

Mossville Residential Needs Assessment

Louisiana Department of Health & Hospitals
Office of Public Health
Section of Environmental Epidemiology & Toxicology

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**MOSSVILLE RESIDENTIAL NEEDS ASSESSMENT
LOUISIANA DEPARTMENT OF HEALTH & HOSPITALS
OFFICE OF PUBLIC HEALTH**

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I. INTRODUCTION

As part of ongoing efforts to assess and respond to environmental health concerns in Calcasieu Parish, the Louisiana Department of Health and Hospitals (LDHH) conducted a Residential Needs Assessment in the Mossville community. During June 2000, LDHH personnel administered the Needs Assessment questionnaire both in Mossville and via telephone interviews. This document contains summary data regarding the community's responses and preliminary recommendations.

Mossville is a small, unincorporated community in Calcasieu Parish, Louisiana, near Lake Charles. Residents have expressed health and quality of life concerns related to industrial activity in the area. An exposure investigation of blood dioxin levels in 28 Mossville residents, conducted by the Agency for Toxic Substances and Disease Registry in 1998, detected elevated dioxin levels in some residents.¹ Dioxins are a highly toxic family of chemicals, formed as byproducts of various human activities involving chlorinated organic compounds. The likelihood of dioxin-related health effects at the levels found in the Mossville sample is uncertain.²

Given this uncertainty, public concerns about dioxins and other chemical pollutants in the Mossville/Lake Charles area warrant thoughtful public health response. The Mossville Residential Needs Assessment, a survey of community demographics, healthcare utilization, health status, and potential routes of chemical exposure, is an important component of such a response.

II. METHODS

To encourage participation in the Residential Needs Assessment, LDHH solicited current and past Mossville residents by radio, television and newspaper advertisement, direct mailing and posting of fliers in the community. On June 27, 2000, residents and LDHH personnel congregated at the Rigmaiden Center in Mossville. Data were collected with a 48-item questionnaire (Appendix). Questionnaires consisted of four sections, eliciting general demographic information, medical and healthcare information, information about possible routes of environmental chemical exposure, and information about media preferences. One questionnaire was administered per household. Heads of households answered questions pertaining to themselves, and by proxy for other household members. Respondents filled out the questionnaires, with LDHH representatives on hand to assist as needed. All responses were voluntary, and participants were assured that sensitive information would be kept in strict confidence. Two hundred twenty-three questionnaires were completed at the Rigmaiden Center. Some community members did not arrive in time to complete questionnaires. For those who wished to participate, LDHH personnel took down their names, and subsequently administered questionnaires by telephone interview. An additional fifty questionnaires were completed in this fashion. The 282 completed questionnaires were screened for current or past residence in Mossville, then tallied and analyzed. A total of 273 questionnaires met screening criteria, and were included.

III. RESULTS

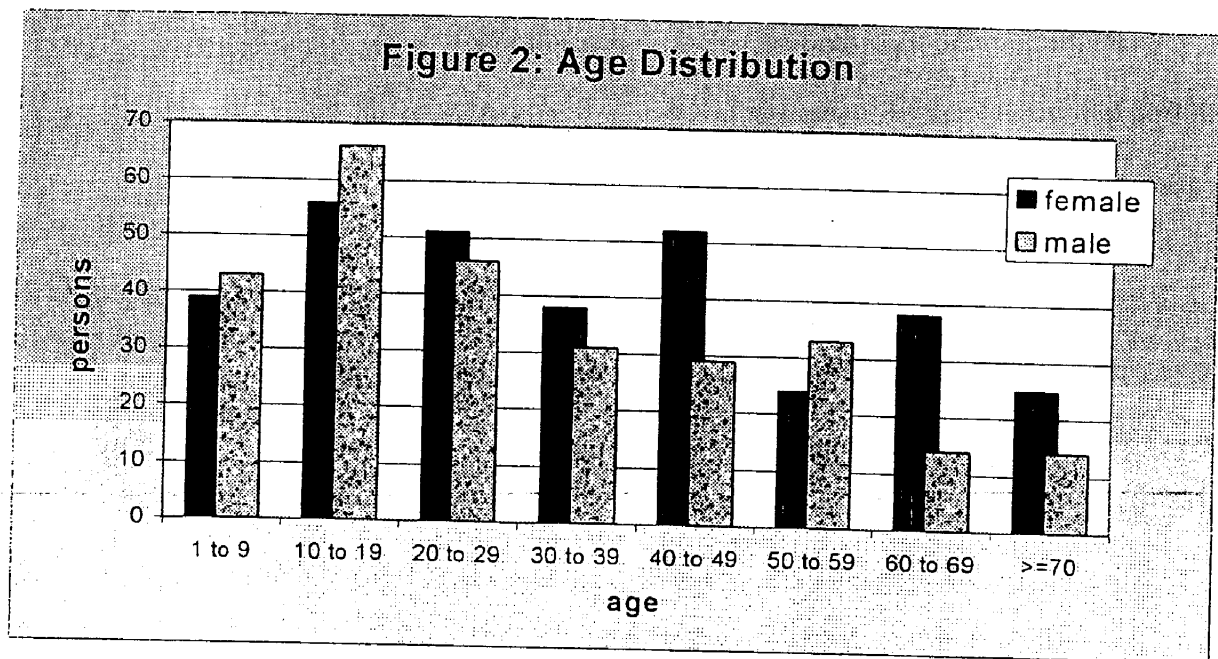
A. General Information

Of the 273 responding households that had ever lived in Mossville, 120 (44%) currently reside in zip code 70669, 61 (22%) in zip code 70663, 31 (11%) in zip code 70601, and 23 (8%) in zip code 70607. The remaining 48 households (15%) reported other zip codes, some outside of Louisiana.

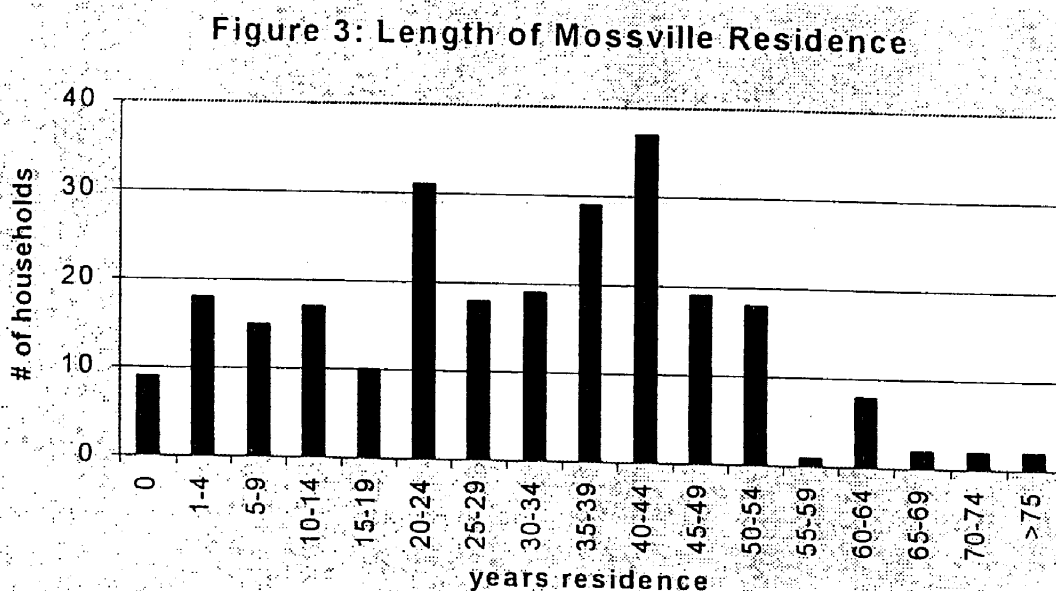
The 273 households comprise 858 individuals, an average household size of 3.1 persons, with a range of 1 to 12 persons. Figure 1 shows distribution of household sizes. Age information was available for 614 of the 858 individuals. Ages ranged from 1 to 89 years, with an average age of 32.9 years. Figure 2 shows the age distribution of this population. Gender information was available for 770 of 858 individuals. Of these, 53% were female and 47% were male.

