



OFFICE OF INSPECTOR GENERAL

*Catalyst for Improving the Environment*

## Evaluation Report

# Survey of Air Quality Information Related to the World Trade Center Collapse

Report No. 2003-P-00014

September 26, 2003



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### **Abbreviations**

EPA	Environmental Protection Agency
HEPA	High Efficiency Particulate Air
NYC	New York City
OIG	Office of Inspector General
OMB	Office of Management and Budget
WTC	World Trade Center

**Cover Photo:** Image from French SPOT satellite, which shows the plume from the World Trade Center site in Lower Manhattan blowing over Brooklyn. Source: image obtained from NASA web site - <http://17fot.gsfc.nasa.gov/NYC.html>



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
WASHINGTON, D.C. 20460

**THE INSPECTOR GENERAL**

September 26, 2003

**MEMORANDUM**

**SUBJECT:** Survey of Air Quality Information  
Related to the World Trade Center Collapse  
Report No. 2003-P-00014

**TO:** Marianne L. Horinko  
Acting Administrator

This memorandum transmits the results of an Office of Inspector General (OIG) survey that gauged the public's perception of air quality information received after the collapse of the World Trade Center (WTC) towers. Data from this survey supplement our earlier report, *EPA's Response to the World Trade Center Collapse: Challenges, Successes, and Areas for Improvement* (Report No. 2003-P-00012), dated August 21, 2003.

EPA communicated air quality information to the public through press releases, interviews with print and television journalists, appearances at public forums, and posting of extensive data on the Agency's public web site. Concerns were raised, however, about government communications in the aftermath of the WTC disaster and the impact these communications had on the actions taken by the public and responders to reduce their exposure to WTC contaminants. More than a year after the WTC disaster, a city-wide study had not been undertaken to gauge the effectiveness of the crisis communication efforts following September 11, 2001. To that end, the OIG conducted a survey of New York City (NYC) residents on a variety of issues related to air quality. Based on the survey's response rate of 11.8 percent, the data presented in this report represent the responses from 1,110 survey respondents, and should not be generalized to the population of NYC.

**Summary of Results**

Overall, the majority of respondents wanted more information regarding outdoor and indoor air quality, wanted this information in a more timely manner, and did not believe the information they received.

The survey results also suggest a disconnect between government statements about air quality and respondents' perceptions of possible health risks from breathing the air in Lower Manhattan. The majority of respondents reported that they thought breathing outdoor and indoor air in Lower

Manhattan in the weeks following the WTC collapse could expose them to short- and long-term health effects.

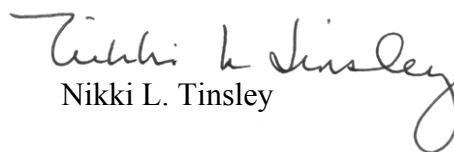
Further, data indicated that contamination from the collapse of the WTC towers spread into the homes of respondents located beyond the perimeter of the zone designated as eligible for the EPA-led testing and cleaning program.

Our data indicated only about 1 out of 10 respondents knew about EPA's "Response to September 11" web site, and even fewer visited the site. The majority of respondents, however, were aware of key WTC-related information, such as EPA's recommendation to have contaminated homes professionally cleaned and the EPA-led testing and cleaning program in eligible areas of Manhattan. Despite this awareness, relatively few respondents with home contamination had their homes tested for asbestos or professionally cleaned.

### **Actions Already Being Taken**

EPA has initiated several actions to improve its risk communications in the aftermath of the WTC collapse. Also, our prior report included many recommendations for improving risk communications that the Agency has agreed to implement. As such, we have not made additional recommendations in this report based on the survey.

We appreciate the efforts of EPA officials and staff in working with us to develop this survey. If you or your staff have any questions regarding this report, please contact me at (202) 566-0847 or Kwai Chan, Assistant Inspector General for Program Evaluation, at (202) 566-0827.

  
Nikki L. Tinsley

Attachment

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# Introduction

## Purpose

This survey was undertaken in order to obtain information to satisfy objective 4 of our prior World Trade Center (WTC) report (No. 2003-P-00012). Objective 4 sought to measure the extent to which government communications regarding air quality and associated health risks were:

- C Rated satisfactory by the public;
- C Understood and interpreted by the public; and
- C Effective in getting people to take desired precautions or actions.

After the September 11, 2001, terrorist attacks on the WTC towers, government communications were criticized for not providing timely and accurate air quality information to the public. In preparing the prior report, the Office of Inspector General (OIG) found that, as of September 2002, a year after the disaster, no city-wide study of the effectiveness of government communications had been undertaken.<sup>1</sup> As such, the OIG conducted a survey of residents in all five boroughs of New York City (NYC) to address the above objective.

## Background

A critical component in helping the public to minimize its exposure to potential health hazards resulting from a terrorist attack or other disaster involves effectively communicating risk information. Armed with such information, the public can take positive steps to mitigate potential exposures as well as take other precautions to avoid unnecessary health risks.

Following the collapse of the WTC towers, EPA announced its intention to keep the public and rescue workers informed about safety and health risks related to air quality. The Agency's first WTC-related press release, on September 13, 2001, noted that EPA:

*... will work with the appropriate officials to ensure that rescue workers, cleanup crews and the general public are properly informed about appropriate steps that should be taken to ensure proper handling, transportation and disposal of potentially contaminated debris or materials.*

EPA communicated air quality information to the public through press releases, appearances at public forums, media interviews, and its public web site. In the days and months following the

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<sup>1</sup> From October 25 through November 1, 2001, the NYC Department of Health conducted a door-to-door survey of residents in Lower Manhattan's Battery Park City, Southbridge Towers, and Independence Plaza. "A Community Needs Assessment of Lower Manhattan Following the World Trade Center Attack," December 2001.

attacks, EPA's overriding message was that the public did not need to be concerned about airborne contaminants. This reassurance appeared to apply to both indoor and outdoor air. EPA's press releases generally did not discuss potential adverse short-term health effects or the potential risks to sensitive populations, although Agency spokespersons orally discussed these issues.

With respect to actions people should take to minimize their exposure to health risks, EPA's press releases advised residents and business owners that they could clean their own spaces if they used "appropriate" vacuum filters and followed "recommended" and "proper" procedures, but the releases did not define these terms. However, Agency spokespersons, including EPA's Administrator, recommended in televised interviews<sup>2</sup> and other public forums that residents should obtain professional cleaning (by professional asbestos contractors) of indoor spaces when dust reached certain levels.

## Scope and Methodology

To obtain information directly from the public about the impact of government communications regarding air quality concerns following the WTC towers' collapse, the OIG developed and mailed out a *Survey of Air Quality Issues After September 11, 2001* (see Appendices A and B). In accordance with the Paperwork Reduction Act, the OIG obtained approval from the Office of Management and Budget (OMB) and solicited public comment regarding the survey through the Federal Register. In addition, former Administrator Christine Todd Whitman reviewed the draft survey questionnaire. Based on her input we included questions about the public's knowledge of EPA's WTC response web site. The survey was pre-tested with selected citizens of NYC prior to its delivery.

The survey requested information from respondents in four areas:

- *Section 1: Satisfaction with outdoor and indoor air quality information received.* Respondents were asked to rate their satisfaction on a scale of "1" (Not at All Satisfied) to "5" (Completely Satisfied).
- *Section 2: Understanding and interpretation of air quality information received.* Questions asked respondents -- in terms of how it was affected by the collapse of the WTC towers -- their perception of air quality in Lower Manhattan in the weeks just after September 11, 2001 and at the time they took the survey in 2003.
- *Section 3: Awareness of WTC-related information and actions taken in response to the collapse.* This section asked respondents if they had taken various actions and/or precautions in response to the dust/debris and if they were aware of certain WTC-related information.

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<sup>2</sup> The earliest instance we could locate was on October 26, 2001, when the EPA Administrator recommended professional cleaning in a televised interview on MSNBC.



- *Section 4: Demographic information.* Voluntary demographic information was requested to detect, assess, and adjust for non-response bias within the sample, and to cross-tabulate variances within sub-populations of interest.

Appendix C provides a detailed description of how we obtained our sample. We began sending out the surveys on March 27, 2003, and accepted responses until July 31. We completed our analysis of the survey responses on September 4, 2003.

Our earlier report, *EPA's Response to the World Trade Center Collapse: Challenges, Successes, and Areas for Improvement* (Report No. 2003-P-00012), dated August 21, 2003, included many recommendations for improving risk communications that the Agency has agreed to implement. As such, this report on the survey is not making any additional recommendations.

