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Environmentally Overburdened Gulf State Residents Lack Access to Environmental Specialty Care

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Abstract

Residents in Louisiana, Mississippi, and Alabama have experienced repeated natural and man-made environmental exposures. As frequency and intensity of exposures increase, the need for environmental specialty care rises in environmentally over-burdened communities. We evaluated access to environmental health expertise in these states. We determined if providers accepted private health insurance and/or self-pay mapping their location using ArcGIS. Of sixty-four physicians meeting inclusion criteria, only eleven (17%) accepted private health insurance and thirty-four (53%) accepted self-pay. The ratio of physicians with environmental expertise who accept private health insurance and/or self-pay, to the population is < 1:1,000,000. Occupational clinics employ specialty physicians to provide care to industry employees but generally not patients with non-work-related exposure. We discuss the implications of limited access to environmental specialty care. To improve the availability of specialty expertise in this region, we recommend increased funding for training physicians in environmental exposure assessment in underserved communities, especially environmental justice communities.

Keywords

environmental justice; environmental specialty care; access to care; environmental expertise; environmental exposure assessment; postdisaster medical care

Introduction

Access to healthcare is the potential ease with which consumers can obtain healthcare at times of need.¹ In research, access is defined through distance or presence of a service in proximity to those in need.^{2,3} However, research has not often included specialty-specific barriers that may influence access such as the physician's contracted employment limitations on which patients can be seen. Disparate access to healthcare has been well documented; however, little is known about access to providers trained in assessment of environmental

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exposure and related care. Previous research examining access to physicians with environmental exposure expertise has been extremely limited.³ Existing research defined “access” as presence within a given area without assessing barriers that may impede easy access of residents.

The Institute of Medicine identified deficiencies in environmental health knowledge among primary care doctors and called for the integration of environmental health education into all levels of medical education.⁴ A strategy to accomplish the Institute of Medicine recommendations was designed by the National Environmental Education Foundation and endorsed by thirty-four medical organizations.⁵ However, very limited progress has been made in increasing the scope of environmental education for primary care physicians.^{6,7}

Physicians trained in the specialty field of occupational and environmental medicine have training in clinical competencies including toxicology, hazardous exposure assessment, and work capability assessment, among others⁸ and work in a variety of settings performing work that includes direct patient care, policy development, and program management.⁹ Direct patient care in occupational and environmental medicine occurs in private practice, free-standing, or hospital-based occupational medicine clinics and industry occupational clinic settings. Recent work analyzing the practice patterns of occupational and environmental physicians providing direct patient care reveals that very little of their practice involves the care of patients with non-work-related environmental exposures as inferred from the low importance of private insurance and Medicare to their income streams.⁹ Although private practice occupational and environmental medicine physicians could care for patients with non-work-related exposures, industry-employed or occupational clinic-employed physicians may only provide environmental exposure care to industry employees. The contractual relationship between an occupational clinic and industry creates an actual or potential conflict of interest at times for employed physicians when seeing patients from the public whose exposure may be in some way also related to local industry.¹⁰ As a result, patients with environmental exposures are often not seen by these clinics. Recognizing this business reality, the Association of Occupational and Environmental Clinics (AOEC) was established in 1987.¹¹ The AOEC aims “to encourage the provision of high quality clinical services for people with work- or environmentally-related health problems.” These clinics provide a multidisciplinary, prevention-oriented, and public health approach to care including adherence to the AOEC Patient Bill of Rights. The forty-eight clinics located throughout the United States accept patients who are both referred by physician and self-referred.¹¹

Cutter et al.¹² created a social vulnerability index and determined areas in the United States that are high risk for environmental hazards and have low social infrastructure to handle such environmental hazards. The Mississippi water basin was identified as an area of high vulnerability to environmental hazards. This suggests the region would have severe social impacts resulting from natural disasters, such as hurricanes, floods, and so forth. Cutter et al.’s work in conjunction with our own suggest a region of high exposure to environmental pollutants, high social vulnerability to environmental hazards, and low access to environmental exposure specialty medical care.