Figure 1: Household Size





Of responding households, the average reported length of residence in Mossville is 30.8 years, with a range of 1 to 81 years. (Figure 3) The average length of residence in Calcasieu Parish is 39.1 years, with a range of 1 to 82 years. Sixty percent of responding households reported that relatives had moved away from Mossville in the last decade.



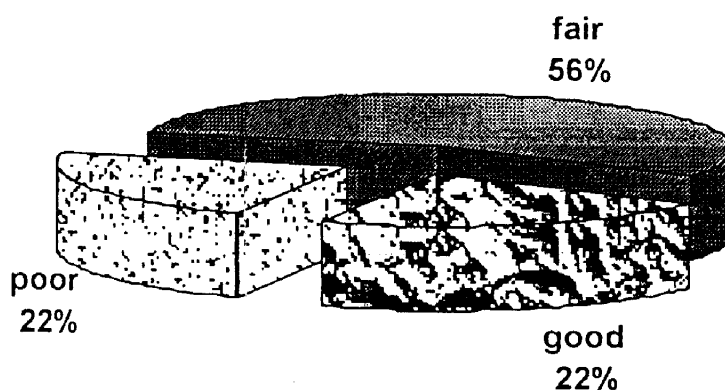
Of 251 households providing information about their access to transportation, 89% reported owning at least one automobile. Six percent had access to an automobile by other means, and six percent had no access to a car.

Two items in the questionnaire asked about current and past employment. Partly due to typographical errors in the questionnaire, responses to these questions were often absent or contradictory, and yielded no meaningful data.

B. Health and Medical Information

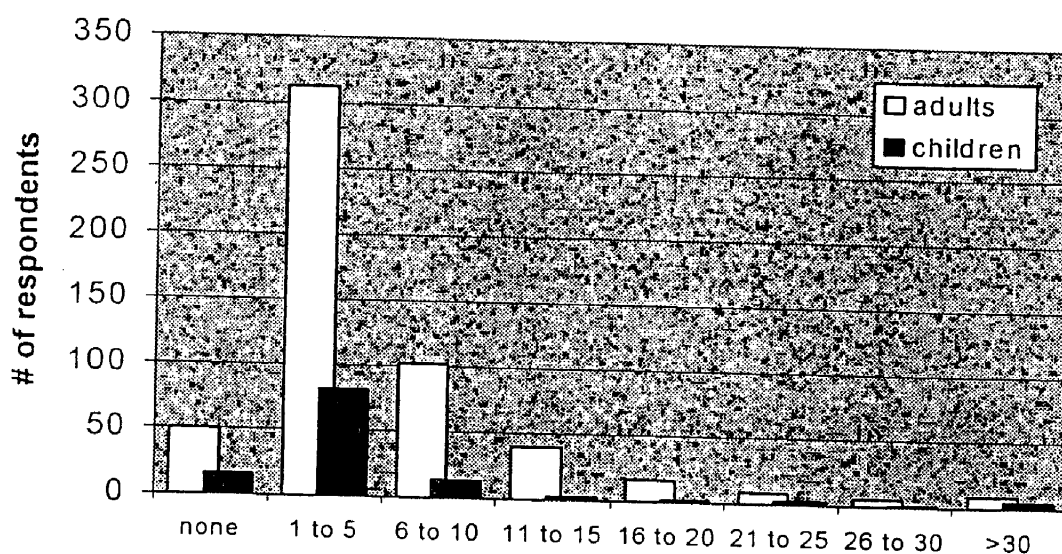
Respondents were asked to rate household members' health status as "good", "fair" or "poor". Of the 823 responses, 56% reported "fair" health status, 23% reported "good" health status, and 22% reported "poor" health status. (Figure 4)

Figure 4: Subjective Health Status



Heads of household reported the number of visits to a physician during the past year for each member of their household. For adults the average annual number of physician visits was 6.3, with a range from 0 to 100 visits. For children, the average annual number of physician visits was 5.7, ranging from 0 to 90 visits. (Figure 5) Sixty-three percent of responding households reported that a family member had sought emergency care in the preceding year.

Figure 5: Doctor Visits in Past Year



Respondents were asked to list one or more physicians, hospitals and clinics that they patronize. Moss Regional, Bayou Comprehensive, Children's Clinic and Family Medical are the clinic sites most frequently used by respondents. Of 220 households responding, the hospitals most commonly attended are Moss Regional (43% of respondents), Memorial (26%), St. Patrick's (25%), and West Calcasieu-Cameron (14%). Drs. Kane, Richert, Jones and Darby were the physicians most often listed. (Table 1)

Table 1: Most Frequent Healthcare Sources

| Hospitals | Number of Respondents | Physicians |
|------------------------|-----------------------|--------------|
| Moss Regional | 96 | Dr. Kane |
| St Patricks | 54 | Dr. Richert |
| Memorial | 57 | Dr. Jones |
| West Calcasieu-Cameron | 30 | Dr. Darby |
| Womens & Childrens | 9 | Dr. Seep |
| Sulphur | 4 | Dr. White |
| Lake Charles Charity | 4 | Dr. Young |
| Other | 25 | Dr. Grimball |

Heads of household were asked to list chronic ailments of each household member. Of 794 individuals for whom responses were given, 115 (14.5%) had no health complaints. Respiratory complaints, including allergies, sinus congestion, asthma and other breathing difficulty, were the most common ailments (60% of respondents). Neurologic problems--primarily headaches, dizziness, anxiety and cognitive difficulties--were the second most prevalent type of complaint, reported for 315 individuals (40% of respondents). Circulatory problems, including high blood pressure and heart disease were the next most common, reported for 253 individuals (32%). Digestive ailments affected 133 individuals (17% of respondents). A total of 131 respondents suffered musculoskeletal problems (e.g., arthritis, aches). Dermatological conditions (rashes) were the next most common complaint (16% of respondents). Table 2 shows the prevalence of health complaints by organ system.