Our review was conducted in accordance with *Government Auditing Standards*, issued by the Comptroller General of the United States.

## **Survey Response Rate**

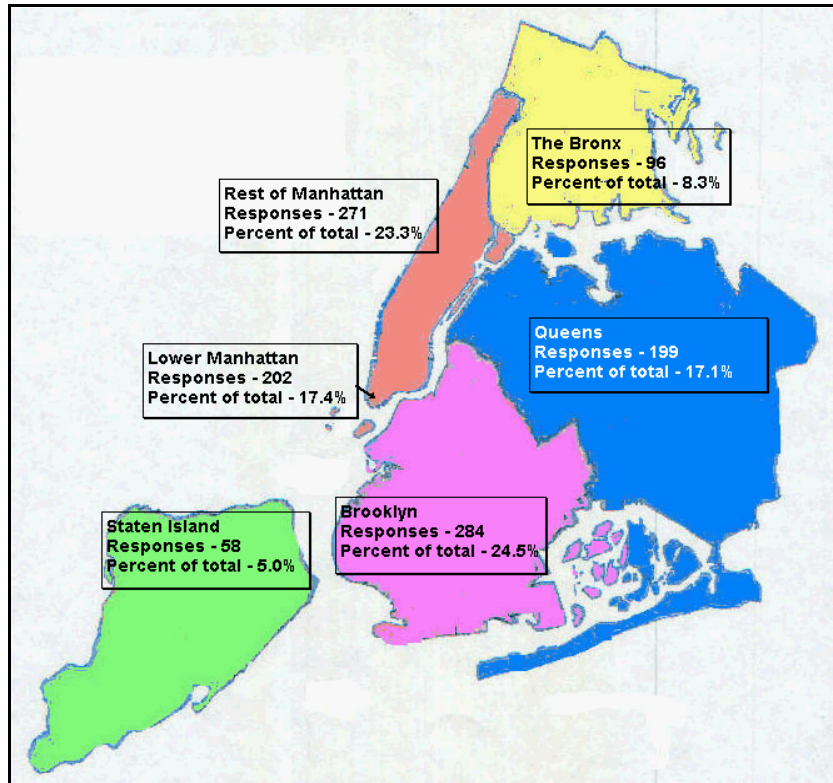
This report is based on surveys received from 1,110 respondents who reported living in NYC as of September 11, 2001. We actually received 1,161 responses, for an overall response rate of 11.8 percent.<sup>3</sup> However, the data analyzed and referred to throughout this report excludes 51 of the 1,161 surveys received because they contained either no zip code or a zip code from outside of NYC. Based on the response rate and a lack of information regarding certain characteristics of non-respondents, we determined that, for purposes of this report, results from the data presented would be limited only to the pool of survey respondents who reported living in NYC as of September 11, 2001, and we did not draw any inferences about the overall population of the five boroughs of NYC.

Figure 1 depicts the distribution of respondents across NYC based on where respondents reported living as of September 11, 2001. For purposes of drawing a sample for the survey and to be able to analyze data by zip code, OIG defined Lower Manhattan as the area south of Broome and E. Houston Streets.

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<sup>3</sup> Response rate was calculated by dividing the number of surveys OIG received by the number of surveys delivered. Out of 10,000 addresses, 191 were deemed insufficient and/or undeliverable by the U.S. Postal Service and did not get delivered. Thus, the response rate = 1,161 / 9,809, or 11.8 percent.

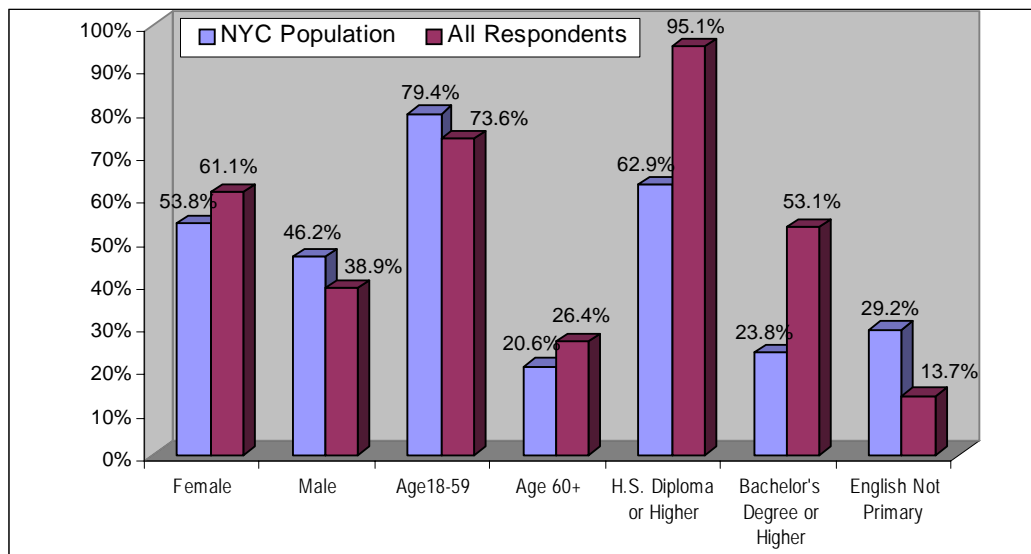
**Figure 1: Distribution of Respondents by Where They Lived on September 11, 2001\***



\* Respondents were asked their five-digit zip code as of September 11, 2001, and the number of responses by borough is based on the respondent's address at that time. An additional 51 surveys contained either no zip code or a zip code from outside of NYC.

Figure 2 shows how the survey respondents compare to the population of NYC in terms of selected demographic characteristics, including sex, age, education level, and language.

**Figure 2: Demographic Characteristics of OIG Survey Respondents Compared to Characteristics of NYC Population\***



\* Source: 2000 Census

Figure 2 indicates that based on the 2000 Census, females are over represented among respondents (61.1 percent versus 53.8 percent in the NYC population). In terms of age, the respondents are somewhat older than the actual population of NYC, with under representation of 18-59 year-olds and over representation of people aged 60 years or more. Overall, respondents have a much higher level of education than the NYC population, with 95.1 percent having at least a high school diploma compared to 62.9 percent in the actual population; and with 53.1 percent having a bachelor's degree or higher compared to 23.8 percent in the actual population. People who do not speak English as their primary language are under represented among respondents at 13.7 percent compared to 29.2 percent in the population.



# Survey Results

The majority of survey respondents indicated they were not satisfied with information they received regarding outdoor and indoor air quality. Despite reassuring statements by EPA that the air was “safe” to breathe, the majority of respondents thought breathing the outdoor and indoor air in Lower Manhattan could expose them to short- and long-term health risks. Most reports of home contamination came from respondents from Manhattan and Brooklyn. The majority of respondents knew that contaminated homes should be professionally cleaned, but few had their residence tested for asbestos and few who reported home contamination in Manhattan and Brooklyn had their home professionally cleaned. Furthermore, few respondents knew about or visited EPA’s “Response to September 11” web site. Details follow.

## Section 1: Respondents’ Satisfaction With Information

Section 1 of the survey asked respondents to rate their satisfaction with various characteristics of the information they received about outdoor and indoor air quality by circling a number on a scale of 1 to 5, with “1” equaling *Not at All Satisfied* and “5” equaling *Completely Satisfied*. In our analysis, ratings of “1” and “2” were considered dissatisfied, while ratings of “4” and “5” were considered satisfied. The scale’s midpoint is 3.0. Table 1 displays satisfaction ratings from all respondents.

**Majority of respondents not satisfied with information on air quality**

**Table 1: Respondents’ Satisfaction With Information Received About Outdoor and Indoor Air Quality in the Weeks Just After Collapse of WTC Towers**

Scale: 1 = Not At All Satisfied 5 = Completely Satisfied		1 to 2 (%)	3 (%)	4 to 5 (%)	Mean Rating	Total (no.)
<b>Outdoor</b>	Amount	59.4	24.0	16.7	2.3	1,051
	Understandability	47.7	25.9	26.3	2.6	1,018
	Timeliness	57.1	23.3	19.6	2.4	1,009
	Believability	61.2	19.8	19.0	2.3	1,011
	Overall	57.3	24.5	18.2	2.3	1,019
<b>Indoor</b>	Amount	66.1	20.1	13.8	2.1	1,029
	Understandability	52.4	25.1	22.6	2.5	978
	Timeliness	62.3	21.4	16.3	2.2	974
	Believability	63.0	19.4	17.6	2.2	974
	Overall	63.5	21.3	15.2	2.2	986

Table 1 indicates that more than half of all respondents were dissatisfied with the amount, timeliness and believability of the information they received in the weeks just after September 11, 2001. Approximately 6 out of every 10 respondents gave a dissatisfactory overall rating for the information they received. Respondents' ratings of the understandability of the information they received for outdoor air quality was slightly higher, but the average rating of 2.6 was still below the scale midpoint of 3.0.

