Agency for Toxic Substances and Disease Registry
Division of Health Studies

SERUM DIOXIN LEVELS IN RESIDENTS OF CALCASIEU PARISH, LOUISINA

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DEPARTMENT OF HEALTH & HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Atlanta, Georgia 30333

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY
ATLANTA, GEORGIA

FINAL REPORT
SERUM DIOXIN LEVELS IN RESIDENTS OF CALCASIEU PARISH, LOUISIANA

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Health Investigations Branch

1600 Clifton Road, E-31
Atlanta, Georgia 30333

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EXECUTIVE SUMMARY

Calcasieu Parish, Louisiana, contains the Calcasieu Estuary, an area with many petrochemical industries that make chlorinated hydrocarbon solvents, vinyl chloride monomer, and other petroleum-based chemicals. Several residents of Calcasieu Parish expressed concerns about the impact that these chemicals may have on their health. In 1998, staff from the U.S. Environmental Protection Agency (EPA) Region VI asked the Agency for Toxic Substances and Disease Registry (ATSDR) to review the blood dioxin results of 11 people and a pooled blood sample from residents of Calcasieu Parish. An ATSDR report concluded that three people and the pooled blood sample had levels of dioxin-like compounds (hereby referred to as dioxins) above a reference range and recommended that the sources of dioxin be identified and measures be implemented to reduce exposure (Agency for Toxic Substances and Disease Registry 1998a). In December 1998, staff from the ATSDR collected blood from an additional 28 self-selected residents of Mossville, an area in Calcasieu Parish, to measure dioxin. The exposure investigation indicated that the mean blood dioxin concentrations of the 28 participants were above the 95th percentile of a reference population (Agency for Toxic Substances and Disease Registry 1999).

This investigation was conducted to better characterize the nature and extent of exposure to dioxin among residents of Calcasieu Parish. Study participants were selected from a residential area surrounding the petrochemical industries located near the Calcasieu Estuary. People living in Lafayette Parish, Louisiana, comprised the comparison group in this investigation.

Overall, the mean serum dioxin level did not differ between residents of Calcasieu Parish and residents of Lafayette Parish. In addition, the mean dioxin levels were similar when Calcasieu residents were placed into three areas based on distance to industrial areas (industrial corridor, industrial buffer, and outer ring). Dioxin levels increased with age in Calcasieu and Lafayette Parishes. Calcasieu Parish residents who reported eating locally caught fish, smoking cigarettes, working in an occupation with potential exposure, or using pesticides, had dioxin levels similar to those of Lafayette Parish residents who reported these activities. Current cigarette smokers in Calcasieu Parish had higher dioxin levels than current cigarette smokers in Lafayette Parish. African Americans in Lafayette Parish had higher dioxin levels than African Americans in Calcasieu Parish and whites in Lafayette Parish.

We also evaluated the blood samples for congener patterns, or the distribution of dioxins in serum. The congener pattern in Calcasieu Parish residents was similar to that of Lafayette Parish residents.

SERUM DIOXIN LEVELS IN RESIDENTS OF CALCASIEU PARISH, LOUISIANA

Following the discovery of petroleum and gas reserves in the 1920s, Calcasieu Parish became a highly industrialized area, containing a large number of petrochemical and agrochemical manufacturing and processing plants. These plants produce chemicals such as chlorinated hydrocarbon solvents, vinyl chloride monomer, petroleum-based chemicals, and commercial feedstock (U.S. Environmental Protection Agency 2003). In 2000, thirty-one Calcasieu Parish industries reported releases of 14,450,855 pounds of environmental contaminants to the Environmental Protection Agency (EPA) Toxic Release Inventory. This included 1.27 pounds of dioxin. Chemical, petroleum, and solvent recovery industries contributed the greatest amount to the total releases (Louisiana Department of Environmental Quality 2000).

Community members were concerned about the effect of chemical releases on their health. Previous review and investigation by the Agency for Toxic Substances and Disease Registry (ATSDR) indicated higher than expected levels of dioxin-like substances in the blood of some community members. As a followup to these previous investigations, ATSDR conducted this study to better characterize the nature and extent of human exposure to dioxin and dioxin-like substances throughout Calcasieu Parish. We selected study participants from a residential area surrounding petrochemical industries located near the Calcasieu Estuary. Residents living in Lafayette Parish, Louisiana, comprised the comparison group in this investigation.

BACKGROUND

Dioxin and dioxin-like compounds

Polychlorinated Dibenzo-p-Dioxins (PCDDs) comprise a family of 75 chemically related compounds each of which is called a congener. PCDDs share properties with two other groups of chemicals, polychlorinated dibenzo furans (PCDFs) and several compounds from a group of chemicals called polychlorinated biphenyls (PCBs). Together with PCDDs, these compounds are referred to as dioxin-like compounds, or dioxins. The term dioxin in this document will be used to describe these three groups of dioxins: PCDDs, PCDFs, and PCBs. Although the mono-ortho PCBs have dioxin activity, this group was not included in the analysis because calculation of the dioxin toxic equivalent (TEQ) for the reference population did not include the mono-ortho PCBs.

Dioxin is found in air, water, and soil. PCDDs and PCDFs are not made on purpose, but result from burning fuel, wood, and waste, and from making certain products. PCBs are commercial mixtures that are no longer produced in the United States, but were used in the past as coolants and lubricants in transformers, capacitors, and other electrical equipment. When humans are exposed to dioxin through contact with contaminated soil, air, and water, dioxins can enter the body and get stored in fat. Individual dioxin congeners are eliminated slowly from the body at different rates. The rate of elimination is calculated in “half-lives”—the time it takes for 50% of dioxin to leave the body.

The most toxic form of dioxin is 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD or TCDD). The half-life of TCDD is estimated to be 7 to 12 years (Agency for Toxic Substances and Disease Registry 1998b). The toxicity of other dioxins is described relative to TCDD by using Toxic Equivalency Factors (TEFs) (van der Berg et al. 1998). A person's dioxin body burden, as measured in blood or other biologic samples, is often described as the sum of the concentration of each dioxin congener in parts per trillion (ppt) weighted by each congener's TEF. This sum is called the Toxic Equivalent Quotient (TEQ).

Reference Levels of Dioxin

All people are exposed to small amounts of dioxins. Dioxin exposure is typically higher in urban areas of industrialized countries compared to rural areas. Average background TCDD and TEQ human body burden of dioxin and dioxin-like compounds measured in blood and adipose tissue have dropped steadily in the United States over the past several decades from 50–80 ppt in the 1970s to 30–50 ppt in the 1980s and 10–20 ppt in the 1990s (Aylward and Hays 2002, Lorber 2002). Levels of TCDD range from 3 to 7 ppt in the general population and rarely exceed 10 ppt (Agency for Toxic Substances and Disease Registry 1998b).

Few data have been published about reference, or background, levels of dioxin in humans. The most current published data about reference levels of dioxin in humans were developed from studies conducted in the 1980s and 1990s (Centers for Disease Control and Prevention 1987; Needham et al. 1996). As described above, dioxin levels in the general population are decreasing. From 1995 through 1998, ATSDR and the National Center for Environmental Health (NCEH) of the Centers for Disease Control and Prevention (CDC), conducted several dioxin studies in the United States. Reference levels of serum dioxin were calculated on the basis of the results from these studies among people with no known occupational or accidental exposures to dioxin. The mean, median, and 95th percentile blood dioxin toxic equivalent (TEQ) concentrations were 21 ppt, 19.9 ppt, and 37.5 ppt, respectively. These reference data may not be representative of the U.S. or the Calcasieu populations, but represent the best available estimate of dioxin levels among unexposed persons (Orloff et al. 2001).

Health Effects

Studies show that as the serum dioxin TEQ level increases, the risk for chronic health effects increases. The International Agency for Research on Cancer has determined that TCDD can cause cancer in humans (International Agency for Research on Cancer 1997). EPA and the CDC's National Institute for Occupational Safety and Health consider TCDD a probable human carcinogen and a "cancer promoter" in conjunction with certain other chemicals (U.S. Environmental Protection Agency 1994, 2000; National Institute for Occupational Safety and Health 1984). The Institute of Medicine of the National Academy of Sciences reviewed all occupational, environmental, and veterans studies on exposure to dioxin in 1996, 1998, and 2000. The 2000 summary of findings stated that evidence is sufficient to suggest an association between exposures to dioxin and soft-tissue sarcoma, non-Hodgkins lymphoma, and Hodgkins disease (Institute of Medicine 2000). The review also stated that limited, but suggestive, evidence indicates an association between exposure to dioxin and the respiratory cancers (lung, bronchus, larynx, trachea), prostate cancer, multiple myeloma, and acute

myelogenous leukemia (Institute of Medicine 2000). However, individual dioxin resistance and individual health outcomes vary greatly (ATSDR 1998b).

Dioxin exposure is also linked with several noncancer health effects. The most widely accepted health effect from high levels of dioxin exposure is a skin condition called chloracne, a severe form of acne. Chronic noncancer health effects linked with dioxins include problems of the immune system, developing nervous system, endocrine system, and reproductive functions.

Animal studies have shown increases in the incidence, prevalence, and severity of endometriosis. (Wissing 1998). Further animal experiments have implicated dioxin in this disease, but small, hospital-based, case-control studies have failed to provide compelling evidence for an association of environmental contaminants and endometriosis. (Rier and Foster 2002). A women's health study in Seveso, Italy, reported a doubled, nonsignificant risk for endometriosis among women with serum TCDD levels of 100 ppt or higher, but the relation between dose and response was not clear (Eskenazi et al. 2002).

Animal studies have shown the immune system to be one of the most sensitive targets of the toxic effects of TCDD. TCDD inhibits immunoglobulin secretion and decreases resistance to bacterial, viral, and parasitic infections in exposed animals. However, human health studies for immune effects have been inconsistent (Baccarelli et al. 2002).

Recent epidemiologic studies suggest a possible association between dioxin and diabetes in human populations (Remillard and Bunce 2002; Longnecker and Daniels 2001). A study of Air Force veterans exposed to Agent Orange and its contaminant, TCDD, suggested an association between dioxin exposure and diabetes mellitus and adverse effects on glucose metabolism and insulin production (Henriksen et al. 1997). Another study of Air Force veterans whose blood levels were within the range of the background population demonstrated an association between diabetes and dioxin levels (Longnecker and Michalek 2000). A mortality study among a highly dioxin-exposed population in Seveso, Italy, showed excess deaths from diabetes (Pesatori et al. 1998).

Subtle effects of environmental exposure to dioxins at background in humans are largely unknown and poorly understood. Further scientific research is ongoing to study subtle changes and various health outcomes from low level and high level dioxin exposures.

Previous Studies in Calcasieu Parish

In 1998, EPA Region VI held meetings with residents of Calcasieu Parish, Louisiana, to discuss ongoing activities in the Calcasieu Estuary. A resident of Calcasieu asked EPA to review results from 12 blood samples from Calcasieu Parish residents who had been independently analyzed for dioxin. EPA requested that ATSDR, the federal agency tasked with studying the human health effects of toxic substances, review the blood dioxin results. The samples included 11 individual blood samples and a pooled blood sample from 100 patients at a local hospital. Three of the individual blood samples and the anonymous pooled blood sample were above the reference for dioxins. The three

persons with elevated dioxin levels lived in Mossville and Bayou D'Inde. In October 1998, ATSDR issued a health consultation on the blood dioxin results and recommended that the exposure sources of dioxin in the three persons with elevated blood dioxin levels be identified and measures be implemented to reduce exposure (ATSDR 1998a).

In December 1998, ATSDR conducted an exposure investigation in Mossville, Louisiana, to determine if other residents of Mossville had been exposed to dioxin. ATSDR conducted blood tests for dioxin-like compounds on 28 self-selected residents of the community who were 18 years of age or older, who had lived in the designated area for at least 5 years, and who had no occupational exposure to dioxin. Older people who had been long-term residents in the neighborhood were given preference for participation of this exposure study. The mean (54.8 ppt), median (68.3 ppt), and 95th percentile (162.3 ppt) dioxin TEQ exceeded the mean (21.0 ppt), median (19.9 ppt), and 95th percentile (37.5 ppt) dioxin TEQ of the reference population. The participants' TEQs ranged from 3.8 ppt to 186 ppt. Age positively correlated with dioxin levels, with the highest elevations found in participants more than 45 years old (ATSDR 1999).

STUDY RATIONALE

The sampling strategy for participants of the Mossville exposure investigation was by convenience biased toward older, potentially more exposed, persons. Further investigation was necessary to determine if the dioxin levels found in the exposure investigation were representative of Calcasieu Parish residents. Further, because diet is an important source of dioxin exposure, it was important to determine if the dioxin levels of Calcasieu residents were different than those of others in southern Louisiana who had a similar lifestyle and diet. The use of a comparison population stratified by age in this study allows analysis of differences in dioxin levels among persons in southern Louisiana who have similar dietary and lifestyle habits. Finally, and most importantly, dioxins are stored in body fat, increase with age, and are eliminated from the body slowly. Therefore, interpreting whether a person's dioxin level resulted from a recent or a past exposure is difficult. High levels of serum dioxin among younger age groups may suggest a more recent exposure and the need to identify and mitigate the relevant source(s) of exposure. An evaluation of serum dioxin for various age groups was regarded as a means by which to assess time of exposure.

OBJECTIVES

The primary objectives of this investigation were to determine

1. whether the serum dioxin levels in a sample of Calcasieu residents ages 15 years and older were elevated relative to a comparison population, and if so,

2. if any pattern of exposure existed among people with elevated serum dioxin.

A secondary goal of this investigation was to determine if levels of volatile organic compounds (VOCs) were elevated in Calcasieu Parish residents. The results of the investigation of VOCs will be discussed in a separate document.

METHODS

Study Design

A cross-sectional design was chosen to determine whether the serum dioxin levels in Calcasieu Parish residents were different from those in a population with a similar age distribution, lifestyle, and diet. The dioxin levels of a population-based random sample of Calcasieu Parish residents were compared to those of a similar group of Lafayette Parish residents. The evaluation of numerous dioxin congeners also allowed for a cross-sectional comparison of the congener profiles between Calcasieu and Lafayette Parishes.

Eligibility Criteria

The target group consisted of persons who had resided in Calcasieu Parish for the last 5 years and were at least 15 years old. The comparison group consisted of persons who had resided in Lafayette Parish for the last 5 years, had never resided in Calcasieu Parish, and were at least 15 years old. In addition, study participants had to weigh at least 95 pounds, could not have lost more than 15 pounds in the last year, were not suffering from hemophilia or any other bleeding disorders, and had not had cancer chemotherapy in the 4 weeks prior to the date of specimen collection. Women were excluded if they were pregnant or had breast-fed a child in the past 6 months. Each study participant was asked to complete a questionnaire (Appendix F) and to provide a blood sample to measure serum dioxin.

Target Area

The target area was chosen to encompass those areas which were in closest proximity to EPA's Toxic Chemical Release Inventory (TRI) sites and had the greatest population density. The choice of three areas with increasing distance to industry allowed analysis of serum dioxin level in relationship to proximity to industry. The target areas were identified and geographically defined by census blocks using 2000 census data and Geographic Information System (GIS). We identified three target areas in Calcasieu Parish (Figure 1):

1. The Industrial Corridor – an elliptical shaped area measuring 3 by 6 miles and encompassing residential areas surrounding petrochemical industries located near the Calcasieu estuary. This area included Westlake, Mossville, Sulphur, Lake Charles, and surrounding area.

2. The Industrial Buffer – an additional 1.5-mile wide area around the industrial corridor.

3. The Outer Ring – the towns of Vinton, Dequincy, and Iowa approximately 6 miles northwest, west and east of the industrial corridor and still in Calcasieu Parish.

The target areas were further divided into sectors at the request of the community study group. The use of the sector design allowed us to ensure that every sector had an equal number of participants. The industrial corridor and the industrial buffer were divided into four sectors each, for a total of eight sectors. The outer ring was not divided

and was considered to be one sector (Sector 9). Our goal was to recruit 32 participants per sector, 8 participants in each of four age groups: 15–29, 30–44, 45–59, and 60 years and older.

Comparison Area

In consultation with the Louisiana Office of Public Health and the Calcasieu Community Dioxin Study Work Group, we chose Lafayette Parish as the comparison population for this study. Lafayette is demographically and geographically similar to Calcasieu Parish, but lacks Calcasieu's chemical (Health Resources and Services Administration 2001). Calcasieu and Lafayette Parishes are similar in total population (183,577 and 190,503); percentage white (73.6 and 73.4), percentage black (24.0 and 23.8), percentage under age 18 (27.3 and 27.4), percentage age 65 through 84 (10.3 and 7.8), percentage age 85 and older (1.0 for both), and percentage of individuals living below the poverty level (16.5 and 15.8). Lafayette Parish is more densely populated, with 682 people per square mile compared to 167 in Calcasieu Parish. The EPA TRI 2000 ranks Calcasieu Parish 6th out of 64 parishes in Louisiana, with 31 industries reporting 12,548,645 pounds of total releases, and 2nd in the state for total releases of dioxin. Lafayette Parish is ranked 48th in the state with 10 industries reporting 11,907 pounds of total releases and no reported dioxin releases. All of Lafayette Parish comprised Sector 10 (Figure 1).

Sampling Design

Sampling was accomplished by multi-stage cluster sampling. Census blocks within the 10 sectors were identified by GIS using 2000 Census data. The blocks were assigned to only one of the sectors. When a block straddled two or more sectors, that block was assigned to the sector that contained most of the block. Blocks within each sector were then randomly assigned to a "cluster" of at least 600 persons. Clusters could be composed of one or many census blocks, depending upon the population size in each block.

Data Collection

Recruitment and Enrollment of Participants. One cluster from each of the nine Calcasieu sectors and three clusters in the 10th Lafayette sector were randomly selected as the sites at which a household enumeration would be conducted and participants selected. Residents of the randomly chosen clusters were sent a letter of introduction (Appendix A) and brochure (Appendix H), informing them of the study and that someone from the National Opinion Research Center (NORC) would come to their house to conduct a household listing. Letters were also sent to local authorities and local physicians advising them of the household listing (Appendix A).

The principal investigator and the contractor developed appropriate forms, canvasser training, and procedures for canvassing, interviewing, recalling, and reporting to insure that appropriate methods were used to make an accurate and complete census. During the household listing phase, NORC personnel conducted a door-to-door household listing of residents in each of the randomly selected clusters in both target and comparison areas (Appendix B).

When the household census was complete, persons who were considered initially eligible were stratified by age and geographic location and contacted by mail to let them

know about the investigation and that they might be asked to participate in the study (Appendix C). Randomly selected initially eligible participants were contacted by telephone to explain the investigation, confirm eligibility, and recruit participants. Investigators introduced themselves, explained the investigation in general, and requested permission to ask eligibility questions. All investigators followed a short script to confirm age, gender, and address, and to ascertain eligibility through a series of questions based on the eligibility criteria (Appendix D).

Informed Consent. The consent of each participant was confirmed at the beginning of each interview by completion of a participant consent form approved by the CDC Human Subjects Institutional Review Board. Participants under 18 years old were asked to sign a participant assent form and their parent or guardian was asked to sign a parental consent form (Appendix E).

Questionnaire. The interviewer administered a questionnaire to the participant (Appendix F). The first part of the questionnaire reconfirmed eligibility to participate in the investigation and to give 60 milliliters (mL) of blood. The second part of the questionnaire was comprised of environmental exposures questions. Interviews were randomly monitored by supervisory personnel and spot checks were made to ensure accuracy in data recording. Contract personnel from NORC administered the questionnaire on behalf of ATSDR.

Laboratory Analysis. A phlebotomist collected a 60 mL venous blood specimen (50 mL for dioxin analysis and 10 mL for VOC analysis) from eligible participants according to procedures established by CDC. Established documentation and chain-of-custody methods were used to ensure the integrity of the biologic specimens collected and to safeguard against tampering with biologic specimens or records (Appendix G).

Using high resolution gas chromatography/isotope-dilution high resolution mass spectrometry, NCEH laboratory personnel measured PCDDs, PCDFs, and PCBs which exhibit dioxin-like properties in serum samples (Patterson et al. 1987; Patterson et al. 1990; Turner et al. 1997). Serum samples were spiked with $^{13}C^{12}$-labelled internal standards. The laboratory staff isolated the analytes of interest using a C18 solid phase extraction procedure followed by a multicolumn automated cleanup and enrichment procedure. Laboratory personnel separated the analytes with a DB-5ms capillary column (30m x 0.25 μm film thickness), using a Hewlett-Packard 6890 gas chromatograph. The staff quantified the analytes by ID-HRMS, using selected ion monitoring at 10,000 resolving power with a Micromass Auto Spec ULTIMA or a Finnigan MAT95 mass spectrometer in the EI mode. The concentration of each analyte was calculated from an individual standard linear calibration curve. Each analytical run included three unknown serum samples, a method blank, and a quality control sample. The analyst was blinded to the quality control samples. After all data were reviewed using comprehensive quality assurance and quality control procedures, the analytical results were reported on both a whole-weight and a lipid-adjusted basis, taking fat concentrations into account in calculating dioxin levels. Results of this study are reported as TEQs.

The detection level of each congener is based on the volume of serum that was analyzed. Thus, detection levels may be different for each congener and for each analytical run. If the serum volume was not sufficient to detect a specific congener, the

result for that congener is reported as non-detect (ND). The NDs were assigned a value equal to the limit of detection divided by two (Hornung and Reed 1990).

Data Management

The NORC interviewers wrote down information obtained during the household listing and in-person interview phases of the study. To assure 100% data entry verification, two separate operators entered the same data into a Computer Assisted Data Interview (CADI) system.

Data Analysis

Statistical analyses were performed by using SUDAAN (Research Triangle Institute, Release 8.0, Research Triangle Park, NC) software. SUDAAN procedures produced population weighted estimates for means and standard deviations of several variables. The specification of the design setup structure, the stratum variable, and the primary sampling unit for the SUDAAN programming are described in Appendix J.

Demographic characteristics of study participants by parish were compared by gender, race, age, length of residency, food consumption patterns, occupation, pesticide usage, smoking, and distance from industry using CHI-SQ test. Results are considered statistically significant if the p-value is less than or equal to 0.05. Only statistically significant differences are noted.

The student's *t*-test was used to compare the weighted mean difference of TEQ between the target and comparison areas. *T*-tests were also used to compare means for the study areas by categories of gender, age, race, ate locally caught fish (ever), ate locally caught fish (past year), year moved to the parish, occupational exposure to dioxin, usage of pesticide, ever smoking, and currently smoking. The *t*-test was also used to compare mean TEQ levels for each parish with the combined reference data set.

We used the Adjusted Wald test with PROC REGRESS to compare weighted mean TEQ levels between the three target areas: industrial corridor, industrial buffer, and outer ring. Each of these target areas was also compared with the comparison area (i.e., Lafayette Parish). The TEQ levels for Calcasieu and Lafayette Parishes stratified by age group were compared with the Combined Reference Data Set using the two sample Z test for means.

Weighted univariate regression analysis was conducted to examine the association between log transformed serum dioxin TEQ level ($\log_{10}$ TEQ) and age of the participants, year first lived in parish, fish consumption, gender, smoking, race, potential occupational exposure, and pesticide usage of the participants independently. Analyses were performed using techniques that incorporated sampling weights and design features of the study.

Linear weighted multiple regression analysis was conducted with parish being the main exposure variable in the model and Adjusted Wald F tests were used to compare means levels among the variables examined in the univariate analysis. We performed all regression analyses after adjustment for age, year first lived in parish, fish consumption, gender, smoking, race, potential occupational exposure, and pesticide usage of the participants.

Because race remained significant in the final reduced model, stratified univariate and multiple regression analysis by race were performed to examine the association between the $\log_{10}$ TEQ and all the other covariates.

RESULTS

Participation

Following the random selection of block clusters, 2,239 households in Calcasieu Parish and 785 households in Lafayette Parish were identified to be canvassed during the household enumeration phase of the investigation. Of these, 1,963 (87.7%) in Calcasieu and 565 (72%) in Lafayette were enumerated. From that enumeration, 606 people in Calcasieu, and 264 people in Lafayette were found to be eligible for the study. From this pool of eligible subjects, 307 (50.7%) people in Calcasieu and 125 (47.3%) people in Lafayette agreed to participate in the study. Blood samples were collected from 423 people—300 in Calcasieu and 123 in Lafayette. Blood samples with quantities sufficient for laboratory analysis were available for 415 participants—295 people in Calcasieu and 120 people in Lafayette.

