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HEALTH
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CHILDREN'S HEALTH AFTER THE OIL SPILL: A FOUR-STATE STUDY

Findings from the Gulf Coast Population Impact Project

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About the National Center for Disaster Preparedness

Founded in 2003, the National Center for Disaster Preparedness (NCDP) is an academically-based resource center at Columbia University's Mailman School of Public Health dedicated to the study, analysis and enhancement of the nation's ability to prepare for, respond to, and recover from major disasters, including terrorism. The NCDP has a wide-ranging research, training and education, and advocacy agenda, with a special interest in megadisasters. NCDP staff and faculty have testified at Congressional hearings, conducted briefings for senior government officials, and have presented at numerous scientific conferences and meetings.

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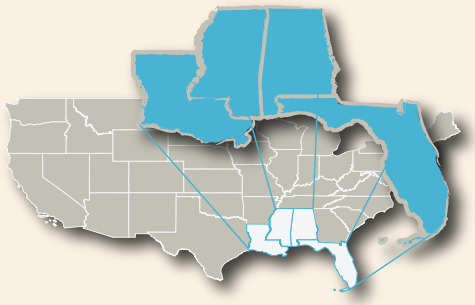
BACKGROUND

Nearly three years after the Deepwater Horizon platform exploded and the Macondo well released an estimated 4.9 million barrels of crude oil into the Gulf waters [1], coastal communities continue to grapple with the impact of the oil leak. The long tails of the nation's largest accidental disaster can be seen in the enduring economic, environmental, and social effects.

Figure 1

Four-State Study Region along the Gulf Coast



We established the Gulf Coast Population Impact Project (GCPI) in the immediate aftermath of the oil spill in order to track the disaster's effect on Gulf Coast populations, in particular the children living in the region. This report presents our latest findings, following up on the report we published in August 2010. [2]

In the weeks following the April 2010 explosion of the Deepwater Horizon oil rig, a team from Columbia University's National Center for Disaster Preparedness (NCDP) and from the Children's Health Fund convened Town Hall meetings and focus groups in Louisiana and Mississippi. The parents we spoke to at these meetings shared their deep concerns about the possibility of long-term health effects from the oil spill. In July 2010, we interviewed over 1,200 parents who lived within ten miles of the Gulf Coast. That survey revealed that more than 40% of the population living within ten miles of the coast had been directly exposed to the oil spill. One in every four parents told us their child had experienced a new physical health problem, and one in five parents reported that their child had experienced mental health distress in the two weeks prior to our phone call. [2]

This initial work in the weeks and months after the oil spill set the stage for the four-state study described in this report. Would parents' concerns about the long-term effects of the oil spill on their children's health and welfare be borne out? Was it possible to describe the ways in which the oil spill had affected children and their environment? In addition to assessing the problems, could we begin to help affected communities identify solutions?

In 2012, with funding from the Baton Rouge Area Foundation, the National Center for Disaster Preparedness at Columbia University, in partnership with the Children's Health Fund, launched the four-state study in order (1) to identify communities of children in the coastal areas of Louisiana, Mississippi, Alabama and Florida (Figure 1) who were adversely impacted by the Deepwater Horizon oil spill, (2) to explore the prevalence of physical and mental health effects among these children, and (3) to conduct a preliminary assessment of the health services available to these children and the potential for targeted interventions or health system enhancements.