Respondents were also asked to rate their satisfaction with health-related information they received in the weeks following the collapse. Satisfaction ratings were calculated for all respondents as well as for those respondents who reported working within the perimeter of Ground Zero between September 11, 2001, and December 31, 2001, and for those respondents who reported living in Lower Manhattan as of September 11, 2001. Table 2 depicts how all respondents, Ground Zero workers, and respondents from Lower Manhattan rated the health-related information they received.

**Table 2: Satisfaction With Information Received About Health Risks in Weeks After the Collapse of WTC Towers for All Respondents, Ground Zero Workers, and Residents of Lower Manhattan**

Scale: 1 = Not At All Satisfied 5 = Completely Satisfied		1 or 2 (%)	3 (%)	4 or 5 (%)	Mean Rating	Total (no.)
Explanation of possible health threats related to air quality	All Respondents	64.3	17.5	18.3	2.2	1,013
	Ground Zero Workers	71.3	14.4	14.4	2.0	188
	Lower Manhattan	68.0	15.5	16.5	2.1	194
Explanation of how to minimize exposure to potential health risks related to air quality	All Respondents	65.3	17.0	17.7	2.2	1,018
	Ground Zero Workers	71.0	17.2	11.8	2.0	186
	Lower Manhattan	69.1	13.1	17.8	2.1	191
Explanation of health problems one may experience due to air quality	All Respondents	65.0	18.1	17.0	2.2	1,014
	Ground Zero Workers	70.6	16.0	13.4	2.0	187
	Lower Manhattan	69.1	16.0	15.0	2.0	194
Explanation of what to do if one experienced a health problem related to air quality	All Respondents	64.6	18.2	17.2	2.2	1,010
	Ground Zero Workers	68.7	17.3	14.1	2.0	185
	Lower Manhattan	69.3	14.6	16.2	2.1	192
Overall rating of information received about health risks related to air quality	All Respondents	64.0	19.9	16.2	2.2	1,027
	Ground Zero Workers	72.3	16.2	11.5	1.9	191
	Lower Manhattan	71.4	14.6	14.1	2.1	192

More than 6 out of every 10 respondents reported dissatisfaction with (a) explanations of possible health threats related to air quality; (b) how to minimize their exposure to health risks related to air quality; (c) health problems they might experience due to air quality; and (d) what to do if they experienced a health problem related to air quality. The mean rating among all respondents for *overall* satisfaction with health-related information received in the weeks following the collapse was 2.2.

Among Ground Zero workers and those living in Lower Manhattan during September 2001 who responded, more than 7 out of 10 were dissatisfied with the overall quality of health-related information they received. For both of these groups, over two-thirds reported dissatisfaction with explanations across all categories of health-related information, resulting in a mean rating for overall satisfaction of 1.9 among Ground Zero workers and 2.1 for residents of Lower Manhattan.

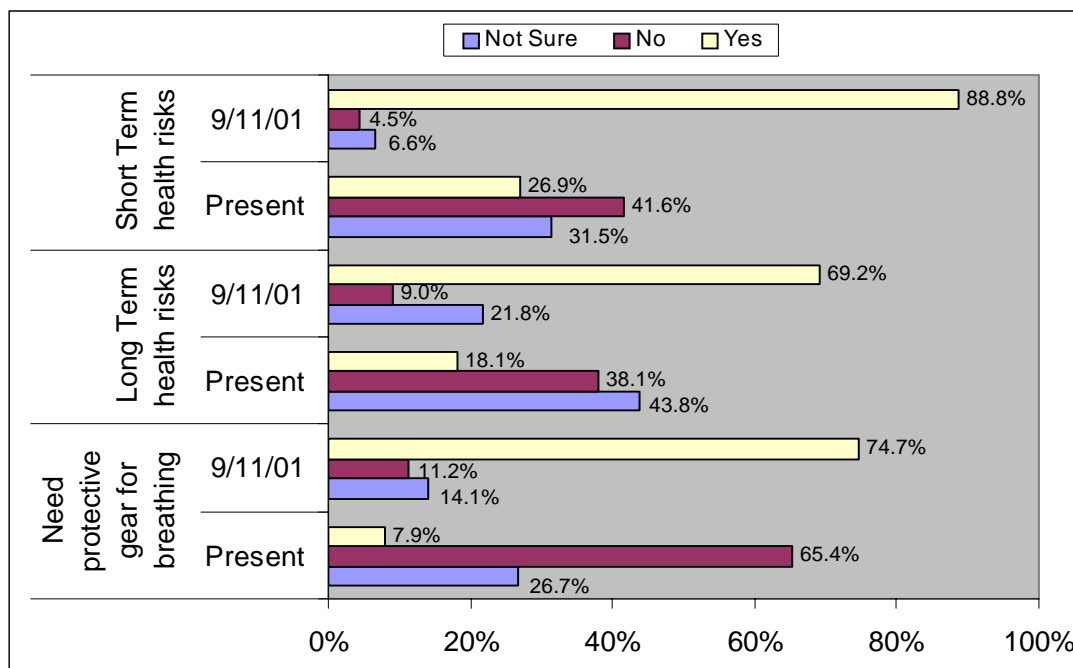
## Section 2: Respondents' Perceptions of Air Quality

Section 2 of the survey asked residents their thoughts about the health risks associated with air quality in Lower Manhattan in the weeks immediately following the collapse of the WTC, as well as their thoughts at the time they completed the survey approximately 18 months later.

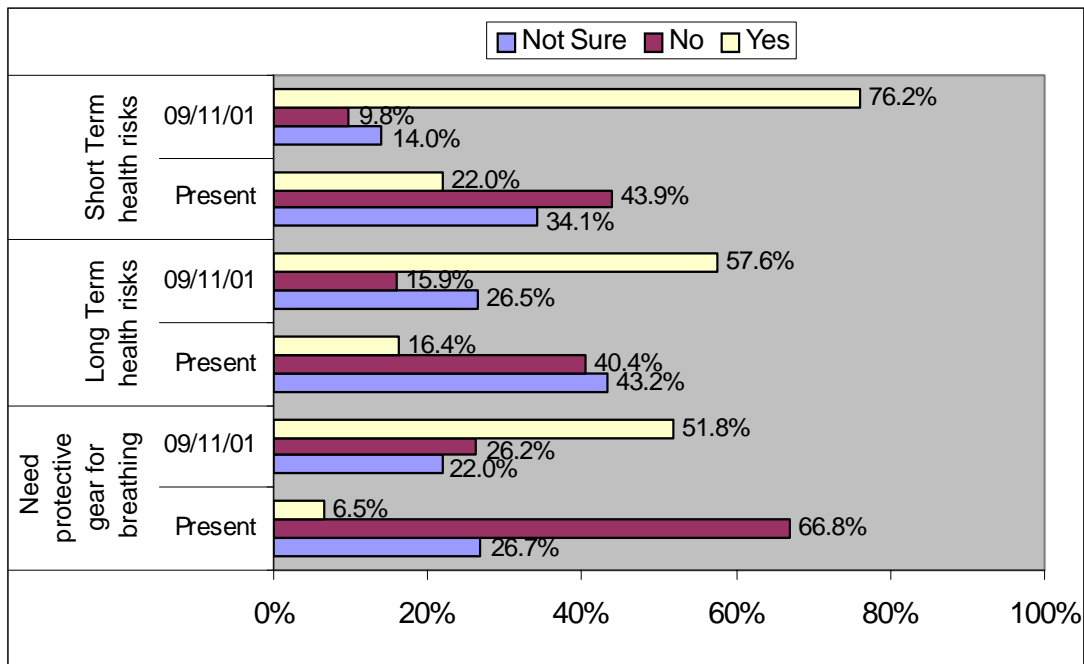
**Majority of respondents thought breathing outdoor and indoor air in Lower Manhattan in weeks after collapse of WTC towers could expose them to short- and long-term risks**

Figures 3a and 3b illustrate respondents' perceptions of outdoor and indoor air quality, respectively, in terms of how it was affected by the collapse of the WTC towers in the weeks just after the collapse (shown in the figure as "9/11/01") and at the time they completed the survey in May-July 2003 (shown as "Present").