Comparison Between Parishes. Questionnaires were completed by 432 participants. Their ages ranged from 15 through 91 years in Calcasieu Parish and 15 through 84 years in Lafayette Parish. Participants in the two areas were similar in most characteristics. Calcasieu participants had greater potential occupational exposure to dioxin and ate locally caught fish. A greater proportion of participants who lived in Lafayette had moved into the parish since 1981 (Table 1).

Dioxin TEQ levels ranged from 2 ppt to 97 ppt in Calcasieu Parish and 2.2 ppt to 146 ppt in Lafayette Parish (Figure 2). Participants from both parishes had similar mean dioxin TEQ levels (Table 2). When the Calcasieu area was divided into three areas (industrial corridor, industrial buffer, and outer ring) (Figure 1), the mean dioxin TEQ levels among persons in these three areas were similar to each other and to Lafayette residents. Dioxin TEQ levels increased with age in both parishes. Mean dioxin TEQ levels were similar among persons in both parishes when stratified by age, gender, length of residence, fish consumption, occupational exposure, or pesticide usage. African Americans in Lafayette Parish showed significantly higher mean dioxin TEQ levels than whites in Lafayette Parish and African Americans in Calcasieu Parish. Mean dioxin TEQ levels were similar for whites in both parishes. When stratified by past smoking history, persons in both parishes had similar mean dioxin TEQ levels. However, current smokers in Calcasieu Parish had significantly higher mean dioxin TEQ levels than current smokers in Lafayette Parish. Dioxin TEQ levels were similar among persons in both Calcasieu and Lafayette Parishes when stratified by consumption of gar, crab, and crawfish, locally caught or raised meat, or locally raised fruits, vegetables, and eggs (data not shown). The mean dioxin TEQ was significantly higher among Lafayette residents compared to that of Calcasieu residents for those who ever ate locally caught catfish (23.9 ppt and 19.2 ppt, respectively, p=0.005) and for those who ever ate locally caught flounder (30.1 ppt and 21.3 ppt, respectively, p=0.006).

Regression Analyses. In weighted univariate regression analysis, age of the participants and year first lived in parish had a significant impact upon serum dioxin TEQ level ($\log_{10}$ TEQ) ($P < 0.001$). Age of the participants explained 48% of the variation independently; year first lived in parish explained 23% of the total variation. Parish did not significantly impact $\log_{10}$ TEQ.

Using weighted multiple regression analysis with parish being the main exposure variable in the model, we found no significant difference of $\log_{10}$ TEQ between Calcasieu and Lafayette after controlling for age of the participants, year first lived in parish, fish consumption, gender, smoking, potential occupational exposure, and pesticide usage by the participants. Furthermore, in the final model, we found that age of the participants, race, year first lived in parish were significant covariates. The multivariate model explained about 52% of the total variation.

We also conducted separate multivariate analyses for African Americans and whites. In the weighted multiple regression analysis among African Americans, the difference of $\log_{10}$ TEQ between parishes was significant (i.e., dioxin TEQ higher in Lafayette than Calcasieu in the group) after controlling for age of the participants, year first lived in parish, fish consumption, gender, smoking, potential occupational exposure, and pesticide usage by the participants. Finally, we found that age of participants, year first lived in parish, potential occupational exposure, and the interaction between occupational exposure and parishes were significant covariates in the final African Americans-only model. This model explained about 77% of the total variation in serum dioxin TEQ for African Americans.

In the multivariate analysis for whites only, the difference of $\log_{10}$ TEQ between parishes was not statistically significant after controlling for age of the participants, year first lived in parish, fish consumption, gender, smoking, potential occupational exposure, and pesticide usage by the participants. Moreover, we found that age of the participants, year first lived in parish, fish consumption, and potential occupational exposure were significant covariates in the final whites-only model. This model explained about 51% of the total variation in serum dioxin TEQ for whites.

Comparison With Combined Data Set. Table 3 presents the mean serum dioxin TEQs by age groups for a combined reference data set of unexposed persons from several serum dioxin studies in the United States. There was no overall difference between the mean serum dioxin TEQs for the Parishes and this combined data set (Table 3). However, mean serum TEQs for the youngest age group, age 15–29, were lower in both Calcasieu Parish and Lafayette Parish compared to the combined reference data set. In the oldest age group available for comparison, age 60–68 years, dioxin TEQ concentrations were slightly, but not significantly, higher in the parishes compared to the combined data set.

Comparison of Congener Profiles. In order to describe a congener profile for each parish, the percent of congener contribution to total TEQ is presented in Figure 3. The congener profiles between the two parishes were similar, with PCDDs accounting for more than 70% of total TEQ. Congener concentrations were also compared to NCEH laboratory comparison range of means (Needham et al. 1996) (Figure 4). Congener concentrations in the parishes were within most of the available NCEH comparison ranges. However, overall concentrations for both parishes were slightly below the lower end of the comparison range of means for 123678D, 1234678D, and OCDD.

Concentrations of co-planar PCBs (3445P, 33445P, 334455P) also appeared to be lower in Calcasieu and Lafayette Parish.

DISCUSSION

This investigation set out to compare serum dioxin levels of Calcasieu Parish residents to those of people who live in a similar parish with a lower amount of industrial activity. Results indicated that dioxin levels are similar in both parishes and that both parishes have levels similar to a combined data set used to give a "best estimate" of dioxin levels among unexposed persons. A few study participants in both Calcasieu Parish (maximum serum TEQ value = 97 ppt) and Lafayette Parish (maximum serum TEQ value = 146 ppt) had high dioxin levels. However, no overall differences existed between the two parishes and the comparison data set.

This investigation also set out to determine any current exposure to unusual sources of dioxin. Analysis of younger persons in Calcasieu, 15–29 years of age, compared to Lafayette and the combined data set, indicated that people in Calcasieu Parish are not currently being exposed to unusual sources of dioxin.

This study was not designed to determine the reason why some people in Calcasieu and Lafayette Parishes have dioxin TEQ levels higher than the reference range. Some factors which might be related to higher dioxin levels include recent weight loss or illness, different food consumption patterns, or individual differences in uptake and elimination of dioxin. Further study of these factors is necessary to determine their relative contribution to serum dioxin levels.

Analysis showed that African Americans in Lafayette Parish had significantly higher dioxin levels than African Americans in Calcasieu Parish or whites in Lafayette Parish. The difference in mean serum dioxin TEQ between African Americans in Lafayette Parish and African Americans in Calcasieu remained significant after controlling for confounders in a multiple regression analysis. Race has not been indicated as a predictive factor in serum dioxin levels in other studies, but few studies have evaluated this factor. The relationship of race to dioxin level should be further studied.

Dioxin, a by-product of industrialization, began to increase in the environment in the early 1900s and peaked in the 1960s and 1970s. Environmental controls initiated in the 1970s have resulted in a decrease in the industrial release of dioxin. However, most people are still exposed to some amount of dioxin primarily through eating fish, meat, and dairy products. When compared with the NCEH congener-specific reference ranges, the Calcasieu and Lafayette residents had lower values for some congeners, particularly the coplanar PCBs. The lower values were not unexpected because the congener-specific reference ranges used by NCEH were from an earlier period to compare with a fish-eating population in the Great Lakes region (Needham et al. 1996). Some of the congener-specific reference ranges were higher than levels observed for Calcasieu or Lafayette residents possibly because the reference ranges were based on data that may have been collected a decade prior to the Calcasieu study. Thus, the differences could reflect the reductions in dioxin body burden observed in the general population over time (Aylward and Hays 2002, Lorber 2002). Nevertheless, the congener pattern, or profile,

observed among Calcasieu Parish residents was similar to that observed in Lafayette Parish residents.

Levels of dioxin seen in Calcasieu and Lafayette, even the highest levels, would not be considered to result in the most common health effects associated with dioxin exposure: chloracne and liver effects. Other health effects associated with dioxin exposure have generally been associated with higher levels of dioxin burden. However, this study evaluated serum dioxin levels at one point in time; levels of past exposure as well as the risk for health effects associated with those exposures are unknown.

Study Strengths

This was a scientifically-based study which also benefited from strong community input and involvement. The Calcasieu study represented the challenge of developing and implementing a study which would withstand scientific scrutiny while simultaneously assuring a study which would answer the questions and concerns of the community. To ensure community input, the Calcasieu Community Dioxin Study Work Group was formed. Approximately 17 Calcasieu Parish community members were in this work group which represented different geographic areas and environmental groups within Calcasieu Parish. The Community Work Group members met frequently with the principal investigator and other study collaborators to assure community involvement in the study design, to assist in the development of the protocol for the study, and to stay abreast of the progress of the study. Members assisted in the development of the study by indicating what they wished to learn from the study, voicing concerns about the study design, and problem solving. Members were educated on the advantages and disadvantages of different study designs. By working together with the community work group, we were able to develop a study which answered the community's concerns while maintaining high scientific standards.

Another strength of this study was that it employed a population-based sample, an unexposed population-based comparison population, and a large sample size which allowed stratification by age and proximity to industry. We collected information on the participants' individual characteristics, including age, consumption of locally caught and raised food, potential occupational and environmental exposure, geographic location, and individual congener data.

This study also benefited from the strong quality assurance and quality control procedures utilized by the NCEH laboratory and the availability of reference comparison values for dioxin TEQ and dioxin congener concentrations. Though the combined data set reference cannot be considered representative of the U.S. population, it does include dioxin data from unexposed persons in different states. These data were available from previous ATSDR and NCEH studies and allowed for an external comparison of study findings with national data, regardless of the overall lack of difference in mean serum dioxin TEQ between the two parishes.

Study Limitations

One limitation of the study was that only 50 mL of whole blood was collected for dioxin analysis. Although this amount of blood was chosen because it was thought to be sufficient for dioxin analysis and would not be a burden on study participants, a larger quantity would have provided more serum for analysis and thus lower detection limits and fewer nondetects. We estimated the results for nondetects by using a recognized method of substituting one half of the detection limit for nondetect results, but fewer nondetect levels would have given a more precise determination of each congener level and of the TEQ for each study participant.

Another limitation of the study was that information regarding weight change and body mass index (BMI) was not included in the questionnaire. In the body, dioxin is found in the blood and in body fat. When weight is stable, a person's dioxin body burden is divided between the blood and the body fat (called partitioning). Total dioxin body burden is represented by the dioxin in blood. However, when weight is gained or lost, the concentration of dioxin in blood and adipose tissue changes. Current and historical information on these parameters may have assisted in the interpretation of the dioxin data.

Finally, we collected self-reported information about consumption of locally caught or raised food. Additional questions regarding consumption of all food sources would have allowed for more detailed analysis. Measurement of dioxin in these foods would also give an indication of the contribution of food on the body burden of dioxin. EPA estimates that more than 90% of the dioxin in humans comes from food sources, especially meat, fish, and dairy products. This study could not identify strong factors in overall food consumption patterns which might have helped to explain the higher dioxin levels observed in some participants.

CONCLUSIONS

1. Overall, people who live in Calcasieu Parish had similar mean serum dioxin TEQ levels as people who live in Lafayette Parish.

2. African Americans who live in Lafayette Parish had significantly higher mean dioxin TEQ levels when compared to those of whites in Lafayette Parish and African Americans in Calcasieu Parish.

3. Dioxin levels in both parishes increased with age and length of residence.

4. Persons in Calcasieu and Lafayette Parishes age 68 years and younger had similar mean serum dioxin TEQ to a combined data set developed to give a best estimate of dioxin level in persons not unusually exposed to dioxin.

5. Serum dioxin TEQ levels were not elevated among the youngest age group evaluated (ages 15 to 29 years) in either Calcasieu Parish or Lafayette Parish when compared with external comparison data. Although not conclusive, these data suggest no unusual current dioxin exposures among the populations in these areas.

6. The dioxin congener profile in Calcasieu Parish is similar to that in Lafayette Parish.

RECOMMENDATIONS

1. Future studies of dioxin exposure should collect information on body mass index, individual weight change, and detailed food consumption patterns.

2. The contribution of race to dioxin level should be further explored in any future population-based studies of serum dioxin.

AUTHORS AND ACKNOWLEDGEMENTS

Authors:
Alden Henderson, PhD, MPH
Roberta Hilsdon
M. Deborah Millette, MPH
Curtis Noonan, PhD
Mohammed Uddin, MD, MPH
Lee Yang-Wong, MS

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The Calcasieu Community Dioxin Study Work Group

Harold Areno	Kathy Landry	Lee Sherman
Charlie Atherton	Betty Larce	Peggie Sullivan
Dagmar Darjean	Lois Booker Malvo	Jerome Summers
Nona Harris	Caroline Peters	Michael Tritico
Pat Hartman	Debra Ramirez	Bobbie White
Barrett Landry	Junus Reado Sr.	

Agency for Toxic Substances and Disease Registry

Sylvia Allen-Lewis	Jennifer Lyke	Jason Saunter
Lafreta Dalton	Melissa Massaro	Kathy Skipper
Steve Dearwent	Elaine McEachern	Judy Smith
Danielle DeVoney	Ketna Mistry	Francisco Tomei-Torres
Yolonda Freeman	Ken Orloff	Rueben Warren
John Holland	George Pettigrew	Lynn Wilder
Michael Lewin	Hana Pohl	Greg Zarus

National Center for Environmental Health, Centers for Disease Control and Prevention

Charles Dodson	Don Patterson
Larry Needham	Wayman Turner

Louisiana Department of Health and Hospitals, Office of Public Health, Section of Epidemiology and Environmental Toxicology

National Opinion Research Center (NORC)

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T A B L E S

Table 1. Demographic and Other Characteristics of Participants from Calcasieu and Lafayette Parishes

Characteristic	Calcasieu (n=295)	Lafayette (n=120)	χ^2 (p-value)
Sex			
Male	140	50	
Female	155	70	2.68 (0.11)
Age (years)			
15–29	76	26	
30–44	70	31	
45–59	80	31	
>60	69	32	1.93 (0.59)
Race			
White	263	108	
African-Americans	28	10	0.98 (0.33)
Ate Locally Caught Fish (ever)			
Yes	258	56	
No	32	53	13.6 (0.00)
Ate Locally Caught Fish (past year)			
Yes	181	38	
No	70	15	0.18 (0.67)
Year Moved to Parish			
1981+	113	67	
1961–1980	96	29	
1941–1960	70	18	
1900–1940	16	6	11.7 (0.01)
Occupational Exposure to Dioxin			
Yes	68	12	
No	227	108	5.93 (0.02)
Use Pesticides			
Yes	254	109	
No	40	10	2.66 (0.11)
Ever Smoked			
Yes	180	71	
No	115	49	2.62 (0.11)
Currently Smoke			
Yes	82	27	
No	27	11	0.32 (0.57)
Smoked in past 5 years			
Yes	109	38	
No	71	33	1.56 (0.21)

Table 2. Mean Serum Dioxin TEQ Levels (ppt) by Demographic and Other Characteristics

	Industrial Corridor (n=142)	Industrial Buffer (n=122)	Calcasieu Parish Outer Ring (n=31)	Calcasieu Parish: 3 Calcasieu Sections Combined (n=295)	Lafayette (n=120)	p-value*
Sex						
Male	19.7	15.7	19.1	16.7	20.5	0.24
Female	19.3	25.8	15.9	23.0	20.1	0.21
Age (years)						
15-29	9.6	8.0	9.0	8.4	7.5	0.34
30-44	11.2	15.4	13.4	14.3	14.7	0.91
45-59	20.8	19.3	21.9	19.7	19.8	0.96
>60	32.7	41.0	25.8	36.9	42.4	0.42
Race						
White	20.2	20.9	16.1	20.2	18.6	0.58
African-Americans	13.3	17.5	14.5	16.9	38.0	0.001
Ate Locally Caught Fish (ever)						
Yes	19.3	19.6	17.1	19.2	20.4	0.46
No	20.4	25.1	18.6	23.2	20.2	0.41
Ate Locally Caught Fish (past year)						
Yes	18.0	20.3	17.1	19.6	18.0	0.52
No	20.1	16.7	17.3	17.7	30.8	0.20
Year Moved to Parish						
1981+						
1961-1980	11.4	18.6	19.0	17.4	16.0	0.60
1941-1960	19.9	16.4	12.1	16.5	19.1	0.39
1900-1940	19.0	23.5	22.6	23.6	26.2	0.51
	35.5	50.6	33.1	44.9	69.2	0.38
Occupational Exposure to Dioxin						
Yes						
No	22.9	19.6	19.0	20.2	19.5	0.73
	18.5	20.4	16.6	19.6	20.4	0.65
Use Pesticides						
Yes						
No	20.4	19.7	17.3	19.6	20.5	0.48
	12.4	22.3	16.8	20.3	19.0	0.88
Ever Smoked						
Yes						
No	18.0	19.5	15.4	18.8	18.8	0.99
	21.5	22.0	19.7	21.6	22.5	0.79
Currently Smoke						
Yes						
No	16.7	17.3	12.2	16.8	12.9	0.05
	13.9	12.7	12.8	13.0	17.3	0.62
Overall mean serum dioxin TEQ (ppt)	19.5	20.1	17.2	19.7	20.3	0.71

** T test comparing mean serum TEQ levels between Calcasieu Parish and Lafayette Parish.*

Table 3. Mean Serum Dioxin TEQ Levels (ppt) by Age (years) for Calcasieu Parish, Lafayette Parish, and the Combined Reference Data Set[*]

Age (years)	Combined Reference Data Set (n=214)	Calcasieu Parish (n=295)	p-value[†]	Lafayette Parish (n=120)	p-value[‡]
15–29	14.3	8.4	0.0001	7.5	0.0001
30–44	15.4	14.3	0.8575	14.7	0.5958
45–59	18.5	19.8	0.6745	19.8	0.3007
60–68	27.5	30.7	0.7980	31.7	0.9064
>69	--	46.9	--	51.3	--

[*]Dioxin 2004, September 2004, Berlin, Germany
[†]Z test comparing mean serum TEQ levels between Calcasieu Parish and the Combined Reference Data Set
[‡]Z test comparing mean serum TEQ levels between Lafayette Parish and the Combined Reference Data Set

F I G U R E S

Figure 1. Location of Calcasieu and Lafayette Parishes

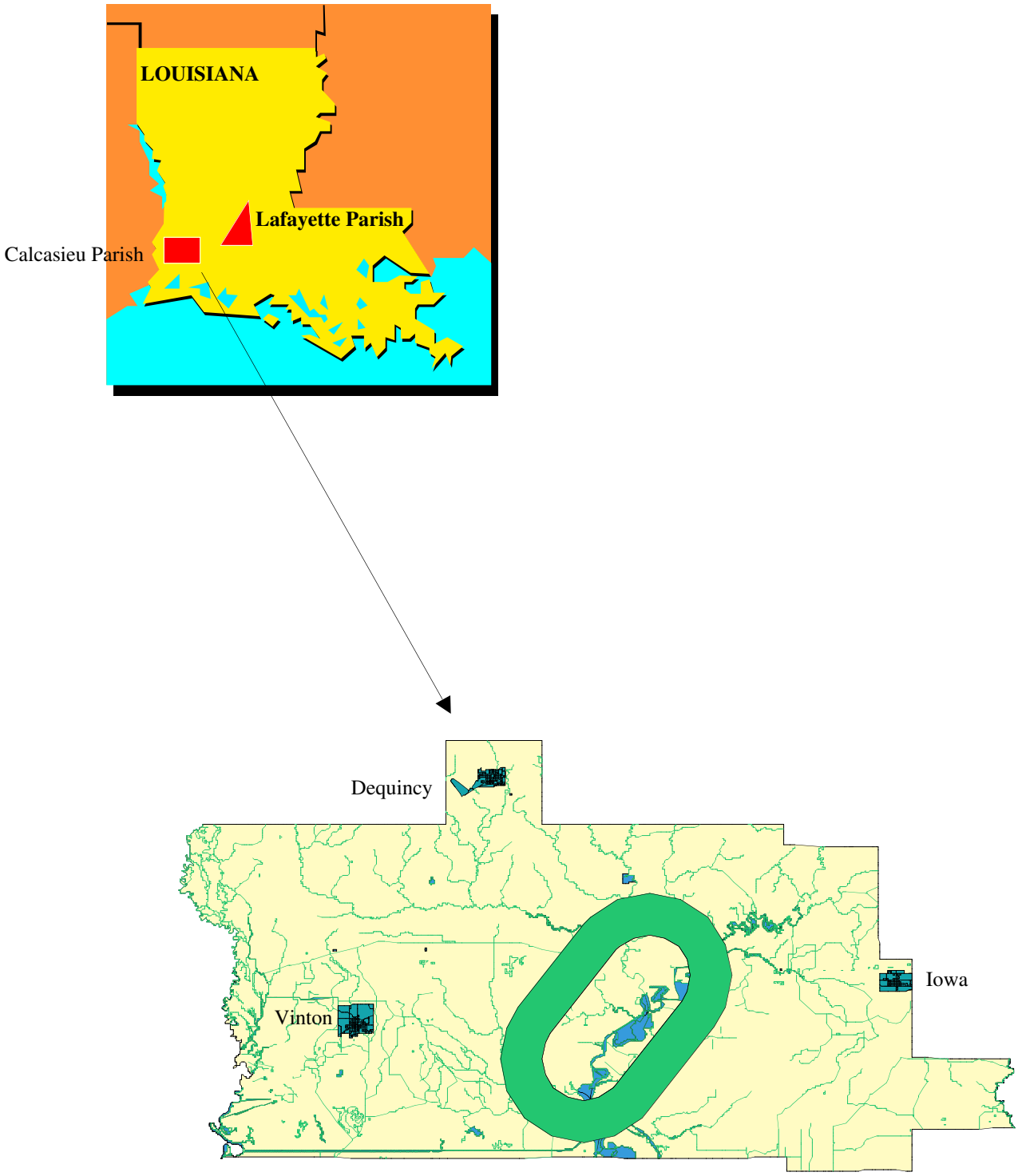


Figure 2. Distribution of Serum Dioxin TEQ by Parish

Figure 3. Congener Contribution to Total TEQ in Calcasieu and Lafayette Parishes

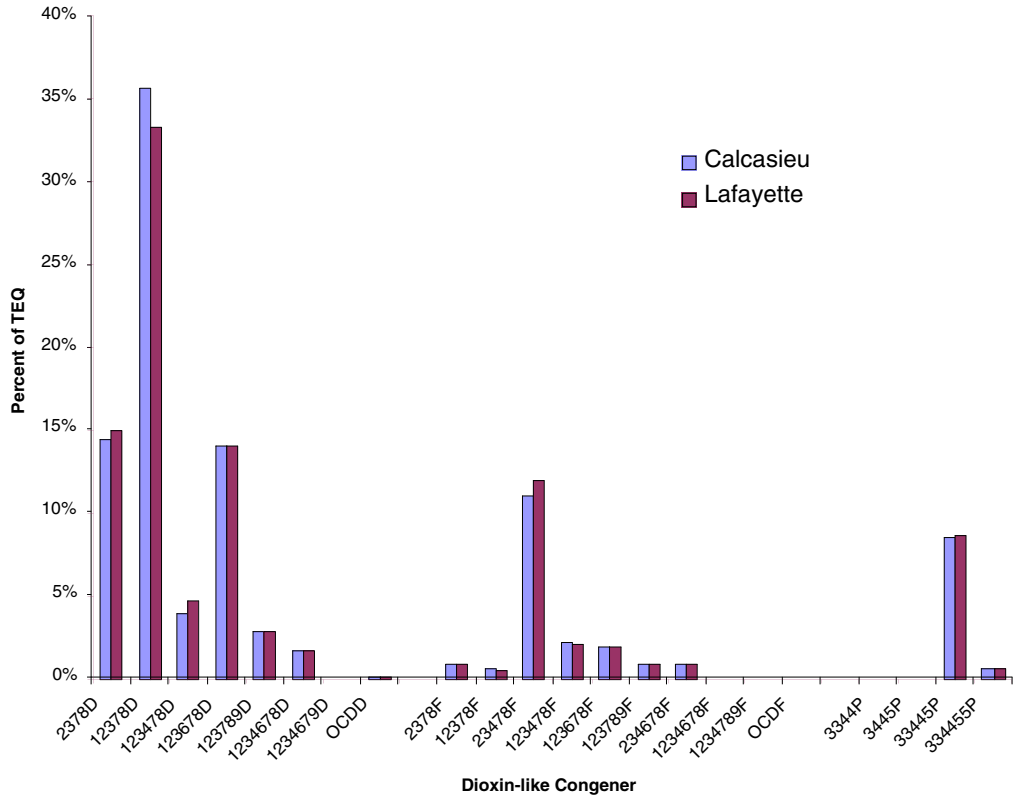
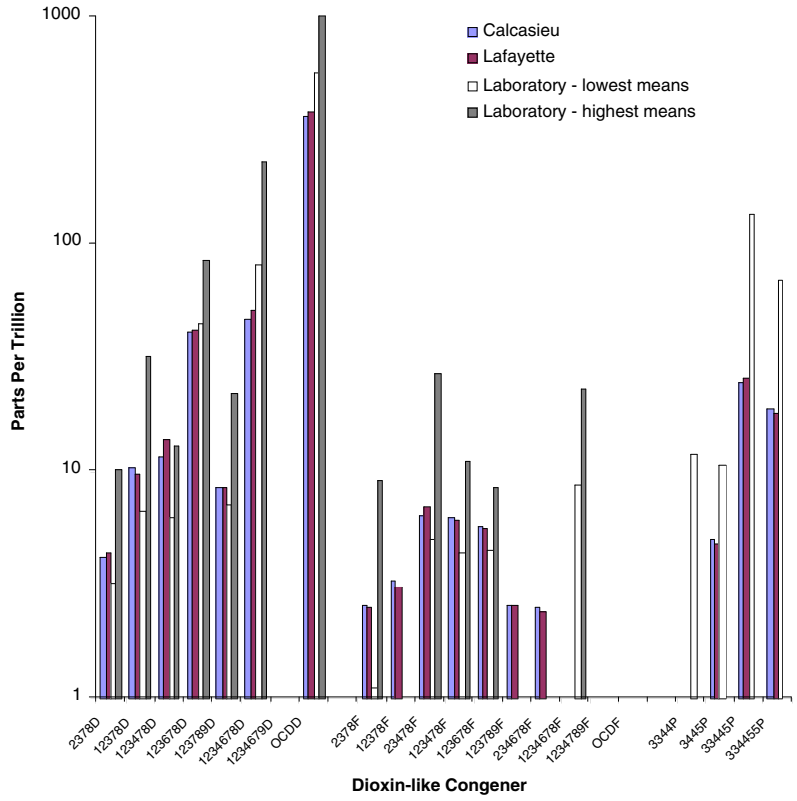


