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Gulf of Mexico Research Initiative

Engagement with Public Health, Risk Perception, and Risk Mitigation

By Burton Singer and Stephen H. Sempier

PUBLIC HEALTH AND SOCIOECONOMIC ISSUES AS A GoMRI PRIORITY

Public health and socioeconomic issues constitute one of the five priority areas for the Gulf of Mexico Research Initiative (GoMRI) Research Board (RB). Public expression of this emphasis, however, did not result in a volume of proposals for research funding that was at all comparable to the interest shown by a diverse set of investigators in physical and biological oceanography, marine biology, ecology, chemistry, and engineering who focused on GoMRI's other four themes. Following consultations and a workshop with deans of schools of public health and other leadership personnel in social science and health policy areas, it became clear that the minimal extant linkages between ocean science and public health groups served to limit interest in participation by that community in the multidisciplinary consortia that were being forged in response to GoMRI's initial request for proposals (RFPs) in 2010.

Since that time, a concerted effort to engage both communities has been followed by increased interest in GoMRI by young investigators. Activities to foster involvement included human health related workshops and board member participation in conferences such as those sponsored by the Center for Natural Resource Economics and Policy (CNREP) in 2013 and 2016 and annual meetings of the American Public Health Association. More recently, in response to GoMRI-supported RFPs, funding has been provided to a new consortium that focuses

on developing and promoting resilience of Gulf communities, stand-alone GoMRI research projects that examine decision-making in the management of fisheries, and a group that collects longitudinal data to assess physical and mental health impacts on children and families in communities affected by the DWH oil spill.

Just prior to initiation of GoMRI RB activities, BP allocated \$10 million dollars to the National Institute of Environmental Health Sciences (NIEHS) to support human health projects directly related to the Deepwater Horizon (DWH) oil spill. This allotment led to support for a research network based at Louisiana State University Health Sciences Center at New Orleans, Tulane University, University of Florida, and University of Texas Medical Branch at Galveston. This program received additional National Institutes of Health support to cover five years of funding for projects focused on physical and mental health effects of the oil spill, seafood safety, and community resilience, with a longer-term objective of enhancing preparedness for effective responses to future potential disasters. These programs are described at <http://www.niehs.nih.gov/research/supported/centers/gulfconsortium>. In addition, part of the initial BP allocation supported a Gulf study of oil spill cleanup workers and volunteers, with primary outcomes focused on respiratory and psychological/mental health, and genotoxic, hematologic, and immunologic problems. Details about this study and its ongoing sub-studies and expanding enrollment can be found at <https://gulfstudy.nih.gov/en>.

Another distinct public health activity has been initiated independent of the GoMRI and NIEHS projects as a consequence of the BP Deepwater Horizon Medical Settlement. Here, \$105 million dollars was allocated to the Louisiana Public Health Institute, which formed a partnership with six Gulf state institutions to improve the resilience of communities by informing residents about their own health and facilitating access to healthcare providers. The full mandate and program is described at <http://www.grhop.org/Pages/Default.aspx>.

Currently funded GoMRI projects and NIEHS-supported studies are beginning to address public health and socioeconomic issues pertaining to the DWH oil spill, but with somewhat patchy coverage of impacted communities, in part as a consequence of the lack of a systematic human health observing system that covers the Gulf region. Accessible community-specific baseline human health information was severely lacking at the time of the DWH oil spill, and the situation remains the same to a considerable extent. As a result, most of the publications about human health consequences of the DWH oil spill are focused on increased risk of possible disease, as opposed to documenting actual cases that follow individuals from exposure to illness. Further, there is a pressing need to have in place an ocean observing system to collect evidence associated with future disasters in the Gulf—an issue that has recently been taken up by the RB—that is linked to a land-based human health system. Environmental engineer



Florida Sea Grant Seafood Specialist Steve Otwell observes as seafood sensory workshop participants try to determine if seafood samples are spiked with crude oil, diesel fuel, or nothing at all (2010). Photo Credit: Mississippi-Alabama Sea Grant Consortium

Helena Solo-Gabriel (University of Miami) presented an initial plan for this linkage at the 2016 CNREP conference. This bridge is an important direction for future development.