**Figure 3a: Respondents' Perceptions of Exposure to Health Risks Associated with Outdoor Air Quality in Lower Manhattan in Weeks After Collapse and at Time of 2003 Survey**



**Figure 3b: Respondents' Perceptions of Exposure to Health Risks Associated with Indoor Air Quality in Lower Manhattan in Weeks After Collapse and at Time of 2003 Survey**



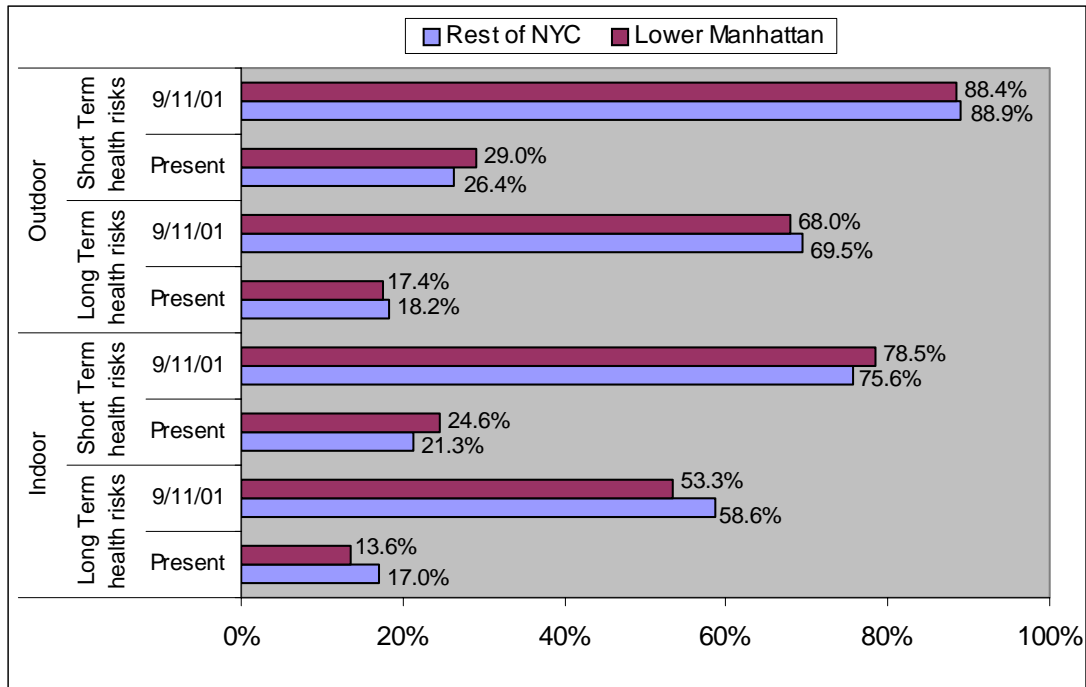
Figures 3a and 3b show that in the weeks just after the collapse, more respondents were concerned about short-term health effects than they were about long-term for both outdoor and indoor air. Almost 9 out of every 10 respondents said they were concerned about the short-term health effects associated with outdoor air whereas approximately 7 of every 10 respondents were concerned about long-term health risks. For indoor air, the results were similar; more than 3 out of every 4 respondents were concerned about the short-term health effects while more than half of the respondents were concerned about long-term health effects.

Based on the survey results in Figures 3a and 3b, it appears that respondents' concerns about the health risks associated with air quality subsided over time. Results further indicate that concerns about health risks did not simply shift from "yes" to "no." Instead, there was an increase in the number of respondents who became unsure about outdoor and indoor health risks from September 2001 to 2003. During that same time, respondents' opinions about whether or not they should wear protective gear when breathing outdoor and indoor air in Lower Manhattan mainly changed from "yes" to "no," and uncertainty over this issue remained relatively stable.

Figure 4 presents the perceptions of health risks from exposure to outdoor and indoor air in Lower Manhattan in the weeks following the collapse among respondents who lived in Lower Manhattan on September 11 and among respondents who lived in other parts of NYC at that time (called "Rest of NYC" in the figure). In the figure, the results labeled "9/11/01" represent respondents' recollections of their perceptions of air quality in the weeks following September 11, 2001, while the results labeled "Present" are respondents' perceptions of air quality at the time they completed the survey in May-July 2003.



**Figure 4: Proportion of Respondents Perceiving Health Risks Associated with Outdoor and Indoor Air Quality in Lower Manhattan in Weeks Just After Collapse of WTC Towers and at Time of Survey in 2003 -- Lower Manhattan Residents and the Rest of NYC**



### Section 3: Awareness of WTC-Related Information and Actions Taken by Respondents

Section 3 of the survey asked respondents if their homes had been contaminated with dust and/or debris due to the collapse of the WTC towers. This section also asked respondents whether they knew about certain WTC-related information and whether they had taken certain actions in response to the dust and debris created by the collapse of the WTC towers. Respondents were asked about some specific EPA communications, such as whether they: (a) knew about EPA’s “Response to September 11” web site, (b) visited the web site, (c) knew that homes contaminated with dust and/or debris should be professionally cleaned, (d) knew about the EPA-led program to test and clean eligible residences in Lower Manhattan, and (e) had their residence professionally cleaned.

***Most reports of home contamination came from respondents in Lower Manhattan, the rest of Manhattan, and Brooklyn; EPA web site not widely used; and homes often cleaned without professional assistance***

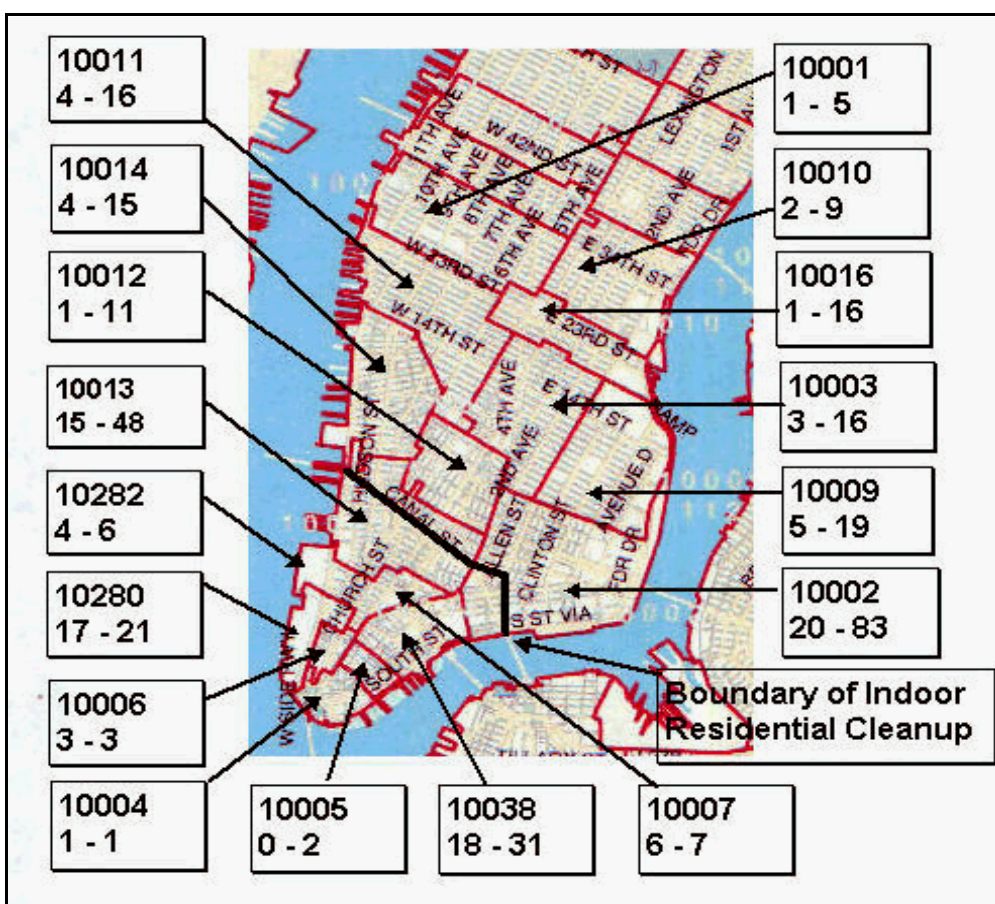
Data indicate that contamination from the collapse of the WTC towers spread into the homes of respondents located beyond the zone designated as eligible for the EPA-led testing and cleaning program. The Indoor Residential Cleaning Program was available to residences located south and west of Canal, Allen, and Pike streets, river to river. Specifically:

- Of the 180 residents of Lower Manhattan who responded, 46.7 percent (84 respondents) reported that their residence had been contaminated with dust and/or debris due to the collapse.