Figure 4. Mean Congener Concentration Levels (ppt) in Calcasieu, Lafayette, and a National Centers for Environmental Health Laboratory Comparison Range of Means



APPENDICIES

A. Letters of Introduction for Census
   a. Community Members
   b. Community Authorities
   c. Physicians

B. Household Census Scripts and Questionnaire

C. Letter to Persons Eligible for Study
   Letter for "Difficult-to-Reach" Eligibles

D. Eligibility Scripts and Questionnaire
   a. Calcasieu Minor
   b. Calcasieu Adult
   c. Lafayette Minor
   d. Lafayette Adult

E. Informed Consent Documents
   a. Adult Consent to Be in a Health Study
   b. Parental Consent for Your Child age 15 to 17 to be in a Health Study
   c. Youth age 15 - 17 Assent to Be in a Health Study

F. Investigation Questionnaire

G. Dioxin Specimen Preparation and Shipping

H. Health Education Materials
   a. Household Listing Brochure
   b. Study Fact Sheet for Eligible Residents
   c. Study Fact Sheet for Community Members
   d. Health Profession Study Fact Sheet

I. Results Letter to Participants
   Dioxin Fact Sheet

J. Specification of the design setup structure, the stratum variable, and the primary sampling unit for the SUDAAN programming

Appendix A

A Letter of Introduction for Census and A Letter to Community Authorities

Agency for Toxic Substances and Disease Registry
U.S. Department of Health and Human Services
Atlanta, Georgia 30333

December, 2001

Dear Resident:

The Agency for Toxic Substances and Disease Registry, also known as ATSDR, is conducting a health study in your parish. ATSDR is a federal health agency which is part of the Public Health Service. We will be looking at some chemical substances in people living in Calcasieu and Lafayette parishes in Louisiana. The chemical substances that we will look at are called **dioxins** and **volatile organic compounds**. This research will help us learn more about differences in the levels of these substances in people who live in the parish.

ATSDR is conducting this study in collaboration with the National Opinion Research Center (NORC). NORC is a non-profit research center affiliated with the University of Chicago that has been conducting research in the public interest for over 50 years. As part of the health study, we need to get a list of everyone living in your area. In the next few weeks, a representative of NORC will come to your home to ask you the names of the people who live in your home, their ages and how long they've lived in the parish. Gathering this information is a very important step in the study.

Interviewers from NORC will have identification badges and will not ask to come into your home. If you have any questions about the interviewers or what they are doing, you may call 1-866-835-6672.

We would very much like your help with this study but giving this information is completely voluntary. All information which you give us will be kept confidential.

ATSDR and NORC recognize that you may have concerns about this study. If you have questions about the interviewers, the study, or medical or technical questions about dioxin and volatile organic compounds please call NORC toll free at 1-866-835-6672. We welcome the opportunity to discuss any concerns with you.

We have enclosed a brochure about the study. We hope you will help us with this research project. Someone will be visiting you soon.

Sincerely,

M. Deborah Millette, MPH
Epidemiologist
Agency for Toxic Substances and Disease Registry

NORC
A national organization for research
at the University of Chicago

January 2002

Dear Community Authority:

The National Opinion Research Center (NORC) at the University of Chicago is undertaking an important study in Calcasieu and Lafayette Parishes on behalf of the Agency for Toxic Substances and Disease Registry (ATSDR). The study is designed to determine exposure to Dioxin and Volatile Organic Compounds.

Some households in your area have been selected as part of the sample for this study. During January and February, NORC interviewers will contact selected households in your community. Interviewers will visit pre-selected households, explain the study to an adult and, after informed consent has been obtained, list the individuals who live there. Since residents are frequently concerned about security and safety, we wanted to inform your organization of this research project and alert you that our interviewers will be present in your community. On other research projects we have found that some of those selected to be interviewed may call organizations such as yours for information about our presence.

Be assured that participation in this study by your residents is completely voluntary and that our interviewers will adhere to the strictest professional standards. Our interviewers will be wearing photo identification badges which state that they are NORC representatives. The interviewers are trained professionals who have signed legally binding pledges of confidentiality.

NORC is one of the oldest and most prestigious social science research organizations in the nation. NORC has been conducting nationwide studies for over 59 years, during which we have earned a reputation for research that is scientifically sound and socially worthwhile.

If you have any questions or would like more information on the study or NORC, please call me toll-free at 1-866-835-6672.

Sincerely,

Official NORC Person
Official NORC Person's Title

Dear Doctor,

The Agency for Toxic Substances and Disease (ATSDR) is conducting a study of chemical exposure in your community. ATSDR is a federal health agency which is part of the U.S. Public Health Service. We will be looking at several chemical substances, dioxins and volatile organic compounds, in people living in Calcasieu and Lafayette parishes, Louisiana.

Participants will be chosen at random, therefore, the first step in the study will be to complete a household listing in selected census blocks in the parish. Since some of the residents may be your patients, we wanted to apprise you of the study in case you receive inquiries from your patients. We also want to assure you that participation in this study by your patients is completely voluntary and that our National Opinion Research Center (NORC) interviewers will adhere to the strictest professional standards.

We will conduct a public meetings in Calcasieu and Lafayette Parishes at the following times and places to explain the study.

> Tuesday, January 15th, 2002 at 7:00 PM at the Lake Charles Civic Center, and
> Thursday, January 17th, 2002 at 7:00 PM at the Holiday Inn Holidome, Lafayette

I am including the advance letter and a brochure which will go to those persons living in census blocks selected for study. If you have any questions, or want additional information on the study, please do not hesitate to contact me.

Thank you for your time.

Sincerely,

M. Deborah Millette, MPH
Epidemiologist
Agency for Toxic Substances and Disease Registry
Division of Health Studies
Health Investigations Branch
404-498-0563 - Direct Line
888-422-8737- Toll-free line

Appendix B

Household Census Scripts and Questionnaires

The questionnaire for both parishes is the same, except that in Lafayette Parish, the subject is asked if he/she EVER lived in Calcasieu Parish. For the comparison population "ever living in Calcasieu" is a disqualifier. The questionnaire used in Calcasieu Parish is presented here.

Interviewer ID:

Case ID: [PLACE STICKER HERE]

Script for Household Listing--Calcasieu Parish

Hello, my name is (INTERVIEWER'S NAME). I'm here on behalf of the Agency for Toxic Substances and Disease Registry. ATSDR is a federal health agency and is part of the Public Health Service. ATSDR is conducting a health study in your parish. As part of the health study, we want to get a list of everyone living in your area. May I speak to the head of the household or an adult member, please?

YES ∫ WHEN SPEAKING TO ADULT, CONTINUE OR IF ANOTHER PERSON COMES TO DOOR, REPEAT INTRODUCTION ABOVE THEN CONTINUE.

NO ∫ When is a good time to come back and speak with an adult?

DAY OF WEEK: Mon Tues Wed Thurs Fri Sat Sun

DATE: _____/_____/__2002__

TIME: _____:_____ AM/PM

IF REFUSE, GO TO **Q3A.**

ATSDR is conducting a health study in your area to tell us more about exposure to dioxin and volatile organic compounds in Calcasieu and Lafayette Parish.

Q1. A few days ago you should have received a letter from us telling you that we are conducting a household listing in your parish and that we would visit you. Did you receive this letter?

1 Yes ∫ SKIP TO **Q2**
2 No

Q1A. The letter explained that we want to get a list of everyone living in your area to see who is eligible for the study. Would you like me to read this letter to you? (IF YES, READ LETTER AND THEN CONTINUE WITH **Q2**. IF NO, CONTINUE WITH **Q2**).

Q2. To see who should be asked to take part in this testing program, we need to ask a few questions about people living in your household. You will be asked mainly about the names, age, and gender of people who live in your household. The interview will take about 10 minutes.

VERBAL CONSENT

Before we start, I want to let you know that your participation is voluntary. You have the right to refuse to answer any question at any time. All data will be kept private to the extent permitted by law. No data that identifies you or your place of residence will be included in any report. If you have questions about the study or about your rights should you decide to participate in the study, I have some phone numbers you can call. Would you like these numbers?

YES ∫ You can call my supervisor at NORC or get more information about the study by calling NORC toll-free at 1-866-835-6672. This phone number is included in the letter and brochure you received earlier/that I just gave you.

NO ∫ CONTINUE WITH **Q3**

Q3: Do you agree to answer my questions?

1 Yes ∫ SKIP TO **Q4**
2 No

Q3A. May I ask why you do not wish to participate?

1 Too busy
2 Not interested
3 Confidentiality concerns
4 Information too personal
5 Need more information about study
6 Other (specify):_____
_____

ATTEMPT TO SET AN APPOINTMENT DATE AND TIME FOR FUTURE VISIT. IF SUCCESSFUL, RECORD DAY, DATE AND TIME ON PAGE 1 AND CONTINUE. IF RESPONDENT STILL REFUSES TO PARTICIPATE, THANK THE RESPONDENT. IF THE ADDRESS INFORMATION IS READILY AVAILABLE, FILL IN **Q4** AND END VISIT.

Q4: I would like to confirm that I am at the correct address. What is the complete address of this household unit?

Address Line 1: _____

Line 2 (Apt #, Lot #): _____
City _____
State _____ Zip Code _____

Q5: What is the correct telephone number of this household unit?

Primary telephone number: _____ - _____ - _____

Secondary phone number (if avail): _____ - _____ - _____

n order for us to scientifically select a respondent who may be able to take part in this study, I will need to list all members of your household, tarting with yourself.

Q6: THE FOLLOWING QUESTIONS WILL BE REPEATED FOR EACH MEMBER OF THE HOUSEHOLD:

	What is your full name?/ What are the names of all the other persons living in this household?			**What is his/her age?**	**What is his/her relationship to you?**	**What is his/her gender?**	**Has he/she lived in Calcasieu for the last 5 years?**
	Last name	First name	Middle name				
Respondent				1 15-29 2 30-44 3 45-59 4 60 +	1 Self	M F	YES NO
Resident #2 Name				1 15-29 2 30-44 3 45-59 4 60 +	2 Wife/Husband 3 Son/Daughter 4 Mother/Father 5 Brother/Sister 6 Grandparent 7 Aunt/Uncle 8 Partner 9 Other: _____	M F	YES NO

Resident #3 Name				1 15-29 2 30-44 3 45-59 4 60 +	2 Wife/Husband 3 Son/Daughter 4 Mother/Father 5 Brother/Sister 6 Grandparent 7 Aunt/Uncle 8 Partner 9 Other: _____	M F	YES NO
Resident #4 Name				1 15-29 2 30-44 3 45-59 4 60 +	2 Wife/Husband 3 Son/Daughter 4 Mother/Father 5 Brother/Sister 6 Grandparent 7 Aunt/Uncle 8 Partner 9 Other: _____	M F	YES NO
	What are the names of all the other persons living in this household?			**What is his/her age?**	**What is his/her relationship to you?**	**What is his/her gender?**	**Has he/she lived in Calcasieu for the last 5 years?**
	Last name	First name	Middle name				
Resident #5 Name				1 15-29 2 30-44 3 45-59 4 60 +	2 Wife/Husband 3 Son/Daughter 4 Mother/Father 5 Brother/Sister 6 Grandparent 7 Aunt/Uncle 8 Partner 9 Other: _____	M F	YES NO

Resident #6 Name				1 15-29 2 30-44 3 45-59 4 60 +	2 Wife/Husband 3 Son/Daughter 4 Mother/Father 5 Brother/Sister 6 Grandparent 7 Aunt/Uncle 8 Partner 9 Other: _____	M F	YES NO
Resident #7 Name				1 15-29 2 30-44 3 45-59 4 60 +	2 Wife/Husband 3 Son/Daughter 4 Mother/Father 5 Brother/Sister 6 Grandparent 7 Aunt/Uncle 8 Partner 9 Other: _____	M F	YES NO
Resident #8 Name				1 15-29 2 30-44 3 45-59 4 60 +	2 Wife/Husband 3 Son/Daughter 4 Mother/Father 5 Brother/Sister 6 Grandparent 7 Aunt/Uncle 8 Partner 9 Other: _____	M F	YES NO
	What are the names of all the other persons living in this household?			**What is his/her age?**	**What is his/her relationship to you?**	**What is his/her gender?**	**Has he/she lived in Calcasieu for the last 5 years?**
	Last name	First name	Middle name				

Resident #9 Name				1 15-29 2 30-44 3 45-59 4 60 +	2 Wife/Husband 3 Son/Daughter 4 Mother/Father 5 Brother/Sister 6 Grandparent 7 Aunt/Uncle 8 Partner 9 Other: _____	M F	YES NO
Resident #10 Name				1 15-29 2 30-44 3 45-59 4 60 +	2 Wife/Husband 3 Son/Daughter 4 Mother/Father 5 Brother/Sister 6 Grandparent 7 Aunt/Uncle 8 Partner 9 Other: _____	M F	YES NO

NTERVIEWER: VERIFY NAME, AGE, AND GENDER OF EACH HOUSEHOLD MEMBER.

*W*HEN FINISHED, PROBE FOR ADDITIONAL HOUSEHOLD MEMBERS: Have we missed anyone?

Please include any children and babies, and any household members who are currently away traveling, in the hospital, or away on business. **Do not include** any students currently living away at school or anyone staying here temporarily who has a usual residence somewhere else. WHEN FINISHED: Thank you for answering these questions and participating in the household listing. Do you have any questions about the study that I can answer?

YES ∫ ANSWER QUESTIONS

NO ∫ Thank you again for letting me ask you about your household.

COMMENTS: _____

_____

_____

_____

Appendix C
Letter to Persons Eligible for Study and Letter for "Difficult-to-Reach" Eligibles

A Letter of Introduction to Persons Eligible for the Study
Target and Comparison Areas

Agency for Toxic Substances and Disease Registry
U.S. Department of Health and Human Services
Atlanta, Georgia 30333

March, 2002

Dear (Person's Name):

The Agency for Toxic Substances and Disease Registry, also known as ATSDR, is conducting a health study in your parish. ATSDR is a federal health agency which is part of the Public Health Service. We will be looking at some chemical substances called dioxins and volatile organic compounds in people living in Calcasieu and Lafayette parishes. This research will help us learn more about differences in the levels of these substances in people who live in the parishes. We would like your help to do the second part of the health study.

ATSDR is conducting this study in collaboration with the National Opinion Research Center (NORC). NORC is a non-profit research center affiliated with the University of Chicago that has been conducting research in the public interest for over 50 years. You may recall that a NORC interviewer came to your home recently to get details about the people who live there. They asked some questions and noted some facts about you. From that information we randomly picked you as someone who can be a part of this study. We will need 400 people to take part in the study. Being in the second part of the study is very important.

People who are in the second part of the study will be asked to come to our local office. While there, a trained interviewer will give you a questionnaire and a health professional will draw some blood and ask you for a urine sample. The questionnaire asks some questions about your occupation, the foods you eat, and some things with which you may have come in contact. It will take about 1-2 hours to do the survey, give a urine sample, and have your blood drawn.

People who take part in the study will be given $50 for their time and transportation.

This study is free of charge and entirely voluntary. Facts about you will be kept private to the extent allowed by law. Your name and records will be kept in a locked file. They will not be used in any reports written about this study.

We hope you will help us with this research project. Someone will be calling you soon to tell you more about the study. Please call the study's toll-free number at 1-866-835-6672 if you have questions about the study. We welcome the opportunity to discuss any concerns with you.

Sincerely,
M. Deborah Millette, MPH, Epidemiologist, Agency for Toxic Substances and Disease Registry

Letter for "Difficult-to-Reach" Eligibles
Target and Comparison Areas

Dear

I am writing to you to ask your help with a health study in Calcasieu and Lafayette parishes.

You recently received a call from the Agency for Toxic Substances and Disease Registry. You may have thought that it was a solicitation but we aren't selling anything nor are we taking a survey. We are a federal public health agency of the U. S. Department of Health and Human Services.

We are conducting a study with 400 participants in Calcasieu and Lafayette parishes. We are doing this study because several years ago we found that some people in Calcasieu Parish had higher than expected levels of a chemical called dioxin in their blood. We are following up on this by measuring levels of dioxin in people in Calcasieu and Lafayette parishes.

In order for this study to give us a scientific answer, we choose people at random. You might remember that several months ago someone in your household answered some questions for us about the people who live in your home. From that information, your name was selected as a person who might be able to be a part of the study. The people who are asked to be in the study represent all the people in Calcasieu and Lafayette parishes. The success of the study depends on getting the participation of everyone who was chosen to be in the study.

I understand that we all get calls and letters from telemarketers and solicitors and it=s hard to decide what to pay attention to. I would appreciate your help with this study. I=m including some press clippings about the study so that you can see that we really are what we say we are.

Our interviewers will be trying to call you again in the next week. If you have questions or would like to speak to me, please call me at ***404-498-0563*** or toll-free at ***1-888-422-8737***.

If you would be willing to answer some questions to see if you are eligible for the study, please call ***1-866-835-6672***.

Thank you.

Respectfully,

M. Deborah Millette, M.P.H.
Epidemiologist
Health Investigations Branch
Division of Health Studies
Agency for Toxic Substances and Disease Registry

Appendix D

Eligibility Scripts and Questionnaires for Adults and Minors in Calcasieu and Lafayette Parishes

Interviewer ID:

Person ID:

Script for Eligibility Questionnaire: Minor
Calcasieu Parish

Hello, my name is (INTERVIEWER NAME) and I'm calling on behalf of the Agency for Toxic Substances and Disease Registry. May I speak with (the parent or Guardian of RESPONDENT), please?

YES ⎩ SKIP TO **(Q1)**
NO ⎩ When is a good time to call back and speak with (the parent or Guardian of RESPONDENT)?

DAY OF WEEK:

Mon Tues
Wed Thurs
Fri Sat
Sun

DATE: _____/_____/__2002__

TIME: _____:_____ AM/PM

(Q1) A few days ago you and your child should have received a letter from us telling you that we are conducting a health study in Calcasieu Parish and that we might call him/her. I am calling to see if he/she might be interested in participating in the study. Did you receive this letter? Q1_MR

YES ⎩ CONTINUE WITH **(Q2)**
NO ⎩ NOLET2 The letter explained he/she was selected to participate in a study we are conducting in Calcasieu Parish. Would you like me to read this letter to you? (IF YES, READ LETTER AND THEN CONTINUE WITH **(Q2)**. IF NO, CONTINUE WITH **(Q2).**

(Q2) Participation will involve completing a questionnaire and having some blood drawn from his/her arm. If he/she decides to participate, it should take about one to two hours of time. Your child must be accompanied by a parent or Guardian. We will schedule a time for you to come to our office which is convenient for you. He/she will receive $50 for time and travel. Do you have any questions? Q2_MR

ANSWER QUESTIONS.
Would it be alright with you for me to talk with your child? I will need to ask him/her some additional questions to see if he/she is eligible to be in the study. CONSENT

PARENT GIVES CONSENT ⎩ **Yes** CHILD IS HOME,
I may also need to talk with you again after speaking with your child to schedule a time that is

convenient for you and your child to participate. SKIP TO **(Q2A)**

⌊ **Yes** Child is NOT home, reschedule using INTRO

⌊ **No** SKIP TO **(Q4A)**

(Q2A) CONTINUE SCRIPT WITH MINOR

Hello (RESPONDENT), my name is (INTERVIEWER NAME) and I'm calling on behalf of the Agency for Toxic Substances and Disease Registry. I just talked to your parent/Guardian and he/she said I could talk to you about participating in a health study.

(Q1A) A few days ago you should have received a letter from us telling you that we are conducting a health study in Calcasieu Parish and that we might call you. I am calling to see if you might be interested in participating in the study. Did you receive this letter? Q1A_MR

YES ⌊ CONTINUE WITH **(Q2A)**
NO ⌊ The letter explained that you were selected to participate in a study we are conducting in Calcasieu Parish. Would you like me to read this letter to you? (IF YES, READ LETTER AND THEN CONTINUE WITH **(Q2A)**. IF NO, CONTINUE WITH **(Q2A).**

(Q2A) Participation will involve completing a questionnaire and having some blood drawn from your arm. If you decide to participate, it should take about one to two hours of time. You must be accompanied by a parent or Guardian to the site office. We will schedule a time for you to come to our office which is convenient for you and your parent or Guardian. You will receive $50 for time and travel. Do you have any questions? Q2A_MR

(Q3A) I would like to confirm a few things and then ask you some questions to see if you are eligible to be in the study. Before we start, I want to let you know that your participation is voluntary. You have the right to refuse to answer any question at any time. All data will be kept private to the extent permitted by law. We can not tell your parent(s) or Guardian about your answers. No data that identifies you or your place of residence will be included in any report. If you have questions about the study or your rights if you take part I have a phone number you can call. Would you like this numbers? Q3A_MR

YES ⌊ You can call my supervisor or get more information about the study by calling NORC toll-free at 1-866-835-6672.
NO ⌊ CONTINUE

(Q4A) Are you willing to consider participating at this time? Q4A_MR

MINOR GIVES CONSENT ⌊ **Yes GO TO ELIGIBILITY QUESTIONNAIRE ON NEXT PAGE**

⌊ **No** SKIP TO **(Q4B)**

Q4B. Thank you for your time. May I ask why you do not wish to participate? Q4B_MR

1 Too busy

2 Not interested
3 Confidentiality concerns
4 Information too personal
5 Need more information about study
6 Don't want to give blood - afraid of needles
7 Other (specify):_____Q4B_OTH_____

_____

ELIGIBILITY SCREENER: CALCASIEU PARISH

1. Last Name S1_LNAME	First Name S1_FNAME	Middle Initial S1_MNAME
2. Gender S2_GENDER |___| M |___| F	3. Age S3_AGE	
4. Date of Birth S4_DOBMO, S4_DOBDAY, S4_DOBYR |___|___| - |___|___| - |___|___|___|___| Month Day Year		
5. Address Line 1: S5_ADDR1_____ Line 2 (Apt #, Lot #): S5_ADDR2_____ _____ City S5_CITY_____ State S5_STATE_____ ___ Zip Code S5_ZIP_____ _____		
6.Telephone Number(s) Primary telephone number: S6PHONE1_____ - _____ - _____ Secondary phone number (if avail): S6PHONE2_____ - _____ - _____ What type of line is this number? S6_TLINE____ work ____ cell phone ____ other Best time to reach respondent: S6_BTIME ___ ___ : ___ ___ am/pm S6_AMPM		
7. Have you lived in Calcasieu Parish for the last 5 years? S7_5YRS	YES	NO INELIG1 Ineligible. Thank you for your time. In order to participate in this

		investigation you must have lived in Calcasieu Parish for the last 5 years.
8. How long have you lived in Calcasieu Parish? S8_YRS	_____ Years	

9. Do you have hemophilia or any other blood clotting or bleeding disorder? S9_HEMO	YES → Ineligible	Thank you for your time. In order to participate in this investigation you must be eligible to give a blood sample. Your "Yes" answer makes you ineligible to give blood. INELIG2	NO
10. Have you received chemotherapy in the past 6 weeks? S10_CHEMO	YES → Ineligible		NO
11. Do you weigh less than 95 pounds? S11_WGH	YES → Ineligible		NO
12. Have you lost more than 15 lbs. In the last year? S12_LOST	YES → Ineligible		NO
For Women Only			
13. Are you currently pregnant? S13_PREG	YES → Ineligible		NO
14. Have you breast fed a child in the last 6 months? S14_BFED	YES → Ineligible		NO

For All Respondents

15. You are eligible to be in the study. Would you be willing to consider participating in the tests for dioxin and volatile organic compounds by completing a questionnaire and having some blood drawn from your arm? S15_INT	Yes Schedule Appointment	No Skip to Q5	I need more information. Schedule follow-up call.