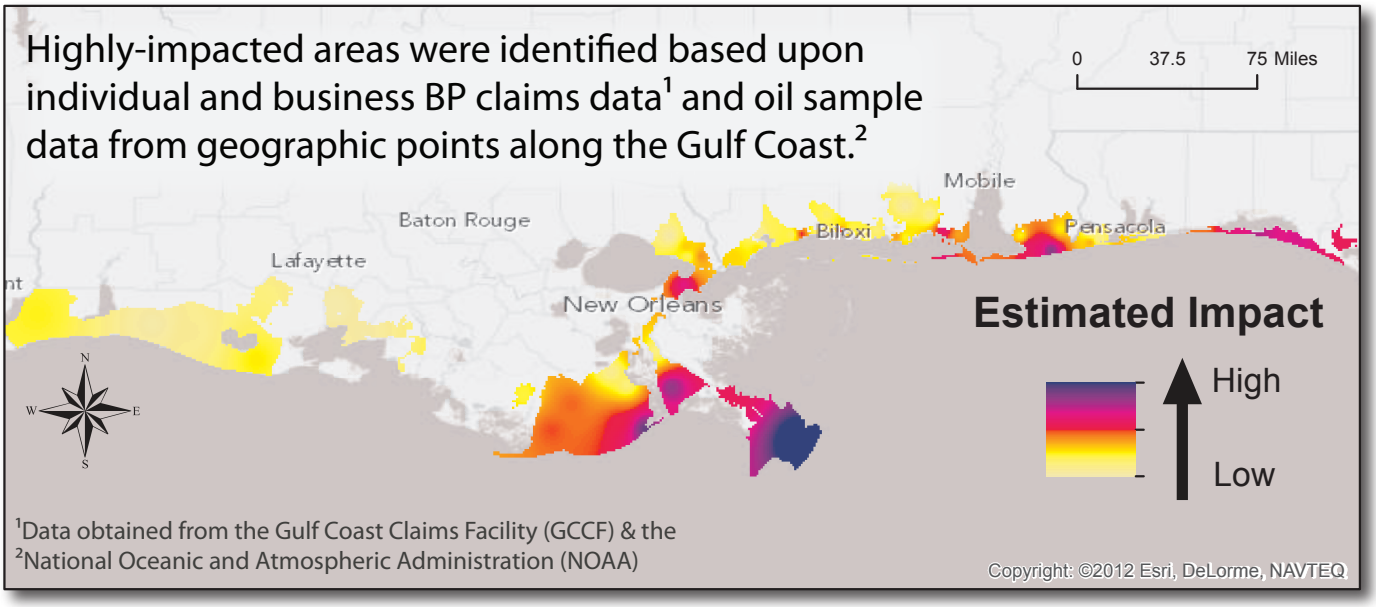
survey FINDINGS

We identified fifteen communities with higher numbers of BP compensation claims submitted by individuals and by businesses, and which also had higher rates of oil washing up on their shores based upon monitoring data collected by the National Oceanic and Atmospheric Administration (Figure 2).

In April 2012, the Gulf Coast Population Impact project started the household survey component of the work. Over a span of four and a half months, a field team of six interviewers and two field coordinators completed 1,437 face-to-face household surveys in 15 communities, with 887 respondents in Louisiana, 177 in Mississippi, 140 in Alabama, and 233 in Florida (Appendix Table 1). The parents whom we interviewed reported considerable exposure to the oil spill as well as a number of physical and mental health problems among their children:

Figure 2

Highly-Impacted Areas



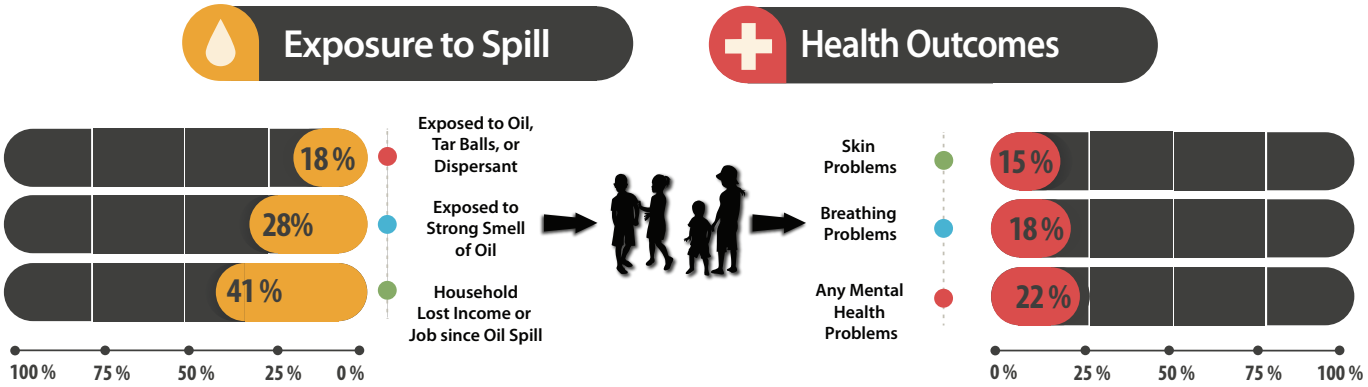
cont'd

survey FINDINGS

- **Exposure to the oil spill:** Over half (Appendix Table 2) of the parents interviewed in these highly-impacted communities reported that their children had some type of oil spill-related exposure, whether it was through physical, environmental, or economic factors. One in every five parents said their children had direct contact with the oil; one in four reported smelling strong oil-related odors; and two of every five said their household had lost income or a job since the oil spill (Figure 3).
- **Health effects:** A little over 40% (Appendix Table 3) of parents in these high-impact communities reported some type of health effect experienced by their children since the oil spill. 18.1% of the parents said their children had experienced breathing problems after the oil spill, 14.8% noted skin problems, 16.0% reported visual problems and 21.6% mentioned emotional or behavioral problems since the oil spill. Parents in Alabama (48.6%) and Mississippi (50.9%) reported higher proportions of children having health problems since the oil spill.
- **Exposure matters:** All other things being equal – regardless as to where people live, how much money they make, or whether or not they have health insurance and a family doctor for their children – **parents who reported that their children had been directly exposed to the oil spill or dispersants were three times (Appendix Table 4) as likely to report new physical or mental health problems among their children** when compared to those parents who reported that their children had not been exposed. **Parents in households that had lost income or a job since the spill were one and a half times as likely to report new physical health or mental health problems among their children**.

Figure 3

Proportion of Children Exposed to Oil Spill and Reported Health Effects



community INTERVIEWS

Insights from Communities

Based on the household data, we selected four communities where parents reported significant health effects; two in Louisiana, one in Mississippi, and one in Alabama. Between October 7 and October 18, 2012 our research team traveled to these four communities to interview local officials and leaders and conduct in-depth parent focus groups. Our final sample, across the four target communities, included **88 professionals, community leaders, and advocates** representing the first four categories identified above. We also interviewed **64 parents and grandparents** in the target communities. Of the twelve parent focus groups we convened, nine were carried out in English, two in Vietnamese (with the assistance of interpreters), and one in Spanish (with the assistance of an interpreter).

During these encounters we heard many insights about children's health, including the following:

- Across the four communities, the team heard of **significant issues related to children's health and well-being**. These were often expressed as lack of access to high-quality pediatric care, particularly specialty and mental health care, and insufficient numbers of local providers who accepted Medicaid; there were clusters of unexplained physical symptoms reported by parents, such as chronic headaches, nosebleeds and ear bleeding, early and heavy menstrual periods among young girls, and skin rashes; there were many reports of unsupervised and "latchkey" children and concerns that this was leading to many harmful or unsafe behaviors; and there was a consistent concern about dwindling recreational and occupational opportunities for children, which was itself affecting children's mental and social well-being.
- The **rising economic pressures on families have led to cascading problems and stressors**. There were many stories of parents (and often caregiving grandparents) unable to meet such basic needs as food, clothing, or shelter for their families, and of how these pressures have led to parental depression, engagement in harmful or addictive behaviors, and to generally poor parenting skills. Overall, the economic landscape appears quite bleak to those parents dependent upon the fishing and hospitality industries and the economies supporting them, and many people spoke to us about the need for education and job training opportunities for both adults and current and future generations of youth.
- **Communities as a whole were losing their ability to sustain economic opportunities, social safety net programs, and sufficient networks of providers**. For example, the research team heard of mental health programs that had been categorically funded, and which were soon ending without the ability to sustain their services despite the evident need.

- **Some, but not all of the problems we heard about were attributable to the oil spill**. Many communities regarded the oil spill as an additional stressor that exacerbated problems that arose from Katrina and other hurricanes and natural weather events, the economic recession, chronic poverty, and more general social disinvestment.

Impressions from the Field

What follow are some of our initial impressions. These are not intended to be construed as analytic "findings," but rather reflect a sense of the issues we heard about in our travels. We have organized our thoughts around the themes of effects of the oil spill on Children, Families, and Communities.