- Of the 204 residents of Brooklyn who responded, 23.5 percent (48 respondents) reported that their residence had been contaminated with dust and/or debris due to the collapse.
- Of the 213 respondents who lived in the rest of Manhattan, 11.3 percent (24 respondents) reported that their residence had been contaminated with dust and/or debris due to the collapse.<sup>4</sup>

Figures 5a and 5b show that, among respondents, the most incidents of contamination were reported by those in Lower Manhattan, followed by Brooklyn and the rest of Manhattan. In the figure below, the zip code appears on the first line of each box inset. On the second line, the number of respondents answering “Yes” to contamination is followed by the number of total respondents from the zip code.

**Figure 5a: Reports of Contamination from Zip Codes in Manhattan\***

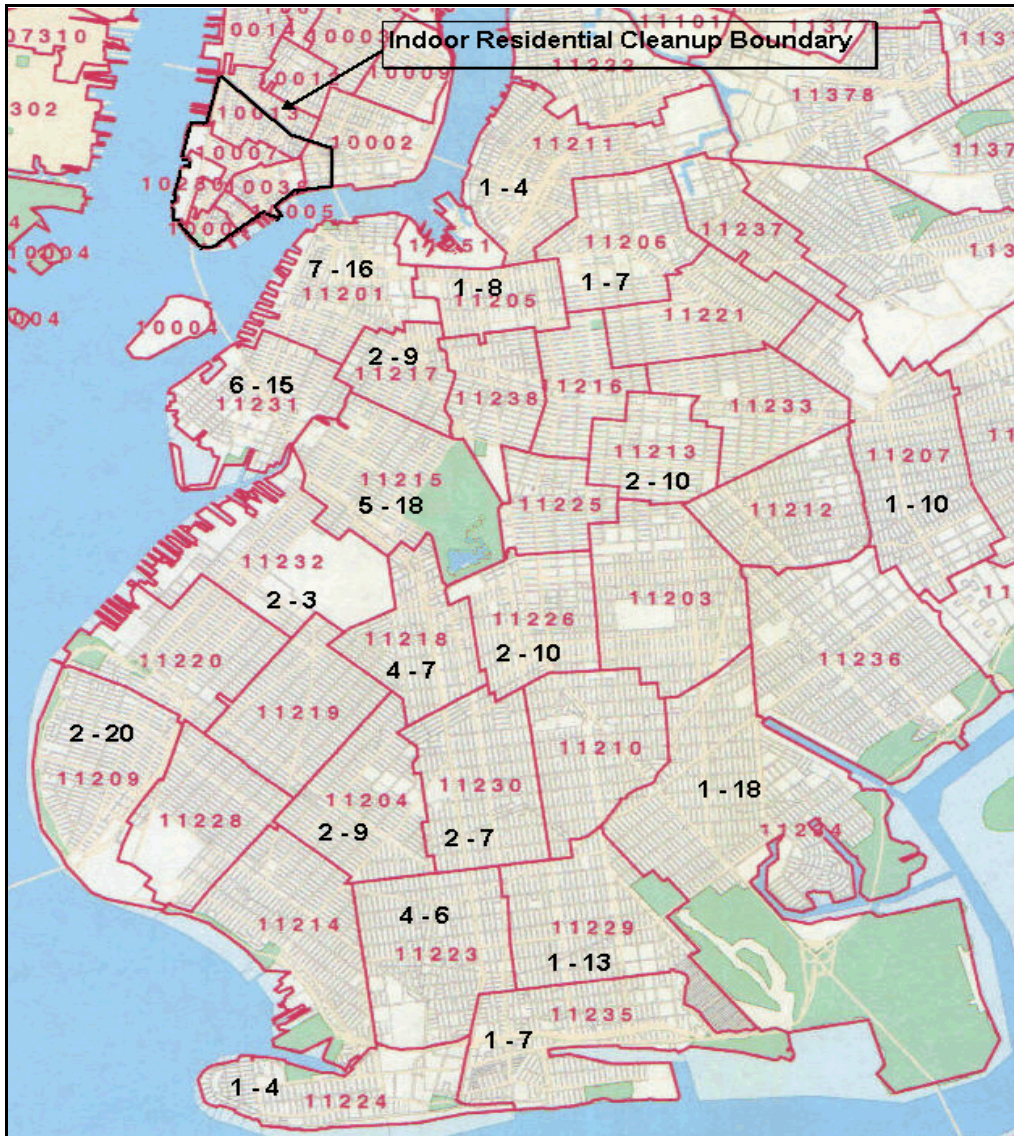


Source: Created using ESRI by the University Neighborhood Housing Program, [www.unhp.org](http://www.unhp.org)

\*Contamination was also reported in two Manhattan zip codes north of the area shown on this map (2 out of 22 respondents from zip code 10025, and 1 out of 9 respondents from zip code 10027). With the exception of zip code 10005, the map only shows results for those zip codes in Lower Manhattan where at least one respondent reported contamination. Ground Zero is located within zip code 10280 in the map above.

<sup>4</sup> The number of “yes” responses from the three remaining areas was as follows: Bronx - 1 out of 58 (1.7 percent); Queens - 5 out of 131 (3.82 percent); and Staten Island - 2 out of 44 (4.55 percent)

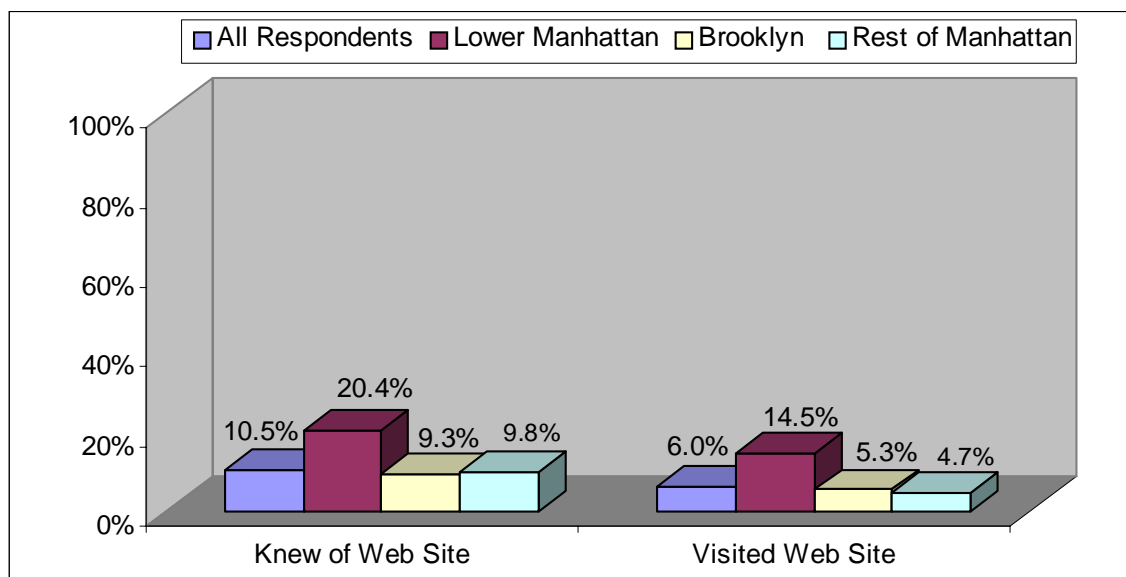
Figure 5b: Reports of Contamination From Zip Codes in Brooklyn\*



## **Few Respondents Knew About or Visited EPA’s “Response to September 11” Web Site**

According to EPA officials, one of the primary means of communicating WTC air quality-related information to the public after September 11 was through EPA’s “Response to September 11” web site. Figure 6 illustrates respondents’ awareness and use of the web site among all respondents, respondents from Lower Manhattan, Brooklyn, and the rest of Manhattan.