Residents of states bordering the Gulf of Mexico have experienced long-term and repeated environmental exposures that have an effect on their overall health.^{3,12–16} The off-shore drilling industry has contributed to these exposures since 1945, as the numbers of rigs and the depth of drilling have increased tremendously over time.¹⁷ Pollution emanates from the construction of every rig due to increased truck and boat traffic leading to diesel fuel emissions into air and water. For the lifetime of a rig, ongoing pollution occurs from oil production through the burn off of gases and water contamination from drilling fluid.

In April 2010, the Deepwater Horizon oil spill began, and the well was not sealed until 19 September 2010. During that time, approximately 210 million gallons of crude oil spilled into the gulf, and many millions of gallons of chemical dispersant were used as part of the remediation. More than one hundred fifty thousand individuals, including a hundred thousand volunteers, participated in the cleanup of the largest oil spill in U.S. history.¹⁸ The volunteer cleanup participants were generally fisherman who had very little training and supervision and very limited personal protective equipment. The general public was also exposed through direct contact with the crude oil, seafood consumption, and breathing volatile organic compounds.

This region has repeatedly experienced natural disasters resulting in significant environmental exposures that may affect population-level health.^{14–16} Hurricane Katrina impacted all Gulf Coast states but made landfall in southeast Louisiana on 29 August 2005 followed in less than thirty days by Hurricane Rita which impacted the same area. The negative health impacts of these devastating natural disasters have been well documented.^{14–16} The hurricanes destroyed the housing stock resulting in many people living in substandard housing which can expose them to numerous health hazards including, but not limited to, mold, air pollution, pests, contaminated water, and harmful compound contamination.^{14–16}

In the Gulf Coast region and throughout the United States, low-income minority populations and those with low socioeconomic status are exposed to more environmental pollutants and hazardous substances than nonminority and higher socioeconomic groups.^{19–22}

Environmental justice communities are locations where environmental pollutants are concentrated in low-income minority predominant areas with very little political voice.^{19,22} These environmental justice communities exist throughout Louisiana, Mississippi, and Alabama and are concentrated along the coast, implying there are subgroups within the region that are at a higher risk for environmental exposure than the general population.

Potential environmental exposures from these existing hazardous conditions and intermittent events include food contamination, water contamination, hazardous waste carried by flood water, sewage, chemicals both from existing sources and chemicals used in the cleanup, among other sources. Pinpointing a single exposure as the determinant of a health outcome is extremely difficult⁹ made even more difficult when individuals are chronically exposed to many different environmental contaminants at mixed and unknown concentrations such as in the Gulf region. The Gulf Coast Health Alliance: Health Risks related to the Macondo Spill, a research consortium funded through a grant from the National Institute of Environmental Health Sciences (NIEHS), and described elsewhere in this journal,²³ included work with

numerous community groups. A previously published study described interviews and self-reported health effects of residents.²⁴ In that study, it was found that when residents asked their primary care doctors whether or not particular symptoms or conditions that they were experiencing were related to the oil spill, their doctors were unsure. Most often, residents' doctors were family medicine, internal medicine, or pediatrics trained physicians. These residents were asked if their doctors had referred them for specialty care and almost universally they had not. Residents were frustrated not knowing whether they were being physically impacted by exposure.

These conditions helped formulate our question: do people in the Gulf States region have access to specialized environmental medical care to address their environmental exposure concerns?

Methods

Our objective was to use information that would be publicly available to patients seeking specialty care. AOEC clinics were easily identified by a Google search. The website provides search capability of clinics by state. The AOEC website was accessed and then rechecked in February 2017 and May 2018 to identify any new clinics that might have become available.¹¹

Patients find specialty physicians through their doctors, friends, family, phone books, and web searches among other strategies. For completeness, we searched the publicly available National Provider Identifier (NPI) database²⁵ for physicians with environmental exposure expertise practicing in Louisiana, Mississippi, and Alabama. Using the information from these databases, we mapped the locations using ArcGIS online mapping to provide a visual tool to describe the distribution of the AOEC clinics and the physicians with environmental exposure expertise in the three states. We also used 2010 Census data²⁶ to calculate physician with environmental exposure expertise to population ratios to further describe the availability of the physicians.