Table 2: Health Complaints by Organ System

| Organ System | Number of Responses | Percentage of Respondents |
|---------------------|----------------------------|----------------------------------|
| respiratory | 474 | 60% |
| neurologic | 315 | 40% |
| circulatory | 253 | 32% |
| digestive | 133 | 17% |
| musculoskeletal | 131 | 17% |
| dermatologic | 125 | 16% |
| eye | 67 | 8% |
| endocrine | 65 | 8% |
| genitourinary | 47 | 6% |
| throat | 30 | 4% |
| reproductive | 28 | 4% |
| ear | 26 | 3% |
| metabolic | 22 | 3% |
| nose | 15 | 2% |
| cancer/tumors | 14 | 2% |
| dental | 10 | 1% |
| hematologic | 9 | 1% |
| other | 21 | 3% |
| none | 115 | 15% |

Respondents were asked to list medications that household members take.

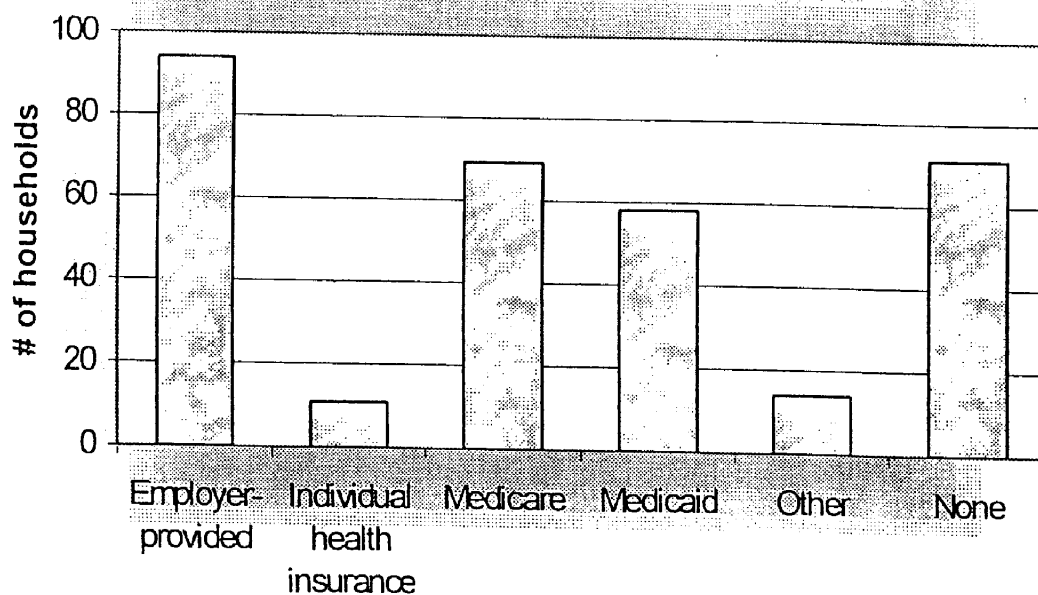
Responses were given for 627 individuals. Of these, 105 (17%) reported taking no medications. Analgesics, both prescription and over-the-counter, were the most common class of medications, used by 235 individuals (37.5% of respondents). Allergy medications were the next most prevalent category, taken by 146 respondents (23%); followed by blood pressure medications, taken by 101 respondents (16%). Table 3 shows complete summary data for medications.

Table 3: Medication Summary

| Medication Type | Number of Responses | Percentage of Respondents |
|-------------------------|---------------------|---------------------------|
| analgesic | 235 | 38% |
| allergy | 146 | 23% |
| antihypertensives | 101 | 16% |
| bronchodilators | 49 | 8% |
| antibiotics | 39 | 6% |
| antacids | 38 | 6% |
| psychiatric | 36 | 6% |
| diuretics | 30 | 5% |
| cardiac | 28 | 5% |
| glycemic | 24 | 4% |
| topical | 20 | 3% |
| lipid-lowering | 20 | 3% |
| unspecified digestive | 19 | 3% |
| thyroid replacement | 13 | 2% |
| anti-emetic/nausea | 13 | 2% |
| anticonvulsants | 10 | 2% |
| anticoagulants | 6 | 1% |
| laxatives | 5 | 1% |
| gastric motility agents | 4 | 1% |
| none | 105 | 17% |

Households were queried about their health insurance coverage. A total of 258 households responded. Of these, 71 (28%) reported having no health insurance whatsoever. Ninety-four households (36%) had one or more members with employer-provided health insurance. Sixty-nine households (27%) had members with Medicare coverage. Fifty-eight households (22%) had members with Medicaid coverage. Eleven households (4%) had members with individual health insurance. Fourteen households (5%) reported other types of health insurance coverage. (Figure 6) Many households reported more than one type of health insurance coverage. Forty-eight percent of households responded that one or more members have health insurance coverage for prescription drugs.

Figure 6: Health Insurance Coverage



Because tobacco use is an important determinant of health status, respondents were asked to provide tobacco history for themselves and other household members. Of 520 responses, 68% reported no tobacco use, 26% smoke or have smoked cigarettes, 4% reported unspecified tobacco use, 1% reported smoking cigars, 1% use smokeless tobacco, 0.4% reported use of more than one type of tobacco product, and 0.2% have smoked a pipe. (Table 4)

Table 4: Tobacco Use

| Type of Tobacco | Number of Responses | Percentage of Respondents |
|-------------------|---------------------|---------------------------|
| cigarettes | 137 | 26% |
| cigars | 4 | 1% |
| smokeless tobacco | 4 | 1% |
| pipe | 1 | 0.2% |
| unspecified type | 20 | 4% |
| >1 type | 2 | 0.4% |
| none | 352 | 68% |

Finally, households were asked to list additional health concerns. A total of 102 households (37%) responded to this question.

C. Sources and Pathways of Environmental Exposure

For purposes of exposure assessment, households were asked to identify members who had been tested for chemical exposure. Only 24 of 264 responding households (9%) reported any chemical exposure testing. Of those who had been tested, chemicals reported included dioxin, lead, ethylene dichloride (EDC), vinyl chloride, ammonia and asbestos. Some respondents indicated that they had been tested, but had not yet received the results.