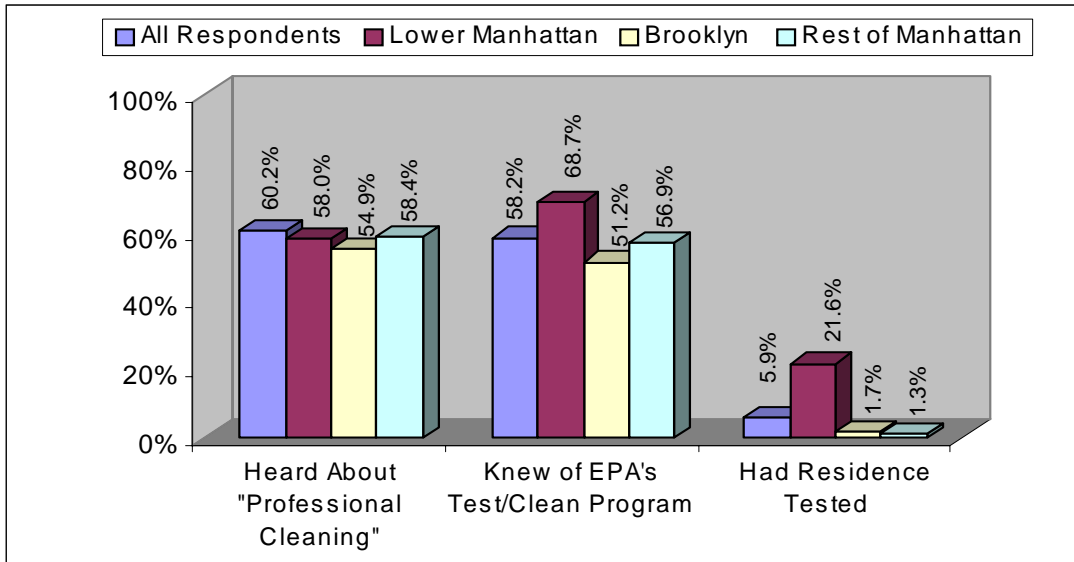
**Figure 6: Proportion of Respondents Aware of EPA’s Web Site - - All Respondents and Respondents From Lower Manhattan, Brooklyn, and Rest of Manhattan**



Data in Figure 6 indicate that approximately 1 out of 10 of all respondents and respondents from Brooklyn and the rest of Manhattan knew about EPA’s web site, but fewer visited the site. Among respondents from Lower Manhattan, approximately 2 out of 10 respondents knew of the web site and about 70 percent of those who knew of the web site visited it.

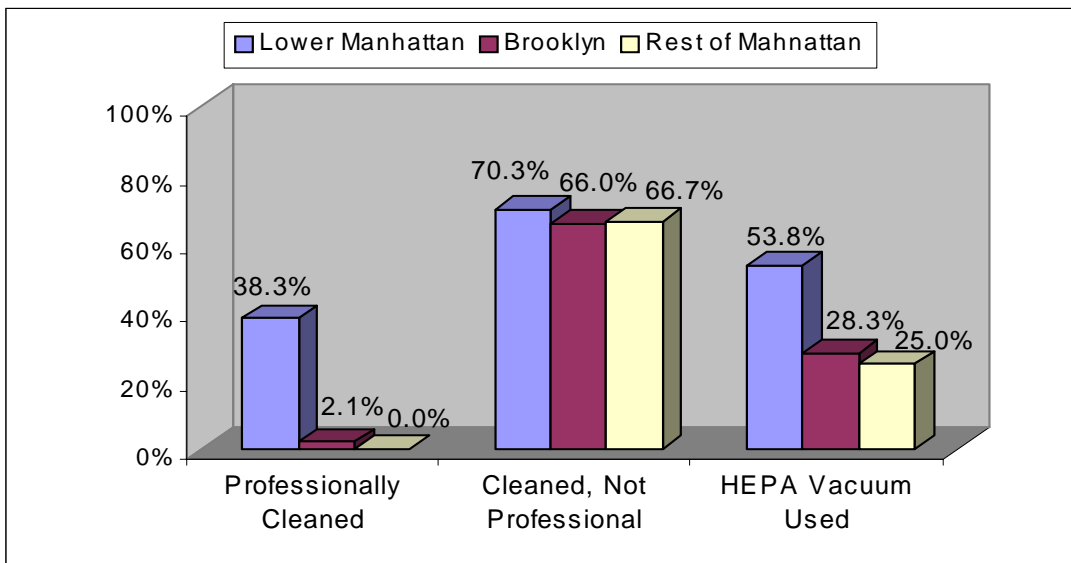
Figure 7 indicates that, among all respondents, approximately 6 out of 10 heard the message in the weeks just after the collapse that homes contaminated with dust and/or debris should be professionally cleaned for asbestos. More than half (58 percent) knew that some residents of Lower Manhattan were eligible to have EPA test and clean their homes. About 6 out of every 100 respondents had their residence tested for asbestos. Among respondents from Lower Manhattan, approximately 20 out of every 100 had their residence tested. Among respondents from the rest of Manhattan and Brooklyn, less than 2 out of every 100 respondents had their residence tested.

**Figure 7: Proportion of All Respondents, Respondents from Lower Manhattan, Brooklyn, and Rest of Manhattan Who Were Aware of the Need for Professional Cleaning and of the EPA-Led Testing and Cleaning Program, and Had Their Residences Tested for Asbestos**



Respondents who reported that their home was contaminated with dust and/or debris due to the collapse (see Appendix B, survey question 3.e.) were further asked whether or not they had taken certain cleaning precautions, including using professional assistance to clean their home, cleaning without professional assistance, or using a HEPA (High Efficiency Particulate Air) vacuum to clean their home. Figure 8 depicts these cleaning activities among respondents from Lower Manhattan, Brooklyn, and the rest of Manhattan who reported home contamination.

**Figure 8: Proportion of Respondents in Contaminated Homes Who Had Their Home Professionally Cleaned, Cleaned Without Professional Assistance, or Used HEPA Vacuum\***



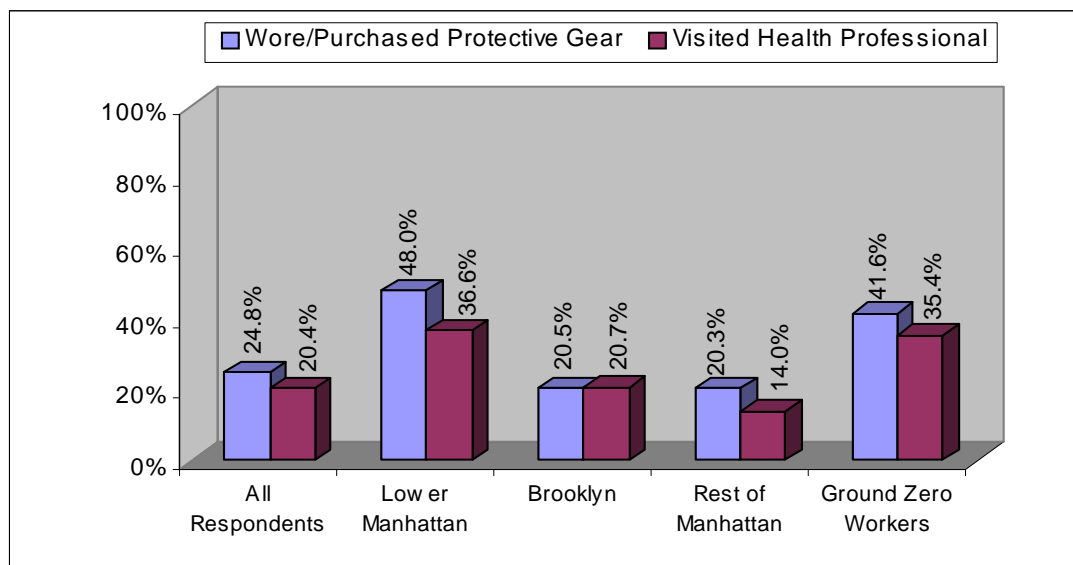
\*Some respondents reported that their residence was cleaned both with and without professional assistance.

Data in Figure 8 indicate that about 4 in 10 of the Lower Manhattan respondents who reported home contamination cleaned their homes with professional assistance. Approximately 2 percent from Brooklyn did so, and no respondents from the rest of Manhattan who reported home contamination used professional assistance to clean their home. At least two-thirds of respondents from each of the three areas indicated they had cleaned their residence but did so without the use of professional assistance.