The *Health Insurance Portability and Accountability Act of 1996* mandated the adoption of standard unique identifiers for healthcare providers and health plans. The NPI database maintained by the Centers for Medicare and Medicaid Services includes all physicians who engage in the Health Insurance Portability and Accountability Act of 1996-compliant transactions which would include all providers of clinical care to patients.²⁵ The database was downloaded on 9 September 2013. The database includes the following information on the provider: the provider's name, credentials, practice address, practice phone number, and multiple self-select taxonomy codes that correspond to the provider's expertise or the type of care they are providing. We identified taxonomy codes that correspond to specialties including environmental exposure training. The taxonomy codes selected were as follows: Emergency Medical Services—Medical Toxicology, Pediatrics—Medical Toxicology, Preventative Medicine—Medical Toxicology, Preventative Medicine—Occupational Medicine, and Preventative Medicine—Occupational Environmental Medicine.

We identified the providers with these taxonomy codes in Louisiana, Mississippi, and Alabama from the NPI database. We filtered the providers to include MDs and DOs only and combined the database duplicates (Figure 1(a)). To determine the availability of the physicians, we called each physician's office using the telephone number from the NPI database and asked: "For patients with environmental exposure concerns, does Dr. (corresponding name from the database) accept patients with private health insurance?" and "For patients with environmental exposure concerns, does Dr. (corresponding name from the database) accept patients who are self-pay?" If multiple physicians worked in a single practice, then each physician's availability based on payment methods was asked about independently. The person answering the question was not the physician but the clerical office staff who would be initiating a new patient contact or the billing staff when the clerical staff did not know the answer. All of the staff members were helpful and willing to ascertain the information regarding each physician's ability to accept private health insurance and/or self-pay. Each response and practice location was mapped separately, and we performed a descriptive analysis using ArcGIS and 2010 Census Data.

Physicians were removed from the analysis if the physician was no longer providing service in the region; had a disconnected phone; had retired; left the practice with no forwarding information; or had an unanswered phone after three attempts (Figure 1(b) and (c)).

Results

AOEC clinics are located in twenty-five states in the United States as of 2018.¹¹ However, no AOEC clinics are located in Louisiana, Mississippi, or Alabama (Table 1).

The ninety physicians with environmental exposure expertise are variably distributed throughout the region: forty are located in Louisiana, six in Mississippi, and forty-four in Alabama (Figure 2). Physician practice locations tend to cluster around urban areas and in counties with higher population (Figure 2). No physician practice was identified in a county or parish with a population less than twenty thousand. Very few physicians with environmental exposure expertise practice in coastal towns. According to the 2010 census data, these three states contain 12,280,405 people resulting in a physician with environmental exposure expertise to population ratio of 1:136,449 throughout the entire region and 1:113,334, 1:494,550, 1:108,630 in Louisiana, Mississippi, and Alabama, respectively (Table 1).

We called ninety physicians; twenty-six were not reachable or were no longer in practice in the area. The remaining sixty-four physicians' office staff answered our questions. Of the sixty-four called, eleven (17%) accepted private health insurance and fifty-three (83%) did not (Figure 3). Physicians with environmental exposure expertise who accept private health insurance are unevenly distributed across the region; six are located in Louisiana, none in Mississippi, and five in Alabama (Figure 3). The majority of physicians who accept private health insurance are not located in coastline towns (Figure 3). There are no physicians with environmental exposure expertise who accept private health insurance in central Louisiana, northern Louisiana, Mississippi, and central Alabama. Considering the region as a whole, the ratio of the physician with environmental exposure expertise who accepts private health

insurance, to the population is 1:1,116,400. The ratios for Louisiana and Alabama are 1:755,562 and 1:955,947, respectively (Table 1).

Of the sixty-four physicians' office staff contacted, thirty-four (53%) accepted self-pay patients and thirty (47%) did not (Figure 3). The distribution of physicians with environmental exposure expertise who accept self-pay patients is uneven across the region and concentrated in urban areas; sixteen are located in Louisiana, none in Mississippi, and eighteen in Alabama (Figure 3). The physicians with environmental exposure expertise who accept self-pay patients are located in southern Louisiana, along the coastline of Alabama, and northern Alabama (Figure 2). There are no physicians with environmental exposure expertise who accept self-pay patients in central Louisiana, Mississippi, and south central Alabama. Considering the region as a whole, the ratio of the physician with environmental exposure expertise who accepts self-pay patients, to the population is 1:361,188. The ratios for Louisiana and Alabama are 1:283,336 and 1:265,541, respectively (Table 1).