In parallel with the research developments outlined above, the GoMRI outreach and communications committee established a valuable linkage with the four Gulf of Mexico Sea Grant programs: Louisiana (<http://www.laseagrant.org>), Mississippi-Alabama (<http://masgc.org>), Florida (<http://www.flseagrant.org>), and Texas (<http://texasseagrant.org>). Sea Grant has an established track record of close engagement with local communities. The extensive DWH-focused outreach provided via the Sea Grant-GoMRI collaboration has led to translation of knowledge and research findings regarding the oil spill to diverse audiences around the Gulf of Mexico. Sea Grant

provides a critically important complement to the research initiatives and shares GoMRI-supported public health research results as well as research results that arise from other funding sources.

SEA GRANT ACTIVITIES PERTAINING TO PUBLIC HEALTH

While composed of four independent organizations, the Gulf of Mexico Sea Grant (GoM SG) College Programs collaborate on regional issues. For decades, GoM SG has worked on public health related issues through investments in coastal research, extension, and outreach and education activities. GoM SG projects have covered an array of fisheries and public health related topics, ranging from organizing seafood safety testing workshops to leading Hazard Analysis Critical Control Point training for seafood processors and convening science-based

forums on prominent public health topics such as methylmercury (Swann, 2002). GoM SG programs support research to identify seafood safety concerns, improve seafood safety testing, and develop methods to reduce seafood-borne illnesses through improved pre- and post-harvest practices. The GoM SG programs address other human health issues such as providing boat safety training for shrimpers and working with community leaders and residents to increase their resilience to flooding and storms.

After the DWH oil spill, there was an urgent need to understand the public health implications of the incident. GoM SG reached out to researchers, people whose livelihoods depended on a healthy Gulf of Mexico, and others to identify emerging research needs (Sempier, 2015). During the summer of 2010, 994 people responded to a research needs survey. At

least one-third of the respondents identified the following public health-related research needs:

- Examine the effects of oil and dispersants on seafood safety, including the potential for bioaccumulation
- Determine the toxicity of the oil, dispersants, and drilling mud on humans and the ecosystem
- Assess the status, well-being, vulnerability, and resilience of coastal communities

GoM SG staff provided the survey results to diverse organizations and agencies, including the National Oceanic and Atmospheric Administration (NOAA), the National Science Foundation (NSF), the Joint Subcommittee on Ocean Science and Technology (JSOST), and others that could potentially provide research investments in these areas.

Following the DWH oil spill, GoM SG staff facilitated, planned, presented at, and/or supported numerous oil spill related workshops, meetings, training sessions, and conferences (Gulf of Mexico Research Initiative, 2013, 2014,

about health-related and other issues. Finally, the GoM SG programs supported an update to the peer listening training program designed for people affected by the *Exxon Valdez* oil spill (Picou et al., 2011). The update assisted people impacted by the DWH oil spill, and trainings occurred throughout the Gulf region.

Addressing public health issues became a priority for the outreach partnership between GoMRI and the four Gulf of Mexico Sea Grant College Programs. A Sea Grant Oil Spill Science Program (SGOSSP) for outreach was assembled once the partnership began to serve the diverse needs of people whose livelihoods depended on a healthy Gulf of Mexico or who manage Gulf of Mexico resources. One of the four Sea Grant oil spill science outreach specialists serves as lead for human health related issues. The SGOSSP team met with more than 500 people within the Gulf of Mexico region during late 2014 through early 2015 (Sempier et al., 2015). Human health concerns were the second highest rated topic identified by meeting participants, and seafood safety issues were

and input from experts from around the country. The large number of participants (more than 50) indicated that even five years after the spill, great interest in the topic persisted. The SGOSSP team also presented seafood testing methods and results at workshops and training sessions for public health experts. Finally, the SGOSSP team is working with people who are researching seafood safety and related topics regardless of the origin of the research funding. The SGOSSP team is building partnerships across these groups to share the latest peer-reviewed science on this issue.

