from other client projects.

With the need to support various systems effectively, certain senior members of the IT and engineering team have access to both roles.

## Role-based Security

Our role-based security is designed around the principle of least privilege. That is, our data is classified as being accessible to either members of an identifiable data role or a non-identifiable data role.

The following groups within the company have access to identifiable data:

- Panel Management Team
- Senior Software Engineering team
- Senior IT Team

The following groups within the company have access to non-identifiable data (questionnaire data):

- Research Analysts
- Client Service team members
- Scripting Teams
- Statistics
- Senior Engineering Team
- Senior IT Team



## Password Policy

Knowledge Networks' panel member passwords are designed to be easy to remember but difficult to guess. With that in mind, secure access to our panel member web-portal is determined by someone entering the appropriate email address and password. Panel member passwords are stored in a secured state within our panel management database software.

Knowledge Networks' internal password policies use the following guidelines:

- Strong Passwords with at least three distinct types of special characters
- Passwords with at least 7 characters in length
- Password expirations after 90 days
- History of over 20 passwords per user account (This means a user needs to cycle through 20 passwords before they are allowed to reuse an old one)
- Password lockout after 4 failed attempts

## Security Auditing

All of our critical servers and network devices are constantly monitoring for authorized and unauthorized access to data. This is recorded in log files and reviewed on a regular basis. In addition, as mentioned earlier, we employ the use of host based intrusion detection systems to check for hacking attempts and or unauthorized changes to our systems. If a security breach occurs, that compromises the confidentiality of our identifiable data, we will notify any client that require this information disclosure.

We also use a centrally managed anti-virus solution from McAfee Inc., to proactively manage all of the Windows computers on our network, ranging from file servers to laptops. This helps us to ensure that data isn't being secretly siphoned off to some unknown source on the Internet.

## Monitoring

Our centralized monitoring system, [Ipswitch's Whatsup](#), checks services every minute. We use [SNMP](#) and http content scans to monitor all necessary services, systems and applications. We automatically receive service failure notifications through email and [SMS](#) on our cell phones.

## **Appendix C: Survey Instruments including Screener/Baseline, Activity Diary, and Debriefing Survey Instruments**

### **C1. Screener and Baseline Surveys**

#### ***Screening Questions***

Thank you for your interest in this survey. In this survey we will ask you about issues related to your quality of life. This survey is being conducted by Research Triangle Institute, a non-profit research organization.

Please first answer some questions about your situation to confirm that you are eligible to participate in the survey. If you have any problems or concerns about this survey, please contact Panel Relations at 800-782-7699, and someone will direct your questions to the appropriate researchers at Research Triangle Institute.

1. “During the past month, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise for work or for leisure?”
  - a. Yes
  - b. No
  
2. How many people live in your household, including yourself?
  - a. \_\_\_\_\_ people
3. How many children (less than 18 years old) currently live in your household?
  - a. \_\_\_\_\_ children
4. Are you currently living with a spouse or partner?
  - a. Yes
  - b. No

If “no” to Q1, then: “Thank you for your interest, but you are not eligible for today’s survey.”

## **Baseline Survey**

The next set of questions asks about your outdoor activities yesterday. We know it can be hard to remember, but please try to answer as accurately as you can.

1. Thinking about yesterday, did you spend any time outside between the time you woke up and 12:00 noon? Please only include times when you were outside for at least 10 minutes continuously. Do not include time spent in your car or other vehicle.
  - i. Yes [*skip to Q3*]
  - ii. No [*skip to Q5*]
  - iii. Don't know
  
2. [*if Don't know*] Okay, let's start when you woke up; think carefully about each activity you did after you woke up and before noon. Did you do anything outside for at least 10 minutes?
  - i. Yes
  - ii. No [*skip to Q5*]
  
3. How much time did you spend outside? Please provide your best estimate.
  - i. Hours\_\_\_\_, minutes\_\_\_\_\_
  
4. Now I want to ask you about your activities when you were outside. During this time, did you engage in moderate or vigorous physical activity? Moderate activities cause only light sweating or a slight to moderate increase in breathing or heart rate. Some examples are brisk walking, bicycling for pleasure, golf, or dancing. Vigorous activities cause heavy sweating or large increases in breathing or heart rate.
  - i. Yes
  - ii. No
  
5. Now let's move on. Did you spend any time outside between 12:00 noon and 4:00 pm in the afternoon? Again, please only include times when you were outside for at least 10 minutes continuously and do not include time spent in your car or other vehicle.
  - i. Yes [*skip to Q7*]
  - ii. No [*skip to Q9*]
  - iii. Don't know
  
6. [*if Don't know*] Okay, let's start at noon; think carefully about each activity you did after noon and before 4:00 pm. Did you do anything outside for at least 10 minutes?
  - i. Yes
  - ii. No [*skip to Q9*]
  