INFORM PARENT/GUARDIAN THAT THEY MUST ACCOMPANY MINOR TO THE APPOINTMENT.

Is R ready to schedule appointment APPTMO

Thank you very much for your time.

Appointment scheduled for:

Date	Time	Location
_____	_____	_____

Follow-up call scheduled for:

Date	Time
_____	_____

Q5. Thank you for your time. May I ask why you do not wish to participate? S16_NOTINT

1 Too busy
2 Not interested
3 Confidentiality concerns
4 Information too personal
5 Need more information about study
6 Don't want to give blood - afraid of needles
7 Other (specify):__S16_OTH_____

Interviewer ID:

Person ID:

Script for Eligibility Questionnaire: Adult
Calcasieu Parish

Hello, my name is (INTERVIEWER NAME) and I'm calling on behalf of the Agency for Toxic Substances and Disease Registry. May I speak with (RESPONDENT), please?

YES ⎫ SKIP TO **(Q1)**
NO ⎭ When is a good time to call back and speak with (RESPONDENT)?

DAY OF WEEK:

Mon	Tues
Wed	Thurs
Fri	Sat
	Sun

DATE: _____/_____/__2002__

TIME: _____:_____ AM/PM

(Q1) A few days ago you should have received a letter from us telling you that we are conducting a health study in Calcasieu Parish and that we might call you. I am calling to see if you might be interested in participating in the study. Did you receive this letter? Q1_AD

YES ⎫ CONTINUE WITH **(Q2)**
NO ⎭ NOLET The letter explained that you were selected to participate in a study we are conducting in Calcasieu Parish. Would you like me to read this letter to you? (IF YES, READ LETTER AND THEN CONTINUE WITH **(Q2)**. IF NO, CONTINUE WITH **(Q2).**

(Q2) Participation will involve completing a questionnaire and having some blood drawn from your arm. If you decide to participate, it should take about one to two, hours of your time. We will schedule a time for you to come to our office which is convenient for you. You will receive $50 for your time and travel. If you are interested, I will need to ask you some additional questions to see if you are eligible to be in the study. Do you have any questions? Q2_AD

ANSWER QUESTIONS.
INTERESTED ⎫ SKIP TO **(Q3)**
NOT INTERESTED ⎭ SKIP TO **(Q4A)**

(Q3) I would like to confirm a few things and then ask you some questions to see if you are eligible to be in the study. Before we start, I want to let you know that your participation is voluntary. You have the right to refuse to answer any question at any time. All data will be kept private to the extent permitted by law. No data that identifies you or your place of residence will be included in any report. If you have questions about the study or your rights if you take part I have a phone number you can call. Would you like this number? Q3_AD

YES ⎩ You can call my supervisor or get more information about the study by calling NORC toll-free at 1-866-835-6672.
NO ⎩ CONTINUE

Are you willing to consider participating at this time? Q3A_AD

YES ⎩ **GO TO ELIGIBILITY QUESTIONNAIRE ON FOLLOWING PAGE**.
NO ⎩ CONTINUE WITH **(Q4A)**

Q4A. Thank you for your time. May I ask why you do not wish to participate? Q4A_AD

1 Too busy
2 Not interested
3 Confidentiality concerns
4 Information too personal
5 Need more information about study
6 Don't want to give blood - afraid of needles
7 Other (specify):_Q4A_OTH_____

ELIGIBILITY SCREENER: CALCASIEU PARISH

1. Last Name S1_LNAME	First Name S1_FNAME	Middle Initial S1_MNAME
2. Gender S2GENDER |___| M |___| F	3. Age S3_AGE	
4. Date of Birth S4_DOBMO, S4_DOBDAY, S4_DOBYR |___|___| - |___|___| - |___|___|___|___| Month Day Year		
5. Address Line 1: S5_ADDR1_____ Line 2 (Apt #, Lot #): S5_ADDR2 _____ City S5_CITY _____ State S5_STATE_____ ____ Zip Code S5_ZIP_____ _____		
6.Telephone Number(s) Primary telephone number: S6PHONE1_____ - _____ - _____ Secondary phone number (if avail): S6PHONE2 _____ - _____ - _____ What type of line is this number? S6_TLINE work ____ cell phone ____ other Best time to reach respondent: S6_BTIME ___ ___ : ___ ___ am/pm S6_AMPM		
7. Have you lived in Calcasieu Parish for the last 5 years? S7_5YRS	YES	NO INELIG1 Ineligible. Thank you for your time. In order to participate in this investigation you must have lived in Calcasieu Parish for the last 5 years.
8. How long have you lived in Calcasieu Parish? S8_YRS	_____ Years	

9. Do you have hemophilia or any other blood clotting or bleeding disorder? S9_HEMO	YES → Ineligible	Thank you for your time. In order to participate in this investigation you must be eligible to give a blood sample. Your "Yes" answer makes you ineligible to give blood. INELIG2	NO
10. Have you received chemotherapy in the past 6 weeks? S10_CHEMO	YES → Ineligible		NO
11. Do you weigh less than 95 pounds? S11_WGH	YES → Ineligible		NO
12. Have you lost more than 15 lbs. In the last year? S12_LOST	YES → Ineligible		NO
For Women Only			
13. Are you currently pregnant? S13_PREG	YES → Ineligible		NO
14. Have you breast fed a child in the last 6 months? S14_BFED	YES → Ineligible		NO

For All Respondents

15. You are eligible to be in the study. Would you be willing to consider participating in the tests for dioxin and volatile organic compounds by completing a questionnaire and having some blood drawn from your arm? S15_INT	Yes Schedule Appointment	No Skip to Q5	I need more information. Schedule follow-up call.

Is R ready to schedule appointment APPTMO

Thank you very much for your time.

Appointment scheduled for:

Date Time Location

_____ _____ _____

Follow-up call scheduled for:

Date Time

_____ _____

Q5. Thank you for your time. May I ask why you do not wish to participate? S16_NOTINT

1 Too busy
2 Not interested
3 Confidentiality concerns
4 Information too personal
5 Need more information about study
6 Don't want to give blood - afraid of needles
7 Other (specify):S16_OTH_____

Interviewer ID:

Person ID:

Script for Eligibility Questionnaire: Minor
Lafayette Parish

Hello, my name is (INTERVIEWER NAME) and I'm calling on behalf of the Agency for Toxic Substances and Disease Registry. May I speak with (the parent or Guardian of RESPONDENT), please?

YES ⎩ SKIP TO **(Q1)**
NO ⎩ When is a good time to call back and speak with (the parent or Guardian of RESPONDENT)?

DAY OF WEEK:

Mon	Tues
Wed	Thurs
Fri	Sat
	Sun

DATE: _____/_____/__2002__

TIME: _____:_____ AM/PM

(Q1) A few days ago you and your child should have received a letter from us telling you that we are conducting a health study in Lafayette Parish and that we might call him/her. I am calling to see if he/she might be interested in participating in the study. Did you receive this letter? Q1_MR

YES ⎩ CONTINUE WITH **(Q2)**
NO ⎩ NOLET2 The letter explained he/she was selected to participate in a study we are conducting in Lafayette Parish. Would you like me to read this letter to you? (IF YES, READ LETTER AND THEN CONTINUE WITH **(Q2)**. IF NO, CONTINUE WITH **(Q2).**

(Q2) Participation will involve completing a questionnaire and having some blood drawn from his/her arm. If he/she decides to participate, it should take about one to two hours of time. Your child must be accompanied by a parent or Guardian. We will schedule a time for you to come to our office which is convenient for you. He/she will receive $50 for time and travel. Do you have any questions? Q2_MR

ANSWER QUESTIONS.
Would it be alright with you for me to talk with your child? I will need to ask him/her some additional questions to see if he/she is eligible to be in the study. CONSENT

PARENT GIVES CONSENT ⎩ **Yes** CHILD IS HOME,
I may also need to talk with you again after

speaking with your child to schedule a time that is convenient for you and your child to participate. SKIP TO **(Q2A)**

⎩ **Yes** Child is NOT home, reschedule using INTRO

⎩ **No** SKIP TO **(Q4A)**

(Q2A) CONTINUE SCRIPT WITH MINOR

Hello (RESPONDENT), my name is (INTERVIEWER NAME) and I'm calling on behalf of the Agency for Toxic Substances and Disease Registry. I just talked to your parent/Guardian and he/she said I could talk to you about participating in a health study.

(Q1A) A few days ago you should have received a letter from us telling you that we are conducting a health study in Lafayette Parish and that we might call you. I am calling to see if you might be interested in participating in the study. Did you receive this letter? Q1A_MR

YES ⎩ CONTINUE WITH **(Q2A)**
NO ⎩ The letter explained that you were selected to participate in a study we are conducting in Lafayette Parish. Would you like me to read this letter to you? (IF YES, READ LETTER AND THEN CONTINUE WITH **(Q2A)**. IF NO, CONTINUE WITH **(Q2A).**

(Q2A) Participation will involve completing a questionnaire and having some blood drawn from your arm. If you decide to participate, it should take about one to two hours of time. You must be accompanied by a parent or Guardian to the site office. We will schedule a time for you to come to our office which is convenient for you and your parent or Guardian. You will receive $50 for time and travel. Do you have any questions? Q2A_MR

(Q3A) I would like to confirm a few things and then ask you some questions to see if you are eligible to be in the study. Before we start, I want to let you know that your participation is voluntary. You have the right to refuse to answer any question at any time. All data will be kept private to the extent permitted by law. We can not tell your parent(s) or Guardian about your answers. No data that identifies you or your place of residence will be included in any report. If you have questions about the study or your rights if you take part I have a phone number you can call. Would you like this numbers? Q3A_MR

YES ⎩ You can call my supervisor or get more information about the study by calling NORC toll-free at 1-866-835-6672.
NO ⎩ CONTINUE

(Q4A) Are you willing to consider participating at this time? Q4A_MR

MINOR GIVES CONSENT ⎩ **Yes GO TO ELIGIBILITY QUESTIONNAIRE ON NEXT PAGE**

⎩ **No** SKIP TO **(Q4B)**

Q4B. Thank you for your time. May I ask why you do not wish to participate? Q4B_MR

1 Too busy
2 Not interested
3 Confidentiality concerns
4 Information too personal
5 Need more information about study
6 Don't want to give blood - afraid of needles
7 Other (specify):____Q4B_OTH_____
_____

ELIGIBILITY SCREENER: LAFAYETTE PARISH

1. Last Name S1_LNAME	First Name S1_FNAME	Middle Initial S1_MNAME
2. Gender S2_GENDER |___| M |___| F	3. Age S3_AGE	
4. Date of Birth S4_DOBMO, S4_DOBDAY, S4_DOBYR |___|___| - |___|___| - |___|___|___|___| Month Day Year		
5. Address Line 1: S5_ADDR1_____ Line 2 (Apt #, Lot #): S5_ADDR2_____ _____ City S5_CITY_____ State S5_STATE_____ ____ Zip Code S5_ZIP_____ _____		
6.Telephone Number(s) Primary telephone number: S6_PHONE1 _____ - _____ - _____ Secondary phone number (if avail): S6_PHONE2_____ - _____ - _____ What type of line is this number? S6_TLINE work ____ cell phone ____ other Best time to reach respondent: S6_BTIME___ ___ : ___ ___ am/pm S6_AMPM		
7. Have you lived in Lafayette Parish for the last 5 years? S7_5YRS	YES	NO Ineligible. Thank you for your time. In order to participate in this

		investigation you must have lived in Lafayette Parish for the last 5 years. INELIG1
8. How long have you lived in Lafayette Parish? S8_YRS	_____ Years	
9. Have you ever lived in Calcasieu Parish S8A_EVER	YES - Ineligible Thank you for your time. In order to participate in this investigation you may not have ever lived in Calcasieu Parish. INELIG1	NO

10. Do you have hemophilia or any other blood clotting or bleeding disorder? S9_HEMO	YES → Ineligible	Thank you for your time. In order to participate in this investigation you must be eligible to give a blood sample. Your "Yes" answer makes you ineligible to give blood. INELIG2	NO
11. Have you received chemotherapy in the past 6 weeks? S10_CHEMO	YES → Ineligible		NO
12. Do you weigh less than 95 pounds? S11_WGH	YES → Ineligible		NO
13. Have you lost more than 15 lbs. In the last year? S12_LOST	YES → Ineligible		NO

For Women Only

14. Are you currently pregnant? S13_PREG	YES → Ineligible		NO
15. Have you breast fed a child in the last 6 months? S14_BFED	YES → Ineligible		NO

For All Respondents

16. You are eligible to be in the study. Would you be willing to consider participating in the tests for dioxin and volatile organic compounds by completing a questionnaire and having some blood drawn from your arm? S15_INT	Yes Schedule Appointment	No Skip to Q5	I need more information. Schedule follow-up call.

INFORM PARENT/GUARDIAN THAT THEY MUST ACCOMPANY MINOR TO THE APPOINTMENT.

Is R ready to schedule appointment APPTMO

Thank you very much for your time.

Appointment scheduled for:

Date	Time	Location
_____	_____	_____

Follow-up call scheduled for:

Date	Time
_____	_____

Q5. Thank you for your time. May I ask why you do not wish to participate? S16_NOINT

1 Too busy
2 Not interested
3 Confidentiality concerns
4 Information too personal
5 Need more information about study
6 Don't want to give blood - afraid of needles
7 Other (specify):S16_OTH_____

Interviewer ID:

Person ID:

Script for Eligibility Questionnaire: Adult
Lafayette Parish

Hello, my name is (INTERVIEWER NAME) and I'm calling on behalf of the Agency for Toxic Substances and Disease Registry. May I speak with (RESPONDENT), please?

YES ⎫ SKIP TO **(Q1)**
NO ⎭ When is a good time to call back and speak with (RESPONDENT)?

DAY OF WEEK:

Mon	Tues
Wed	Thurs
Fri	Sat
	Sun

DATE: _____/_____/__2002__

TIME: _____:_____ AM/PM

(Q1) A few days ago you should have received a letter from us telling you that we are conducting a health study in Lafayette Parish and that we might call you. I am calling to see if you might be interested in participating in the study. Did you receive this letter?Q1_AD

YES ⎫ CONTINUE WITH **(Q2)**
NO ⎭ NOLET The letter explained that you were selected to participate in a study we are conducting in Lafayette Parish. Would you like me to read this letter to you? (IF YES, READ LETTER AND THEN CONTINUE WITH **(Q2)**. IF NO, CONTINUE WITH **(Q2).**

(Q2) Participation will involve completing a questionnaire and having some blood drawn from your arm. If you decide to participate, it should take about one to two, hours of your time. We will schedule a time for you to come to our office which is convenient for you. You will receive $50 for your time and travel. If you are interested, I will need to ask you some additional questions to see if you are eligible to be in the study. Do you have any questions?Q2_AD

ANSWER QUESTIONS.
INTERESTED ⎫ SKIP TO **(Q3)**
NOT INTERESTED ⎭ SKIP TO **(Q4A)**

(Q3) I would like to confirm a few things and then ask you some questions to see if you are eligible to be in the study. Before we start, I want to let you know that your participation is voluntary. You have the right to refuse to answer any question at any time. All data will be kept private to the extent permitted by law. No data that identifies you or your place of residence will be included in any report. If you have questions about the study or your rights if you take part I have a phone number you can call. Would you like this number?Q3_AD

YES ⎩ You can call my supervisor or get more information about the study by calling NORC toll-free at 1-866-835-6672.
NO ⎩ CONTINUE

Are you willing to consider participating at this time? Q3A_AD

YES ⎩ **GO TO ELIGIBILITY QUESTIONNAIRE ON FOLLOWING PAGE**.
NO ⎩ CONTINUE WITH **(Q4A)**

Q4A. Thank you for your time. May I ask why you do not wish to participate? Q4A_AD

1 Too busy
2 Not interested
3 Confidentiality concerns
4 Information too personal
5 Need more information about study
6 Don't want to give blood - afraid of needles
7 Other (specify):Q4A_OTH_____

ELIGIBILITY SCREENER: LAFAYETTE PARISH

1. Last Name S1_LNAME	First Name S1_FNAME	Middle Initial S1_MNAME
2. Gender S2GENDER |___| M |___| F	3. Age S3_AGE	
4. Date of Birth S4_DOBMO, S4_DOBDAY, S4_DOBYR |___|___| - |___|___| - |___|___|___|___| Month Day Year		
5. Address Line 1: S5_ADDR1_____ Line 2 (Apt #, Lot #): S5_ADDR2 _____ City S5_CITY _____ State S5_STATE_____ ____ Zip Code S5_ZIP_____ _____		
6.Telephone Number(s) Primary telephone number: S6PHONE1_____ - _____ - _____ Secondary phone number (if avail): S6PHONE2 _____ - _____ - _____ What type of line is this number? S6_TLINE work ____ cell phone ____ other Best time to reach respondent: S6_BTIME ___ ___ : ___ ___ am/pm S6_AMPM		
7. Have you lived in Lafayette Parish for the last 5 years? S7_5YRS	YES	NO Ineligible. Thank you for your time. In order to participate in this investigation you must have lived in Lafayette Parish for the last 5 years. INELIG1
8. How long have you lived in Lafayette Parish? S8_YRS	_____ Years	
9. Have you ever lived in Calcasieu Parish S8A_EVER	YES - Ineligible Thank you for your time. In order to	NO

	participate in this investigation you may not have ever lived in Calcasieu Parish. INELIG1	

10. Do you have hemophilia or any other blood clotting or bleeding disorder? S9_HEMO	YES → Ineligible	Thank you for your time. In order to participate in this investigation you must be eligible to give a blood sample. Your "Yes" answer makes you ineligible to give blood. INELIG2	NO
11. Have you received chemotherapy in the past 6 weeks? S10_CHEMO	YES → Ineligible		NO
12. Do you weigh less than 95 pounds? S11_WGH	YES → Ineligible		NO
13. Have you lost more than 15 lbs. In the last year? S12_LOST	YES → Ineligible		NO
For Women Only			
14. Are you currently pregnant? S13_PREG	YES → Ineligible		NO
15. Have you breast fed a child in the last 6 months? S14_BFED	YES → Ineligible		NO

For All Respondents

16. You are eligible to be in the study. Would you be willing to consider participating in the tests for dioxin and volatile organic compounds by completing a questionnaire and having some blood drawn from your arm? S15_INT	Yes Schedule Appointment	No Skip to Q5	I need more information. Schedule follow-up call.

Is R ready to schedule appointment APPTMO

Thank you very much for your time.

Appointment scheduled for:

Date Time Location

_____ _____ _____

Follow-up call scheduled for:

Date Time

_____ _____

Q5. Thank you for your time. May I ask why you do not wish to participate? S16_NOTINT

1 Too busy
2 Not interested
3 Confidentiality concerns
4 Information too personal
5 Need more information about study
6 Don't want to give blood - afraid of needles
7 Other (specify):S16_OTH_____

Appendix E

Informed Consent Documents
Consent for Adults
Consent for Parent or guardian of Minor
Assent for Minor

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
U.S. PUBLIC HEALTH SERVICE
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY
ATLANTA, GEORGIA 30333

ADULT CONSENT TO BE IN A HEALTH STUDY

What We Are Doing

The Agency for Toxic Substances and Disease Registry (ATSDR) is doing research about exposure to some chemicals in a few parishes in Louisiana. Your parish has been chosen for the study. The chemicals which we will study are called dioxins and volatile organic compounds (VOCs).

Dioxin is a name given to a family of similar chemicals. Dioxins are found in the air, water, soil and food. Dioxins are not made on purpose. They come from burning fuel, wood and waste and from making certain products. When dioxins get in the environment, they do not break down easily. They do not dissolve in water and they do not evaporate in air. When they get in your body they stay for a long time in your blood and body fat. Everyone has some dioxin in their blood.

Volatile Organic Compounds or **VOCs** are a group of chemicals which go from liquid to gas, or evaporate, very quickly. This means that they can get into the air easily. There are many individual VOCs. Some common things which have VOCs in them are: gasoline, kerosene, nail polish remover, paints, paint thinners, dry cleaner fluid, cleaning products, pesticides, glues, permanent markers, and building materials and home furnishings. We are all exposed to VOCs. Some health effects from too much VOC exposure include eye and throat irritation, nasal congestion, rash, headache, nausea, shortness of breath, and vomiting.

Why We Are Doing This Study

The purpose of the study is to find out if there are differences in the levels of dioxin in different people's blood. We will also look at VOC levels in people's blood to see if there are differences in the levels between people. If we find differences, we will look to see if the people with higher levels have anything in common. This study will tell us about dioxin and VOC level by age, eating habits, where people work, and where people live. We can use those facts with what we know about soil, air and water to help learn how people come into contact with dioxin and VOCs.

Why You Are Being Asked to Be in this Study

You have been chosen for this study because you live in one of the selected areas, you are the right age, and you are able to give a blood sample. We are asking you to be in this study to help us find out if there are differences in the levels of dioxins and VOCs in people's blood.

What We Will Ask You to do

You are free to join the study or not. If you join the study, you are free to stop at any time. If you join the study you will be asked some questions and we will draw some blood from your arm.

What We Will do

We will ask you some questions to make sure that you can be in the study and that you can give blood.

1. A person trained to draw blood will take 60 ml (about 3_ tablespoons) of blood from a vein in your arm.
2. A staff person will ask you questions about where you have lived, worked, and what foods you eat.

How Long it Will Take
It should take about one hour, but no more than two hours, to complete blood test and questions. You will only have to give a blood sample once.

Contacting You in the Future
We will send you a letter with your test results. The letter will have a number for you to call if you have any questions. If we find any pattern of exposure, we may contact you to ask additional questions sometime in the future. If you agree to allow us to contact you, we will explain our questions to you in advance and you can decide to consent to answer them or not in the same manner that you are doing now.

What We Will Do with Your Blood
For this study we will look at your blood for dioxins and VOCs only. We will not test your blood for anything else.

We don't know enough about the human health effects of dioxin but progress in studying dioxin and human health is being made every day. Your blood and the results of the test that we are doing on it for this study may be helpful in the future. Because of that, any blood that is left after we test it will be stored for future study. If we want to conduct a study which will be meaningful to your health, we will contact you to ask for your consent. You will be free to agree or not agree to our using your blood in another study. If your blood is used for any analysis which does not pertain to your health, such as research on analysis methods, we will remove your name and anything that could link the blood to you. If you change your mind about having your blood stored, you can contact the Principal Investigator, M. Deborah Millette at 404-498-0563 or 1-888- 422-8737.