Children – Health, Health Care Access, and Future Opportunities

1. **Physical health issues** – We heard many vivid stories – especially in those communities most physically exposed to the oil spill and dispersants – of physical health issues that children had been struggling with since the oil spill. Here are just a few examples of things that providers told us about the children they serve and that mothers told us about their children: that children had been bleeding from their noses and ears; that girls were starting their menstrual periods early and bleeding so heavily that they had to be put on birth control; that children were experiencing problems with their eyes and blurred vision; that children had gastrointestinal problems; and that children and youth were experiencing unexplained skin rashes and intensified problems with pre-existing conditions like eczema. One mother, for example, recounted a story of being on the beach with her child who was digging in the sand as she sunbathed. She looked over to see her young son covered in brown, mucky oil mixed with dispersant. She grabbed him and began trying to clean him off as soon as she could get him home. She used baby wipes, bleach, and finally had to wash him down with Pine Sol to get the oil off his skin. Her child had eczema, and his condition worsened terribly after this incident. She had not taken her child to the beach since.
2. **Mental health issues** – In each community we visited, parents and many providers expressed intense concerns about children's mental health and cognitive functioning. Several interviewees told us that children and youth who had previously been very bright and engaged had lost their motivation and were apparently depressed. Others talked about how children were forgetting things and seemed to be having memory and concentration issues in school and at home. Health providers in one community spoke at length about the rise in suicidal ideation and self-injury among the youth in their care.
3. **Drug use** – Interviewees in some of the communities expressed serious concerns about rising drug use among children and youth. Generally this was confined to marijuana and prescription drugs, but there was also some discussion of a growing crystal meth problem, especially in one of the communities we visited.
4. **Teen pregnancy** – In one coastal community, 90 teenage girls were pregnant this year, representing about 1 in 11 students in the high school. One Vietnamese teen from the community whom we met said she knew a 13-year-old girl who was getting ready to have a baby, and that she had another 15-year-old friend who was pregnant. The parents were aware of the pregnancy issues, although there has been little public discussion about it. Most point to the problems of

unsupervised children (because parents are out working), parents with poor parenting skills or addictive disorders of their own, and a lack of other opportunities (recreational or employment) for their teenagers. A community advocate told us that girls were getting pregnant because they "just wanted something of their own, something to love."

5. **Behavioral issues** – Behavioral problems were also noted by many parents and school officials. For example, school nurses in one community told us stories about children as young as third and fourth grade engaging in "sex games" at school that then resulted in disciplinary action; parents told us about youth getting involved in gangs; and many people talked about the rise in bullying across all of the communities. The interviewees expressed what they saw as the root causes of the behavioral issues. "Is it the oil spill?," they often asked. "Perhaps," was a typical response, but they also related the issues back to economic pressures, housing and food instability, poor parental coping skills, and lack of parental involvement in children's lives due to work demands and other challenges.
6. **Health care access** – Many children were unable to access pediatric primary care, in that local providers did not accept Medicaid or that there were simply no providers or specialists in the communities where they lived. We heard many stories of families traveling great distances (ranging from 45 minutes to 3 hours) to access specialty care or mental health care. In Grand Isle, where the physical health effects among children seemed to be the most extreme, parents expressed frustration at the lack of responsiveness of some medical professionals to their concerns. They felt like doctors had been "bought off" by BP or were too "concerned about getting drawn into a lawsuit" to accurately and adequately test and treat their children. One mother noted that she had moved her daughter, who had become quite sick since the spill, to Mississippi, just to get her away from the water and dispersants.
7. **Education** – A number of concerns were raised about children who had "given up" on school, or whose future outlook was bleak or uncertain in the face of dwindling economic opportunities in a deeply damaged environment. This was occasionally balanced by inspirational stories of school officials, teachers, and nurses who strived to provide supportive environments for the children in their care. One especially kind nurse told us that she felt fortunate that she could still hug children and that she had many elementary school students who would come to her nursing office three to four times a day, just to get a hug. Schools were clearly regarded as the most important institution for supporting children and providing critical resources to them and their families, although opinions on how they could accomplish that varied widely.
8. **Future opportunities** – This is closely connected to the education issue noted above. There was concern expressed by parents, particularly in the fishing communities, that a way of life was disappearing for their children. We heard many stories of families that had been in the fishing, shrimping, or oyster business for generations. They had passed down skills and knowledge of the environment; now there is a sense that all of that is lost forever, and that the children and families do not have a path forward in terms of finding future opportunities.

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Families – Stress and Stressors