7. How much time did you spend outside? Please provide your best estimate.
  - i. Hours\_\_\_\_, minutes\_\_\_\_\_

- 8.** During this time, did you engage in any moderate or vigorous physical activity?  
Remember, Moderate activities cause only light sweating or a slight to moderate increase in breathing or heart rate. Some examples are brisk walking, bicycling for pleasure, golf, or dancing. Vigorous activities cause heavy sweating or large increases in breathing or heart rate.
- i.** Yes
  - ii.** No
- 9.** Now, please think about the end of the day. Did you spend any time outside after 4:00 pm? Again, please only include times when you were outside for at least 10 minutes continuously and do not include time spent in your car or other vehicle.
- i.** Yes [*skip to Q11*]
  - ii.** No [*skip to Q13*]
  - iii.** Don't know
- 10.** [*if Don't know*] Okay, let's start with 4:00 pm; think carefully about each activity you did after 4:00 pm. Did you do anything outside for at least 10 minutes?
- i.** Yes
  - ii.** No [*skip to Q13*]
- 11.** How much time did you spend outside? Please provide your best estimate.
- i.** Hours\_\_\_\_, minutes\_\_\_\_\_
- 12.** During this time, did you engage in any moderate or vigorous physical activity?  
Remember, Moderate activities cause only light sweating or a slight to moderate increase in breathing or heart rate. Some examples are brisk walking, bicycling for pleasure, golf, or dancing. Vigorous activities cause heavy sweating or large increases in breathing or heart rate.
- i.** Yes
  - ii.** No
- 13.** Yesterday, how much time total did you spend driving or riding in a vehicle? Again, please give us your best estimate.
- i.** \_\_\_\_ hours and \_\_\_\_ minutes
- 14.** During a typical week in the summer (June, July or August) do you exercise or engage in other moderate or vigorous physical activity at least 2 times a week for your job or for leisure? This could be either indoors or outdoors.
- i.** Yes
  - ii.** No [*skip to Q17*]
- 15.** In the summer, does your physical activity usually take place only indoors, only outdoors, or both indoors and outdoors?
- i.** Only indoors [*skip to Q17*]
  - ii.** Only outdoors

**iii.** Both indoors and outdoors

**16.** Thinking about the times you are outdoors and physically active in the summer, on average how many minutes of moderate or vigorous physical activity do you do per day on days when you are active? This could be activity for work or leisure.

**i.** \_\_\_\_\_minutes

**17.** These next questions are about your health. Would you say that in general your health is excellent, very good, good, fair or poor?

**i.** Excellent

**ii.** Very good

**iii.** Good

**iv.** Fair

**v.** Poor

**18.** Do you have any allergies to grasses, pollen, or other plants?

**i.** Yes

**ii.** No

**iii.** Don't know

**19.** Has a doctor ever told you that you have high blood pressure?

**i.** Yes

**ii.** No

**iii.** Don't know

**20.** Has a doctor ever told you that you have heart disease?

**i.** Yes

**ii.** No

**iii.** Don't know

**21.** Has a doctor ever told you that you have heart failure or congestive heart failure?

**i.** Yes

**ii.** No

**iii.** Don't know

**22.** Has a doctor ever told you that you had a stroke?

**i.** Yes

**ii.** No

**iii.** Don't know

**23.** Has a doctor ever told you that you have asthma?

**i.** Yes

**ii.** No

**iii.** Don't know

24. Do you still have asthma?
- i.** Yes
  - ii.** No
  - iii.** Don't know
25. Has a doctor ever told you that you have a lung disease other than asthma, such as emphysema or COPD? COPD means Chronic Obstructive Pulmonary Disease and is also known as Chronic Lower Respiratory Disease. Do not include Tuberculosis (TB).
- i.** Yes
  - ii.** No
  - iii.** Don't know
26. Do you have any other health conditions that limit the amount of time you spend outdoors?
- i.** yes
  - ii.** no
27. What type of vehicle do you usually drive?
- i.** Regular fuel car
  - ii.** Hybrid or biofuel car
  - iii.** Minivan
  - iv.** Full-size Passenger Van
  - v.** SUV
  - vi.** Motorcycle
  - vii.** Pickup
  - viii.** Other, \_\_\_\_\_
  - ix.** I do not drive
28. How would you describe where you live?
- i.** Urban setting
  - ii.** Suburban setting
  - iii.** Rural setting
29. How many years have you lived in [name of city]?
- i.** \_\_\_\_Years
30. Do you speak a language other than English at home?
- i.** Yes
  - ii.** No [*skip to Q32*]
31. If yes, what language\_\_\_\_\_
32. Are you currently employed?
- i.** Yes

*ii.* No [skip to Q40]

33. How many jobs do you currently have?

- i.* 1
- ii.* 2
- iii.* 3
- iv.* 4
- v.* More than 4

34. In an average week how many hours do you work in total for all paid jobs?

- i.* 0-10 hours
- ii.* 11-20 hours
- iii.* 21-30 hours
- iv.* 31-40 hours
- v.* 41-50 hours
- vi.* 51-60 hours
- vii.* More than 60 hours

**If you have more than one job, answer the next five questions for the job at which you spend the most hours.**

35. When you are at work, which of the following best describes what you do?

- i.* Mostly sitting (at a desk or table) or
- ii.* Mostly standing
- iii.* Mostly walking, but not heavy labor
- iv.* Mostly heavy labor or physically demanding work

36. When you are at work, which of the following best describes how much time you spend outdoors?

- i.* All or most of my time at work is spent outdoors
- ii.* About half my time at work is spent outdoors
- iii.* A quarter or less of my time at work is spent outdoors
- iv.* I do not spend any time at work outdoors

37. How did you usually get to work last week? If you usually use more than one method of transportation during your trip to work, select the one used for most of the distance.