What the Study Will Tell us
1. The level of dioxin and VOCs that you have in your blood.
2. The level of dioxin and VOCs that other people have in their blood.
3. If there are differences in people's dioxin levels and VOC levels, and if so, if there are any patterns to the differences.
4. What environmental health activities may be needed in the future.

What the Study Will Not Tell us
1. Where the dioxin or VOCs came from, if they are found
2. Information on chemicals other than dioxin and VOCs.
3. If you will get sick from the level of dioxin and VOCs in your blood

Risks
We will try to make you as comfortable as possible but taking your blood may hurt a little. You will feel a slight "pinch" when we put the needle in. You may feel some discomfort or see a small bruise where the blood was drawn.
Benefits

You will receive a copy of your test results and a copy will be sent to your physician if you wish. You will receive fact sheets about dioxins and VOCs. You will assist in answering questions about the amount of dioxin and VOCs in people's blood.

If You Don't Want to Be in the Study or If You Change Your Mind Later
You can refuse to take the blood test or answer any survey questions. There is no penalty. You may choose to leave this study at any time, even after signing the consent form.

Privacy
Your name and test results are kept private to the extent allowed by law. Your name will not be used in any reports written about this study. Any reports written about the study will use dioxin and VOC levels. All names and test results will be kept in a locked file.

Payment for Your Time
You will get a $50 money order after giving a blood sample and answering the questions, to repay you for travel and your time for being in the study.

Contact Person
If you have any questions, feel that you have been hurt by being in this study, or wish to have your blood removed from storage, please contact:

M. Deborah Millette, Principal Investigator
Agency for Toxic Substances and Disease Registry
1600 Clifton Road E-31
Atlanta, Georgia 30333
Direct: 404-498-0563
Toll-free: 1-888- 422-8737 Extension 0563

Please leave your name, telephone number, and your question(s). Your call will be returned as soon as possible.

For questions regarding research subjects' rights, please contact:

Dr. Robin Wagner, Deputy Associate Administrator for Science,
Agency for Toxic Substances and Disease Registry
1600 Clifton Road E-31
Atlanta, Georgia 30333
Direct: 404-498-0003
Toll-free: 1-888-422-8737 Extension 0003

If you do not understand the study or what we are asking you to do, please ask questions. If you have no questions and agree to be in this study, please sign the consent form.

PARTICIPANT CONSENT

I agree to be in the health study. I have read and/or been told about what the study is about, the study questions, and blood samples. I have been given a chance to ask questions and I feel that my questions have been answered. I know that being in this study is my choice and that I can leave it at any time. I have been given a copy of this Consent Form.

Please answer the following questions by initialing your response. Your answers will not disqualify you from the study. You may have your blood removed from storage at any time by calling the number listed above. If you allow us to contact you in the future, you are not agreeing to answer any future questions. You will be able to agree or decline to answer our questions at that time.

You may store my blood for future study. I may choose to remove my blood from storage at any time. YES_____ NO_____	You may contact me in the future if you have additional questions. At that time I will be asked my consent again. YES_____ NO_____

_____
Participant Name (Print)

_____ _____
Participant's Signature Date

I would like a copy of my test results to be sent to my doctor:

Name: _____Telephone Number:_____

Address:_____

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
U.S. PUBLIC HEALTH SERVICE
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY
ATLANTA, GEORGIA 30333

PARENTAL CONSENT FOR YOUR CHILD TO BE IN A HEALTH STUDY

What We Are Doing

The Agency for Toxic Substances and Disease Registry (ATSDR) is doing research about exposure to some chemicals in a few parishes in Louisiana. Your parish has been chosen for the study. The chemicals which we will study are called dioxins and volatile organic compounds (VOCs).

Dioxin is a name given to a family of similar chemicals. Dioxins are found in the air, water, soil and food. Dioxins are not made on purpose. They come from burning fuel, wood and waste and from making certain products. When dioxins get in the environment, they do not break down easily. They do not dissolve in water and they do not evaporate in air. When they get in your body they stay for a long time in your blood and body fat. Everyone has some dioxin in their blood.

Volatile Organic Compounds or **VOCs** are a group of chemicals which go from liquid to gas, or evaporate, very quickly. This means that they can get into the air easily. There are many individual VOCs. Some common things which have VOCs in them are: gasoline, kerosene, nail polish remover, paints, paint thinners, dry cleaner fluid, cleaning products, pesticides, glues, permanent markers, and building materials and home furnishings. We are all exposed to VOCs. Some health effects from too much VOC exposure include eye and throat irritation, nasal congestion, rash, headache, nausea, shortness of breath, and vomiting.

Why We Are Doing this Study

The purpose of the study is to find out if there are differences in the levels of dioxin in different people's blood. We will also look at VOC levels in people's blood to see if there are differences in the levels between people. If we find differences, we will look to see if the people with higher levels have anything in common. This study will tell us about dioxin and VOC level by age, eating habits, where people work, and where people live. We can use those facts with what we know about soil, air and water to help learn how people come into contact with dioxin and VOCs.

Why Your Child Is Being Asked to Be in this Study

Your child has been chosen for this study because he/she lives in one of the selected areas, is the right age, and is able to give a blood sample. We are asking your child to be in this study to help us find out if there are differences in the levels of dioxins and VOCs in people's blood.

What We Will Ask You and Your Child to do

Your are free to allow your child to join the study or not. If he/she joins the study, he/she is free to stop at any time.

If you allow your child to join the study he/she will be asked some and we will draw some blood from his/her arm. Before we ask your child any questions, we will ask you to leave the room. We cannot tell you anything about the answers your child gives.

What We Will do
We will ask your child some questions to make sure that he/she can be in the study and that he/she can give blood.

1. A person trained to draw blood will take 60 ml (about 3_ tablespoons) of blood from a vein in his/her arm.
2. A staff person will ask him/her questions about where he/she has lived, worked, and what foods he/she eats.

How Long it Will Take
It should take about one hour, but no more than two hours, to complete the blood test and questions. He/She will only have to give a blood sample once. Depending on what we find, we may contact you or your child to ask additional questions sometime in the future.

Contacting You and Your Child in the Future
We will send you and your child letters with their test results. The letter will have a number for you or your child to call if you have any questions. If we find any pattern of exposure, we may contact you and your child to ask additional questions sometime in the future. If you agree to allow us to contact you and your child, we will explain our questions to you in advance and you can decide to consent to answer them or not in the same manner that you are doing now.

What We Will Do with Your Child's Blood
For this study we will look at your child's blood for dioxins and VOCs only. We will not test your child's blood for anything else.

We don't know enough about the human health effects of dioxin but progress in studying dioxin and human health is being made every day. Your child's blood and the results of the test that we are doing on it for this study may be helpful in the future. Because of that, any blood that is left after we test it will be stored for future study. If we want to conduct a study which will be meaningful to your child's health, we will contact you to ask for your consent. You will be free to agree or not agree to our using your child's blood in another study. If your child's blood is used for any analysis which does not pertain to his/her health, such as research on analysis methods, we will remove his/her name and anything that could link the blood to him/her. If you change your mind about having your child's blood stored, you can contact the Principal Investigator, M. Deborah Millette at 404-498-0563 or 1-888- 422-8737.

The Study Will Tell Us:
1. The level of dioxin and VOCs that your child has in his/her blood.
2. The level of dioxin and VOCs that other people have in their blood.
3. If there are differences in people's dioxin levels and VOC levels, and if so, if there are any patterns to the differences.
4. What environmental health activities may be needed in the future.

The Study Will Not Tell Us:

1. Where the dioxin or VOCs came from, if they are found.
2. Information on chemicals other than dioxin and VOCs.

3. If your child will get sick from the level of dioxin and VOCs in his/her blood.

Risks
We will try to make your child as comfortable as possible but taking his/her blood may hurt a little. He/She will feel a slight "pinch" when we put the needle in. He/She may feel some discomfort or see a small bruise where the blood was drawn.

Benefits
You and your child will receive a copy of his/her test results and a copy will be sent to his/her physician if you wish. You and your child will receive fact sheets about dioxins and VOCs. Your child will assist in answering questions about the amount of dioxin and VOCs in people's blood.

If You Don't Want Your Child to Be in the Study or If You or Your Child Change Your Minds Later
You can refuse to allow your child give a blood sample or answer any survey questions. Your child can refuse to take the blood test or answer any survey questions. Your child may choose to leave this study at any time, even after you sign the consent form. If you withdraw your consent, your child will leave the study. There is no penalty.

Privacy
Your child's name and test results are kept private, to the extent allowed by law. His/Her name will not be used in any reports written about this study. Any reports written about the study will only use dioxin and VOC levels. All names and test results will be kept in a locked file.

Payment for Your Child's Time
Your child will get a $50 money order after giving a blood sample and answering the questions, to repay him/her for travel and his/her time for being in the study.

Contact Person
If you have any questions, ~~or~~ feel that your child has been hurt by being in this study, or wish to have your child's blood removed from storage, please contact:

M. Deborah Millette, Principal Investigator
Agency for Toxic Substances and Disease Registry
1600 Clifton Road E-31
Atlanta, Georgia 30333
Direct: 404-498-0563
Toll-free: 1-888- 422-8737 Extension 0563

Please leave your name, telephone number, and your question(s). Your call will be returned as soon as possible.

For questions regarding research subjects' rights, please contact:

Dr. Robin Wagner, Deputy Associate Administrator for Science,
Agency for Toxic Substances and Disease Registry
1600 Clifton Road E-31
Atlanta, Georgia 30333
Direct: 404-498-0003

Toll-free: 1-888-422-8737 Extension 0003

If you do not understand the study or what we are asking you and you child to do, please ask questions. If you have no questions and agree to allow your child to be in this study, please sign the consent form.

PARENTAL CONSENT FOR YOUR CHILD TO BE IN A HEALTH STUDY

I agree to allow my child to be in the health study. I have read and/or been told about what the study is about, the study questions, and blood samples. I have been given a chance to ask questions and I feel that my questions have been answered. I know that allowing my child to be in this study is my choice and my child can leave it at any time at his/her request or at my request. I have been given a copy of this Consent Form.

Please answer the following questions by initialing your response. Your answers will not disqualify you from the study. You may have your child's blood removed from storage at any time by calling the number listed above. If you allow us to contact you and your child in the future, you are not agreeing to answer any future questions. You will be able to agree or decline to answer our questions at that time.

You may store my child's blood for future study. I may choose to remove my child's blood from storage at any time. YES_____ NO_____	You may contact me and my child in the future if have additional questions. At that time my child a will be asked for our consent again. YES_____ NO_____

_____

Child's Name (Print)

_____

Parent or Guardian's Name (Print)

_____ _____

Parent or Guardian's Signature Date

I would like a copy of my child's test results to be sent to his/her doctor:

Name: _____
Telephone Number:_____
Address:_____

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
U.S. PUBLIC HEALTH SERVICE

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY
ATLANTA, GEORGIA 30333

YOUTH ASSENT TO BE IN A HEALTH STUDY

What We Are Doing?
The Agency for Toxic Substances and Disease Registry (ATSDR) is doing research about exposure to some chemicals in a few parishes in Louisiana. Your parish has been chosen for the study. The chemicals which we will study are called dioxins and volatile organic compounds (VOCs).

Dioxin is a name given to a family of similar chemicals. Dioxins are found in the air, water, soil and food. Dioxins are not made on purpose. They come from burning fuel, wood and waste and from making certain products. When dioxins get in the environment, they do not break down easily. They do not dissolve in water and they do not evaporate in air. When they get in your body they stay for a long time in your blood and body fat. Everyone has some dioxin in their blood.

Volatile Organic Compounds or VOCs are a group of chemicals which go from liquid to gas, or evaporate, very quickly. This means that they can get into the air easily. There are many individual VOCs. Some common things which have VOCs in them are: gasoline, kerosene, nail polish remover, paints, paint thinners, dry cleaner fluid, cleaning products, pesticides, glues, permanent markers, and building materials and home furnishings. We are all exposed to VOCs. Some health effects from too much VOC exposure include eye and throat irritation, nasal congestion, rash, headache, nausea, shortness of breath, and vomiting.

Why We Are Doing This Study
We are trying to find out if there are differences in the levels of dioxin in different people's blood. We will also look at VOC levels in people's blood to see if there are differences in the levels between people. If we find differences, we will look to see if the people with higher levels have anything in common. This study will tell us about dioxin and VOC level by age, eating habits, where people work, and where people live. We can use those facts with what we know about soil, air and water to help learn how people come into contact with dioxin and VOCs.

Why You Are Being Asked to Be in this Study
You have been chosen for this study because you live in one of the selected areas, you are the right age, and you are able to give a blood sample. We are asking you to be in this study to help us find out if there are differences in the levels of dioxins and VOCs in peoples' blood.

What We Will Ask You to Do:
You are free to join the study or not. If you join the study, you are free to stop at any time.

If you join the study you will be asked some questions and we will draw some blood from your arm.
What We Will Do:
We will ask you some questions to make sure that you can be in the study and that you can give blood.

1. A person trained to draw blood will take 60 ml (about 3 _ tablespoons) of blood from a

vein in your arm.

2. A staff person will ask you questions about where you have lived, worked, and what foods you eat. Before we ask you these questions we will ask your parent(s) or guardian to leave the room (unless you prefer to have them stay with you). We cannot tell your parent(s) or guardian about your answers.

How Long it Will Take

It should take about one hour, but no more than two hours, to complete the blood test and questions. You will only have to give a blood sample once. Depending on what we find, we may contact you to answer additional questions sometime in the future.

Contacting You in the Future

We will send you a letter with your test results. The letter will have a number for you to call if you have any questions. If we find any pattern of exposure, we may contact you to ask additional questions sometime in the future. If you agree to allow us to contact you, we will explain our questions to you in advance and you can decide to consent to answer them or not in the same manner that you are doing now.

What We Will Do with Your Blood

For this study we will look at your blood for dioxins and VOCs only. We will not test your blood for anything else.

We don't know enough about the human health effects of dioxin but progress in studying dioxin and human health is being made every day. Your blood and the results of the test that we are doing on it for this study may be helpful in the future. Because of that, any blood that is left after we test it will be stored for future study. If we want to conduct a study, which will be meaningful to your health, we will contact you to ask for your consent. You will be free to agree or not agree to our using your blood in another study. If your blood is used for any analysis which does not pertain to your health, such as research on analysis methods, we will remove your name and anything that could link the blood to you. If you change your mind about having your blood stored, you can contact the Principal Investigator, M. Deborah Millette at 404-498-0563 or 1-888- 422-8737.

What the Study Will Tell us

1. The level of dioxin and VOCs that you have in your blood.
2. The level of dioxin and VOCs that other people have in their blood.
3. If there are differences in people's dioxin levels and VOC levels, and if so, if there are any patterns to the differences.
4. What environmental health activities may be needed in the future.

What the Study Will Not Tell Us

1. Where the dioxin or VOCs came from, if they are found
2. Information on chemicals other than dioxin and VOCs.
3. If you will get sick from the level of dioxin and VOCs in your blood

Risks

We will try to make you as comfortable as possible but taking your blood may hurt a little. You will feel a slight "pinch" when we put the needle in. You may feel some discomfort or see a small bruise where the blood was drawn.

Benefits
You and your parent(s) will both receive a copy of your test results. You will receive fact sheets about dioxins and VOCs. You will assist in answering questions about the amount of dioxin and VOCs in people's blood.

If You Don't Want to Be in the Study or If You Change Your Mind Later
You can refuse to take the blood test or answer any survey questions. There is no penalty. You may choose to leave this study at any time, even after signing the consent form. If your parent(s) decides to withdraw their consent, you will leave the study.

Privacy
Your name and test results are kept private, to the extent allowed by law. Your name will not be used in any reports written about this study. Any reports written about the study will only use dioxin and VOC levels. All names and test results will be kept in a locked file.

Payment for Your Time
You will get a $50 money order after giving a blood sample and answering the questions, to repay you for travel and your time for being in the study.

Contact Person
If you have any questions, feel that you have been hurt by being in this study, or wish to have your blood removed from storage, please contact:

M. Deborah Millette, Principal Investigator
Agency for Toxic Substances and Disease Registry, 1600 Clifton Road , Atlanta, Georgia 30333
Direct: 404-498-0563
Toll-free: 1-888- 422-8737 Extension 0563

Please leave your name, telephone number, and your question(s). Your call will be returned as soon as possible.

For questions regarding research subjects' rights, please contact:
Dr. Robin Wagner, Deputy Associate Administrator for Science,
Agency for Toxic Substances and Disease Registry, 1600 Clifton Road, Atlanta, Georgia 30333
Direct: 404-498-0003
Toll-free: 1-888-422-8737 Extension 0003

If you do not understand the study or what we are asking you to do, please ask questions. If you have no questions and agree to be in this study, please sign the consent form.

YOUTH ASSENT TO BE IN A HEALTH STUDY

I agree to be in the health study. I have read and/or been told about what the study is about, the study questions, and blood samples. I have been given a chance to ask questions and I feel that my questions have been answered. I know that being in this study is my choice and that I can leave it at any time. I understand that my parent(s) can withdraw consent for me to participate in this study at any time. I have been given a copy of this Assent Form.

Please answer the following questions by initialing your response. Your answers will not disqualify you from the study. You may have your blood removed from storage at any time by calling the number listed above. If you allow us to contact you in the future, you are not agreeing to answer any future questions. You will be able to agree or decline to answer our questions at that time.

You may store my blood for future study. I may choose to remove my blood from storage at any time. YES_____ NO_____	You may contact me in the future if you have additional questions. At that time I will be asked my consent again. YES_____ NO_____

_____
Participant Name (Print)

_____ _____
Participant's Signature Date

Appendix F

Study Questionnaire

The questionnaire for Lafayette Parish is included. It includes one more question than the version used in Calcasieu Parish. That question is, “Have you ever lived in Calcasieu Parish”.

The Louisiana Calcasieu and Lafayette Parishes Dioxin and Volatile Organic Compounds Exposure Investigation

Investigation Questionnaire Lafayette Parish, Louisiana

a. U.S. Department of Health and Human Services
b. U.S. Public Health Service
c. Agency for Toxic Substances and Disease Registry
d. Atlanta, Georgia 30333

Respondent ID: PERSONID Interviewer ID: _____

Interview Date: ____ / ____ / ____ Interview Time: Begin [ ][ ] : [ ][ ] am/pm

End [ ][ ] : [ ][ ] am/pm

QUEX Status: [ ][ ] Blood Draw ID: _____

1. RESPONDENT INFORMATION

First I'm going to ask you some questions about yourself.

79.What is your name?

Last: Q1_LNAME

First: Q1_FNAME Middle: Q1_MNAME

80.Date of Birth ____/____/____ Q2DOB_MO/Q2DOB_DY/Q2DOB_YR

81.Age (years) _____ Q3_AGE **(If <15 years, ineligible, GO TO END)**

82.What is your Race (circle all that apply)?

1. White Q4_RACE1
2. Black, African American Q4_RACE2
3. American Indian, Alaska Native Q4_RACE3
4. Asian Q4_RACE4
5. Hispanic/Latino Q4_RACE5
6. Native Hawaiian,Pacific IslanderQ4_RACE6
   1. Other Specify Q4_RACE7

RACEOTH _____

8. Don't Know
9. Refused

83.What is your home address?

Address Line 1: Q5_ADDR1

Line 2 (Apt/Lot #): Q5_ADDR2

City: Q5_CITY

State: Q5_STATE Zip code: Q5_ZIP

84.What is your telephone number(s)?

		Q6_HMPH	
Home:	( )	_____	- _____
		Q6_WKPH	
Work:	( )	_____	- _____
		Q6_CELL	
Cell:	( )	_____	- _____
		Q6_OTHPH	
Other:	( )	_____	- _____

2. ELIGIBILITY

Now I'm going to ask you some questions to confirm your eligibility to give blood.

	YES	NO	DON'T KNOW	REFUSED	IF YES, DON'T KNOW OR REFUSED R IS NOT ELIGIBLE FOR BLOOD DRAW: Thank you. Your answer makes you ineligible to give a blood sample. However, you will be able to complete the questionnaire. When we finish with the survey, I will take you to the check out area.
85.Do you have hemophilia or any other blood clotting or bleeding disorder? Q7	1	2	3	4	
86.Have you received chemotherapy in the past 6 months? Q8	1	2	3	4	
87.Do you weigh less than 95 pounds? Q9	1	2	3	4	
88.Have you lost more than 15 pounds in the last year? Q10	1	2	3	4	
89.WOMEN: Are you currently pregnant? Q11	1	2	3	4	
90.WOMEN: Have you breastfed a child in the last 6 months? Q12	1	2	3	4	

	YES	NO	IF R answers "YES" to Q13 and "NO" to Q14: Thank you. Based on your answer you may not be able to give a blood sample. We will complete the questionnaire and then take your blood pressure to see if you are eligible to give a blood sample.
91.Have you ever been told by a physician that you have high blood pressure? Q13	1	2 (Go to Q15)	
92.Are you being treated for this condition with medications? Q14	1	2	

93.When did you move to Lafayette Parish?
Q15_MTH, Q15_DAY, Q15_YR

	/		/	
mm		dd		yyyy

IF DATE IS AFTER 1997, R IS NOT ELIGIBLE FOR BLOOD DRAW:
Thank you. You must have lived in Lafayette Parish for at least 5 years. Your answer makes you

94.Have you ever lived in Calcasieu Parish? Q16

o YES ⎩ o NO

If "Yes", R IS NOT ELIGIBLE FOR BLOOD DRAW:Thank you. You must never have lived in Calcasieu Parish. Your answer makes you ineligible to give a blood sample. However, you will be able to complete the questionnaire. When we finish with the survey, I will take you to the check out area.

95.Have you lived at another address in Lafayette Parish? Q17

o YES ⎪ o NO ➨ **GO TO Q18**

If you ever lived at another address in Lafayette Parish, please give the other address(es) and the dates you lived there:

17A. **What was the first address?**

What dates did you live at the most recent address? From: Q17A_BM, Q17A_BY (mm yyyy) To: Q17A_EM, 17A_EY (mm yyyy)

Address Line 1: Q17A_AD1

Line 2 (Apt/Lot #): Q17A_AD2

City: Q17A_CTY State: Q17A_ST

Zip code: Q17A_ZIP Telephone: Q17A_PH

17B. **Was there another address?** o YES o NO ⎩ **(GO TO Q18)** Q17B

What dates did you live at the next most recent address? From: Q17B_BM, Q17B_BY (mm yyyy) To: Q17B_EM, 17B_EY (mm yyyy)

Address Line 1: Q17B_AD1

Line 2 (Apt/Lot #): Q17B_AD2

City: Q17B_CTY State: Q17B_ST

Zip code: Q17B_ZIP Telephone: Q17B_PH

17C. **Was there another address?** o YES o NO ⎩ **(GO TO Q18) Q17C**

What dates did you live at the next most recent address? From: Q17C_BM,Q17C_BY (mm yyyy) To: Q17C_EM, 17C_EY (mm yyyy)

Address Line 1: Q17C_AD1

Line 2 (Apt/Lot #): Q17C_AD2

City: Q17C_CTY State: Q17C_ST

Zip code: Q17C_ZIP Telephone: Q17C_PH

17D. **Was there another address?** o YES o NO ⎩ **(GO TO Q18) Q17D**

What dates did you live at the next most recent address? From: Q17D_BM,Q17D_BY (mm yyyy) To: Q17D_EM, 17D_EY (mm yyyy)

Address Line 1: Q17D_AD1

Line 2 (Apt/Lot #): Q17D_AD2

City: Q17D_CTY State: Q17D_ST

Zip code:	Q17D_ZIP	Telephone:	Q17D_PH

17E. **Was there another address?** o YES o NO ⎩ **(GO TO Q18) Q17E**

What dates did you live at the next most recent address?	From:	Q17E_BM, Q17E_BY mm yyyy	To:	Q17E_EM, 17E_EY mm yyyy	
Address Line 1:	Q17E_AD1				
Line 2 (Apt/Lot #):	Q17E_AD2				
City:	Q17E_CTY		State:	Q17E_ST	
Zip code:	Q17E_ZIP		Telephone:	Q17E_PH	

Case ID: | | Lab ID: | |

3. SMOKING HISTORY

Next I'm going to ask you some questions about your smoking history.