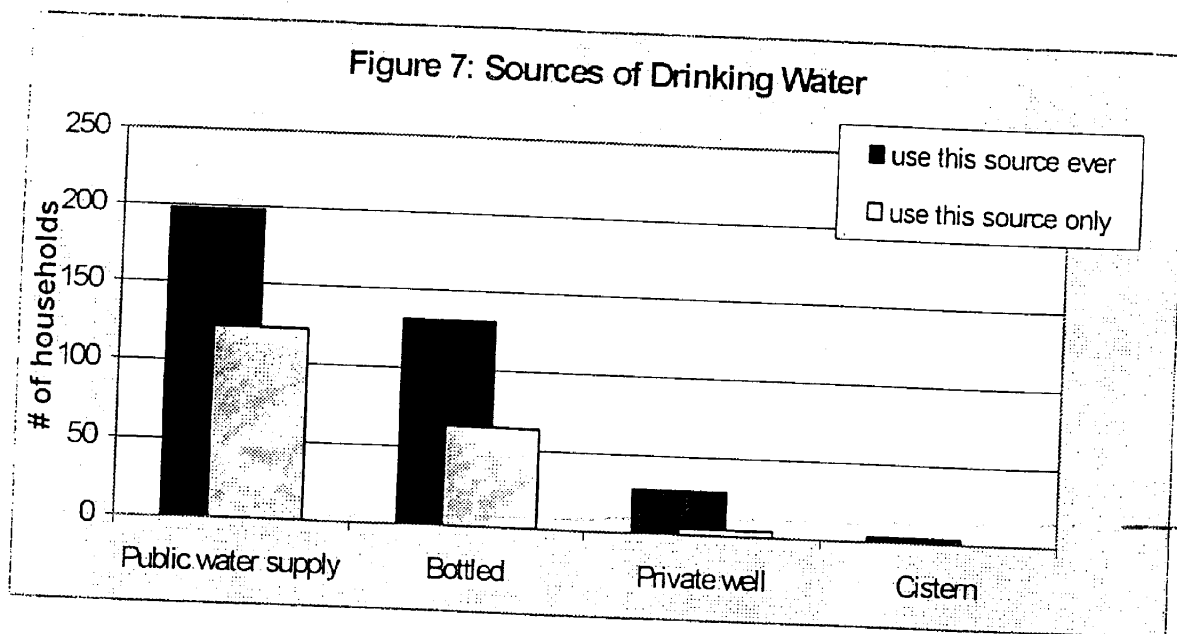
Households were asked what ailments they attribute to environmental pollution. A total of 198 households responded. Health conditions most frequently linked to pollution were: respiratory problems, including allergies, sinus conditions, asthma and breathing difficulty by 162 respondents (82%); neurologic disorders, including headache and dizziness, by 79 respondents (40%); rashes and other skin disease by 45 respondents (23%); digestive problems, including nausea, vomiting, diarrhea and ulcers by 44 respondents (22%); eye irritation and vision problems by 26 respondents (13%); and heart problems by 20 respondents (10%). Eighteen households (9%) attributed all their ailments to environmental pollution. (See Table 5 for complete list)

Table 5: Ailments Associated with Pollution

| Ailment | Number | Percent |
|---------------------|--------|---------|
| respiratory | 162 | 82% |
| neurologic | 79 | 40% |
| skin | 45 | 23% |
| digestive | 44 | 22% |
| eye | 26 | 13% |
| cardiovascular | 20 | 10% |
| musculoskeletal | 13 | 7% |
| cancer | 13 | 7% |
| cognitive/affective | 7 | 4% |
| infectious | 6 | 3% |
| dental | 6 | 3% |
| constitutional | 5 | 3% |
| renal | 4 | 2% |
| diabetes | 4 | 2% |
| reproductive | 3 | 2% |
| other abdominal | 3 | 2% |
| other/miscellaneous | 4 | 2% |
| all illnesses | 18 | 9% |
| no illnesses | 7 | 4% |

The Needs Assessment questionnaire also asked about common pathways of environmental chemical exposure. Of 266 responding households, 167 (63%) stated that they live within 100 feet of a highway or railroad tracks. Fifty-eight of 268 respondents (22%) reported open burning of trash and/or yard waste near their home. Sixty-one of 258 respondents (24%) believed there was a waste incinerator within 1 mile of their home. Of 262 responding households, 172 (66%) cited one or more industrial plants with flares and/or smokestacks within a mile of their home. The most commonly reported industrial plants were Condea Vista, Conoco, PPG and Olin. Only 3 of 264 respondents (1%) reported burning of sugar cane or rice chaff within a mile of their home.

The questionnaire assessed use of water resources in Mossville. Many households reported more than one source of drinking water. The most common was the public water supply, used by 198 of 272 responding households (73%). One hundred thirty-one households (48%) drink bottled water, and sixty-three of them use this source exclusively. Thirty-one households drink water from a private well or cistern at least some of the time. Five households obtain drinking water exclusively from these sources. (Figure 7) Of 272 responding households, 105 (38%) reported secondary water sources for uses other than drinking.



Households were asked about their method of sewerage disposal. Of 262 respondents, 144 (55%) reported sewerage disposal by septic tanks. Another 166 (44%) were connected to a municipal sewerage system.

The questionnaire also asked about recreational water use. Fifty-four of 265 respondents (20%) reported that household members swim in local water bodies, primarily the Calcasieu River and Lake Charles. Of 252 responding households, 128 (51%) were aware of public health fishing advisories on Calcasieu water bodies.

Households were asked about their consumption of locally grown food products. Sixty-six households (25%) responded that they grow fruits and/or vegetables to eat. The most common crops are tomatoes, okra, cucumbers, greens and peppers. (Table 6) Thirty-six households reported that they raise animals for food--chickens, pigs and ducks being the most common. (Table 7) One hundred sixteen households (43%) reported eating local wildlife, primarily rabbit, deer, raccoon and squirrel. (Table 8) One hundred thirty-two households (49%) eat food that is grown or raised by other Mossville residents.

Table 6: Crops Grown for Consumption

| Crop | Number of Responses |
|-------------|---------------------|
| tomato | 32 |
| okra | 22 |
| cucumber | 17 |
| greens | 14 |
| peppers | 10 |
| fig | 8 |
| onion | 7 |
| beans | 7 |
| cabbage | 5 |
| green onion | 5 |
| corn | 4 |
| kumquat | 4 |
| lemon | 3 |
| orange | 3 |
| peach | 3 |
| pecan | 3 |
| plum | 3 |
| pear | 3 |
| eggplant | 2 |
| peas | 2 |
| watermelon | 2 |

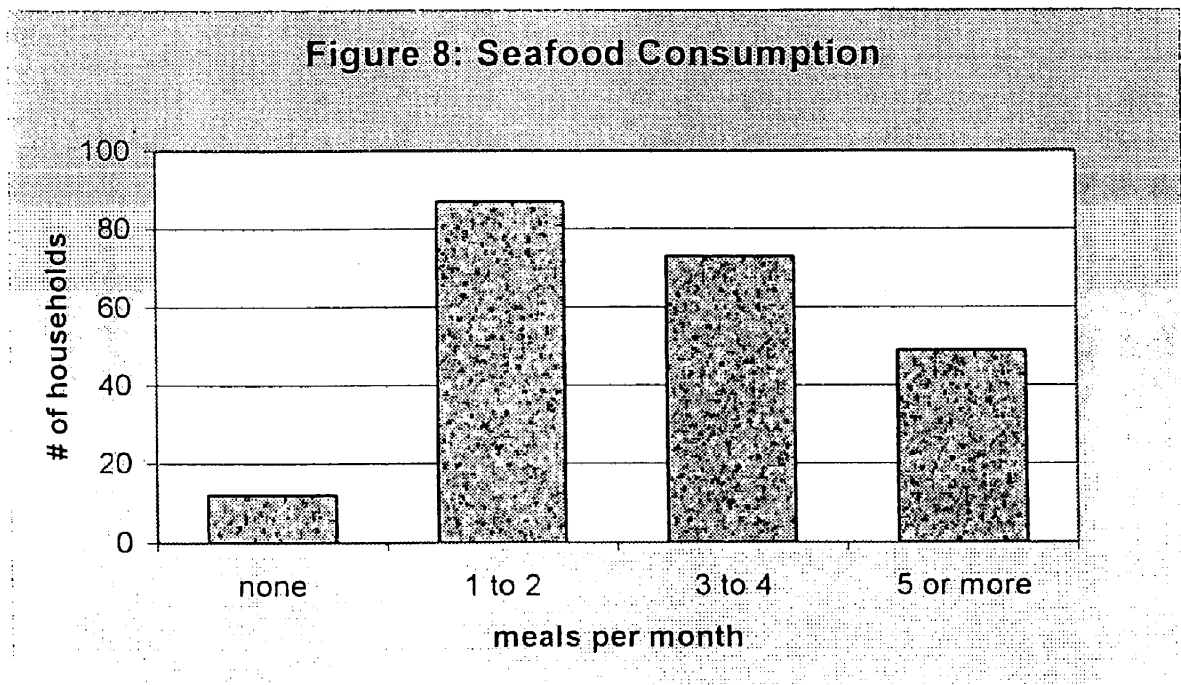
Table 7: Livestock Raised for Consumption

| Species | Number of Responses |
|----------|---------------------|
| chickens | 23 |
| pigs | 14 |
| ducks | 9 |
| rabbits | 4 |
| cows | 3 |
| geese | 2 |
| turkeys | 2 |
| turtles | 2 |