Discussion

Our research examined access of residents in Louisiana, Mississippi, and Alabama to physicians with environmental exposure expertise and found specialty-specific business practice barriers that limited access to specialty care. Specifically, the presence of physicians specializing in occupational and environmental medicine or other specialties which include training in environmental exposure assessment in a geographic area does not equate to public access to environmental medical specialty care. By using publicly available information and resources that would be used by patients or their doctors looking for a physician with environmental exposure expertise, we simulated their results in finding a physician who would see them and accept payment by private health insurance or self-pay.

There has been very little previous research on access to physicians with environmental exposure expertise and specialty-specific barriers. Safran et al.³ examined the barriers to occupational and environmental medicine services in the southeastern United States but did not consider the business realities inherent in the occupational clinic setting involving the potential conflict of interest limiting accessibility of environmental medicine physicians to the public.³ Their research defined "access" as environmental medicine physician services being present within a county and/or being within one hundred miles of an AOEC clinic.³

There were, and as of this writing are, no AOEC clinics in the three states that were the subject of this research. AOEC clinics are a network of forty-eight clinics across North America working to improve the practice of occupational and environmental medicine through a collaborative and multidisciplinary public health approach. These clinics are highly accessible to the public as they accept physician referrals and self-referrals.¹¹ The need for this type of resource for the environmentally overburdened communities in the Gulf region cannot be overstated, and the addition of an AOEC to each state would not only provide environmental specialty medical care to residents in the region but also enhance the overall education and awareness of practicing physicians and trainees about the field.

There is limited access to physicians with environmental exposure expertise in the Gulf States studied, and the mere presence of physicians in an area did not equate to public access to environmental exposure medical care. We found ninety total physicians with environmental exposure expertise in these Gulf States, but only eleven of them accept private health insurance and thirty-four accept self-pay patients (Table 1). More physicians are needed in Mississippi since it had only six total physicians with environmental exposure expertise, but none of these physicians were available to see residents with environmental exposures (Figure 3, Table 1). Mississippi is classified as a medically underserved area, and state and federal incentives should be put in place to encourage physicians with environmental exposure expertise to work in the state.

All three states in our study were medically underserved considering the distribution of physicians with environmental exposure expertise available to see patients not employed by contracted industry. For the region as a whole, there is one physician with environmental exposure expertise who accepts private health insurance for every 1,116,400 persons (Table 1). In addition, at least three physicians who took private health insurance did not accept Medicare and/or Medicaid. This additional barrier was not systematically evaluated for all respondents but may be a topic of future exploration as Medicaid recipients are extremely common in low-income communities.

There were more physicians with environmental exposure expertise who were willing to accept self-pay patients. However, the region has relatively high poverty rates with 18.7 percent, 22.3 percent, and 18.1 percent of people below the poverty line in Louisiana, Mississippi, and Alabama, respectively, compared to 14.9 percent of the United States, according to the U.S. Bureau of Census, 2010. The price of an appointment and tests vary depending upon the concerns of the individual and the physician. The location of available physicians may add significant transportation cost to this mix, resulting in more people finding the cost of environmental specialty care an insurmountable barrier.

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.^{19,22} Environmental justice communities in the Gulf region exist as a subgroup of high-risk individuals with more limited access to physicians with environmental exposure expertise compared to the general population. Previous research has shown that low-income, minority populations and those with low socioeconomic status are exposed to more environmental pollutants and hazardous substances than nonminority groups and those with higher socioeconomic status.^{12,13,19,21} These communities are the most at risk for environmental exposure but have the least access to environmental exposure specialty medical care because of conflicts of interest that limit physician availability to them and financial barriers due to high poverty rates.

To improve the availability of needed environmental exposure expertise in this region, we recommend (1) an increase in funding to programs that train physicians of all specialties in environmental exposure assessment in under-served communities, especially environmental justice communities, (2) development of an AOEC clinic in each of the Gulf States within

fifty miles of the coastline, and (3) consideration by researchers of specialty-specific barriers that may limit accessibility when examining access.