	YES	NO	DON'T KNOW	REFUSED
96.Have you ever smoked cigarettes? Q18	1	2 **(GO TO Q22)**	3	4
97.Have you smoked cigarettes in the past 5 years? Q19	1	2 **(GO TO Q22)**	3	4
98.Do you currently smoke? Q20	1 **(GO TO Q21)** Check ineligible smoker on case label	2 **(GO TO Q22)**	3 **(GO TO Q22)**	4 **(GO TO Q22)**

99.How many cigarettes do you smoke a day? Q21

1. Up to _ pack
2. Up to 1 pack
3. Up to 1 _ pack
4. Up to 2 packs
5. Over 2 packs

4. OCCUPATION

Next I'm going to ask you some questions about your job. Please base your answers on your current job, or if retired or unemployed, your last job.

100.A. **What is the name of the company for which you work(ed)?**

Q22A Q22VER

If Homemaker or never worked, please check one of the following: Q22A1

o Homemaker with past employment experience ⎩ **GO TO Q23**

o Homemaker who has never worked ⎩ **GO TO Q35**

o Never worked ⎩ **SKIP TO Q35**

B. **What kind of business or industry is this, that is, what do they make or do at the place where you work?**

Q22B

C. **What do you actually do on the job, what are some of your main duties?**

Q22C

D. **How many years have you been doing this job?**

Q22D # Years

E. **How many hours a week do you usually work on this job?**

Q22E # Hours

5. DIOXIN EXPOSURE

Next I'm going to ask you some questions about dioxin exposure throughout your employment history.

101.Have you EVER been employed: Q23_1

In the manufacture, formulation, or commercial application of the herbicide 2, 4-D, 2,4,5-T or related compounds. *Example: Agent Orange, Agricorn D, D50, Lawn-keep, Pantgard, Weed-B-Gon* ..... o YES o NO (GO TO Q24) o DK

(Most recent job with exposure)

A. **What is the name of the company for which you worked?**

Q23A1 Q23A1VER

B. **In what City and State was the company located?**

City: Q23B1CTY **State:** Q23B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q23C1

D. **How many years had you been doing this job?**

Q23D1 # Years

Did you do this work for another company? o YES o NO **GO TO Q24**

(Next most recent job with exposure) Q23_2

102.Have you EVER been employed: Q24_1

In the manufacture or formulation of hexachlorophene? o YES o NO | o DK
Example: Phisohex, Septisol, Septpfen, Dermadex ..... **(GO TO Q25)**

*(**If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q24A1 Q24A1VER

B. **In what City and State was the company located?**

City: Q24B1CTY **State:** Q24B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q24C1

D. **How many years had you been doing this job?**

Q24D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
(Next most recent job with exposure) Q24_2

A. **What is the name of the company for which you worked?**

Q24A2 Q24A2VER

B. **In what City and State was the company located?**

City: Q24B2CTY **State:** Q24B2ST

C. **What did you actually do on the job, what were some of your main duties?**

Q24C2

D. **How many years had you been doing this job?**

Q24D2 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
If Yes Insert extra job pages here Q24_3

103.Have you EVER been employed: Q25_1

In direct handling, transportation, or disposal of phenolic or pesticide hazardous waste? Example: Insecticide, Karbofos, Kill-A-Mite, Melathion, Parathion ..... o YES o NO **(GO TO Q26)** o DK

*(**If Yes** ⎩ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q25A1 Q25A1VER

B. **In what City and State was the company located?**

City: Q25B1CTY **State:** Q25B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q25C1

D. **How many years had you been doing this job?**

Q25D1 # Years

Did you do this work for another company? o YES o NO ⎩ **GO TO Q25**
(Next most recent job with exposure) Q25_2

104.Have you EVER been employed: Q26_1

In the lawn care industry? ..... o YES o NO | o DK
(GO TO Q27)

*(**If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q26A1 Q26A1VER

B. **In what City and State was the company located?**

City: Q26B1CTY **State:** Q26B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q26C1

D. **How many years had you been doing this job?**

Q26D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
(Next most recent job with exposure) Q26_2

A. **What is the name of the company for which you worked?**

Q26A2 Q26A2VER

B. **In what City and State was the company located?**

City: Q26B2CTY **State:** Q26B2ST

C. **What did you actually do on the job, what were some of your main duties?**

Q26C2

D. **How many years had you been doing this job?**

Q26D2 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
If Yes Insert extra job pages here Q26_3

105.Have you EVER been employed: Q27_1

In sod production? ..... o YES o NO | o DK
(GO TO Q28)

*(**If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q27A1 Q27A1VER

B. **In what City and State was the company located?**

City: Q27B1CTY **State:** Q27B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q27C1

D. **How many years had you been doing this job?**

Q27D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
(Next most recent job with exposure) Q24_2

A. **What is the name of the company for which you worked?**

Q27A2 Q27A2VER

B. **In what City and State was the company located?**

City: Q27B2CTY **State:** Q27B2ST

C. **What did you actually do on the job, what were some of your main duties?**

Q27C2

D. **How many years had you been doing this job?**

Q27D2 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
If Yes Insert extra job pages here Q27_3

106.Have you EVER been employed: Q28_1

In crop management? ..... o YES o NO | o DK
(GO TO Q29)

*(**If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q28A1 Q28A1VER

B. **In what City and State was the company located?**

City: Q28B1CTY **State:** Q28B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q28C1

D. **How many years had you been doing this job?**

Q28D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
(Next most recent job with exposure) Q28_2

107.Have you EVER been employed: Q29_1

In forestry brush control and hardwood eradication? ..... o YES o NO | **(GO TO Q30)** o DK

*(**If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q29A1 Q29A1VER

B. **In what City and State was the company located?**

City: Q29B1CTY **State:** Q29B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q29C1

D. **How many years had you been doing this job?**

Q29D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**

(Next most recent job with exposure) Q29_2

108.Have you EVER been employed: Q30_1

In highway and railroad right-of-way clearance? ..... o YES o NO | **(GO TO Q31)** o DK

*(**If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q30A1 Q30A1VER

B. **In what City and State was the company located?**

City: Q30B1CTY **State:** Q30B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q30C1

D. **How many years had you been doing this job?**

Q30D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**

(Next most recent job with exposure) Q30_2

109.Have you EVER been employed: Q31_1

In chemical warehouse operations? ..... o YES o NO | o DK
(GO TO Q32)

*(**If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q31A1 Q31A1VER

B. **In what City and State was the company located?**

City: Q31B1CTY **State:** Q31B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q31C1

D. **How many years had you been doing this job?**

Q31D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
(Next most recent job with exposure) Q31_2

A. **What is the name of the company for which you worked?**

Q31A2 Q31A2VER

B. **In what City and State was the company located?**

City: Q31B2CTY **State:** Q31B2ST

C. **What did you actually do on the job, what were some of your main duties?**

Q31C2

D. **How many years had you been doing this job?**

Q31D2 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
If Yes Insert extra job pages here Q31_3

There were 3 job iterations in this series. Only 2 iterations are listed here to establish the naming pattern and minimize document size. The last variable in series is Q31_4. Please see the data layout included with the 9/26/03 data file delivery for a complete listing of all variables included in the loop.

110.Have you EVER been employed: Q32_1

In papermill pond management? ..... o YES o NO | o DK
(GO TO Q33)

*(**If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q32A1 Q32A1VER

B. **In what City and State was the company located?**

City: Q32B1CTY **State:** Q32B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q32C1

D. **How many years had you been doing this job?**

Q32D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
(Next most recent job with exposure) Q32_2

111.Have you EVER been employed: Q33_1

In the use of pentachlorophenol? Example: Fungifen, Liroprem, Lauxton, Permasan, Woodtreat ..... o YES o NO | **(GO TO Q34)** o DK

***(If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q33A1 Q33A1VER

B. **In what City and State was the company located?**

City: Q33B1CTY **State:** Q33B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q33C1

D. **How many years had you been doing this job?**

Q33D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
(Next most recent job with exposure) Q33_2

112.Have you EVER been employed: Q34_1

As a hazardous waste worker?..... o YES o NO | o DK
(GO TO Q35)

*(**If Yes** \ Most recent job with exposure)*

A. **What is the name of the company for which you worked?**

Q34A1 Q34A1VER

B. **In what City and State was the company located?**

City: Q34B1CTY **State:** Q34B1ST

C. **What did you actually do on the job, what were some of your main duties?**

Q34C1

D. **How many years had you been doing this job?**

Q34D1 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
(Next most recent job with exposure) Q34_2

A. **What is the name of the company for which you worked?**

Q34A2 Q34A2VER

B. **In what City and State was the company located?**

City: Q34B2CTY **State:** Q34B2ST

C. **What did you actually do on the job, what were some of your main duties?**

Q34C2

D. **How many years had you been doing this job?**

Q34D2 # Years

Did you do this work for another company? o YES o NO \ **GO TO Q25**
If Yes Insert extra job pages here Q34_3

There were 4 job iterations in this series. Only 2 iterations are listed here to establish the naming pattern and minimize document size. The last variable in series is Q34_5. Please see the data layout included with the 9/26/03 data file delivery for a complete listing of all variables included in the loop.

6. HOME ENVIRONMENT

Now I'm going to ask you a few questions about your home.

113. Are pesticides, herbicides, fungicides, and germicides (bug or weed killers; flea and tick sprays, collars, powders, or shampoos) used in your home, garden, or on pets? Q35

1. YES
2. NO
3. DON'T KNOW

114.* Where does your drinking and cooking water come from? *Circle all that apply.

1. Private well Q36_1
2. City water Q36_2
3. Local spring Q36_3
4. Other Source : Q36_4 Specify Q36OTH_____
5. Don't know

7. FOOD HISTORY

The following questions ask for information about the foods that you eat. For each food, I will ask you if you have ever eaten this food, and if you have eaten this food in the past year.

	YES	NO	DK	REFUSED
115. Have you ever eaten locally caught fish or shellfish (fish caught in Lafayette Parish)? Q37	1	2 **(GO TO Q54)**	3	4
A. Do you know where the fish was caught? Q37A	1	2 **(GO TO Q37B)**	3	4

Please give names and/or locations of fishing areas.

(Interviewer show participant the map of Lafayette Parish. Ask the participant to show areas in which fish they have eaten have been caught. Record each response the participant gives.)

1) Map area # Q37_1
   Name Q37_1NM

2) Map area # Q37_2
   Name Q37_2NM

3) Map area # Q37_3
   Name Q37_3NM

4) Map area # Q37_4
   Name Q37_4NM

37B. Have you eaten locally caught fish in the past year? Q37B	1	2	3	4

		YES	NO	DK	REFUSED
116.Have you ever eaten locally caught catfish? Q38		1	2 **(GO TO Q39)**	3	4
Q38A	A. Have you eaten locally caught catfish in the past year?	1	2	3	4
117.Have you ever eaten locally caught gar? Q39		1	2 **(GO TO Q40)**	3	4
Q39A	A. Have you eaten locally caught gar in the past year?	1	2	3	4
118.Have you ever eaten locally caught redfish? Q40		1	2 **(GO TO Q41)**	3	4
Q40A	A. Have you eaten locally caught redfish in the past year?	1	2	3	4
119.Have you ever eaten locally caught perch? Q41		1	2 **(GO TO Q42)**	3	4
Q41A	A. Have you eaten locally caught perch in the past year?	1	2	3	4
120.Have you ever eaten locally caught bass? Q42		1	2 **(GO TO Q43)**	3	4
Q42A	A. Have you eaten locally caught bass in the past year?	1	2	3	4
121.Have you ever eaten locally caught flounder? Q43		1	2 **(GO TO Q44)**	3	4
Q43A	A. Have you eaten locally caught flounder in the past year?	1	2	3	4
122.Have you ever eaten locally caught trout? Q44		1	2 **(GO TO Q45)**	3	4
Q44A	A. Have you eaten locally caught trout in the past year?	1	2	3	4
123.Have you ever eaten locally caught drum? Q45		1	2 **(GO TO Q46)**	3	4
Q45A	A. Have you eaten locally caught drum in the past year?	1	2	3	4
124.Have you ever eaten locally caught shrimp? Q46		1	2 **(GO TO Q47)**	3	4
Q46	A. Have you eaten locally caught fish in the past year?	1	2	3	4
125.Have you ever eaten locally caught crawfish? Q47		1	2 **(GO TO Q48)**	3	4
Q47A	A. Have you eaten locally caught crawfish in the past year?	1	2	3	4
126.Have you ever eaten locally caught crab? Q48		1	2 **(GO TO Q49)**	3	4
Q48A	A. Have you eaten locally caught crab in the past year?	1	2	3	4
127.Have you ever eaten locally caught oysters? Q49		1	2 **(GO TO Q50)**	3	4
Q49A	A. Have you eaten locally caught oysters in the past year?	1	2	3	4
128.Have you ever eaten locally caught mussels? Q50		1	2 **(GO TO Q51)**	3	4

Q50A	A. Have you eaten locally caught mussels in the past year?	1	2	3	4

	YES	NO	DK	REFUSED
129.Have you ever eaten locally caught clams? Q51	1	2 **(GO TO Q52)**	3	4
Q51A A. Have you eaten locally caught clams in the past year?	1	2	3	4
130.Have you ever eaten locally caught seafood gumbo? Q52	1	2 **(GO TO Q53)**	3	4
Q52A A. Have you eaten locally caught seafood gumbo in the past year?	1	2	3	4
131.Have you ever eaten other locally caught fish? Q53	1	2 **(GO TO Q54)**	3	4
Q53A A. Have you eaten other locally caught fish in the past year? Specify fish Q53OTH_____	1	2	3	4
132.Have you ever eaten vegetables or fruits grown in Lafayette Parish? Q54	1	2 **(GO TO Q55)**	3	4
Q54A A. Have you eaten vegetables or fruits grown in Lafayette Parish in the past year?	1	2	3	4
133.Have you ever eaten beef, poultry, or other meat raised in Lafayette Parish? Q55	1	2 **(GO TO Q65)**	3	4
Q55A A. Have you eaten beef, poultry, or other meat grown in Lafayette Parish in the past year?	1	2	3	4
134.Have you ever eaten locally raised chickens? Q56	1	2 **(GO TO Q57)**	3	4
Q56A A. Have you eaten locally raised chickens in the past year?	1	2	3	4
135.Have you ever eaten locally raised pigs? Q57	1	2 **(GO TO Q58)**	3	4
Q57A A. Have you eaten locally raised pigs in the past year?	1	2	3	4
136.Have you ever eaten locally raised ducks? Q58	1	2 **(GO TO Q59)**	3	4
Q58A A. Have you eaten locally raised ducks in the past year?	1	2	3	4
137.Have you ever eaten locally raised rabbits? Q59	1	2 **(GO TO Q60)**	3	4
Q59A A. Have you eaten locally raised rabbits in the past year?	1	2	3	4
138.Have you ever eaten locally raised cows? Q60	1	2 **(GO TO Q61)**	3	4
Q60A A. Have you eaten locally raised cows in the past year?	1	2	3	4
139.Have you ever eaten locally raised geese? Q61	1	2 **(GO TO Q62)**	3	4
Q61A A. Have you eaten locally raised geese in the past year?	1	2	3	4
140.Have you ever eaten locally raised turkey? Q62	1	2 **(GO TO Q63)**	3	4

Q62A	A. Have you eaten locally raised turkey in the past year?	1	2	3	4

	YES	NO	DK	REFUSED
141.Have you ever eaten locally raised turtles? Q63	1	2 **(GO TO Q64)**	3	4
Q63A A. Have you eaten locally raised turtles in the past year?	1	2	3	4
142.Have you ever eaten other locally raised meat? Q64	1	2 **(GO TO Q65)**	3	4
A. Have you eaten other locally raised meat in the past year? Specify meat Q64OTH_____ Q64A	1	2	3	4
143.Have you ever eaten game caught in Lafayette Parish? Q65	1	2 **(GO TO Q78)**	3	4
Q65A A. Have you eaten game caught in Lafayette Parish in the past year?	1	2	3	4
144.Have you ever eaten locally caught rabbit? Q66	1	2 **(GO TO Q67)**	3	4
Q66A A. Have you eaten locally caught rabbit in the past year?	1	2	3	4
145.Have you ever eaten locally caught deer? Q67	1	2 **(GO TO Q68)**	3	4
Q67A A. Have you eaten locally caught deer in the past year?	1	2	3	4
146.Have you ever eaten locally caught raccoon? Q68	1	2 **(GO TO Q69)**	3	4
Q68A A. Have you eaten locally caught raccoon in the past year?	1	2	3	4
147.Have you ever eaten locally caught squirrel? Q69	1	2 **(GO TO Q70)**	3	4
Q69A A. Have you eaten locally caught squirrel in the past year?	1	2	3	4
148.Have you ever eaten locally caught duck? Q70	1	2 **(GO TO Q71)**	3	4
Q70A A. Have you eaten locally caught duck in the past year?	1	2	3	4
149.Have you ever eaten locally caught turtle? Q71	1	2 **(GO TO Q72)**	3	4
Q71A A. Have you eaten locally caught turtle in the past year?	1	2	3	4
150.Have you ever eaten locally caught alligator? Q72	1	2 **(GO TO Q73)**	3	4
Q72A A. Have you eaten locally caught alligator in the past year?	1	2	3	4
151.Have you ever eaten locally caught nutria? Q73	1	2 **(GO TO Q74)**	3	4
Q73A A. Have you eaten locally caught nutria in the past year?	1	2	3	4
152.Have you ever eaten locally caught armadillo? Q74	1	2 **(GO TO Q75)**	3	4
Q74A A. Have you eaten locally caught armadillo in the past year?	1	2	3	4

153.Have you ever eaten locally caught wild geese? Q75	1	2 **(GO TO Q76)**	3	4
Q75A A. Have you eaten locally caught wild geese in the past year?	1	2	3	4

		YES	NO	DK	REFUSED
154.Have you ever eaten locally caught opossum? Q76		1	2 **(GO TO Q77)**	3	4
Q76A	A. Have you eaten locally caught opossum in the past year?	1	2	3	4
155.Have you ever eaten other locally caught game? Q77		1	2 **(GO TO Q78)**	3	4
Q77A	A. Have you eaten other locally caught game in the past year? Specify meat Q77OTH_____	1	2	3	4
156.Have you ever eaten eggs raised in Lafayette Parish? Q78		1	2 **(GO TO Q79)**	3	4
Q78A	A. Have you eaten eggs raised in Lafayette Parish in the past year?	1	2	3	4

8. VOLATILE ORGANIC COMPOUND EXPOSURE

Finally, I'm going to ask you some questions concerning exposure to volatile organic compounds.

	YES	NO	DK	REFUSED
157.Have you picked up dry cleaning in the last 24 hours? Q79	1	2	3	4
158.Have you pumped gasoline in the last 24 hours? Q80	1	2	3	4
159.Have you smoked a cigarette, cigar, or pipe today? Q81	1 Check ineligible smoker on case label	2	3	4

The next questions concern possible sources of chemical exposure. I am going to read a list of common household items. For each of these I will ask you five questions:

Product	A. IN THE LAST THREE DAYS (TODAY, YESTERDAY, OR THE DAY BEFORE YESTERDAY) HAVE YOU EITHER BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN? (IWER: IF NO, SKIP QUESTIONS B-E AND GO TO NEXT PRODUCT).	B. DID YOU BREATHE THE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN TODAY?	C. DURING THIS TIME ALTOGETHER, HAVE YOU BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN FOR LONGER THAN 30 MINUTES.	D. DID YOU BREATHE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN WHILE YOU WERE WORKING AT YOUR JOB?	E. DURING THE USE OF THIS PRODUCT DID YOU WEAR A PROTECTIVE MASK?
160.Diesel fuel or kerosene	1. Yes Q82A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q82B 2. No 3. DK 4. Refused	1. Yes Q82C 2. No 3. DK 4. Refused	1. Yes Q82D 2. No 3. DK 4. Refused	1. Yes Q84E 2. No 3. DK 4. Refused
161.Gasoline	1. Yes Q83A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q83B 2. No 3. DK 4. Refused	1. Yes Q83C 2. No 3. DK 4. Refused	1. Yes Q83D 2. No 3. DK 4. Refused	1. Yes Q83E 2. No 3. DK 4. Refused
162.Paint thinner, brush cleaner, furniture stripper, benzene, carbon tetrachloride	1. Yes Q84A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q84B 2. No 3. DK 4. Refused	1. Yes Q84C 2. No 3. DK 4. Refused	1. Yes Q84D 2. No 3. DK 4. Refused	1. Yes Q84E 2. No 3. DK 4. Refused

Product	A. IN THE LAST THREE DAYS (TODAY, YESTERDAY, OR THE DAY BEFORE YESTERDAY) HAVE YOU EITHER BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN? (IWER: IF NO, SKIP QUESTIONS B-E AND GO TO NEXT PRODUCT).	B. DID YOU BREATHE THE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN TODAY?	C. DURING THIS TIME ALTOGETHER, HAVE YOU BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN FOR LONGER THAN 30 MINUTES.	D. DID YOU BREATHE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN WHILE YOU WERE WORKING AT YOUR JOB?	E. DURING THE USE OF THIS PRODUCT DID YOU WEAR A PROTECTIVE MASK?
163.Varnish, lacquer, wood stain, or wet paint	1. Yes Q85A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q85B 2. No 3. DK 4. Refused	1. Yes Q85C 2. No 3. DK 4. Refused	1. Yes Q85D 2. No 3. DK 4. Refused	1. Yes Q85E 2. No 3. DK 4. Refused
164.Model glue or other adhesives	1. Yes Q86A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q86B 2. No 3. DK 4. Refused	1. Yes Q86C 2. No 3. DK 4. Refused	1. Yes Q86D 2. No 3. DK 4. Refused	1. Yes Q86E 2. No 3. DK 4. Refused
165.Bug or insect spray	1. Yes Q87A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q87B 2. No 3. DK 4. Refused	1. Yes Q87C 2. No 3. DK 4. Refused	1. Yes Q87D 2. No 3. DK 4. Refused	1. Yes Q87E 2. No 3. DK 4. Refused
166.Weed killer	1. Yes Q88A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q88B 2. No 3. DK 4. Refused	1. Yes Q88C 2. No 3. DK 4. Refused	1. Yes Q88D 2. No 3. DK 4. Refused	1. Yes Q88E 2. No 3. DK 4. Refused
167.Solid toilet bowl deodorizers	1. Yes Q89A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q89B 2. No 3. DK 4. Refused	1. Yes Q89C 2. No 3. DK 4. Refused	1. Yes Q89D 2. No 3. DK 4. Refused	1. Yes Q89E 2. No 3. DK 4. Refused
168.Air freshener or room deodorizer	1. Yes Q90A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q90B 2. No 3. DK 4. Refused	1. Yes Q90C 2. No 3. DK 4. Refused	1. Yes Q90D 2. No 3. DK 4. Refused	1. Yes Q90E 2. No 3. DK 4. Refused
169.Pressure treated lumber/wood products	1. Yes Q91A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q91B 2. No 3. DK 4. Refused	1. Yes Q91C 2. No 3. DK 4. Refused	1. Yes Q91D 2. No 3. DK 4. Refused	1. Yes Q91E 2. No 3. DK 4. Refused
170.Fingernail polish or nail polish remover	1. Yes Q92A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q92B 2. No 3. DK 4. Refused	1. Yes Q92C 2. No 3. DK 4. Refused	1. Yes Q92D 2. No 3. DK 4. Refused	1. Yes Q92E 2. No 3. DK 4. Refused