- i.* Alone in a car, truck, or van
- ii.* With at least one other adult in a car, truck, or van
- iii.* Bus, trolley, or streetcar
- iv.* Subway, elevated train, or railroad
- v.* Ferryboat
- vi.* Motorcycle

- vii.** Bicycle
- viii.** Walked
- ix.** Worked at home [*skip to Q40*]
- x.** Other

**38.** How many minutes did it usually take you to get from home to work last week?

- i.** \_\_\_\_ minutes

**39.** How many miles is your one way trip to work?

- i.** \_\_\_\_miles

**40.** Do you own any of the following?

- i.** Wood stove
- ii.** Wood burning fire place
- iii.** Natural gas fire place
- iv.** Motorboat or personal watercraft (PWC)
- v.** Motorhome or RV
- vi.** Snowmobile
- vii.** Bicycle

**41.** Which best describes the building you live in?

- i.** A mobile home
- ii.** A one-family house detached from any other house
- iii.** A one-family house attached to one or more other houses
- iv.** A building with 2 apartments
- v.** A building with 3 or more apartments
- vi.** Boat, RV, van, etc.
- vii.** Other, \_\_\_\_\_

**42.** Which of the following income categories best describes your total 2007 household income before taxes?

- i.** Less than \$10,000
- ii.** \$10,000 to \$14,999
- iii.** \$15,000 to \$24,999
- iv.** \$25,000 to \$34,999
- v.** \$35,000 to \$49,999
- vi.** \$50,000 to \$74,999
- vii.** \$75,000 to \$99,999
- viii.** \$100,000 to \$149,999
- ix.** \$150,000 to \$199,999
- x.** \$200,000 or more



43. Please rate the following statements for yourself

	1 Not true	2	3	4	5 Very True
It would be hard for me to break any of my bad habits.					
I always know why I like things.					

Thank you for completing the survey. This survey is part of a research project on daily activities. You have been selected to participate in the next step in the research project. To collect more information about individuals' activities, we will be sending you a set of activity diaries. An activity diary is a survey that asks you questions about what you did during the day. The data from these diaries will be used to provide a better understanding of how people spend their day. The data collected from these diaries will be kept confidential – as always, your name will never be associated with the information from the surveys you take.

We will be sending you a total of 7 activity diaries this summer. First, we will ask you to fill out diaries for 4 days in a row and then later in the summer you will fill out diaries for another 3 days in a row. To alert you that a diary will be coming, you will receive an email 2 days before we send the first diary. We designed the diaries so that they will be easy to fill out, so the diary surveys shouldn't take more than about 10 minutes to complete.

Your participation in this survey is very important for the overall success of the research project. You are part of a group of 1,600 people who will be completing activity diaries, and for our sample to be representative we need everyone to participate.

To thank you for your participation, you will receive a \$36 bonus for completing all the surveys in this project.

## C2. Activity Diary

**N-SAS LONGITUDINAL SURVEY  
DRAFT 3/20/09**

DIARY-ACTIVITIES AND TIMES
----------------------------

### **BASE: ALL RESPONDENTS**

In this survey, we are asking you to fill out a "diary" of various activities that you did on INSERT DATE. It may be hard to remember what you did and when, but it is important to this research project for you to give us the most accurate information possible. The information from your diary and the other

people taking these surveys will be used for studies of activity patterns.

Please be assured that any information you provide will be kept strictly confidential. Your name will not be provided to anyone outside Knowledge Networks and your answers will never be linked to your name.

Remember that you will earn \*\*\*\* points/dollars for taking this survey and \*\*\*\* if you fill out all seven days of diary surveys we will send you.

Let's begin.

**BASE: RESPONDENTS WHO ENTERED SURVEY AFTER 48 HOURS OF INVITATION**

[if more than 48 hours since INSERT DATE] Unfortunately the deadline for filling out this diary has passed. Diaries need to be filled out within 48 hours of when we send you the invitation. Please keep checking for additional opportunities to fill out up to 7 diaries in total.

**BASE: ALL QUALIFIED RESPONDENTS**

**Q1:** What time did you wake up on INSERT DATE?

01 12:00 A.M

...

02 6:00 A.M.

03 6:15 A.M.

04 6:30 A.M.

05 6:45 A.M.

06 7:00 A.M.

07 7:15 A.M.

08 7:30 A.M.

09 7:45 A.M.

10 8:00 A.M.

11 8:15 A.M.

...

59 11:45 P.M.