The limitations of our study include the lack of a control or comparison group, so our findings may not be broadly reproducible to other areas of the country. Comparing physicians in other areas of the country would provide insight into whether the lack of availability of physicians with environmental expertise is uniformly low or whether Gulf States are uniquely underresourced. Without a control or comparison group, it is not possible to know how the business circumstances experienced by physicians in our study would compare to the medical practice financial drivers in other areas of the United States. In addition, our choice of taxonomy or specialty codes limited our definition of physicians with environmental expertise to those with identified specialty training. We chose the taxonomy or specialty codes because the entire specialty would have formal and in-depth environmental exposure training. Internists, family medicine physicians, and pediatricians in some cases have sought continuing medical education in environmental exposure and care and would not have been identified in our approach. Neither would those physicians be easy to identify by patients.

There are also inherent limitations of the NPI database. A physician may have exposure training but may not identify themselves as providing this type of service to patients on the NPI database. We were not able to locate a similar evaluation of access to physicians with environmental exposure expertise completed in another area of the country, so we do not have a direct comparison or control. More research needs to be conducted to determine other physicians or specialties with environmental exposure training. The database may also contain limitations and out-of-date contact information for the physicians. We did not ask the question, “are you accepting new patients?” which may further limit availability of the physician.

Beyond the scope of this study is an analysis of the availability of primary physicians in these states. According to the Graham Center: Policy Studies in Family Medicine and Primary Care, each state has a large number of primary care health professional shortage areas (AL: twenty-nine of sixty-seven counties, MS: fifty-two of eighty-two counties, LA: eighteen of sixty-four parishes).²⁷ These primary physician shortages impact access for healthcare in general and may pose a barrier to the availability and willingness of overextended physicians to accept additional training.

Through our research, we now have a more complete picture of the lack of access to environmental exposure care in the Gulf States that we studied. Our findings are consistent with the experiences that residents there shared with us. We would like to use our methodology in other regions of the United States to get a more complete understanding of the national map of access to physicians with environmental exposure expertise. Future research should assess the environmental expertise of other specialties and fields such as public health nurses as well as their availability to the community. Although primary prevention is the best way to reduce environmental exposure effects, some overburdened communities are not currently positioned to achieve primary prevention. A practical strategy for these communities may be the early evaluation and intervention achieved by ensuring

access to appropriate environmental specialty medical care. Hopefully, this research can inform policy and encourage public–private partnerships that would enhance access to environmental specialists and services to all residents not just those employed by industry.

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Figure 1.

(a) The filtering process of the NPI database for physicians with environmental exposure expertise. (b) Results from the telephone question: “For patients with environmental exposure concerns, does Dr. (corresponding name from the database) accept patients with private health insurance?” (c) Results from the telephone question: “For patients with environmental exposure concerns, does Dr. (corresponding name from the database) accept patients who are self-pay?”

NPI = National Provider Identifier.

Figure 2. Distribution of physicians with environmental exposure expertise in Louisiana, Mississippi, and Alabama and county population. Overlapping dots obscure some individual locations.

Figure 3.

Distribution of physicians with environmental exposure expertise according to their acceptance of private health insurance and/or self-pay patients in Louisiana, Mississippi, and Alabama. The map shows the distribution of all physicians who accept patients with private health insurance (green dots: N = 11) and physicians who accept self-pay patients (black dots: N = 34). Overlapping dots obscure some individual locations.

Table 1.

Summary of Physicians With Environmental Exposure Expertise, Physicians With Environmental Exposure Expertise Who Accept Private Health Insurance, and Physicians With Environmental Exposure Expertise Who Accept Self-Pay Patients in Louisiana, Mississippi, and Alabama.

	Region	Louisiana	Mississippi	Alabama
2010 Census population	12,280,405	4,533,372	2,967,297	4,779,736
Association of Occupational and Environmental Clinics	0	0	0	0
Physicians with environmental expertise	90	40	6	44
	1:136,449	1:113,334	1:494,550	1:108,630
Accepts private health insurance	11	6	0	5
	1:1,116,400	1:755,562	-	1:955,947
Accepts self-pay	34	16	0	5
	1:361,188	1:283,336	-	1:265,541

Note. Top cell is number of physicians. Bottom cell is the physician with environmental exposure expertise to state population ratio.