Product	A. IN THE LAST THREE DAYS (TODAY, YESTERDAY, OR THE DAY BEFORE YESTERDAY) HAVE YOU EITHER BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN? (IWER: IF NO, SKIP QUESTIONS B-E AND GO TO NEXT PRODUCT).	B. DID YOU BREATHE THE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN TODAY?	C. DURING THIS TIME ALTOGETHER, HAVE YOU BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN FOR LONGER THAN 30 MINUTES.	D. DID YOU BREATHE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN WHILE YOU WERE WORKING AT YOUR JOB?	E. DURING THE USE OF THIS PRODUCT DID YOU WEAR A PROTECTIVE MASK?
171.Dry-cleaning liquid or spot remover	1. Yes Q93A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q93B 2. No 3. DK 4. Refused	1. Yes Q93C 2. No 3. DK 4. Refused	1. Yes Q93D 2. No 3. DK 4. Refused	1. Yes Q93E 2. No 3. DK 4. Refused
172.Hair Dyes	1. Yes Q94A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q94B 2. No 3. DK 4. Refused	1. Yes Q94C 2. No 3. DK 4. Refused	1. Yes Q94D 2. No 3. DK 4. Refused	1. Yes Q94E 2. No 3. DK 4. Refused
173.Cutting or sanding wood	1. Yes Q95A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q95B 2. No 3. DK 4. Refused	1. Yes Q95C 2. No 3. DK 4. Refused	1. Yes Q95D 2. No 3. DK 4. Refused	1. Yes Q95E 2. No 3. DK 4. Refused
174.Household bleach	1. Yes Q96A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q96B 2. No 3. DK 4. Refused	1. Yes Q96C 2. No 3. DK 4. Refused	1. Yes Q96D 2. No 3. DK 4. Refused	1. Yes Q96E 2. No 3. DK 4. Refused
175.Cleaners with bleach	1. Yes Q97A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q97B 2. No 3. DK 4. Refused	1. Yes Q97C 2. No 3. DK 4. Refused	1. Yes Q97D 2. No 3. DK 4. Refused	1. Yes Q97E 2. No 3. DK 4. Refused
176.Oven cleaners	1. Yes Q98A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q98B 2. No 3. DK 4. Refused	1. Yes Q98C 2. No 3. DK 4. Refused	1. Yes Q98D 2. No 3. DK 4. Refused	1. Yes Q98E 2. No 3. DK 4. Refused
177.Rug cleaners	1. Yes Q99A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q99B 2. No 3. DK 4. Refused	1. Yes Q99C 2. No 3. DK 4. Refused	1. Yes Q99D 2. No 3. DK 4. Refused	1. Yes Q99E 2. No 3. DK 4. Refused
178.Drain cleaner	1. Yes Q100A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q100B 2. No 3. DK 4. Refused	1. Yes Q100C 2. No 3. DK 4. Refused	1. Yes Q100D 2. No 3. DK 4. Refused	1. Yes Q100E 2. No 3. DK 4. Refused

Product	A. IN THE LAST THREE DAYS (TODAY, YESTERDAY, OR THE DAY BEFORE YESTERDAY) HAVE YOU EITHER BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN? (IWER: IF NO, SKIP QUESTIONS B-E AND GO TO NEXT PRODUCT).	B. DID YOU BREATHE THE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN TODAY?	C. DURING THIS TIME ALTOGETHER, HAVE YOU BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN FOR LONGER THAN 30 MINUTES.	D. DID YOU BREATHE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN WHILE YOU WERE WORKING AT YOUR JOB?	E. DURING THE USE OF THIS PRODUCT DID YOU WEAR A PROTECTIVE MASK?
179.Stain repellent	1. Yes Q101A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q101B 2. No 3. DK 4. Refused	1. Yes Q101C 2. No 3. DK 4. Refused	1. Yes Q101D 2. No 3. DK 4. Refused	1. Yes Q101 2. No 3. DK 4. Refused
180.VCR cleaner	1. Yes Q102A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q102B 2. No 3. DK 4. Refused	1. Yes Q102C 2. No 3. DK 4. Refused	1. Yes Q102D 2. No 3. DK 4. Refused	1. Yes Q102E 2. No 3. DK 4. Refused
181.Video disk cleaner	1. Yes Q103A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q103B 2. No 3. DK 4. Refused	1. Yes Q103C 2. No 3. DK 4. Refused	1. Yes Q103D 2. No 3. DK 4. Refused	1. Yes Q103E 2. No 3. DK 4. Refused
182.Tape recorder cleaner	1. Yes Q104A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q104B 2. No 3. DK 4. Refused	1. Yes Q104C 2. No 3. DK 4. Refused	1. Yes Q104D 2. No 3. DK 4. Refused	1. Yes Q104E 2. No 3. DK 4. Refused
183.Typewriter correction fluid	1. Yes Q105A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q105B 2. No 3. DK 4. Refused	1. Yes Q105C 2. No 3. DK 4. Refused	1. Yes Q105D 2. No 3. DK 4. Refused	1. Yes Q105E 2. No 3. DK 4. Refused
184.Paint primer	1. Yes Q106A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q106B 2. No 3. DK 4. Refused	1. Yes Q106C 2. No 3. DK 4. Refused	1. Yes Q106D 2. No 3. DK 4. Refused	1. Yes Q106E 2. No 3. DK 4. Refused
185.Rust remover	1. Yes Q107A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q107B 2. No 3. DK 4. Refused	1. Yes Q107C 2. No 3. DK 4. Refused	1. Yes Q107D 2. No 3. DK 4. Refused	1. Yes Q107E 2. No 3. DK 4. Refused
186.Spray paint	1. Yes Q108A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q108B 2. No 3. DK 4. Refused	1. Yes Q108C 2. No 3. DK 4. Refused	1. Yes Q108D 2. No 3. DK 4. Refused	1. Yes Q108E 2. No 3. DK 4. Refused

Product	A. IN THE LAST THREE DAYS (TODAY, YESTERDAY, OR THE DAY BEFORE YESTERDAY) HAVE YOU EITHER BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN? (IWER: IF NO, SKIP QUESTIONS B-E AND GO TO NEXT PRODUCT).	B. DID YOU BREATHE THE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN TODAY?	C. DURING THIS TIME ALTOGETHER, HAVE YOU BREATHED FUMES FROM THIS PRODUCT OR HAD IT ON YOUR SKIN FOR LONGER THAN 30 MINUTES.	D. DID YOU BREATHE FUMES FROM THIS PRODUCT OR HAVE IT ON YOUR SKIN WHILE YOU WERE WORKING AT YOUR JOB?	E. DURING THE USE OF THIS PRODUCT DID YOU WEAR A PROTECTIVE MASK?
187.Spray shoe polish	1. Yes Q109A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q109B 2. No 3. DK 4. Refused	1. Yes Q109C 2. No 3. DK 4. Refused	1. Yes Q109D 2. No 3. DK 4. Refused	1. Yes Q109E 2. No 3. DK 4. Refused
188.Water repellent	1. Yes Q110A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q110B 2. No 3. DK 4. Refused	1. Yes Q110C 2. No 3. DK 4. Refused	1. Yes Q110D 2. No 3. DK 4. Refused	1. Yes Q110E 2. No 3. DK 4. Refused
189.Suede protector	1. Yes Q111A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q111B 2. No 3. DK 4. Refused	1. Yes Q111C 2. No 3. DK 4. Refused	1. Yes Q111D 2. No 3. DK 4. Refused	1. Yes Q111E 2. No 3. DK 4. Refused
190.Degummers	1. Yes Q112A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q112B 2. No 3. DK 4. Refused	1. Yes Q112C 2. No 3. DK 4. Refused	1. Yes Q112D 2. No 3. DK 4. Refused	1. Yes Q112E 2. No 3. DK 4. Refused
191.Tire cleaner	1. Yes Q113A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q113B 2. No 3. DK 4. Refused	1. Yes Q113C 2. No 3. DK 4. Refused	1. Yes Q113D 2. No 3. DK 4. Refused	1. Yes Q113E 2. No 3. DK 4. Refused
192.Door spray lubricant	1. Yes Q114A 2. No (Go to next product) 3. DK 4. Refused	1. Yes Q114B 2. No 3. DK 4. Refused	1. Yes Q114C 2. No 3. DK 4. Refused	1. Yes Q114D 2. No 3. DK 4. Refused	1. Yes Q114E 2. No 3. DK 4. Refused

9. CONTACT INFORMATION

193.In case we want to contact you again, keeping in mind that people move, we would like to get a little more information to help us locate you in the future. In case you move to another residence could we have the names and addresses of two people who live outside of your household who would always know how to find you? Q115

1. YES
2. NO ⎩ **GO TO END**
3. DON'T KNOW
4. REFUSED

194.Contact #1 Information

First Name:	Q116_FNA
Last Name:	Q116_LNA
Address Line 1:	Q116_AD1
Line2apt#:	Q116_AD2
City:	Q116_CTY
State:	Q116_ST
Zip code:	Q116_ZIP
Telephone ( )	Q116_PH

What is Contact #1 relationship to you?

Q116REL

1. Parent
2. Grandparent
3. Friend
4. Neighbor
5. Coworker
6. Other specify Q116OTH _____

195.Contact #2 Information

First Name:	Q117_FNA
Last Name:	Q117_LNA
Address Line 1:	Q117_AD1
Line2apt#:	Q117_AD2
City:	Q114_CTY
State:	Q117_ST
Zip code:	Q117_ZIP
Telephone ( )	Q117_PH

What is Contact #2 relationship to you?

Q117REL

1. Parent
2. Grandparent
3. Friend
4. Neighbor
5. Coworker
6. Other specify Q117OTH_____

End of survey.

IWER: Please thank respondent for their participation and move them to the blood draw area for the next phase of the study.

APPENDIX G

Dioxin Specimen Preparation and Shipping

WHOLE BLOOD COLLECTION AND PROCESSING FOR DIOXIN

TUBE METHOD

NOTE: UNIVERSAL PRECAUTIONS SHOULD BE OBSERVED AT ALL TIMES WHEN COLLECTING AND HANDLING BODILY FLUIDS AS OUTLINED BY CDC. REFER TO MMWR VOLUME 36/NO. 2S.

A. COLLECTION PROCEDURE

1. Materials needed per participant.

   -Gauze sponges
   -Alcohol wipe
   -Bandaid
   -10 mL non-siliconized red top tubes (Each tube of whole blood will yield approximately 4 to 5 mls of serum
   -19g or 21g 3/4" butterfly assembly with multiple sample luer adapter
   -Preprinted labels
   -Tourniquet
   -Vacutainer holder

2. Venipuncture procedure.

   -Locate a suitable table and chair for blood collecting and lay out blood collection supplies.

   -Locate the puncture site. Hold with 2 fingers on one side of the "alcohol wipe" so that only the other side touches the puncture site. Wipe the area in a circular motion beginning with a narrow radius and moving outward so as not to cross over the area already cleaned. Repeat with a second alcohol wipe.

   -Locate vein and cleanse in manner previously described, then apply the tourniquet. If it is necessary to feel the vein again, do so; but after you feel it, cleanse with alcohol prep again, and dry with a sterile gauze square.

   -Fix the vein by pressing down on the vein about 1 inch below the proposed point of entry into the skin and pull the skin taut.

-Approach the vein in the same direction the vein is running, holding the needle so that a 15^{o} angle with the examinee's arm.

   -With bevel facing up, push the needle (either butterfly or regular needle) firmly and deliberately into the vein. Tape the needle in place to allow both hands to be free for collecting the tubes of blood. Activate the vacuum collection tube. If the needle is in the vein, blood will flow freely into the tube. If no blood enters the tube, probe for the vein until entry is indicated by blood flowing into the tube.

   -For collection, loosen the tourniquet immediately after blood flow is established and release

entirely as the last tube fills. Collect the red top tubes and label with the appropriate label. Place the tubes upright in a rack and allow to clot.

-After the last tube has filled, withdraw the needle with a swift backward motion. When the needle is out of the arm, press gauze firmly on the puncture. Heavy pressure as the needle is being withdrawn should be avoided because it may cause the sharp point of the needle to cut the vein.

-Have the examinee raise his arm (not bend it) and continue to hold the gauze in place for several minutes. This will help prevent hematomas and bruising.

-Report to the physician any reaction experienced by the participant during the venipuncture procedure.

-Label all tubes with the preprinted labels provided, and use a ballpoint pen to add the date collected and your initials to the label.

-Place a bandaid on the subject's arm.

B. SERUM PROCESSING PROCEDURE

1. Materials and Equipment Needed per Participant

-Disposable pipet
-30 mL (1 oz.) glass bottle for **SERUM DIOXIN** with Teflon-lined screw cap
-7 ml glass vial with white screw cap for **SERUM LIPIDS**
-Preprinted labels
-Centrifuge
-Freezer (-20^{o}C) or dry ice

2. Processing

-After the blood has been allowed to clot at room temperature for 20- 30 minutes, centrifuge the red-top tubes for 15 minutes at the rpm necessary to attain a force of 1000 g. To calculate the number of rpm necessary to attain 1000 g, use the following formula:

rpm = 9450//r,

where r is the distance in centimeters from the center of rotation to the bottom of a test tube when it is extended in the centrifuge head.

Example: for r = 16, rpm = approximately 2400.

-Using preprinted labels for each participant, label each of the containers as follows:

Priority	**Size/Type Container**	**Container Label**

1. 30 mL glass bottle SERUM DIOXIN
2. 7 mL glass vial SERUM LIPIDS

-Use a ballpoint pen to add the date collected and your initials to the labels on all containers.

-To maximize the amount of serum recovered from all of the red top tubes, do the following:

1. Using a disposable pipet, transfer all of the serum that is free of red cells from each red top tube to the 30 mL glass bottle.

2. Any remaining serum left in the red top tubes that may have become mixed with red cells should be transferred to a clean 10 mL red top tube. Extra tubes are provided for this purpose.

3. Centrifuge for 10 minutes and transfer the clear serum to the glass bottle containing the serum originally harvested. Prepare a lipid aliquot from this serum by adding about 2-3 mls to the 7 ml glass vial with the white screw cap. Recap both bottles and freeze. Place upright in a -20°C (or lower) freezer and store at the same temperature until shipment to the CDC on dry ice.

SHIPPING INSTRUCTIONS

1. Place the glass bottles in the boxes that are provided. Place each box inside a zip-lock bag and seal the bag.

2. Place the bagged specimen boxes inside the styrofoam shipping container. Add 10-15 lbs of dry ice to the shipper and place extra packing material around the specimens (newspaper, paper towels, etc.)

3. Prepare a Federal Express airbill for shipping and mark the appropriate boxes including the one for dry ice shipment and overnight delivery. Place a dry ice sticker on the outside of the shipping box.

Shipping address:

Charles Dodson TEL: (770) 488-4305 FAX: (770) 488-4541
Centers for Disease Control
Building 17 Loading Dock
4770 Buford Highway NE
Atlanta GA 30341

4. Please phone or fax to the above numbers to inform the day the package is shipped. Ship only on Monday - Thursday to insure that the package will arrive during a regular work day and not over a weekend day.

APPENDIX H

Health Education Materials

Household Listing Brochure

Exposure Investigation of Dioxins and Volatile Organic Compounds in Calcasieu and Lafayette Parishes, Louisiana

Several years ago, some citizens from Calcasieu Parish, Louisiana, were found to have higher-than-expected levels of chemicals called dioxins in their blood. To follow up on that finding, the Agency for Toxic Substances and Disease Registry (ATSDR), a public health agency of the U.S. Department of Health and Human Services, is planning an investigation to determine the amount of dioxins and other chemicals, called volatile organic compounds (VOCs), present in people who live in Calcasieu and Lafayette parishes.

ATSDR wants to find out if there is any difference between the two parishes in the amounts of these chemicals in people's blood. If differences are found, ATSDR will look at the people with higher levels to see if they have anything in common that might cause the differences. This exposure investigation also will give ATSDR scientists information on the amount of dioxins and VOCs among area residents, as well as their ages, eating habits, place of work, and place of residence. ATSDR will examine this information to find out if residents of these areas are exposed to unusual levels of dioxins and VOCs and how people may be exposed to them.

The First Step —A Household Listing

ATSDR has hired the National Opinion Research Center (NORC) to visit households in communities in Calcasieu and Lafayette parishes to make a list of everyone who lives in those areas. NORC researchers will make a door-to-door survey of households in these neighborhoods during January and February, 2002. You will be asked to give the names and ages of those who live in your household. Your help in answering these questions is very important to the success of this exposure investigation.

The Second Step — The Study

Some of the residents of Calcasieu and Lafayette parishes who are identified in the household listing will be contacted again by NORC in April or May, 2002. These residents will be invited to take part in an interview and asked to give a blood and urine sample for testing.

If you have any questions, please call the NORC toll-free number at 1 (816) 835-6672.

Questions and Answers About the Exposure Investigation

What is ATSDR?
The Agency for Toxic Substances and Disease Registry (ATSDR) is a public health agency in the U.S. Department of Health and Human Services. ATSDR headquarters are in Atlanta, Georgia. The agency's mission is to serve the public by using the best science, taking responsive

public health actions, and providing trusted health information to prevent harmful exposures and disease related to toxic substances.

What is NORC?Who is Conducting this Census?
NORC is a non-profit research center affiliated with the University of Chicago that conducts research in the public interest for government agencies, colleges and universities, foundations, non-profit organizations, and private corporations. ATSDR has hired the National Opinion Research Center (NORC) at the University of Chicago to do a door-to-door survey of households in your community to gather information from residents for the household listing.

What are dioxins? A group of **c**hemicals commonly called dioxins are a family of similar chemicals. Dioxins are found in the air, water, and soil. They are not made on purpose, but result from burning fuel, wood, and waste, and from making certain products. When they get into the soil, air, and water, they can enter your body and stay in your blood and body fat for a long time.

What are volatile organic compounds (VOCs)? What are Volatile Organic Compounds (VOCs)VOCs is the name of a group of similar chemicals that change from liquid into gas (evaporate) very quickly. This means that they get into the air easily. Some common things that have VOCs in them are gasoline, kerosene, nail polish remover, paints, paint thinners, dry cleaning fluid, cleaning products, pesticides, glues, permanent markers, building materials, and home furnishings. Almost everyone is exposed to VOCs.

Why do you need to know how many people live here?
ATSDR will select a research sample for the investigation from household members in your community. ATSDR wants to be sure that this study represents people of all ages in your community.

Why should I answer the questions?
Answering the questions for the household listing will only take a few minutes of your time, and your answers will help find answers to some important questions about exposure to dioxins and VOCs in your community.

What if I don't want to answer the questions?

Answering the questions for the household listing is voluntary, and you may refuse if you wish. We hope you will take part, because for the study to be complete, all of the households in your area need to be on the listing.

Will my answers be kept private?

Yes, your answers will be private. All information you give is solely for the use of ATSDR for this investigation. The Privacy Law, a special federal law, protects you answers. This law requires all federal agencies to maintain the privacy of citizens. No information that would identify any individual may be released. The law also requires that ATSDR protects your privacy in the ways personal information is collected and handled.

Will I be called later?

You may or may not be asked to take part in the second part of the investigation. A group of residents, picked at random from the household listing, will be called in April or May and invited to take part in the interview and testing.

If I answer the questions in the first part of the study, do I have to take part in the second part?

No. Your participation is up to you, but by participating you will help to determine if people in Calcasieu and Lafayette parishes are being exposed to unusual levels of dioxins and VOCs.

Study Fact Sheet for Eligible Residents

The 2002 Dioxin Study

The Louisiana Calcasieu and Lafayette Parishes Dioxins and Volatile Organic Compounds Exposure Investigation

Several years ago, some citizens from Calcasieu Parish, Louisiana, were found to have higher-than-expected levels of dioxins in their blood. To follow up on that finding, the Agency for Toxic Substances and Disease Registry (ATSDR), a public health agency of the U.S. Department of Health and Human Services, is doing a study to find out the amount of dioxins in people who live in Calcasieu parish. As part of the study, we will also look at the amount of volatile organic compounds (VOCs) in selected parish residents.

Purpose of the Study

We are doing this study to see if people in Calcasieu Parish are being exposed to unusual levels of dioxins or volatile organic compounds. In order to find out, we will compare the dioxin and volatile organic compound levels of people in Calcasieu Parish with those of people in Lafayette Parish. If we find differences in the levels, we will look to see if there are any patterns to the differences.

The results of the study will tell us if people in Calcasieu Parish are being exposed to unusual levels of dioxins and VOCs.

Who can participate?

Participants must be:

1. 15 years old or older
1. Have lived in their parish for the last 5 years.
2. Residents of Lafayette Parish may never have lived in Calcasieu Parish.
3. Participants must be able to have blood drawn.

We will choose 288 participants in Calcasieu Parish and 112 participants in Lafayette Parish to be in the study.

How the study is being conducted

Step 1 - We made a list of everyone who could be in the study. Your name was selected as a person who might be able to participate in the study.

Step 2 – We will call people to ask them a few more questions. Those people who are still able to participate will be asked to join the study.

Each participant will be asked to answer questions about their job, the food they eat, and contact with various substances. We will collect a blood sample (about 4 tablespoons). This will take about one, but no more than two, hours. We will give you $50.00 for your time and travel.

Why should I participate if I'm asked?

Study participants are scientifically selected to represent many people in the parish. When

we have a good sample of people, it is not necessary to test everyone in order to draw conclusions about the parish. If you are asked to be in the study, your participation will make our results stronger.

What is dioxin?

Dioxin is not one chemical, but a family of 75 similar compounds. The toxicity of each of the compounds is different. Dioxins are found in the air, water, and soil. They are not made on purpose, but result from burning fuel, wood, and waste, and from making certain products. When they get into the soil, air, and water, they enter the body and are stored in fat. Dioxin leaves the body very slowly. The time it takes for one-half of the most toxic type of dioxin to leave your body is estimated to be seven to twelve years. Everyone has some dioxin in his or her body.

The best-known health effect from high levels of dioxin exposure is a skin problem. This skin problem is called chloracne, a severe form of acne. Other health effects linked with dioxins are problems of the immune system, developing nervous system, endocrine system, and reproductive functions. Dioxin exposure is linked with several types of cancer.

What are Volatile Organic Compounds (VOCs)

VOCs are a group of similar chemicals that evaporate very quickly and get into the air easily. Some common things that have VOCs in them are gasoline, kerosene, nail polish remover, paints, paint thinners, dry cleaning fluid, cleaning products, pesticides, glues, permanent markers, building materials, and home furnishings. Everyone is exposed to VOCs.

The health effects of different VOCs vary. Some VOCs linked with health problems are benzene, vinyl chloride, and ethylene dichloride (EDC). High levels of VOCs can cause dizziness, headache, and sleepiness. They can also cause confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Breathing VOCs for long periods of time can result in liver, kidney and nerve damage, immune reactions, various blood disorders, liver cancer and leukemia.

The Agency for Toxic Substances and Disease Registry

The Agency for Toxic Substances and Disease Registry (ATSDR) is an agency of the U.S. Department of Health and Human Services. ATSDR is headquartered in Atlanta, Georgia. The agency's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to help prevent harmful exposures and disease related to toxic substances.

For more information about this study, please contact:

M. Deborah Millette, Epidemiologist

The Agency for Toxic Substances and Disease Registry, Division of Health Studies, Health Investigations Branch, 1600 Clifton Road E-31, Atlanta, Georgia 30333

Direct Line: 404-498-0563

Toll-free number 888-422-8737

Website: http://www.atsdr.cdc.gov

The 2002 Dioxin Study

Fact Sheet for Community Members

The Louisiana Calcasieu and Lafayette Parishes Dioxins and Volatile Organic Compounds Exposure Investigation

Several years ago, some citizens of Calcasieu Parish, Louisiana, were found to have higher-than-expected levels of dioxins in their blood. To follow up on that finding, the Agency for Toxic Substances and Disease Registry (ATSDR), a public health agency of the U.S. Department of Health and Human Services, is conducting an investigation to determine the amount of dioxins present in people who live in Calcasieu parish. As part of the study, we will look at the amount of volatile organic compounds (VOCs) present in selected parish residents.

What are dioxins?

Dioxin is not one chemical, but a family of 75 similar compounds. The toxicity of each of the compounds is different. Dioxins are found in the air, water, and soil. They are not made on purpose, but result from burning fuel, wood, and waste, and from certain manufacturing processes. When they get into the soil, air, and water, they enter the body and are stored in fat. Dioxin leaves the body very slowly. The time it takes for one-half of the most toxic type of dioxin to leave a person=s body is estimated to be seven to twelve years. Everyone has some dioxin in his or her body.

The most familiar health effect from high levels of dioxin exposure is a skin condition called chloracne, a severe form of acne. Other health effects linked with dioxins are problems of the immune system, developing nervous system, endocrine system, and reproductive functions. Dioxin exposure is also linked with several types of cancer.