Section 3 also asked respondents whether they took certain health-related actions in response to the dust and debris created by the collapse of the WTC towers, such as whether they wore or purchased protective breathing gear they normally would not have, or whether they visited a health professional for symptoms they believed were related to air quality after the collapse.

Figure 9 depicts the actions of all respondents, as well as the actions taken by respondents from Lower Manhattan, Brooklyn, and the rest of Manhattan. Figure 9 also shows the health-related actions taken by respondents who worked within the perimeter of Ground Zero between September 11, 2001, and December 31, 2001.

**Figure 9: Proportion of Respondents Who Wore or Purchased Protective Gear or Visited a Health Professional**



Among all respondents, approximately 1 out of 4 reported wearing or purchasing protective breathing gear, such as a mask. Approximately 1 out of 5 of all respondents visited a health professional due to health problems they believed were due to air quality following the collapse. Among respondents from Lower Manhattan, approximately 1 out of 2 reported wearing or purchasing protective breathing gear in response to dust and/or debris created by the collapse, and approximately 4 out of 10 visited a health professional. Among Ground Zero workers, approximately 4 out of 10 wore or purchased protective breathing gear and about 1 out of 3 visited a health professional for problems they believed were related to air quality following the collapse.

## Limitations of Survey Results

Most important among the limitations associated with the OIG's survey is the low response rate – less than 12 percent. The low response rate limits our ability to generalize survey results to the population of NYC with sufficient confidence. Reasons may vary as to why potential respondents and/or certain groups of demographically similar people opted not to complete and return the survey. For some potential respondents, the urgency, and possibly the relevancy, of the matters covered in the survey could have been affected due to the passage of time between the collapse of the WTC towers and when the survey was administered. The first survey forms were distributed more than a year and a half after September 11, 2001. It is possible that one's opinions about air quality information may have weakened or intensified, depending on one's experiences, during that time. Thus, data could be skewed toward the positive or negative extremes.

Another limitation associated with this survey is that some survey questions required respondents to recollect events and experiences that occurred over a year and a half ago from the time they took the survey. The tragic and striking nature of this event and the fact that some cleanup activities were still ongoing in parts of NYC at the time our survey was conducted may mitigate the likelihood of faded memories, but it is also possible that respondents' recollections may have faded or been skewed over time.

Further, although we asked that the person who most recently celebrated a birthday respond to the survey, because it was a mail survey we cannot be certain that this occurred. Therefore, even though the households were randomly selected, we cannot be sure that respondents from within each household were selected at random as requested in the survey cover letter





## Observations

Data from the survey suggest that the majority of respondents were generally dissatisfied with the amount, timeliness, believability, and overall quality of the information they received in the weeks just after the collapse of the WTC towers for both outdoor and indoor air quality. More respondents reported dissatisfaction when asked specifically about health-related information, suggesting that potential health risks related to air quality was an area of particular concern.

Despite reassuring statements about air quality following the collapse of the WTC towers, the majority of respondents living in Lower Manhattan and the rest of NYC believed that there were health risks associated with breathing outdoor and indoor air in Lower Manhattan. In the weeks following the collapse, more than 3 out of 4 respondents thought that there were short-term health risks associated with breathing outdoor and indoor air in Lower Manhattan, and more than half of respondents thought that breathing outdoor and indoor air in Lower Manhattan could expose them to long-term health risks. In the period just after the collapse until 2003, data indicate that immediate concerns over air quality in Lower Manhattan subsided; however, over time, substantially more respondents became unsure about whether or not breathing outdoor and indoor air in Lower Manhattan could expose them to health risks.

The responses suggest that one of EPA's major sources of information, its "Response to September 11" web site, was largely unused. Only about 10 percent of the respondents knew about EPA's web site, and even fewer actually visited the site. Approximately 6 out of 10 respondents had heard that residences contaminated with dust and debris should be professionally cleaned for asbestos, and knew about the EPA-led program to test and clean for asbestos in certain residences in Lower Manhattan. However, despite this awareness, less than 6 percent of all respondents had their residence tested for asbestos.

Most reports of residential contamination came from respondents in Lower Manhattan, Brooklyn, and the rest of Manhattan. Among respondents from these areas who reported home contamination, relatively few reported having their residence professionally cleaned.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, DC 20460

THE INSPECTOR GENERAL

**February 28, 2003**

Dear New York City Resident:

It has been over one year since the terrorist attacks on the World Trade Center, yet concerns about New York City's air quality still remain. The Office of Inspector General would like to know your opinion of the air quality information you received following the attacks. By completing and returning the enclosed survey you can help us determine whether the U.S. Environmental Protection Agency (EPA) needs to improve the way it responds to disasters. This survey should take 10 minutes or less to complete.

Please be assured that all responses are confidential. Your name will not be linked to your responses and individual answers will not be revealed. For statistical purposes only, we ask that the survey be completed by someone residing in the household who is 18 years of age or older, and is the person who most recently celebrated a birthday. Following these instructions will ensure that our results are as meaningful as possible.

A pre-addressed, postage paid envelope has been provided for you to return your completed survey. We appreciate your prompt response. If you have any questions about this survey, please call us at 1-800-846-3117.

Thank you in advance for your time and cooperation. In appreciation, we will send all households a postcard providing them with a web address and phone number for accessing the survey results.

You may be interested in knowing more about the Office of Inspector General. We conduct independent reviews of EPA programs and activities. To learn more about our office, please visit our website at <http://www.epa.gov/oigearth.htm>.

Sincerely,

A handwritten signature in black ink that reads "Nikki L. Tinsley".

Nikki L. Tinsley  
Inspector General

*Si desea recibir esta encuesta en español, por favor llama a 1-800-846-3117.  
If you wish to receive this survey in Spanish, please call 1-800-846-3117.*

Completing questions on the survey should take approximately 10 minutes or less. The total public reporting burden for this survey is estimated to average 15 minutes per respondent as a one-time-only burden. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, or disclose or provide information to or for a Federal agency. This includes: the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information; processing and maintaining information; disclosing and providing information; adjusting the existing ways to comply with any previously applicable instructions and requirements; training personnel to be able to respond to a collection of information; searching data sources; completing and reviewing the collection of information; and, transmitting or otherwise disclosing or reporting on the information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR Part 9 and 48 CFR Chapter 15.

Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave. NW, Washington DC, 20460. Include the EPA ICR number 2094.01 in any correspondence. Please do not send completed surveys to this address, use the provided envelope instead.

**Survey of Air Quality Issues After September 11, 2001**

EPA Office of Inspector General - 1200 Pennsylvania Ave. NW, Washington, DC 20460

**Instructions:** Listed on the front and back of this page are three main topics relating to air quality. Some of the main topics ask you to think about specific times, such as “just after the collapse.” Below each of the main topics are several questions. Please respond to each question by choosing the response that best reflects your thoughts or actions during the specified time period. Please complete the **front and back** of this survey. **Circle “NA” (not applicable) if you have no response because a question does not apply to you.**

1.) <i>Please rate your satisfaction with the information you heard or received about air quality in the weeks just after the collapse of the World Trade Center towers:</i>	Not at All Satisfied					Completely Satisfied
a. The amount of information I heard or received about <b>outdoor</b> air quality	1	2	3	4	5	NA
b. The amount of information I heard or received about <b>indoor</b> air quality	1	2	3	4	5	NA
<b>FOR THE INFORMATION YOU HEARD OR RECEIVED, PLEASE RATE:</b>						
c. The “understandability” of information I heard or received about <b>outdoor</b> air quality	1	2	3	4	5	NA
d. The “understandability” of information I heard or received about <b>indoor</b> air quality	1	2	3	4	5	NA
e. The timeliness of information I heard or received about <b>outdoor</b> air quality	1	2	3	4	5	NA
f. The timeliness of information I heard or received about <b>indoor</b> air quality	1	2	3	4	5	NA
g. The “believability” of information I heard or received about <b>outdoor</b> air quality	1	2	3	4	5	NA
h. The “believability” of information I heard or received about <b>indoor</b> air quality	1	2	3	4	5	NA
i. My overall rating of information I heard or received about <b>outdoor</b> air quality	1	2	3	4	5	NA
j. My overall rating of information I heard or received about <b>indoor</b> air quality	1	2	3	4	5	NA
k. Explanation of possible threats to my health related to air quality	1	2	3	4	5	NA
l. Explanation of how to minimize my exposure to potential health risks related to air quality	1	2	3	4	5	NA
m. Explanation of health problems I might experience due to air quality	1	2	3	4	5	NA
n. Explanation of steps I should take if I experienced health problems related to air quality	1	2	3	4	5	NA
o. My overall rating of information I received about health risks related to air quality	1	2	3	4	5	NA