Table 8: Wildlife Consumed

| Species | Number of Responses |
|----------|---------------------|
| rabbit | 69 |
| deer | 29 |
| raccoon | 26 |
| squirrel | 26 |
| duck | 15 |
| fish | 16 |
| turtle | 6 |
| crab | 3 |
| cow | 2 |
| opossum | 2 |

To assess the possibility of chemical exposure via seafood, the questionnaire inquired about seafood consumption. Of 221 responding households, 5% reported no seafood consumption, 39% eat seafood once to twice per month, 33% eat three to four seafood meals per month and 22% consume seafood five or more times per month (Figure 9). Of 270 respondents, 92% eat fish, 87% eat shrimp, 70% eat crawfish, 64% eat crab, and 34% eat oysters. (Figure 10) The most common types of fish eaten are catfish, gar, redfish, perch and bass. (Table 9)



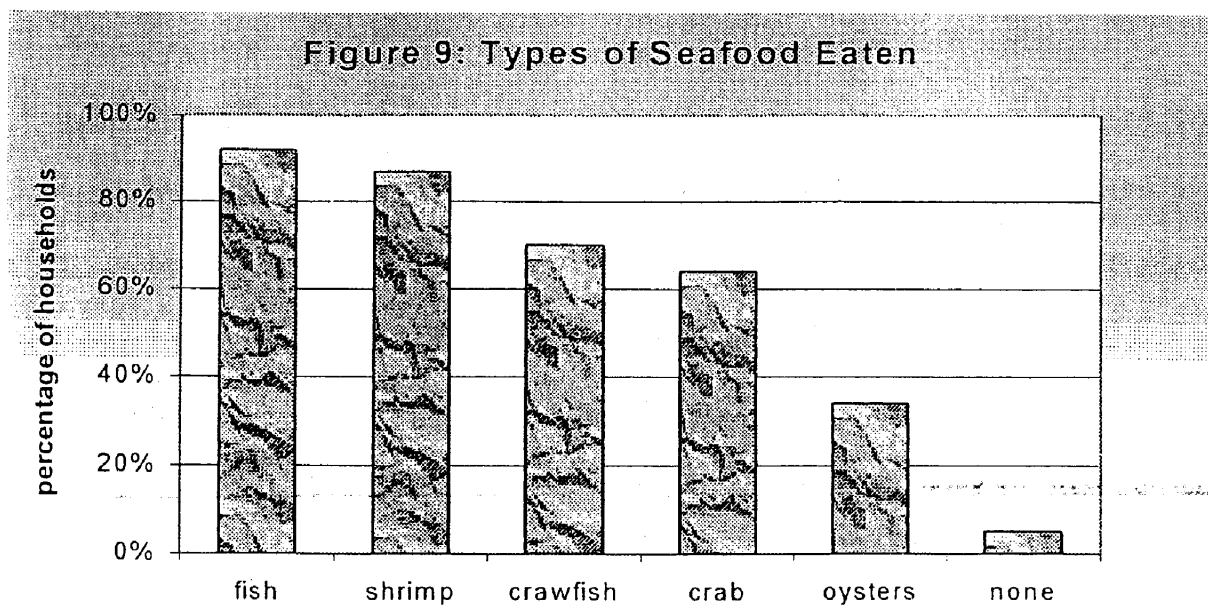
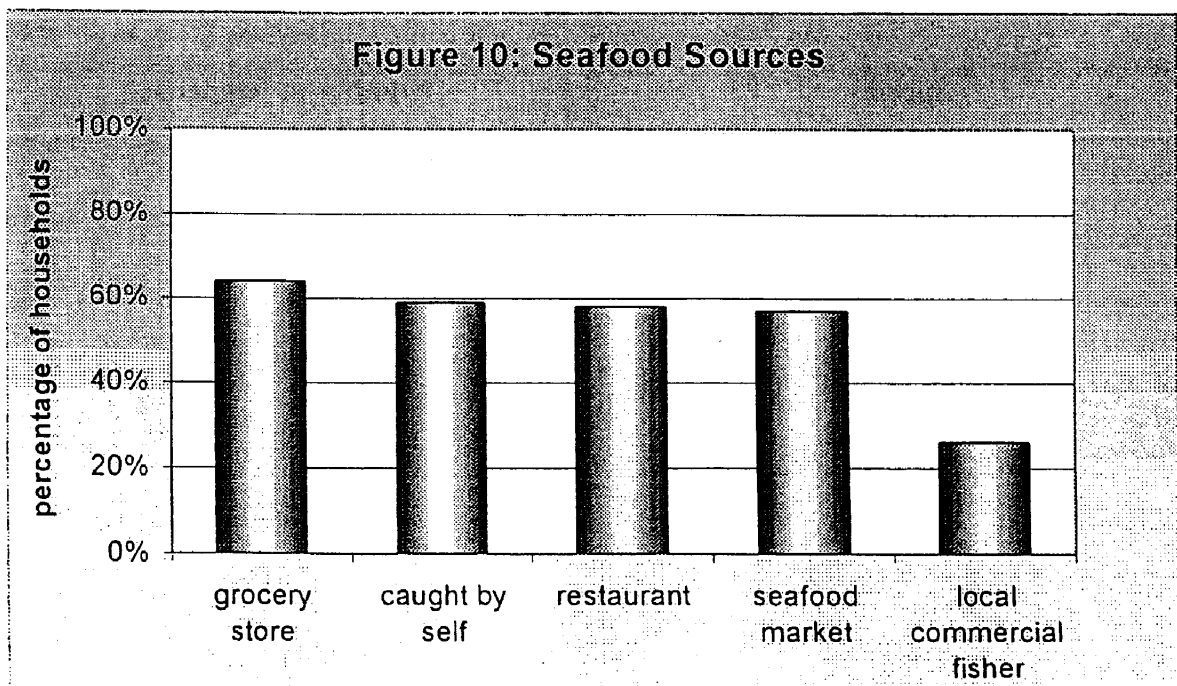


Table 9: Most Commonly Eaten Species of Fish

| Species | Number of Responses |
|----------|---------------------|
| catfish | 205 |
| gar | 80 |
| redfish | 57 |
| perch | 50 |
| bass | 45 |
| flounder | 25 |
| trout | 23 |
| drum | 16 |