**BASE: ALL QUALIFIED RESPONDENTS**

**Q2:** When you got woke up on INSERT DATE, where were you?

1. Home or near home
2. Work or school
3. Other's home
4. A parking lot/garage
5. An outdoor park or natural area
6. A private vehicle (for example, car, truck, taxi)
7. A public vehicle (for example, bus, train, airplane)
8. Other

[If indoor/outdoor location ambiguous] Q2.1: Where you

1. Totally indoors
2. Mostly indoors
3. Half indoors/half outdoors
4. Mostly outdoors
5. Totally outdoors

**Q2.2 [if chose “other”]** What other place were you? \_\_\_\_\_

**BASE: ALL QUALIFIED RESPONDENTS**

**Q3:** Now think about the first thing you did immediately after waking up at [programmer note: insert response from q3]. Please pick the type of activity from the following list or tell us what you did by choosing the “other” category.

1. Shower, bathe, personal hygiene
2. Eat
3. Sleep/Nap
4. Work (any paid work)
5. Childcare
6. Caregiving for an adult
7. General household activities
8. Shop, run errands
9. Attend classes
10. Exercise, participate in sports
11. General leisure activities
12. Travel to another destination [*skip to Q4.2*]
99. Other

**Q3.1 [if chose other 99]** What other activity did you do? \_\_\_\_\_

**Q3.2 [if activity is “travel”]** Method of travel

1. Car
2. Hybrid car
3. Minivan
4. Full-size Passenger Van
5. SUV
6. Motorcycle
7. Pickup truck
8. Walking/Running to destination
9. Riding on a bus,
10. Riding on a train, subway or light rail
11. Commercial vehicle
12. Bicycle, Skate, etc. to destination
13. Airplane
14. Boat
99. Other method

**Q3.3 [if chose other 99]** What other method of travel did you use? \_\_\_\_\_

**BASE: ALL QUALIFIED RESPONDENTS**

**Q4:** What was your level of activity? Please select the level of activity from the list below.

<b>Activity</b>	<b>Description</b>	<b>Energy Level</b>	
Sleep	Sleeping	Very Low	<input type="checkbox"/>
Sedentary	For example, sitting	Low	<input type="checkbox"/>
Light	For example, standing	Low active	<input type="checkbox"/>
Moderate	Moderate activities cause only light sweating or a slight to moderate increase in breathing or heart rate. Some examples are brisk walking, bicycling for pleasure, golf, or dancing.	Moderate	<input type="checkbox"/>
Vigorous	Vigorous activities cause moderate sweating or large increases in breathing or heart rate. An example is jogging.	Heavy/vigorous	<input type="checkbox"/>
Maximal exertion	Maximal exertion activities cause heavy sweating or large increases in breathing or heart rate. An example is running hard.	Maximal exertion	<input type="checkbox"/>

**BASE: ALL QUALIFIED RESPONDENTS**

The table below lists all your activities so far. If you need to change one of your responses, please click on the item you need to change and use the drop down list to select the correct response.

<b>Time</b>	<b>Activity</b>	<b>Location or Method of travel</b>	<b>Activity Level</b>
Before Q1	Wake up and get out of bed	Q2	Sleep
Q1	Q3	Q2	Q4

**BASE: ALL QUALIFIED RESPONDENTS**

**Q5** What time did you finish [insert Q3]?

Time [PROGRAMMER NOTE: SHOW CHOICES FROM Q1, Starting with Q1.]

01 12:00 A.M

...

02 6:00 A.M.

03 6:15 A.M.

04 6:30 A.M.

05 6:45 A.M.

06 7:00 A.M.

07 7:15 A.M.

08 7:30 A.M.

09 7:45 A.M.  
10 8:00 A.M.  
11 8:15 A.M.  
...  
59 11:45 P.M.

**Q6 Now think about the next thing you did.** Please pick the type of activity from the following list or tell us what you did by choosing the “other” category.

1. Shower, bathe, personal hygiene
2. Eat
3. Sleep/Nap
4. Work (any paid work)
5. Childcare
6. Caregiving for an adult
7. General household activities
8. Shop, run errands
9. Attend classes
10. Exercise, participate in sports
11. General leisure activities
12. Travel to another destination [*skip to Q4.2*]
99. Other

**Q6.1 [if chose other 99]** What other activity did you do? \_\_\_\_\_

**Q7: Where were you?**

1. Home or near home
2. Work or school
3. Other's home
4. A parking lot/garage
5. An outdoor park or natural area
6. A private vehicle (for example, car, truck, taxi)
7. A public vehicle (for example, bus, train, airplane)
8. Other

[If outdoor/indoor location ambiguous] Q7.1: Where you

1. Totally indoors
2. Mostly indoors
3. Half indoors/half outdoors
4. Mostly outdoors
5. Totally outdoors

**Q7.2 [if chose “other”]** What other place were you? \_\_\_\_\_

**Q8: (if change from own home to other place or back with no travel): (if change from own home to other place with no travel):** During your last activity, you were [insert location from last activity] and now you are [insert location from current activity]. Is this correct?