2.) *Please circle the response for both time periods that best reflects your thoughts about air quality in terms of how it was affected by the collapse of the World Trade Center towers:*

a. Did you think breathing <b>outdoor</b> air in lower Manhattan could expose you to <b>long-term</b> health risks, such as cancer?	▶ <i>In the weeks just after the collapse?</i>	Yes	No	Wasn't Sure	NA
	▶ <i>How about outdoor air now?</i>	Yes	No	Not Sure	NA
b. Did you think breathing <b>indoor</b> air in lower Manhattan could expose you to <b>long-term</b> health risks, such as cancer?	▶ <i>In the weeks just after the collapse?</i>	Yes	No	Wasn't Sure	NA
	▶ <i>How about indoor air now?</i>	Yes	No	Not Sure	NA
c. Did you think breathing <b>outdoor</b> air in lower Manhattan could expose you to <b>short-term</b> health problems, such as coughing, sore throat, or asthma attacks?	▶ <i>In the weeks just after the collapse?</i>	Yes	No	Wasn't Sure	NA
	▶ <i>How about outdoor air now?</i>	Yes	No	Not Sure	NA
d. Did you think breathing <b>indoor</b> air in lower Manhattan could expose you to <b>short-term</b> health problems, such as coughing, sore throat, or asthma attacks?	▶ <i>In the weeks just after the collapse?</i>	Yes	No	Wasn't Sure	NA
	▶ <i>How about indoor air now?</i>	Yes	No	Not Sure	NA
e. Did you think you should have worn protective gear, such as a mask, when breathing <b>outdoor</b> air in lower Manhattan?	▶ <i>In the weeks just after the collapse?</i>	Yes	No	Wasn't Sure	NA
	▶ <i>How about wearing it now?</i>	Yes	No	Not Sure	NA
f. Did you think you should have worn protective gear, such as a mask, when breathing <b>indoor</b> air in lower Manhattan?	▶ <i>In the weeks just after the collapse?</i>	Yes	No	Wasn't Sure	NA
	▶ <i>How about wearing it now?</i>	Yes	No	Not Sure	NA

**PLEASE TURN PAGE OVER TO COMPLETE SURVEY**

3.) Please circle the response that best describes the actions you took in response to dust or debris created by the collapse of the World Trade Center towers and your awareness of certain WTC-related information:

a. I wore or purchased protective gear, such as a mask, that I normally would not have.	Yes	No	Not sure	NA
b. I visited a health professional for health problems I believed were related to air quality.	Yes	No	Not sure	NA
c. A HEPA vacuum was used to clean the carpeting and/or rugs in my residence.	Yes	No	Not sure	NA
d. My residence was tested for asbestos.	Yes	No	Not sure	NA
e. My residence was contaminated with dust/debris due to the collapse. (If you answer "No" or "NA", skip to m.)	Yes	No	Not sure	NA
f. My residence was cleaned for dust/debris with professional assistance.	Yes	No	Not sure	NA
g. My residence was cleaned for dust/debris without professional assistance.	Yes	No	Not sure	NA
h. The floors and surfaces in my residence were wiped for dust/debris with a wet cloth.	Yes	No	Not sure	NA
i. All of the clothes in my residence were laundered due to dust from the collapse.	Yes	No	Not sure	NA
j. I have permanently vacated my residence due to dust/debris from the collapse. (If you answer "Yes", skip to m.)	Yes	No	Not sure	NA
k. I temporarily (at least 24 hrs) vacated my residence due to dust/debris from the collapse. (If you answer "No", "Not sure" or "NA", skip to m.)	Yes	No	Not sure	NA
l. How long was it before anyone moved back into your residence? <input type="radio"/> 1 to 6 days <input type="radio"/> 7 to 14 days <input type="radio"/> 15 to 21 days <input type="radio"/> 21 days to 1 month <input type="radio"/> more than 1 month <input type="radio"/> No one has moved back in yet				
m. I know about EPA's "Response to September 11" Internet website.	Yes	No	Not sure	NA
n. I have visited EPA's "Response to September 11" Internet website.	Yes	No	Not sure	NA
o. In the weeks just after the collapse, I heard that homes contaminated with dust/debris should be professionally cleaned for asbestos.	Yes	No	Not sure	NA
p. I know that some residents of lower Manhattan are eligible to have EPA test and clean their homes.	Yes	No	Not sure	NA

4.) Thank you for your help so far. There are only a few more questions to go. The following information is optional, but it will help us to make sure that everyone's opinion is included.

- a. How many children under the age of 18 lived in your home as of September 11, 2001?  
 None    1    2    3    4    5 or more
- b. Not counting you, how many adults between the age of 18 and 60 lived in your home as of September 11, 2001?  
 None    1    2    3    4    5 or more
- c. Not counting you, how many adults over the age of 60 lived in your home as of September 11, 2001?  
 None    1    2    3    4    5 or more
- d. What is your age? \_\_\_\_\_ years old
- e. What is your gender?    Female    Male
- f. What was your 5-digit zip code as of September 11, 2001? \_\_\_\_\_
- g. Which choice best represents the area in which you worked during the month of September, 2001? (pick one)  
 Manhattan: South of Canal or Pike St.       Bronx       Connecticut  
 Manhattan: On Canal or Pike to South of 14<sup>th</sup>       Brooklyn       New Jersey  
 Manhattan: On 14<sup>th</sup> to 42<sup>nd</sup>       Queens      Other: \_\_\_\_\_  
 Manhattan: On 42<sup>nd</sup> to top of Manhattan       Staten Island
- h. Between 9-11-01 and 12-31-01, did you ever work within the perimeter of Ground Zero?    Yes       No
- i. What is the highest level of education you have completed?  
 Less than High School    High School Diploma    Some College    Bachelor's Degree  
 Post-Grad. Degree    Associate's Degree    Tech/Vocational Degree   Other: \_\_\_\_\_
- j. Is your primary language English?    Yes       No

**Thank you for completing our survey. Please use the pre-addressed, postage-paid envelope to return your responses.**

If you have further comments regarding the issues covered in this survey, please contact our office at 1-800-846-3117 or write to us at EPA Office of Inspector General, 1200 Pennsylvania Ave. NW, Washington, DC 20460.

## Sample Details

The sampling frame – the universe from which the OIG drew its sample – consisted of all addresses in the five boroughs of NYC (Bronx, Brooklyn, Manhattan, Queens, and Staten Island). These areas were selected based on the proximity of residences to the WTC towers site and their potential exposure to the dust and debris created by the collapse. The sample was purchased from R.L. Polk Co., of Detroit, Michigan.

A sample of 10,000 addresses was selected from this frame and divided into two sample groups of 5,000. The proportion of addresses in each set were drawn to approximate the proportion of households in each borough as reported in the 2000 Census. The distribution of addresses was approximated so that Manhattan could be over sampled. Manhattan was divided into two parts: Lower Manhattan, which, for purposes of this report, is defined to include residences south of E. Houston and Broome Streets; and the rest of Manhattan, which is defined to include residences north of E. Houston and Broome Streets. The final distribution of addresses in the sample was:

C Bronx: 13%	C Rest of Manhattan: 21%
C Brooklyn: 27%	C Queens: 22%
C Lower Manhattan: 13%	C Staten Island: 4%

The *Survey of Air Quality Issues After September 11, 2001*, was initiated with the delivery of the pre-notification postcard on March 25, 2003 and collection was closed on July 31, 2003.

A pre-notification postcard was delivered to 5,000 addresses in the first sample group 2 days before the surveys were mailed to inform recipients that a survey was coming and to ask for their cooperation. This was done to promote a high response rate. In addition, a toll-free hotline was provided in both English and Spanish for respondents to ask questions and/or request a Spanish version of the survey. The package delivered to each address in the sample included: (1) a cover letter printed on OIG stationery and signed by the Inspector General; (2) a one-page, double-sided survey; and (3) a postage-paid business reply envelope for the survey's return. Appendix B provides the survey form. Based on the response rate from the first 5,000 surveys released, the OIG released surveys to the second set of 5,000 addresses to increase the number of responses. A pre-notification postcard was not sent to the second set of addresses. As a followup reminder, a postcard was delivered to every address in both sample groups asking potential respondents to fill out and return the survey.





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