Consumption of local seafood is a particular concern. Many respondents get their seafood from a variety of sources. One hundred seventy-two households (64%) report buying seafood from the grocery store. One hundred fifty-eight households (59%) eat seafood caught by themselves or a friend. One hundred fifty-six households (58%) eat seafood at restaurants. Fifty-seven percent of responding households purchase seafood at a seafood market, and twenty-six percent eat seafood obtained from local commercial fishers. Sixteen households (6%) report eating only seafood they catch themselves; eight households (3%) eat only seafood caught by themselves or a local commercial fisherman. (Figure 11)



The questionnaire also asked households how they clean and cook the fish they eat. Filletting and removing the skin was the most frequently reported cleaning method, followed by leaving the fish whole with the skin on. Households also reported carving filets with the skin on; leaving the fish whole, but removing the skin; and "other" as methods of dressing their fish. (Figure 12) Frying was the preferred method of cooking fish, used by 85% of responding households (34% cook fish by frying only). Forty percent of respondents bake fish, 24% broil fish, 11% boil fish or use its stock, and 8% reported "other" as a method of cooking fish. (Figure 13)

Figure 11: Seafood Cleaning Methods

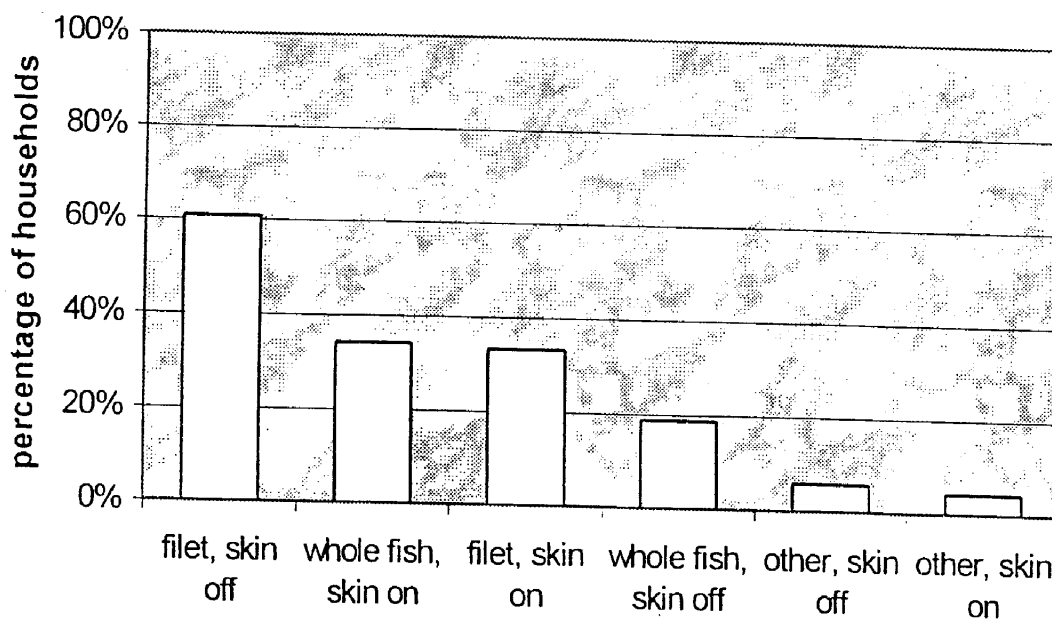
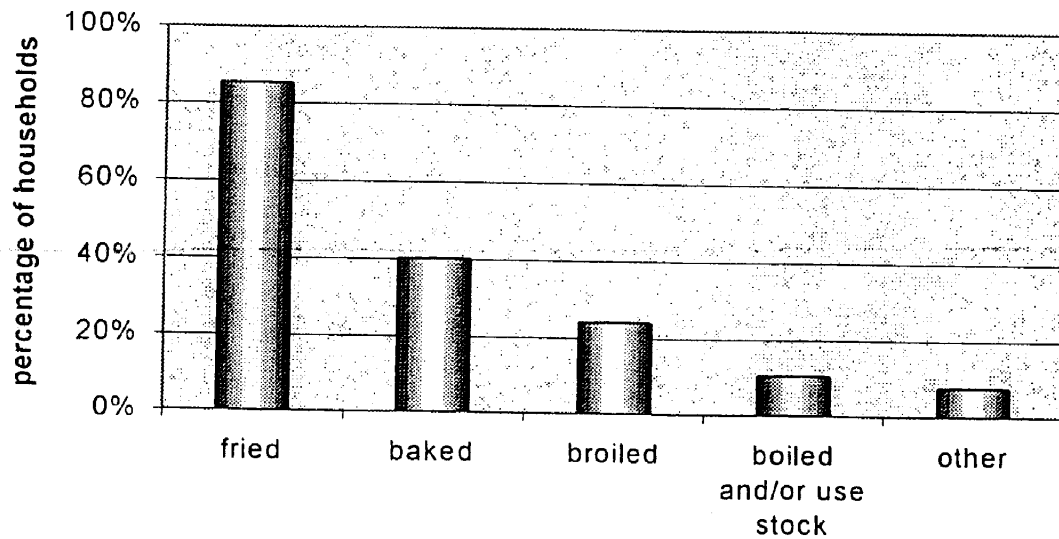


Figure 12: Seafood Cooking Methods



Because military service in Vietnam has been linked with dioxin exposure, the questionnaire asked about Vietnam veterans in the household. Twelve of 271 households responding (4%) contain a Vietnam veteran. Because breast-feeding is a significant route of dioxin exposure, the questionnaire inquired about such practices, but the response rate was too low to yield meaningful data.

D. Media Preferences

To guide future communication with the Mossville community, the Needs Assessment questionnaire asked about media preferences. Eighty-six percent of respondents listen to the radio. The most popular radio stations are KZWA 105.3 FM and KXZZ 1580 AM. Nearly all respondents reported watching television (99.6%). The most popular television stations are CBS/KPLC, FOX/KVHP, and CBS/KFLY. Seventy-nine percent of respondents read the newspaper, most frequently the Lake Charles American Press. When asked how they would like to receive further information, the order of preference was by mail, television and newspaper.

IV. DISCUSSION

The Mossville Residential Needs Assessment questionnaire gathered information to guide public health planning and action in Mossville. Questions addressed the demographics, health status and health care access, potential routes of exposure to toxic substances in the local environment, and media preferences of the Mossville community. The Needs Assessment does not attempt to link exposure to toxic substances with health effects. Making such causal associations is beyond its scope. Its data nonetheless underscore various unmet needs and causes for concern, which are discussed below.

The Louisiana Department of Health and Hospitals believes that the data accurately reflect the state of affairs in Mossville. The Needs Assessment drew a large number of respondents. This large sample size increases the chances that data are accurate. Because participation was voluntary, however, the sample group may not be fully representative of Mossville. Likewise, responses to each question were voluntary, and response rates for different questions varied. Items with low response rates are more likely to yield inaccurate data. Responses were subjective, some addressing events in the distant past--another potential source of inaccuracy. To streamline data collection, questionnaires were limited to one respondent per household. Heads of household responded on behalf of themselves and other household members. This use of proxy responses could also reduce accuracy. Finally, most Needs Assessment questionnaires were self-administered. Representatives of LDHH were available to clarify questions when asked, but some items on the questionnaire may have been misunderstood. This appears to have been the case with questions relating to occupational history, which were not drafted as clearly as they

might have been. While acknowledging these pitfalls, LDHH is confident using Needs Assessment data to plan public health response in Mossville.