1. **Employment and income** – It was clear in every community we visited that loss or diminishment of household employment and income was often driving the series of cascading issues we heard about. No one was surprised by our finding that 40% to 50% of parents in our household survey had reported loss of income since the oil spill (many, in fact, said they thought the number should be much higher). Virtually everyone with whom we spoke had either experienced direct economic effects or knew someone who had. Economic pressures led to many of the stressors listed throughout this report – families could not afford the basic necessities (food, clothing, transportation, or shelter), could not afford discretionary spending (sports activities, family vacations, recreation opportunities, toys), and these pressures often fundamentally altered the dynamics of the households. We heard of parents becoming increasingly depressed when they could not provide for their families, and heard several anecdotal stories of suicides and drug use. These financial issues were often the starting point for both the focus groups and the key informants. When we would ask the interviewees what they needed most in their communities, we would often hear a similar refrain: "Jobs!" The types of jobs needed varied by the community: In the most resource dependent communities interviewees talked about the need to restore the fishing, shrimping, and oyster beds and to figure out how to drill oil again safely. In the more urban areas there was more discussion of how to bring back the hospitality and tourism industries and to regain the jobs that had been lost. In all of the communities, advocates and parents talked about a need for job training for adults who had few skills outside the fishing, oil, or tourism industries. One mother noted that two of her boys were illiterate, and now that they could no longer fish, she did not know what they would do.
2. **Food security** – Hunger was a pervasive issue in all of the communities we visited. Parents described problems getting enough food for their children (this was especially pronounced among residents of the fishing communities who often relied upon local catches to feed their families and other community members), and of shrinking portion sizes in schools. One woman with whom we spoke who ran a food pantry mentioned that when her program was promoted by the mayor on a radio talk show, the next morning at 4:00 a.m. there was a line around the block of people waiting for food. The same woman told a heartbreaking story of teenagers attempting to break into her food pantry, which was connected to a local church, so they could steal food. She began crying as she said: "If they would just ask, I would give it to them. They are just hungry."
3. **Housing issues / homelessness** – In the communities we visited, economic pressures have forced families to double- and triple-up with friends and relatives, which has led to many household pressures and challenges providing stable home environments for children (with ripple effects on schools, obviously). In one community a middle school official noted that they presently have nearly 30 homeless families (which includes the doubled-up, as per McKinney Vento guidelines); this compares to a neighboring district with only one homeless family. In another community there were no services for homeless individuals, so they often had to be moved to neighboring communities.

4. **Transportation** – Transportation was an issue that came up in every community that we visited. This included issues with attaining personal transportation for households so that families could get children to doctor's visits, school, after school activities, and to other critical places.
5. **Physical and mental health concerns** – Adults also spoke to us about their own physical and mental health concerns – both within their own households and in their communities. Women spoke to us not only about their sick children, but also about how their husbands had become sick. One mother began crying during a focus group interview as she described how many health problems her daughter had had since the spill, and then she revealed that her husband, who had been in remission for four years, had recently discovered that his cancer had returned (he had worked on one of the oil cleanup crews). Providers also spoke at length about the stress that parents and grandparents were now under, which was then rippling through the families, causing conflict and in some cases, domestic violence. As one provider observed: "Stress is contagious."
6. **Intergenerational pressures** – We heard about many inter-generational pressures, which came in many forms. However, probably the most common was the pressure on grandparents and seniors who had been thrust in to positions as caregivers because their children could no longer take care of their children due to economic reasons, mental health struggles, drugs, incarceration, etc. Grandparents who attended our focus group meetings told us this is not what they "intended" for their lives. Also, the seniors in the fishing communities have often lost an income stream on which they depended to supplement their fixed incomes. Among Vietnamese parents, there were some concerns stemming from acculturation and language issues, in which the younger children often eluded their control, and they had difficulty communicating with one another. Parents also expressed concern regarding the loss of the capability for the inter-generational transmission of wealth. If parents were fortunate enough to have a safety net in the form of a house or savings, they had often spent that acquired wealth on health care needs. If they did not have a safety net, they just felt out of luck and out of time in terms of supporting their children's future goals and aspirations.

Communities – Dealing with Disaster

1. **Recreation** – In each community we visited, we asked respondents: "What do children need here?" The answer we heard in every community was, "Something to do!" So many people talked to us about the dearth of recreational opportunities for children in their communities. This encompassed the lack of school-based activities, the lack of community-sponsored recreational opportunities, the rarity of supervised play, etc. As one community resident described it to us, "There are only three things to do here: go fishing, get high, or get pregnant."
2. **Safety/security** – There was considerable discussion about rising crime and drug issues in the communities we visited, and this was also related to recreational opportunities. Parents in some of the communities said they were uncomfortable letting their children go out of their house to play in the streets or to local parks because of the criminal activity. We heard a number of stories from one urban community about school children being bussed far from their neighborhoods (often

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after 5:00 p.m., sometimes asleep on the bus), and having to walk through unsafe places to and from the bus because the bus drivers did not feel safe driving in to the neighborhoods.