01 Yes

02 No [return to Q7]

**Q8.1 How did you get from Q2 to Q7?**

1. Car
2. Hybrid car
3. Minivan
4. Full-size Passenger Van
5. SUV
6. Motorcycle
7. Pickup truck
8. Walking/Running to destination
9. Riding on a bus,
10. Riding on a train, subway or light rail
11. Commercial vehicle
12. Bicycle, Skate, etc. to destination
13. Airplane
14. Boat
99. Other method

**Q8.2 [if chose other 99]** What other method of travel did you use? \_\_\_\_\_

**Q9 [if activity is “travel”]** Method of travel

1. Car
2. Hybrid car
3. Minivan
4. Full-size Passenger Van
5. SUV
6. Motorcycle
7. Pickup truck
8. Walking/Running to destination
9. Riding on a bus,
10. Riding on a train, subway or light rail
11. Commercial vehicle
12. Bicycle, Skate, etc. to destination
13. Airplane
14. Boat
99. Other method

**Q9.1 [if chose other 99]** What other method of travel did you use? \_\_\_\_\_

**Q10:** What was your level of activity?

Activity	Description	Energy Level	
Sleep	Sleeping	Very Low	<input type="checkbox"/>

Sedentary	For example, sitting	Low	<input type="checkbox"/>
Light	For example, standing	Low active	<input type="checkbox"/>
Moderate	Moderate activities cause only light sweating or a slight to moderate increase in breathing or heart rate. Some examples are brisk walking, bicycling for pleasure, golf, or dancing.	Moderate	<input type="checkbox"/>
Vigorous	Vigorous activities cause moderate sweating or large increases in breathing or heart rate. An example is jogging.	Heavy/vigorous	<input type="checkbox"/>
Maximal exertion	Maximal exertion activities cause heavy sweating or large increases in breathing or heart rate. An example is running hard.	Maximal exertion	<input type="checkbox"/>

**BASE: ALL QUALIFIED RESPONDENTS**

The table below lists all your activities so far. If you need to change one of your responses, please click on the item you need to change and use the drop down list to select the correct response.

Time	Activity	Location or Method of travel	Activity Level

**CONTINUE UNTIL CYCLE THROUGH 24 HOURS**

Q11 On [insert date], did you leave [insert name of city]?

- 1 Yes
- 2 No [skip to 13]

Q12 [if yes] Below is a table of your activities on [insert date] that took place away from your home. Please type in the name of the city where the activity took place if it took place in another city.

Q13 You indicated that some of the activities took place at “work or school” Do you know the address of the building where the work took place or where you go to school?

- 1 Yes, the address is \_\_\_\_\_ [skip to Q15]
- 2 No

Q13.1 [if no] Do you know the name of the nearest major intersection?

- 3 Yes
- 4 No

**Q13.2** If you were to drive from your house to this location, how long would it take?

- 01 Less than 5 minutes
- 02 5 to 10 minutes
- 03 10 to 20 minutes
- 04 20 to 40 minutes
- 05 More than 40 minutes

POST-DIARY
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**BASE: ALL QUALIFIED RESPONDENTS**

**Q15** Think about the amount of time you spent indoors and outdoors compared to the amount time you usually spend indoors and outdoors on weekdays. Using the scale below, please indicate the amount of time you spent indoors or outdoors on [PROGRAMMER NOTE: INSERT DATE] compared to a typical day.

A lot more Time indoors	A little more time indoors	Usual amount of time indoors and outdoors	A little more time outdoors	A lot more time outdoors
1	2	3	4	5

**BASE: SPENT A LOT OR A LITTLE MORE TIME INDOORS**

**Q16** Which of the following contributed to you spending more time indoors? *Please check all that apply.*

- 01 Your health on this day
- 02 The health of your child on this day
- 03 The health of another person you care for on this day
- 04 Conditions were not good outside.
- 05 I had previously scheduled plans to do an indoor activity.
- 06 No particular reason
- 96 Other, What other reason contributed to you spending more time indoors?

**BASE: CONDITIONS OUTSIDE WERE NOT NICE**

**Q16.1** Which outdoor conditions contributed to you spending more time indoors? *Please check all that apply.*

- 01 Too hot
- 02 Too cool
- 03 Too humid
- 04 Poor air quality
- 05 Too much dust or pollen
- 06 Too much rain
- 07 Too windy
- 96 Other, What other reason contributed to you spending more time indoors?

**BASE: SPENT A LOT OR A LITTLE MORE TIME OUTDOORS**



**Q17** Which of the following contributed to you spending more time outdoors? *Please check all that apply.*

- 01 Conditions outside were nice
- 02 I had previously scheduled plans to do an outdoor activity
- 03 No particular reason
- 96 Other, What other reason contributed to you spending more time outdoors?

**BASE: CONDITIONS OUTSIDE WERE NICE**

**Q17.1 (md6351-md6356)** Which outdoor conditions contributed to your spending more time outdoors? *Please check all that apply.*

- 01 Good weather
- 02 Good air quality
- 03 Low dust or pollen
- 96 Other, What other reason contributed to you spending more time outdoors?

