

driving allergic airway response, cardio-metabolic response, and the systemic vascular inflammatory response to combustion-source mixtures, such as gasoline and diesel emissions. These findings, combined with results from other laboratories, indicate a role for PRRs that may help refine our understanding of the link between the chemistry of pollutant interactions at the lung surface and the ultimate pathophysiological outcome.

W 46 Differential Effects of PM Components: Toward a Better Understanding of Underlying Mechanisms.

A. Rohr. *Air Quality, Electric Power Research Institute, Palo Alto, CA.*

Multiple epidemiological and toxicological studies have reported differential responses to fine particulate matter components, such as elemental carbon, organic carbon, sulfate, nitrate, and individual elements. While different PM components likely invoke unique pathophysiological pathways, it is also likely that there is overlap between mechanisms of action. For example, oxidative stress is a likely pathway for both organic PM components as well as trace elements. In a multipollutant setting, it is critical to understand the underlying mechanisms of adverse biological responses to these materials. This presentation will review what is currently known about pathophysiological pathways of response to PM components, with an emphasis on shared pathways.

RI 47 Toxicological Challenges in Food Production in Texas and the Gulf Coast.

L. M. Plunkett. *Integrative Biostrategies LLC, Houston, TX.*

With recent media attention on episodes of food contamination and the impact of chemicals in the environment on the food supply (i.e., bacterial contamination of food, as well as the 2010 BP oil spill), public awareness of food safety issues has grown. This symposium will explore the topic of food safety as it relates to unique features of food production in Texas and the Gulf Coast. Texas is a major source of fresh fruit and vegetable production for both regional and countrywide consumption, while the Gulf Coast is a major source of fresh fish and seafood for many parts of the United States. Topics covered in the symposium will include recent legislative initiatives such as the Food Safety and Modernization Act of 2010, current regulatory oversight of food safety in the Gulf Coast region, and key public and/or worker health issues associated with food production in the region. The goal of the symposium is to describe the strengths and weaknesses of current regulations and practices to ensure a safe food supply as well as worker safety, and provide dialog for ways to address unique concerns related to food production in Texas and the Gulf Coast. Symposium speakers work in academia, for the United States government (US FDA), and an organization representing the interests of the public (Center for Science in the Public Interest), which will allow for discussion of the topics from a variety of perspectives.

RI 48 Multiagency Response to Seafood Safety Concerns following the 2010 Deepwater Horizon Oil Spill.

R. W. Dickey. *US FDA, Dauphin Island, AL.* Sponsor: L. Plunkett.

The April 20, 2010 explosion and sinking of the Deepwater Horizon oil drilling platform (DWH) resulted in the largest oil spill in U.S. history. For a period of 87 days roughly 53 thousand barrels of oil per day flowed into the Gulf of Mexico (GOM). The U.S. Coast Guard estimated 4.9 million barrels of crude oil escaped before the damaged wellhead was sealed on July 15. The DWH spill threatened all States bordering the GOM, and crossed Federal and State jurisdictional boundaries. Agencies responded to the spill in a coordinated manner to execute a unified seafood safety risk assessment and protocol for testing and re-opening GOM fisheries.

Polycyclic aromatic hydrocarbons (PAH) are internationally recognized as the most appropriate indicators of potential human health risk from crude oil residues in seafood. A representative subset of 13 PAH and their alkylated homologues was selected for critical analysis of oil-impacted seafood. A standard set of calculations was used to determine seafood PAH tissue concentrations above which a 10-5 upper-bound risk for low dose, life-time cancer is exceeded. Levels of concern for non-cancer risks were also adopted from EPA IRIS reference dose values. Values for other event-specific variables were selected from the most recent and reliable information available.

FDA and NOAA tested more than 10,000 seafood specimens from state territorial and federal waters that were impacted by the oil spill. Waters were not reopened for fisheries harvest until oil had dissipated and testing showed that seafood was safe for consumption. The duration of fishery closures in the oil-impacted region ranged from 16 days for areas receiving little to no impact to greater than 24 months for areas more heavily oiled.