3. **Differences between "oiled" communities and chronic stressor communities** – One way of characterizing the differences in the places we visited was by the nature of the exposure and stressors that people reported. Two of the communities we visited experienced more direct impacts of the oil spill, both in terms of direct exposure to the oil and dispersants as described by local residents, and in terms of the direct economic effects on the fishing and oil industries. People with whom we spoke in these communities were often able to easily identify the consequences of the oil spill. Indeed, the week before we arrived in one community over 1,000 pounds of tar balls had been discovered in the aftermath of Hurricane Isaac. The mayor passionately told us that he was "the only mayor in the United States with oil on his beaches." Some people in these communities also expressed problems common to "corrosive communities" (a term popularized after the Exxon Valdez spill and other major technological disasters), in which people in the community divide over the distribution of compensation and benefits, and communal solidarity becomes eclipsed by personal self-interest. Sadly, even children were depicted as bullying those children who did not receive compensation or attempting to take things from those children who had something new as a result of "oil money." Community advocacy and parental concern around oil spill issues were more pronounced, and so there was a greater receptivity to oil spill specific conversations. In contrast to these "oiled" communities were the "chronic stressor" communities, in which the oil spill was often regarded as one more stressor layered on top of multiple assaults – Katrina, Gustav, Isaac, the economic recession, marsh fires, freshwater flooding, and chronic poverty, to name just a few. The health and well-being of children in these communities was clearly an issue, and the people we talked to expressed many manifestations of these chronic stressors in their kids (e.g., mental health issues, drug use, behavioral issues, physical ailments, etc.).

4. **Root causes** – In all of the target communities, the respondents emphasized that it is difficult to isolate the effect of the oil spill as opposed to understanding the cumulative impact of these multiple insults to the environment and the economy that these communities have endured. Yet, interestingly, a number of people with whom we spoke noted that Katrina and hurricanes provide a clear, indisputable "cause" for a community's problems (such as flooding or levee breaks that affected everyone within a defined area), whereas the oil spill was more insidious, its effects not as obvious, and it was an event that affected each household differently. Plus, some community advocates noted that by speaking out forcefully about seafood and fishing problems (such as shrimp mutations) they were regarded by other community members as threatening the livelihood of community residents, and even noted efforts to intimidate them in to silence. The compensation claims process was brought up in many communities, and often noted that what they thought was well-documented impacts were not settled fairly or equitably (we heard this from a pro-bono attorney, as well). Coupled with physicians who often did not attribute their symptoms to the oil spill "cause," some people felt that they were not believed.

In reflecting back on what we learned and heard during our time along the Gulf, it was particularly striking how differently the groups whom we interviewed viewed their communities: local officials and health administrators often did not seem to fully grasp the levels of stress and difficulty experienced by children and families, and generally approached the issues as "system" problems (economic, political, or organizational systems). Some of the health providers occupied a middle ground, sometime believing there was an oil spill effect, sometimes not, often narrow-cast in their view of what could be done. Yet, there were plenty of individual health care providers who were quite impassioned about the oil spill effects (generally mental health, but not exclusively) although they were more often outliers than other clinicians. School nurses, community advocates and parents were often enmeshed in the draining, yet critical, work of dealing with complex issues tied in to the oil, lingering effects of hurricanes and other environmental disasters, social factors, and economic issues, and often related individual stories as illustrations of the problems.

And yet even with all the sad stories we heard, in each community we visited we also met with any number of people who inspired us with their stories and their commitment to bettering children's lives. This included a woman running a food pantry who shared from her own table as much as from her church pantry; an elementary school principal who truly engaged her students, promoted them ceaselessly, and created a multi-cultural environment in which African American, Vietnamese, Hispanic, and white children were equally valued and supported (a sentiment echoed by the parents in the community); community organizers who were trying to cobble together "real services" to help their community members; a medical doctor who had set up an alternative treatment program to help people in his and other oiled communities; a Native American advocate who was creating "de-stress" programs for youth; a child care provider who had 4 children of her own and had taken in 7 others, all the while hiring community members to ensure that they would have jobs to feed their families; an African American widow who advocates for "youth councils" so that young people can have their voices heard; and the list goes on. These individuals and so many others were deeply committed to the healing and restoration process in their communities. They also expressed their strong expectation that we would "come back" and would not just "disappear" on them. Many of our interviewees wanted to know what we would do with our findings and whether they would be used to *help* their communities. We left the Gulf with much new information, and also a sense of responsibility to convey our findings in such a way as to clearly express what it is that we found and to compel action.

needs of children IN THE GULF COAST

The children in the four states we surveyed need what *all* children need – stable and supportive homes, opportunities for play and growth, access to high-quality health care and education, and a healthy environment. The Deepwater Horizon oil spill is not the only factor that has made the attainment of these goals a challenge. The region has been confronted with numerous challenges in recent years, as noted in our small-group meetings, most notably Hurricanes Katrina and Isaac and the economic recession.