**BASE: ALL QUALIFIED RESPONDENTS**

**Q18 (md6401-md64012)** Did you experience any of the following symptoms on [PROGRAMMER NOTE: INSERT DATE]? *<I>Please check all that apply.</I>*

- 01 Coughing
- 02 Wheezing
- 03 Shortness of breath
- 04 Asthma attack
- 05 Runny nose or other cold symptoms
- 06 Nausea, stomachache
- 07 Fever
- 08 Earache
- 09 Sore throat
- 10 Chest pain
- 96 Other, What other symptoms did you experience?
- 97 I did not experience any symptoms on [PROGRAMMER NOTE: INSERT DATE].

**BASE: HAVE EXPERIENCED SYMPTOMS**

**Q18.1** How long your [PROGRAMMER NOTE: INSERT RESPONSE FROM Q17] last?

- 1 All day
- 2 Most of the day
- 3 Some of the day
- 4 A short time

**BASE: HAVE EXPERIENCED SYMPTOMS**

**Q18.2** How would you characterize your [PROGRAMMER NOTE: INSERT RESPONSE FROM Q17]?

- 1 Mild
- 2 Moderate
- 3 Severe

**BASE: ALL QUALIFIED RESPONDENTS**

**Q19** Did you take any medication on [PROGRAMMER NOTE: INSERT DATE]? Please include prescription and over the counter medicines.

- 1 Yes
- 2 No

**BASE: TOOK MEDICATION**

**Q20** Did you take any medication that you do not usually take every day or did you take a higher dose of a medication you usually take?

- 1. Yes
- 2. No

**Q21** What medications did you take? *<I>Please enter one medication per box.</I>*

[TEXT BOX]  
[TEXT BOX]  
[TEXT BOX]  
[TEXT BOX]  
[TEXT BOX]

**BASE: ALL QUALIFIED RESPONDENTS**

**Q22** Did you have your windows open between 7 a.m. and 8 p.m. on [PROGRAMMER NOTE: INSERT DATE]?

- 1 Yes
- 2 No
- 8 Not sure

**BASE: HAD WINDOWS OPEN**

**Q22.1** For how long between 7 a.m. and 8 p.m. did you have your windows open?

<b>Q19.11</b>	<b>Q19.12</b>
Hours	Minutes
[Range 0-13]	[Range 0-59]
_ _	_ _

Thank you for completing this survey. We appreciate your time and effort.

[if appropriate] You will be asked to fill out more diary surveys for the next (1/2/3) days. It is very important for this research study that we get more than 1 diary from each person and ideally that we get all 7 diaries from each person. Don't forget that you can earn \*\*\*\* for completing all 7 diaries.

### C3. Debriefing Survey

1. When you think about air pollution, do you consider any of the following air pollution?
  - i. pollen from plants
    1. yes
    2. no
    3. don't know
  - ii. smoke from a wood fire
    1. yes
    2. no
    3. don't know
  - iii. dust from a construction site or other open area
    1. YES
    2. NO
    3. don't know
  - iv. smoke from factories
    1. Yes
    2. No
    3. Don't know
  - v. exhaust from cars and trucks
    1. yes
    2. no
    3. don't know

In this survey, when we say air pollution we are not talking about pollen.

2. Overall, how would you rate the level of air quality in [name of metro area]? Would you say it is excellent, good, fair, poor or very poor?
  - i. excellent [*skip to Q5*]
  - ii. good
  - iii. fair
  - iv. poor
  - v. very poor

3. Please rate the level of air quality in [insert name of metro area] during each season. [*if all excellent, skip to Q5*]

	Excellent	good	fair	poor	Very poor
Winter					
Spring					

Summer					
Fall					

4. In some cities, air quality may be different in different parts of the city. Do you think the air quality in the neighborhood where you **live** is better, worse or about the same as the rest of the [name of city]?
  - i.* Better
  - ii.* Worse
  - iii.* About the same
  - iv.* Don't know
5. Have you ever lived somewhere else that had episodes of high air pollution?
  - i.* yes
  - ii.* no
  - iii.* don't know
6. In your opinion, can air pollution have an impact on a person's life or the quality of their life?
  - i.* Air pollution can have a big impact
  - ii.* Air pollution can have a moderate impact
  - iii.* Air pollution can have a small impact
  - iv.* Air pollution has no impact
  - v.* Don't Know

**Ask Q7 only if they think air quality in their city is good or less in Q2 and 3 or lived somewhere that had air pollution (Q6)**

7. What about your life -- would you say air pollution currently has a big impact, a moderate impact, a small impact or no impact on your life and the quality of your life?
  - i.* Air pollution has a big impact
  - ii.* Air pollution has a moderate impact
  - iii.* Air pollution has a small impact
  - iv.* Air pollution does not affect the quality of my day-to-day life at all
  - v.* Don't Know