What are Volatile Organic Compounds (VOCs)?

VOCs are a group of similar chemicals that evaporate very quickly and get into the air easily. Some common things that have VOCs in them are gasoline, kerosene, nail polish remover, paints, paint thinners, dry cleaning fluid, cleaning products, pesticides, glues, permanent markers, building materials, and home furnishings. Everyone is exposed to VOCs.

The health effects of different VOCs vary. Some VOCs associated with adverse health effects are: Benzene, Tetrachloroethylene (TCE), Vinyl Chloride, Ethylene Dichloride (EDC), and Carbon Tetrachloride. High levels of VOCs can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Breathing VOCs for long periods of time can result in liver damage, kidney damage, immune reactions, nerve damage, liver cancer, various blood disorders, and leukemia.

What is the purpose of this study?

The purpose of this study is to see if people in Calcasieu Parish are being exposed to unusual levels of dioxins or volatile organic compounds. In order to determine that, we will compare the

dioxin and volatile organic compound levels of people in Calcasieu Parish with those of people in Lafayette Parish. If we find differences in the levels, we will look to see if there are any patterns to the differences. The results of the study will tell us if people in Calcasieu Parish are being exposed to unusual levels of dioxins and VOCs.

Who can participate?

We will choose 288 participants from Calcasieu Parish and 112 participants from Lafayette Parish who must meet the following requirements to be in the study.

- Participants must be at least 15 years old.
- Participants must have lived in either Calcasieu or LaFayette Parish for the last 5 years (residents of Lafayette Parish must never have lived in Calcasieu Parish).
- Participants must be able to provide a blood sample.

How is the study being conducted?

The first step in the study process compiling a list of possible participants is complete. Your name was selected as a person who might be qualified to participate.

Next, some of the people on the list will be called to confirm that they meet the requirements listed above, and to ask their participation in the study. Each participant will be asked questions about their occupation, food consumption, and exposure to various substances.

At the appropriate time, an appointment will be made for collecting a blood sample (about 4 tablespoons) specimen. This will take about one to two hours. Participants will receive $50.00 for their time and transportation costs.

Why should I participate if I'm asked?

If you are asked to be in the study, your participation will make our results stronger. Study participants are scientifically selected to represent many people in the parish. When we have a scientific representation of people, it is not necessary to test everyone in order to draw health conclusions about the parish and achieve the study=s objective.

The Agency for Toxic Substances and Disease Registry

The Agency for Toxic Substances and Disease Registry (ATSDR), located in Atlanta, is an agency of the U.S. Department of Health and Human Services. The agency's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to help prevent harmful exposures and disease related to toxic substances. More information about ATSDR and its public health activities can be found at www.atsdr.cdc.gov.

For more information about the 2002 dioxin study, please contact:

M. Deborah Millette, Epidemiologist
Agency for Toxic Substances and Disease Registry
Division of Health Studies
Health Investigations Branch

1600 Clifton Road, MS E-31
Atlanta, Georgia 30333
Phone: (404) 498-0563, (404) 498-0563 (toll free)
Dmillette@cdc.gov

Health Profession Study Fact Sheet

The 2002 Dioxin Study

The Louisiana Calcasieu and Lafayette Parishes Dioxins and Volatile Organic Compounds Exposure Investigation

Several years ago, some citizens from Calcasieu Parish, Louisiana, were found to have higher-than-expected levels of dioxins in their blood. To follow up on that finding, the Agency for Toxic Substances and Disease Registry (ATSDR), a public health agency of the U.S. Department of Health and Human Services, is conducting an investigation to determine the amount of dioxins present in people who live in Calcasieu parish. As part of the study, we will also look at the amount of volatile organic compounds (VOCs) present in selected parish residents.

Objectives of the Study

The primary objective of this investigation is to better characterize the nature and extent of human exposure to dioxin-like compounds throughout Calcasieu Parish by comparing citizens' blood dioxin levels with a comparison population in Lafayette Parish. A secondary objective of the investigation will be to determine if citizens' blood volatile organic compound (VOC) levels are elevated compared with the comparison population.

Eligibility

Participants must be 15 years old or older and have lived in their parish for at least 5 years. Residents of Lafayette Parish may never have lived in Calcasieu Parish. Participants must be medically eligible to have 60 ml. of blood drawn for testing purposes.

Methods

A household listing will be conducted in selected areas in each parish. 288 participants in Calcasieu Parish and 112 participants in Lafayette Parish, will be chosen at random from persons determined to be eligible from the household listing. Each participant will be asked to take part in an interview consisting of questions about their occupation, food consumption, and exposure to various substances. A 60ml. blood sample will be collected in order to conduct biological testing for dioxins and VOCs.

Chlorinated Dibenzo-p-Dioxins (CDDs)

CDDs are a family of 75 chemically related compounds commonly known as chlorinated dioxins. Dioxins are found in the air, water, and soil. They are not made on purpose, but result from burning fuel, wood, and waste, and from making certain products. When they get into the soil, air, and water, they enter the body and are stored in fat. The half-life of 2,3,7,8-TCDD, the most toxic form of dioxin, is estimated to be seven to twelve years.

Volatile Organic Compounds (VOCs)

VOCs are a group of similar chemicals that evaporate very quickly and get into the air easily. Some common things that have VOCs in them are gasoline, kerosene, nail polish remover, paints, paint thinners, dry cleaning fluid, cleaning products, pesticides, glues, permanent markers, building materials, and home furnishings. Almost everyone is exposed to VOCs.

Health effects

Health effects from acute high levels of **dioxin** exposure include skin lesions, such as chloracne and patchy darkening of the skin, altered liver function (transient elevation of liver enzymes that improves over time), and sub-clinical peripheral neuropathy (occurring shortly after acute exposure) that also disappears over time. Long-term exposure is associated with impairment of the immune system, developing nervous system, endocrine system, and reproductive functions. Chronic exposure of animals to dioxins has resulted in several types of cancer. The Environmental Protection Agency and the National Institute for Occupational Safety and Health consider 2,3,7,8-TCDD (the most toxic dioxin) a probable human carcinogen, and a cancer promoter when present with certain other chemicals. Cancer effects of dioxins were extensively studied with some associations in multiple sites, but concomitant exposure to other chemicals cannot be ruled out. Data from studies suggest a possible relationship between soft-tissue sarcoma and non-Hodgkin's lymphoma. Statistically significant increases in the risk of all cancers were found in highly exposed workers with longer latency periods.

Health effects of **VOC**s vary. Some VOCs associated with adverse health effects are: Benzene, Tetrachloroethylene (PCE), Vinyl Chloride, Ethylene Dichloride (EDC), and Carbon Tetrachloride. High levels of VOCs (acute exposure) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Breathing VOCs for long periods of time can result in liver damage, kidney damage, immune reactions, nerve damage, liver cancer, various blood disorders, and leukemia. The health conditions associated with a known exposure to VOCs in drinking water or with living near contaminated sites include several types of adverse birth outcomes, stroke, and several general illnesses.

The Agency for Toxic Substances and Disease Registry

The Agency for Toxic Substances and Disease Registry (ATSDR) is an agency of the U.S. Department of Health and Human Services. ATSDR is headquartered in Atlanta, Georgia. The agency's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to help prevent harmful exposures and disease related to toxic substances.

For more information about this study, please contact:

M. Deborah Millette, Epidemiologist
The Agency for Toxic Substances and Disease Registry
Division of Health Studies
Health Investigations Branch
1600 Clifton Road E-31
Atlanta, Georgia 30333

Direct Line: 404-498-0563
Toll-free number 888-422-8737
Website: http://www.atsdr.cdc.gov

APPENDIX I

RESULTS LETTER TO PARTICIPANTS AND DIOXIN FACT SHEET

ATSDR LETTERHEAD

NAME **Date Blood Sample Taken _____**
ADDRESS **Dioxin TEQ (ppt) _____**

We are sending this letter to thank you for participating in the 2002 Dioxin Study and to tell you about your dioxin result. We are also giving you information to help you understand what this result means.

Not Reported means that the level of dioxins in your blood sample may be lower than the level that can be measured. It can also mean that we did not have enough blood to test or that there was a lab error in testing your blood.

ppt means "parts per trillion." One part per trillion is a very small amount. This is like putting one drop of ink in enough water to fill a string of railroad tank cars ten miles long. It is also one second in 32,000 years.

TEQ means "**T**oxic **EQ**uivalent." Dioxins are a family of over 72 chemicals. Each member of the family is called a "congener" and may have a different strengh or "toxicity". When you add the strength of each congener you get the TEQ. This number lets us look at the toxicity of all the dioxins with just one number.

Percentiles tell you the amount of dioxin TEQ that 25%, 50%, 75%, 90% or 95% of the people tested in Lafayette Parish have in their blood. To find your percentile, first find your age group and then move to the right to find the dioxin TEQ that is the closest to your TEQ. The percentile tells you the percent of people in Lafayette Parrish who have a similar TEQs or a TEQ that is lower than yours.

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If we look at Calcasieu and Lafayette residents and these results, 88% of the people in Calcasieu and Lafayette Parishes have dioxin TEQs below 35.5 ppt. Most of the people with dioxin levels higher than this level are older – more than 90% were over 55 years old. We know that dioxin builds up in the body over time and that most of the dioxin in our bodies comes from food that we eat. It is possible that the diet of the people with dioxin TEQs above 35.5 ppt was higher in dioxins. It is also possible that they may have been exposed to an additional source of dioxin. Because most of the participants with higher levels are older, it is also possible that exposure to dioxin occurred sometime in the past.

All of us have dioxin in our bodies, some have more, and others have less. We know that the amount of dioxin in the body may increase as we get older. This is one reason why older people have more dioxin in their blood than younger people. This is also why we looked at dioxin levels

by age. We also know that the dioxin in our bodies comes mostly from food sources, with meat, fish, and dairy products providing the greatest amount.

There is no "cure" for dioxin in your body, but it does leave the body very slowly. If you take in less dioxin than the amount of dioxin that leaves your body, the level of dioxin in your body will gradually decrease. In the next months, we will be looking at the data we have gathered to see if we can find out why some people have higher dioxin levels. It is important to remember that the dioxin TEQ levels that people in Calcasieu and Lafayette Parishes that are in this study are not associated with health problems.

If you asked us, we will send your test results to your doctor. If you have any health questions or concerns, we suggest that you talk to your doctor. Your doctor can talk to us if he/she has any questions about your dioxin level.

We know that you may have more questions about dioxin and its health effects. We have attached a Dioxin fact sheet and a Health Effects of Dioxin "question and answer" sheet for your information. If you have any questions about your dioxin test results or any other questions about this study, please contact us:

M. Deborah Millette, MPH at (404) 498-0563 or 1-888-422-8737, extension 0563.
Mohammed S. Uddin, MD at (404) 498-0587 or 1-888-422-8737, extension 0587

Thank you again for your participation in the study.

Respectfully,

M. Deborah Millette, Epidemiologist
Principal Investigator
Health Investigations Branch
Division of Health Studies
Agency for Toxic Substances and Disease Registry
1600 Clifton Road E-31
Atlanta, Georgia 30333

Frequently Asked Questions about Dioxin Health Effects

Question: Will I get sick if I have dioxins in my body?

> ***Answer:*** Most people in the United States have a small amount of dioxin in their body – usually in the low parts-per-trillion (ppt). Studies tell us that people do not seem to get sick from these low levels. We do know that as the dioxin level goes up, the chance of getting sick from dioxin also goes up. Exposure to high levels of dioxin can affect your skin, liver, and nerves. However, people may react differently to the same level of dioxin - some of them may get sick and others may not

Question: What is a "high" dioxin level?

> ***Answer:*** Here are some examples of high level dioxin exposures.

Seveso, Italy: In 1976, an explosion in a plant in Seveso released dioxins into the air. Some people who were exposed got chloracne - a rash on the face and neck that looks like acne. The rash can occur after a few days of exposure to high levels of dioxin. The people in Seveso who had chloracne had dioxin blood levels from 828 ppt to 56,000 ppt. People without this condition had dioxin blood levels from 1,770 ppt to 10,400 ppt. Studies conducted many years after the accident showed that more people in Seveso died from heart disease, lung disease, and diabetes than people who lived in other places. Also, more people in Seveso got cancer. Studies are now being done to find out if these health problems were due to dioxin.

Operation Ranch Hand: From 1962 to 1971, soldiers in the U. S. Air Force sprayed chemicals to kill plants and trees in Vietnam. These chemicals had dioxin in them. The highest level of dioxins in a group of people that were highly exposed to dioxins was 618 ppt. Studies of health effects in this group show that there may be more diabetes in this group than in soldiers who were not exposed to dioxin.

Times Beach Missouri: In 1971 and 1972, oil that had dioxins was sprayed on dirt roads in Times Beach to keep the dust down. Dioxin levels in the fat of 39 people who lived in Times Beach were from 2.8 ppt to 750 ppt. Studies on this group of people have not found any health effects. Fat was used in this study because there were no laboratory methods to measure dioxin in blood. Dioxin levels in fat are usually higher than levels in blood.

Question: How do the dioxin levels of people living in Calcasieu and Lafayette Parishes compare with other people who were exposed to dioxin?

> ***Answer:*** The highest levels of dioxin of people who live in Calcasieu and Lafayette Parishes are lower than highest levels of the people in Seveso and of the soldiers in Operation Ranch Hand.

Question: What are the most common health effects after a short exposure to a high level of dioxin?

> ***Answer:*** The most common health effects from short exposures are **chloracne** (an acne-like skin rash), **liver changes** (liver swelling and dull pain)**,** and **peripheral neuropathy** (weakness, numbness, burning, tickling, pricking or tingling and pain in the arms, hands,

legs and/or feet).

Question: What other health effects are related to dioxin exposures?

Answer: While there many studies on people with high exposure levels, there are few studies on people with low exposure levels. Every two years, the Institute of Medicine reviews dioxin studies. The latest review said that exposure to dioxin may be related to soft-tissue sarcoma, non-Hodgkin's lymphoma, Hodgkin's disease, and chloracne. The Institute also said that there was little data that dioxins may also cause other health effects.

Question: How likely are dioxins to cause cancer?

Answer: The International Agency for Research on Cancer (IARC), The World Health Organization (WHO), and The U.S. Department of Health and Human Services (DHHS) have said that one form of dioxin, 2,3,7,8-TCDD, can cause cancer in humans.

Question: Would you expect any adverse health effects to occur at the dioxin levels seen in Calcasieu and Lafayette Parishes?

Answer: We don't know much about the health effects of dioxin at levels people have in these parishes. Based on what we know now about dioxins, we do not believe that the dioxin levels of people who live in Calcasieu and Lafayette Parishes will cause the health effects that were seen in the Ranch Hand and Seveso studies.

For more information, contact:

M. Deborah Millette, M.P.H. at (404) 498-0563 or 1-888-422-8737, extension 0563
Mohammed S. Uddin, M.D. at (404) 498-0587 or 1-888-422-8737, extension 0587

References:

1. NRS/NRC. 2000. Veterans and Agent Orange: Update 2000. National Academy of Science / Institute of Medicine . Washington, DC: National Academy Press, 115-117.

2. ATSDR. 1998. Toxicological profile for Chlorinated Dibenzo-p-Dioxins (update). U.S. Department of Health and Human Services, PublicHealth Service, Agency for Toxic Substances and Disease Registry. Atlanta, GA.

3. Schecter, A, ed. Dioxin and Health. New York and London: Plenum Press, 1994.

You can find more information about dioxin at the Agency for Toxic Substances and Disease Registry, Tox FAQs. Internet site: http://www.atsdr.cdc.gov/tfacts104.

APPENDIX J

Specification of the design setup structure, the stratum variable, and the primary sampling unit for the SUDAAN programming

Specification of the design setup structure, the stratum variable, and the primary sampling unit for the SUDAAN programming

This study follows a sample design involving a complex two-stage sampling process to draw a representative sample to make population based inferences. The first stage stratification variable was sector with nine sectors in Calcasieu Parish, Louisiana (target area), and a tenth sector for Lafayette Parish, Louisiana (control area) (Figure 1). Within each of the 10 sectors in both Calcasieu Parish and Lafayette Parish, a set of clusters of census blocks found in those areas were formed. The list of census blocks was randomly sorted and sequentially divided so that each formed cluster contained at least 600 people. One of these clusters was then randomly selected from each sector (stratum) in Calcasieu Parish and three clusters were selected from Lafayette Parish (Table 1).

Using age as the second-stage stratification variable, four age groups were formed for all residents in the sampled Primary Sampling Units (PSU); 15 to 29, 30 to 44, 45 to 59, and over 60 years of age. In the second stage, the sampling plan was to obtain eight people from each of the four age groups for the nine sectors in Calcasieu Parish, and 32 people from each of the four age groups in the single Lafayette Parish sector.

After the screeners completed the work, we had a list of 1816 potentially eligible people from which to draw the final study sample. Replicates of 9 people were formed by randomly selecting one person from each sector within an age group. Once a sector was depleted of people, no further replicates for the given age group were formed.

In light of the study design, the selection of the final participants was complex beyond that which can be easily and fully captured by SUDAAN (version 8.0, Research Triangle Institute), survey data analysis software. Three features of this phase complicate analysis of the data (Dr. Kalsbeek, University of Carolina, Chapel Hill, personal communication, 2003 Jun 19). These complicating features are 1) Selection of one cluster of census blocks in each of the nine Calcasieu sectors, 2) Selection of the post-screening sample by age and sector from the eligible persons in all selected sample PSUs combined, and 3) Composition of the replicates is selective, which means ending replicate construction when sectors are depleted of eligible people.

Thus, the sample design specified for this analysis would have to be a reasonable proxy of what was actually done, rather than the sample design as actually implemented. For example, because a minimum of two clusters for analysis is needed per stratum, we dealt with the first complicating feature by using the census block as the PSU; each cluster consisted of a random sample of blocks in Calcasieu Parish. We used the selected 3 Lafayette Parish clusters to be the analysis PSU for the tenth sector. Use of proxy specification for samples is not unusual in practice, but the question always remains as to how good a proxy can be found.

Three optional design setups were considered to deal with the other complicating features in running SUDAAN to account for the sample design. In addition to these three setups, some variations for each option also was considered. The analysis design, the PSU, and the secondary sampling unit (SSU) for each setup option is shown in Table 2. We then compared analysis results under these options based on the analysis of serum total dioxin level (TEQ) by parish and by age group. Details of each option follow.

Option 1:

The first setup we considered assumes WOR (without replacement) selection in the first stage and WOR selection in the second stage, thus necessitating accounting for the stage-specific sampling fractions. In this proxy setup, the numerator of the first stage sampling fraction is the number of selected census blocks in each sector for sectors 1 through 9 in Calcasieu Parish, and the number of clusters selected for sector 10 in Lafayette Parish; the denominator is the total number of census blocks in each sector in Calcasieu Parish and the total number of clusters in Lafayette Parish. The numerator of the second stage sampling fraction is the number of selected eligible people in each selected census block in each age stratum; the denominator is the total number of eligible people in the age group within the PSU at the formation of replicates. Stratification was considered to be by sector in the first stage and by age in the second stage.

Table 4 shows the result of the mean and median of TEQ by parish in each age group. A statistically significant difference in TEQ between parishes for each age group was not observed. Mean and median estimates under this option were somewhat different from the un-weighted analysis done in SAS, as were standard errors for the means.

SUDAAN under this setup option detected many strata or clusters at a given stage of the design with a single subunit. To resolve this problem, the "missunit" option was specified in which the variance contribution for that stratum or that cluster is computed using the deviation from the overall mean of that sampling stage.

Option 1A:
To reduce the many single subunit problems, a variation to option 1 was developed to further collapse the original selected census blocks, thereby creating a modified proxy PSU in each of sectors one through nine. This will create more than one respondent for most of the modified proxy PSU within a given stage. We used GIS to delineate all the originally selected census blocks, and examined the number of people in each age group within each block to collapse the blocks so that they were close enough geographically, and the total number of people in each block was sufficient to calculate the variance.

The denominator of the stage sampling fraction in each sector was computed as the total number of blocks divided by the average number of census blocks per modified proxy PSU in the sector. We also modified the denominator of the second stage sampling fraction to equal the number of eligible people in each age group according to the modified proxy PSU.

Table 5 shows the results of the same analyses as is shown in table 4. The changes in standard error from Option 1 to Option 1A, which are very minimal, are within the second decimal place. The minor modification made in the specified PSU for analysis had minimal effect on results.

Option 2:
A second considered proxy design specified WOR selection for the first stage and WR (with replacement) selection for the second stage. Stratification in the first and second stages is once again assumed to be by sector and by age, respectively. We also specified the original selected census blocks as PSU, and person as the second stage stratification unit.

Table 6 shows the results of the same comparative analysis of TEQ by parish in each age group. Comparing these results with those from Option 1, we did not observe significant changes in standard error and the weighted point estimates of the means and median were identical under both options as expected.

As with Option 1, SUDAAN programming for this design showed that there were many strata or clusters at a given stage of the design with only one specified sampling subunit, thus creating the need for the "missunit" remedy as before. To reduce the many single subunit problems, a variation similar to the variation developed for Option 1 was developed for Option 2.

Option 2A:
As in Option 1A, we further collapsed the census blocks to form a modified proxy PSU. This variation in Option 2 showed generally modest change in standard error as before (Table 7).

Option 3:
Lastly, we considered a proxy design where with replacement (WR) selection of PSUs is assumed using the original selected census block as the PSU. Under this option, only univariate stratification (by sector) needed to be assumed for PSU selection. Table 8 also showed very similar results as all the previous options; although, as expected, the estimated standard errors of means TEQ were generally higher (i.e. more conservative) than comparable results under the other options.

Adopted approach:
To draw population-based inference from the data in this study, we need to consider using the probability sampling weight and also to account for the 2 stage design in the analysis. With this complex design, we accommodated the analysis by considering proxy designs in running SUDAAN. We evaluated several plausible options to accommodate the two-stage design using the probability sampling weight and showed that the standard errors of estimates were not substantially different as shown by the TEQ analyses we ran. Although Option 1 is the one that perhaps comes closer to the actual sample design, Option 3 produced results very similar to Option 1, which generally estimates precision conservatively, yet was very simple and practical to implement. Therefore, we decided to implement Option 3, using SUDAAN for all analyses in the final report, and recommended that it be used for comparable analysis for this data.

Table 1. Original selection of census blocks to compile one cluster of about 600 people in the 9 sectors of Calcasieu Parish, and three clusters of census blocks in Lafayette Parish

Sector	Population	Total Number of Census Blocks	Total Clusters of Census Blocks	Number of People in Selected Cluster
2	9675	191	15	629
3	5312	116	8	621
6	2597	42	4	675
7	1803	25	2	692
1	11435	168	19	647
4	48789	1040	15	621
5	13367	320	21	607
8	6658	70	7	683
9	9303	323	16	698
10	190000		265	1818

Table 2. Specifications of optional proxy design setups for SUDAAN programming

Option	First Stage Selection	Second Stage Selection	Primary Calcasieu Sampling Unit	Primary Lafayette Sampling Unit	Secondary Sampling Unit
1	Without replacement	Without replacement	Census block	Census block cluster	People in four age strata
1A	Without replacement	Without replacement	Census block collapsed further	Census block cluster	People in four age strata
2	Without replacement	With replacement	Census block	Census block Cluster	People in four age strata
2A	Without replacement	With replacement	Census block collapsed further	Census Block cluster	People in four age strata
3	With replacement	With replacement	Census block	Census block cluster	People in four age strata

Table 3. Un-weighted analysis of Dioxin TEQ level (ppt) for Calcasieu and Lafayette Parishes by age groups

		Total Dioxin Level (TEQ)		
Age Group	**Parish**	**Respondents**	**Mean (SE)**	**Median**
15-29	Calcasieu	76	8.13(0.76)	6.88
	Lafayette	26	7.48(0.70)	6.47
30-44	Calcasieu	70	12.91(0.94)	10.42
	Lafayette	31	14.46(1.25)	14.04
45-59	Calcasieu	79	20.08(1.05)	19.33
	Lafayette	31	19.79(1.75)	18.62
60+	Calcasieu	70	36.98(2.61)	33.27
	Lafayette	32	43.32(5.33)	36.00