Possible solutions are easy to describe, but hard to make happen. They require investments of money as well as social and political will. Among the solutions that have emerged from our survey and small-group discussions are: enhancements of the pediatric medical systems to include greater access to mental health and specialty care; improved opportunities for after-school recreational and educational support programs; and economic opportunities, job training, and mental health support for parents.

REFERENCES

[1] U.S. Scientific Teams Refine Estimates of Oil Flow from BP's Well Prior to Capping. U.S. Department of the Interior, Press Release 2 August 2010.

[2] "Impact on Children and Families of the Deepwater Horizon Oil Spill: Preliminary Findings of the Coastal Population Impact Study." David Abramson, Irwin Redlener, Tasha Stehling-Ariza, Jonathan Sury, Akilah Banister, Yoon Soo Park; National Center for Disaster Preparedness, Research Brief 2010:8. Columbia University Mailman School of Public Health, New York. (Release date 3 August 2010). http://academiccommons.columbia.edu/item/ac:128195

APPENDIX

Study Methods

The three main stages of the 2012 study are (1) Identification of "highly-impacted" communities between the Florida panhandle and the western Louisiana border, based on available secondary data sources such as BP claims assessment data and NOAA oil monitoring data; (2) Conduct of a household survey of parents in randomly sampled areas among these high-impact communities; (3) Conduct of a "community engagement" phase in which local leaders and health providers in four of the most highly-affected communities are consulted in order to develop a deeper understanding of the mechanisms by which children were affected by the spill, and the strength and capacity of local health systems to address their needs.

Once we had identified the fifteen highly impacted communities based on BP claims data and NOAA oil monitoring data, we randomly sampled census blocks within each of these. With the census blocks being the smallest geographical area used by the US Census, the average block we sampled had 130 households living in it, with most falling in the range of 10 – 400 households. We limited the study to census blocks where at least 70% of the households were occupied, so that we wouldn't be selecting areas that were predominantly vacation rentals. From April through August 2012, the interviewers knocked on 6,800 doors across the four-state region. In order to be eligible, a household had to have a child between the ages of 3 and 18 living in it, and an adult parent or caregiver present. Our team of community-based interviewers conducted brief ten minute interviews with parents or caregivers in the homes they approached. We found 1,700 eligible households that met these criteria and interviewed 1,437 parents.

The team used cutting edge technologies, including tablet computers for data collection and mapping, customized databases, and software applications, all of which allowed real-time transfer and analysis of data from the Gulf Coast field effort to the Columbia offices (AT&T, our mobile service provider, dispatched a film crew to document our innovative use of technology, see their video here: http://www.ncdp.mailman.columbia.edu/mobileresearch.html).

From the survey data we selected four communities from among the fifteen for the Community Engagement phase. We chose the four communities where parents in the survey expressed most concern about health effects – two were in Louisiana, one in Mississippi, and one in Alabama. We invited key community leaders, health providers and administrators, advocates and service providers to our small-group meetings. In addition, we ran two to four parent focus groups in each of the four selected communities, including one in Spanish and two in Vietnamese. In each of the four target communities, we conducted a series of key informant interviews and focus groups with the following knowledgeable persons: health care providers including, among others, pediatricians, school nurses, mental health counselors, and licensed social workers; health center directors and other health administrators; local officials, school administrators, and other community leaders; advocates from non-governmental organizations, non-profits, religious institutions, childcare centers, and other groups active in the communities we visited; and parents and grandparents.

APPENDIX

TABLE 1. SURVEY RESPONDENTS

		NUMBER INTERVIEWED	% OF TOTAL
N		1437	100.0
By State	Louisiana	887	61.7
	Mississippi	177	12.3
	Alabama	140	9.7
	Florida	233	16.2
By Race/Ethnicity[1]	White	899	62.6
	Black	402	28.0
	Hispanic	41	2.9
	Asian	57	4.0
	Other	26	1.8
	Missing	12	0.8
By Household Income	Less than $10,000	95	6.6
	$10,001 – $20,000	189	13.2
	$20,001 - $35,000	256	17.8
	$35,001 - $50,000	245	17.1
	Greater than $50,000	428	29.8
	Missing or Refused	224	15.6

[1] As observed by interviewers.