**Ask everyone**

8. Do you think people can experience symptoms or other health problems due to air pollution? The health problems could be short term or long term. Remember we are talking about air pollution, not pollen.
  - i.* Yes
  - ii.* No Don't Know

9. Has a doctor, nurse, or other health professional ever told you to reduce your outdoor activity level when the air quality is bad?
- i.** Yes
  - ii.** No[*skip to Q13*]
  - iii.** Don't know

**Ask Q10-12 only if think air pollution can impact health**

10. Have you ever experienced any symptoms or developed any health problems that you think were related to air pollution? Please think about all the places you have lived when you answer this question.
- i.** Yes
  - ii.** No [*skip to Q12*]
  - iii.** Don't know

11. Some people are more likely to experience health problems related to air pollution than others. Do you consider yourself to be more likely than the average person your age to experience health problems related to air pollution?
- i.** Yes
  - ii.** No
  - iii.** Don't know

12. Thinking about the other people in your household, is there anyone in your household who is more likely than the average person their age to experience health problems related to air pollution?
- i.** Yes
  - ii.** No
  - iii.** Don't know

**Ask Q13 to 16 only if they think air quality in their city is good or less in Q2 and 3 or lived somewhere that had air pollution (Q6) and think air pollution has some impact on day to day life (Q7)**

13. Sometimes people make big changes in their life because of air pollution. Has air pollution ever been an important factor in your decision about what city to live in?
- i.** Yes
  - ii.** No
  - iii.** I don't know

14. Has air pollution ever been an important factor in your decision about which neighborhood within the city to live in?
- i.** Yes
  - ii.** No
  - iii.** I don't know

15. Has air pollution ever been an important factor in your decision about what job to take?

- i.** Yes
- ii.** No
- iii.** I don't know

**16.** Has air pollution ever been an important factor in your decisions about your daily schedule or things you do during the day? Examples might be the time of day you exercise, how long you exercise, how you commute, when you commute, or what activities to participate in.

- i.** Yes
- ii.** No
- iii.** I don't know

**Ask everyone**

**17.** Do you think there are actions that people can take to protect themselves from exposure to air pollution?

- i.** Yes
- ii.** No [*skip to Q19*]
- iii.** Don't know

**18.** What actions can people take to avoid being exposed to air pollution or to reduce the effects of being exposed? ***Please list up to 3 actions.***

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**19.** Here is a list of strategies that have been suggested if people want to avoid being exposed to air pollution. In your opinion, how effective would the strategy be in reducing someone's exposure to air pollution or reducing the impact air pollution had on the individual?

	Very Effective	Somewhat Effective	Not at all effective	No opinion
Spend less time outdoors				
Use the air conditioner				
Close the windows				
Engage in less strenuous activities outdoors				
Take medication				

Wear a face mask				

**20.** Now we would like you to think about the things a person can do to reduce air pollution. Do you think there are actions that people can take to reduce their contribution to air pollution?

- i.** Yes
- ii.** No [*skip to Q22*]
- iii.** Don't know

**21.** What actions can people take to reduce air pollution? Please list up to 3 actions.

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**22.** Here is a list of strategies that have been suggested if people want to reduce the amount of pollution in their city. In your opinion, how effective would the strategy be in reducing the amount of air pollution?

	Very Effective	Somewhat Effective	Not at all effective	No opinion
Drive less, carpool or postpone errands				
Use public transportation				
Don't burn wood in the fireplace or wood stove				
Don't burn trash or brush				
Drive a hybrid car or a car that gets good gas mileage				
Postpone refueling their cars until after sundown				
Postpone using gas-powered machines or tools until after sundown				
Reduce electricity use				
Get you car's emissions tested regularly				

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**Ask Q23 and 24 only if they think air quality in their city is good or less in Q2 and 3 or lived somewhere that had air pollution (Q6)**

Now let’s go back to actions people can take to avoid exposing themselves to air pollution and talk about things that you, personally, might have done. We recognize that people have very demanding schedules and lifestyles. Making changes to avoid air pollution can be difficult or impossible. For these next few questions, please give us your honest opinions.

**23.** On days when you think air pollution is high, do you [only include somewhat or very effective actions from Q19]

	Always	Sometimes	Rarely	Never
Spend less time outdoors				
Use the air conditioner				
Close the windows				
Engage in less strenuous activities outdoors				
Take medication				
Wear a face mask				

- i. [if never] There are lots of reasons why people do or do not do things. What would say is the main reason that you don’t [name of activity]?
  1. People don’t do things like that where I live.
  2. Air pollution is not a big enough problem here
  3. I can’t [insert activity].
  4. I don’t take any medication
  5. It costs too much
  6. I never thought about doing this
  7. I don’t know



Now let's go back actions people can take to reduce air pollution, and talk about things that you, personally, have done. Again, we realize that some of these actions may be difficult to take. Please give us your honest opinions.