A. General Information

The lack of such basic information as population has hindered response efforts in Mossville. Because it is an unincorporated community, Mossville's population is hard to estimate. Parts of the community lie within the boundaries of Sulphur; parts, within the boundaries of Westlake. There are also indications that the Mossville population has dwindled significantly in recent years, due to buyouts by neighboring industrial facilities. Address information collected in the Needs Assessment questionnaire gives a clearer estimate of the Mossville population. Of 273 responding households who have ever lived in Mossville, 247 households still reside in zip codes 70663 or 70669, which encompass Mossville, Sulphur and Westlake. At least 50 households still live in Mossville proper. Thus, Mossville is not abandoned, and households that move out often relocate nearby.

Data on duration of residence in Mossville further indicate a stable population in the community. Average residence in Mossville among responding households is 30.8 years. Average length of residence in Calcasieu Parish is 39.1 years. This is pertinent because longer residence implies longer exposure to environmental pollution in the area.

The age and gender distributions of Needs Assessment respondents are comparable to Calcasieu Parish as a whole. Six percent of respondents are younger than five years old versus seven percent of the Parish population.³ Eleven percent of respondents are 65 or

older versus eleven percent of the Parish population.⁴ This suggests birth rate and life expectancy in Mossville are roughly equivalent to Parish norms.

In addition to basic demographic information, the Needs Assessment questionnaire contained items relating to socioeconomic status, including occupation and mode of transportation. Questions pertaining to occupation did not yield usable data. Inquiries about automobile ownership were more successful. About 6% of responding households do not have access to an automobile. This is important because access to an automobile can increase access to healthcare services. In Mossville, it appears that transportation is not a major barrier to reaching healthcare services.

B. Health and Healthcare

The Needs Assessment questionnaire gathered data about health status and healthcare access. The data confirm that healthcare services are available in the Mossville area. Of 220 respondents, 94% go to hospitals in Lake Charles. Of the thirteen most popular physicians, nine practice in Lake Charles, three in Sulphur, and one in Westlake. The great majority of responding households have doctors close to home.

Needs Assessment data regarding physician office visits also indicate ample access to healthcare. Estimates by heads of household of the number of visits to physicians in the past year averaged 6.4 per person. This exceeds the national average of 3.1 physician office visits per person annually.⁵ The difference may be because the Mossville data are self-reported, whereas national data are physician-reported. Alternatively, it may indicate that responding households go to the doctor more often because of poor health.

There are also significant differences in healthcare utilization between insured and uninsured households with the Needs Assessment sample group. Adults from households with any health insurance coverage averaged 6.7 physician visits in the previous year, whereas adults from households with no health insurance coverage averaged 5.0 annual doctor visits, a statistically significant difference ($p < .05$).⁶ The disparity for children is even more significant—6.5 annual physician visits for children from households with any health insurance versus 2.1 annual physician visits for children without health insurance ($p < .01$).

Needs Assessment data show a relatively high proportion of households lacking health insurance. Twenty-eight percent of responding households reported having no health insurance at all. The proportion of individuals in the Needs Assessment group without health insurance is likely even higher, because some households contain both insured and uninsured members. It exceeds both the national uninsured rate of 15.5% and the Louisiana uninsured rate of 22.5%.⁷

Needs Assessment data regarding health status are harder to compare. Respondents' health complaints were categorized by organ system. Respiratory complaints, including allergies, sinus congestion, asthma and breathing difficulties were the most frequently reported. Neurologic complaints, primarily headaches and dizziness, were the next most common category. Though the data allow ranking of categories of complaints by organ system, they are too general for calculation of specific disease rates or comparison with other communities. This is because individual health complaints can encompass several different diagnoses or diseases. Headaches, for example, can be

tension, migraine or cluster, each of which is a distinct medical condition. Nor do health complaint data permit conclusions about cause and effect. This is because individual complaints may have various causes--for example, headaches may result from emotional stress, odors, vascular spasm or (rarely) brain tumors. Though it is certainly true that air emissions of particulates, sulfides, sulfur dioxide, organic compounds, etc. can cause allergies and respiratory irritation, natural allergens such as pollens and molds may elicit similar symptoms. Exposure information, in the form of ambient air monitoring data, will be most useful in linking pollution with respondents' health complaints. The U.S. Environmental Protection Agency (EPA) is devising an ambitious air monitoring plan that may provide such data.

In the meantime, Needs Assessment respondents have stated their beliefs regarding the influence of environmental pollution on their health. Respiratory complaints and headaches were the ailments most frequently linked with environmental pollution. Current medical knowledge supports the plausibility of this association. In contrast, nine percent of respondents ascribed all illness to environmental pollution--a link that is inconsistent with contemporary theories of disease causation. Infectious agents, genetics and nutrition, among other factors, are also important causes of disease.

C. Sources and Pathways of Exposure

Environmental contaminants can harm human health. To do so, however, they must enter the body. Hazardous substances can move through air, water, and on land. Potential routes of exposure therefore include inhalation, ingestion, and skin contact. Sometimes exposure pathways are direct, as with inhalation of polluted air. Other

exposure pathways are indirect, following movement of contaminants through ecosystems and the food chain. The Needs Assessment questionnaire asked about various activities and practices that could contribute to toxic substance exposures in the Mossville area.

Vehicles are the number one source of air pollution in the United States.⁸ Living in close proximity to highway or railway can expose people to elevated levels of criteria pollutants (particulates, sulfur dioxide, nitrogen oxides, and ozone) and organic pollutants--all of which can cause respiratory illness. Until the ban on leaded gasoline, highways were also significant sources of airborne lead. Even today high lead levels may persist in roadside soils.⁹ Mossville abuts Interstate 10, and there is much automobile and rail traffic to and from industrial facilities in the area. This is of particular concern, because trucks and trains typically run on diesel fuel, and pollute more than cars. Sixty-three percent of Needs Assessment respondents reported living within 100 feet of a highway and/or railway. This indicates that exposure to vehicular pollution in the Mossville community may be considerable.

Waste incineration is another potential source of air pollution. Without effective technologic controls incinerators emit criteria pollutants, heavy metals, and dioxins.¹⁰ Critics argue that waste incinerators emit excessive amounts of these chemicals under any circumstances. Needs Assessment respondents were asked about their proximity to incinerators. Twenty-four percent of them reported a waste incinerator within one mile of their home.

Open burning of industrial and/or residential waste pollutes the air even more severely. The lack of pollution control devices permits escape of criteria air pollutants,

while low combustion temperatures favor dioxin formation.¹¹ Twenty-two percent of respondents reported open burning of waste within a mile of their home.

Flaring, the venting and burning of excess precursor compounds in petrochemical production, can be another source of air pollution. Unlike smokestack emissions, flares often lack pollution control devices. They rely on high combustion temperatures to consume organic compounds. Critics argue that temperature regulation is insufficient, and that flaring of such chlorinated organic compounds as vinyl chloride can generate dioxins. Sixty-six percent of Needs Assessment respondents report residence within one mile of a smokestack and/or flare. Failure or lack of emission controls could expose them to air pollution from these sources.