Most seafood samples that were tested after the oil spill had dissipated, and before waters were reopened for fishing, did not contain measurable levels of oil or dispersant residues. The samples that did contain measurable residues were consistently 100 to 1000-fold below levels of concern established in the unified seafood safety protocol.

RI 49 Seafood Safety Challenges for the Texas Gulf Coast.

D. W. Plunkett. *Center for Science in the Public Interest, Washington DC.* Sponsor: L. Plunkett.

Potentially toxic chemistry from the 2010 BP oil spill and clean-up efforts generated widespread public concern over the safety of seafood harvested from the Gulf of Mexico. Government agencies moved swiftly to contain the threat and reassure consumers. The effort, though, masked a larger truth. While contamination events caused by human activities draw public attention, naturally occurring toxins and deadly bacteria in Gulf waters sicken, maim and kill far more people than oil and chemical dispersants. Rare cases of neurotoxic shellfish poisoning occur in Texas. Much more common are illnesses and deaths from naturally occurring vibrios. Oysters harvested from Texas coastal waters have killed 53 people since 1995 and resulted in 45 serious illnesses from *Vibrio vulnificus* contamination. The presentation will cover the risks to human health from human and naturally occurring contaminants, focusing on shellfish. It will also cover responses, adequate and inadequate, by governmental food safety agencies and the fishing industry.

RI 50 Occupational Hazards in Texas Food Production.

E. Shipp. *Epidemiology and Biostatistics, Texas A&M School of Rural Public Health, College Station, TX.* Sponsor: E. Bruce.

A substantial number of hired farmworkers help Americans to put food on their tables. This largely foreign-born (>75%) workforce makes a huge contribution to the agricultural economy, yet the average family income ranges from \$15,000 to \$17,499 and less than a quarter are covered by health insurance. The agricultural industry also is among the most hazardous in the United States in terms of fatal and nonfatal injury. Common occupational hazards include: prolonged time in awkward postures, sun and heat stress, sharp implements, motorized farm equipment, inadequate safety training and field sanitation, and pesticides. Pesticides are especially a concern for farmworkers given the potential for long-term consequences such as skin problems, neurologic and motor problems, birth defects, and cancer. There are an estimated 10,000-20,000 cases of physician diagnosed pesticide poisoning among agricultural workers each year in the U.S. Many more cases likely go undiagnosed because symptoms can be flu-like and non-specific or the farmworkers lack access to healthcare. Worker training can reduce this exposure, but employers often do not provide training even when required to do so by law. In a study of adolescent farmworkers from Texas, only 21% had ever received any training in pesticide safety. This is troubling because adolescents are still developing both physically and mentally and may be especially vulnerable to chemical exposures. A recent pilot study showed that adolescent farmworkers who reported 5+ symptoms of neurotoxicity were nearly nine times as likely to report an acute injury compared to those reporting a lower number of symptoms (Whitworth et al., 2010). This presentation provides an overview of the occupational health and safety issues impacting farmworkers with a focus on pesticides and a current research study designed to examine this issue further in adolescents.

RI 51 Occupational Heat Stress in Agricultural Settings.

J. L. Levin. *Occupational Health Sciences, The University of Texas Health Science Center at Tyler, Tyler, TX.* Sponsor: E. Bruce.

Occupational heat stress and heat illness disproportionately affect agricultural workers compared with other occupations, including migrant and seasonal farmworkers. From 1992 to 2006, there were 423 occupational heat-related deaths in the United States. The mortality rate from occupational heat-related illness among crop workers was nearly twenty times as high as for all industries during that time frame. This presentation will review underlying causes and risk factors for occupational heat stress, recognition of the continuum of heat illness, and recommendations for monitoring and prevention. Presently, there is no federal occupational regulatory standard specifically regarding heat exposure. This presentation will also review fundamental differences between OSHA and NIOSH and emphasize the complexities of understanding recommended exposure limits. Case examples from outdoor work environments will be presented including one which culminated in adjudication before the Occupational Safety and Health Review Commission.

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