The SGOSSP team addresses other oil spill related public health issues beyond seafood safety. The Sea Grant specialist focused on public health issues has presented the latest public health science findings with members of the Gulf of Mexico Alliance and the network of more than 70 Gulf of Mexico Sea Grant personnel. The benefit of sharing this information among the network of Sea Grant personnel is that they will be equipped to share the most up-to-date information with their target audiences. As more peer-reviewed oil spill public health research is published, the SGOSSP team is poised to synthesize and share the results with the audiences they serve. More details about the program and the SGOSSP outreach publications are available at <https://gulfseagrant.wordpress.com>.

OCEANS AND HUMAN HEALTH PROGRAMS

Dialog between biomedical and ocean scientists systematically began roughly 15 years ago. Investigators with interests in the microbiology of marine and terrestrial organisms and of ecosystems were finding common ground on issues of toxicology and, more broadly, of diverse environmental exposures that impacted human health. Gordon Research Conferences (GRCs) were central to the development of a new interdisciplinary field, oceans and human health. Four stimulating GRC workshops

“ There is a pressing need to have in place an ocean observing system to collect evidence associated with future disasters in the Gulf [of Mexico]—an issue that has recently been taken up by the [GoMRI] Research Board—that is linked to a land-based human health system. ”

2015; National Science and Technology Council’s Joint Subcommittee on Ocean Science and Technology, 2010, 2011; National Science Foundation and Louisiana Board of Regents, 2010; Sempier, 2010; Schneider, 2013). Sea Grant programs held town hall meetings throughout the region that provided opportunities for the public to inquire

the top human health concern. Later in 2015, the SGOSSP team released its first outreach publication that focused on seafood safety. Also that year, the team organized and facilitated a regional science seminar on the topic. This science seminar combined peer-reviewed research results from GoMRI-funded scientists, state and federal seafood testing results,

have now brought together diverse sets of young investigators from microbiology, biochemistry, molecular genetics, marine ecology, and—to a very limited extent—people from the public health community.

Although most of the specific projects discussed in the first three conferences were of a basic science character, the 2014 GRC was, without prior intent, directly linked to GoMRI interests. The 2014 theme was “anthropogenic impacts on coastal communities and ecosystems.” Anthropogenic, or human-induced, impacts on the ocean include the discharge of contaminants, of which oil from the DWH event is just one instance. Of equal concern at the 2014 GRC were the many impacts that human activities have on the world ocean and its ecosystems that ultimately affect human health and well-being. Details of the 2014 GRC can be found at <https://www.grc.org/programs.aspx?id=13816>. Most of the participants in these conferences did not have strong links to the public health and socioeconomic academic communities. Building this important bridge is now underway, as exemplified by Helena Solo-Gabriel’s participation in the 2016 CNREP conference. She has also been a principal organizer of the GRCs on Oceans and Human Health.

The GRCs were an early precursor of a currently funded and operating set of university centers on oceans and human health, based at Woods Hole Oceanographic Institution, University of Miami, University of Washington, and University of Hawaii. These centers are augmented by NOAA-sponsored oceans and human health centers. The now much larger oceans and human health initiative is spawning many new investigators who have linkages to public health and are pursuing new and important career tracks. For a historical review and up-to-date discussion of this area, see Fleming et al. (2015). In addition to this encyclopedia entry, an excellent set of papers covering oceans and human health research internationally is contained in a special issue of the *Journal of the Marine Biological*

Association of the United Kingdom from February 2016 (volume 96). One of the most interesting developments concerning new career directions is the American Chemical Society and American Geophysical Union sponsorship of new journals focusing on both chemistry/geoscience and public health. A hope is that highlighting research in such interdisciplinary areas will produce new types of public health practitioners and stimulate much needed fresh research emphases. These emerging communities provide the personnel for an expansion of studies consistent with GoMRI’s initial priority focused on public health and socioeconomic studies. 

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