Agricultural burning can also pollute the air. Only three percent of the respondents, however, reported burning of sugar cane or rice chaff within a mile of their home.

Drinking water is a potential source of toxic exposure. Municipal water supplies are regulated and tested for contamination under the Safe Drinking Water Act. Mossville's public water supply was tested and found to be within drinking water standards in 1999. It is uncontaminated at the source.¹² Private wells are not routinely tested, and, because of shallow depth, may be more prone to contamination. The Needs Assessment questionnaire asked respondents about their drinking water source(s). The public water supply is the main source of drinking water, followed by bottled water, but many households reported multiple sources. Five households reported drinking water from private wells or cisterns only. The potential for contamination of these sources should be considered.

The Needs Assessment asked a number of questions about potential exposure to toxic chemicals in the food chain. Plants can take up pollutants from the soil or by deposition from the air. Root crops like potatoes, carrots and beets have a greater tendency for contamination.¹³ Twenty-five percent of Needs Assessment respondents reported gardening for food, and about half eat food products grown by other local residents. Plants do not concentrate dioxins sufficiently to cause significant exposure, but produce can contain unsafe amounts of other substances.¹⁴

In contrast, animals, especially cattle and fish, do accumulate and concentrate dioxins.¹⁵ Thirteen percent of Needs Assessment respondents raise livestock for consumption. Three households reported raising cattle. Forty-three percent of responding households eat local wildlife. About sixty percent consume locally caught fish. Twenty-four households reported eating locally caught fish exclusively. Of these households, seventeen reported eating catfish, and ten eat gar. Catfish are bottom-feeders, and tend to accumulate contaminants from sediment.¹⁶ Gar prey on smaller fish. Their high position in the food chain also causes them to accumulate contaminants.¹⁷

In addition to concerns about dioxin, sampling of local fish has found harmful levels of other contaminants in some areas. The State has issued a fish consumption advisory for Bayou d'Inde, secondary to hexachlorobenzene (HCB), hexachlorobutadiene (HCBd) and polychlorinated biphenyls (PCBs) detected in fish there. A fish consumption advisory relative to mercury contamination has been issued for the West Fork of the Calcasieu River. Unfortunately, nearly half of respondents reported being unaware of

these advisories. Efforts to determine the extent of fish contamination in Calcasieu Parish are still ongoing.

Methods of cleaning and cooking fish can influence the amount of toxic exposure from eating them. The skin, underlying fat and entrails tend to have higher levels of contaminants than the rest of the fish.¹⁸ Skinning and filleting is the most popular method of preparation, but at least a third of respondents sometimes cook fish with the skin on. This further underscores a potential for exposure to environmental contaminants from local fish in the Mossville area.

Because some toxic chemicals can cross the skin, swimming in contaminated water and sediments can be hazardous. Bayou d'Inde currently has a swimming advisory related to HCB, HCBd and PCB contamination. Twenty percent of the participants report swimming in local water bodies, primarily the Calcasieu River and Lake Charles. There are currently no swimming advisories for either of these sites.

In addition to questions about unintentional toxic exposures, the Needs Assessment asked about a popular means of voluntary toxic exposure, smoking. Response rate for this item was low--61% of the sample group. Twenty-six percent of respondents report cigarette use, and 33% use tobacco in any form. This is consistent with State and national rates of 26% and 24%, respectively.¹⁹ The harmful effects of smoking cannot be overstated. In conjunction with other toxic exposures, effects may be more severe than the sum of each separately. The risks of lung cancer in smokers with a history of asbestos exposure, for example, are 10 times that of non-smoking asbestos workers and 5 times that of smokers without a history of asbestos exposure.²⁰

V. CONCLUSIONS

To inform planning and response, the Needs Assessment questionnaire collected descriptive data about demographics, health status and healthcare utilization, potential routes of environmental chemical exposure, and media preferences in the Mossville community. Important findings include: 1) the Mossville community has a stable population that has lived in the area for many years and continues to reside there; 2) there are ample healthcare facilities and professionals in the Mossville vicinity; 3) there is a disproportionate number of individuals lacking health insurance coverage in Mossville; 4) uninsured Needs Assessment respondents report fewer doctor visits than their insured counterparts; 5) respiratory complaints and headaches are the ailments most frequently reported by respondents; 6) many respondents live in close proximity to industrial facilities, highways and railways; and 7) a large percentage of respondents consume local fish and wildlife, a potential route of chemical exposure.

VI. RECOMMENDATIONS

1. Continue efforts to determine the source, extent and health implications of dioxin exposure in Mossville/Calcasieu area. Environmental and biological monitoring are both relevant.
2. Continue monitoring of air, water, soil, sediment and biota to characterize levels of other contaminants in the Mossville/Calcasieu area. Provide resulting data to the public in a "user friendly" format. Include gar among fish species tested for mercury contamination
3. Conduct educational activities for health professionals, community leaders, and the public on limiting, assessing, and responding to toxic exposures.
4. Continue analysis of selected health outcomes, including cancer incidence, in Calcasieu Parish.
5. Facilitate healthcare access among the uninsured in the Mossville area.
6. Seek input and cooperation of local government and business leaders.

Notes

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- ¹ Agency for Toxic Substances and Disease Registry, Mossville Exposure Investigation Report, CERCLIS no. LA0002368173, Atlanta, 1999.
- ² Ibid.: U.S. Department of Health and Human Services. Toxicological Profile for Chlorinated Dibenzo-p-Dioxins (Update). Research Triangle Institute, 1998.
- ³ Office of Public Health. Calcasieu Parish Health Profile 1999, (in press).
- ⁴ Ibid.
- ⁵ National Center for Healthcare Statistics. "Ambulatory Healthcare Data, 1998," <http://www.cdc.gov/nchs/about/major/ahcd/officevisitcharts.htm>.
- ⁶ This means that the difference has less than a 1-in-20 probability of arising by chance.
- ⁷ Pugh T. "Number of Uninsured in U.S. Dips." New Orleans Times-Picayune, Sept. 29, 2000, p. A-4.
- ⁸ Moeller DW. Environmental Health, Harvard University Press, Cambridge, 1992, pp. 14-17.
- ⁹ Mielke HW. Lead in the Inner Cities. American Scientist, 87:62-73, 1999.
- ¹⁰ Moeller, pp. 124-125.
- ¹¹ Ibid.
- ¹² It is possible, however, that water may become contaminated en route to the tap.
- ¹³ International Agency for Research on Cancer. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Polychlorinated Dibenzo-*para*-dioxins and Polychlorinated Dibenzofurans, Volume 69, Lyon, 1997, p. 95.
- ¹⁴ Ibid., p. 90.
- ¹⁵ Ibid., pp. 91-93.
- ¹⁶ Environmental Protection Agency. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1, EPA 823-R-99-007, Washington, 1999, p. 3-5.
- ¹⁷ Ibid., p. 3-7.
- ¹⁸ Environmental Protection Agency. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 2, EPA 823-R-99-008, Washington, 1999, p. C-4.
- ¹⁹ Office of Public Health.
- ²⁰ Cotran R, Kumar V and S Robbins. Robbins Pathologic Basis of Disease (4th ed.), W.B. Saunders, Philadelphia, 1989, p. 480.