TABLE 2. PROPORTION OF CHILDREN EXPOSED TO OIL SPILL EFFECTS

		BY STATE			
	TOTAL	LA	MS	AL	FL
N	1437	887	177	140	233
% with ANY type of exposure* **	58.6	54.8	59.3	79.3	60.1
% Physically exposed[2]* **	18.0	13.0	17.0	40.0	24.9
% Environmentally exposed[3]* **	28.1	25.9	29.4	52.1	21.0
% Economically exposed[4]* **	40.9	37.7	41.2	57.9	42.9
Among those, % in oil industry***	12.2	18.0	4.1	6.2	4.0
Among those, % in comm. fishing***	22.3	28.7	13.7	24.7	5.0
Among those, % in tourism***	27.9	21.3	34.3	22.2	50.0
Among those, % in other industry***	36.9	31.1	46.6	46.9	41.0

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[2] Physical exposure was based on parent reporting that the child participated in the oil cleanup activities and had direct contact with the oil or came into direct contact with the oil, tar balls from the spill or any oil spill cleanup material while engaged in other activities e.g., playing on the beach, hunting, fishing or swimming.

[3] Environmental exposure was based on parent reporting that the smell of oil was moderately to extremely strong.

[4] Economic exposure was based on parent reporting that the household lost income or job since the oil spill.

cont'd

APPENDIX

TABLE 3. HEALTH IMPACTS ON CHILDREN

		BY STATE			
	TOTAL	LA	MS	AL	FL
N	1437	887	177	140	233
% with ANY health effect[5]* **	41.5	39.5	50.9	48.6	37.8
Average Health Impact Intensity Score[6]* **	1.0	0.9	1.5	1.2	0.8
% whose health has been worse since oil spill*	15.1	15.0	22.0	13.6	11.2
% with any PHYSICAL health effect post-spill*	33.3	31.6	41.8	39.3	30.0
% with RESPIRATORY effects**	18.1	16.1	27.7	23.6	15.0
% with DERMATOLOGICAL effects**	14.8	13.5	22.0	18.6	12.0
% with VISUAL effects	16.0	15.8	19.2	15.0	15.0
% with any MENTAL health effect post-spill**	21.6	19.6	28.8	27.9	19.7
% who have been sad or depressed	12.2	11.1	15.8	14.3	12.5
% who have been nervous or afraid**	11.3	10.6	16.4	15.7	7.3
% who have been having problems sleeping**	10.0	8.6	17.5	13.6	7.3
% who have had problems with other kids*	5.9	4.6	10.2	7.9	6.0
% who reported having OTHER problems*	12.4	12.5	18.1	9.3	9.9

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[5] Any health effect is based on parent reporting that the child experienced any respiratory, dermatological, visual or mental health effect post oil spill.

[6] Score developed on a scale of 0 to 8 based on 8 health effects since the oil spill: 1) respiratory 2) dermatological 3) visual 4) sadness or depression 5) nervousness or fear 6) sleeping problems 7) problems with other kids and 8) deterioration of overall health.

TABLE 4. ADJUSTED ODDS RATIOS OF HEALTH EFFECTS[7]

	MENTAL HEALTH	PHYSICAL HEALTH
	Adjusted OR	Adjusted OR
Exposure to Oil Spill		
Physical	3.41***	2.85***
Environmental	2.43***	2.68***
Economic	1.50*	1.60*
Child's Access to Health Care		
Primary care provider and insurance	0.83	0.76
BP Compensation		
Community-level individual claims (above vs. below mean)	0.72	0.90
Household received compensation	0.91	0.88
Chronic Stressors		
Household income less than $20,000	2.02***	1.49*
Persistent communal poverty	1.43	1.17
GINI coefficient (4^{th} vs. 1^{st}-3^{rd} quartile)	1.00	1.05
Katrina damage (some vs. none)	1.25	1.21
Child-level Moderators		
Age (3-12 vs. 13-18 yrs.)	1.36*	0.80
Gender (male vs. female)	1.14	1.27

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[7] Note: Adjusted odds ratios are from mixed-effects logistic regression models that imputed missing data using chained equations, controlling for the respondents' race and gender.