24. On days when you think air pollution is high, do you [only include somewhat or very effective actions from Q22]

	Always	Sometimes	Rarely	Never
Drive less, carpool or postpone errands				
Use public transportation				
Don't burn wood in the fireplace or wood stove				
Don't burn trash or brush				
Drive a hybrid car or a car that gets good gas mileage				
Postpone refueling their cars until after sundown				
Postpone using gas-powered machines or tools until after sundown				
Reduce electricity use				
Get you car's emissions tested regularly				

- i. [if no] Again, there are lots of reasons why people do or do not do things. What would say is the main reason that you don't [name of activity]?
1. I am worried about air pollution, but I don't think this will help reduce air pollution levels.
  2. Air pollution is not a big enough problem here
  3. People don't do things like that where I live
  4. I can't [insert activity].
  5. I don't drive
  6. I don't have any gas powered machines or tools
  7. The reduction in air pollution would be so small it wouldn't matter
  8. It costs too much.
  9. I never thought about doing this.
  10. I don't know

**Ask everyone**

25. During the past year, have you heard, read or seen any news stories, articles or public service announcements about air pollution in your city? We are interested in what you have heard about your city, not national or international air pollution.
- i.** Yes
  - ii.** No [*skip to Q27*]
  - iii.** Don't know [*skip to Q27*]
26. Where have you heard about or seen information about daily air pollution or air pollution warnings
- i.** on TV
  - ii.** on the radio
  - iii.** in a newspaper
  - iv.** on the Internet or a website
  - v.** at your school or office
  - vi.** from a friend, family member, or colleague at work
  - vii.** I receive e-mail notifications when higher levels of air pollution are forecast
  - viii.** Other, where \_\_\_\_\_
  - ix.** Don't know
27. In some cities, the government routinely collects information on air quality that may be distributed by local radio, TV and newspapers to help inform the public about air pollution levels. Have you ever heard or read about air pollution information or warning systems where you live? Please do not include times when you may have heard or read about high pollen counts.
- i.** Yes
  - ii.** No [*skip to Q29*]
  - iii.** Don't know [*skip to Q29*]
28. What is the name an air pollution warning system used in your city?  
\_\_\_\_\_ [*skip to Q31*]
29. These warnings might be called the Air Quality Index, Code Red or Orange Days, Air Pollution Watch, Ozone Action Days, Smog Alert, Spare the Air Day or something similar. Have you ever heard or read about any of these air pollution alerts where you live? Please do not include times when you may have heard or read about high pollen counts.
- i.** Yes
  - ii.** No [*skip to Q36*]
  - iii.** Don't Know

- 30.** Which of the following do you think is the name of the air pollution warning system in your city?
- i.** Air Quality Index
  - ii.** Code Red or Orange Days
  - iii.** Air Quality Action Day
  - iv.** Air Pollution Watch
  - v.** Ozone Action Days
  - vi.** Smog Alert
  - vii.** Spare the Air Day
  - viii.** Enviroflash
  - ix.** Other, name \_\_\_\_\_
  - x.** Don't know
- 31.** Using a scale of 1 to 10, where 1 is least important to you and 10 is vitally important to you, how important are air quality forecast alerts to you and your family's daily life?
- i.** enter response \_\_\_\_\_
- 32.** What is the name of the agency or organization that provides air pollution information for your city?
- i.** The name is \_\_\_\_\_
  - ii.** Don't know
- 33.** Do you think the information in the air quality forecast is
- i.** Very reliable
  - ii.** Somewhat reliable
  - iii.** Not very reliable
  - iv.** Don't know
- 34.** In general, which of the following best describes how often you get information about air pollution during the summer?
- i.** I receive e-mail notifications when bad air quality conditions are forecasted
  - ii.** I look for the air pollution forecast myself every day or almost every day
  - iii.** I look for the air pollution forecast myself some days
  - iv.** I do not check the forecast, if I see or hear that air pollution is forecast to be high, I consider that information when I make plans for the day
  - v.** I rarely or never pay attention to air pollution or air pollution warnings
  - vi.** Other, \_\_\_\_\_
- 35.** Can you tell me what air quality color code was forecast for today [OR Can you tell me if a smog alert/ozone action day/spare the air day was forecast for today – tailor to city]?
- i.** Code Red
  - ii.** Code Orange
  - iii.** Code Yellow
  - iv.** Code Green

- v. Other \_\_\_\_\_
- vi. Don't know

**Ask Q36 and Q37 only if they think there is air pollution in their city or lived somewhere that had air pollution**

**36.** Which of the following pollutants is biggest problem in your city in the summer, if any?  
(randomize order)

- i.** My city does not have an air pollution problem in the summer
- ii.** Ozone
- iii.** Particle pollution
- iv.** Carbon Dioxide
- v.** Nitrogen
- vi.** Sulfur or acid rain
- vii.** Other, \_\_\_\_\_
- viii.** Don't know

**37.** Which of the following pollutants is biggest problem in your city in the winter, if any?

- i.** My city does not have an air quality problem in the winter
- ii.** Ozone
- iii.** Particle pollution
- iv.** Carbon Dioxide
- v.** Nitrogen
- vi.** Sulfur or acid rain
- vii.** Other, \_\_\_\_\_
- viii.** Don't know