



THE LSU SUPERFUND RESEARCH PROGRAM

HEALTH VS. WASTE

The Superfund Research Program (SRP) enables university-based scientists, engineers, and public health workers, along with community members, to lessen the environmental health effects of hazardous waste sites across the nation. The focus of our SRP at Louisiana State University is to (a) clarify the pulmonary and cardiovascular health effects associated with inhalation exposure to environmentally persistent free radicals, or EPFRs; (b) understand how EPFRs are formed; and (c) develop methods to destroy EPFRs—with the ultimate goal of protecting our communities and the environment.

Environmentally Persistent Free Radicals, or EPFRs

EPFRs are a recently discovered class of pollutants, generated during thermal remediation (e.g. burning) of hazardous wastes on or from Superfund sites across the United States. One such site is in Colfax, Louisiana (pictured above). Although our LSU SRP team identified EPFRs in 2006, there are still no federal or state air quality standards for EPFRs, and their health effects are only partly known.

Health Hazards

EPFRs can induce severe asthma, according to research led by our team's director, Dr. Stephania Cormier. Exacerbations are usually not responsive to steroid treatment and can be fatal; children are particularly vulnerable. Dr. Kurt Varner has also demonstrated that exposure to EPFRs diminishes baseline cardiac function and increases vulnerability to ischemia, a restriction in blood supply to tissues.

Scope

Nearly 53 million people live within three miles of a Superfund remediation site. This is approximately 17% of the US population, including 18% of all children under the age of five. This means that a vast number of US residents are exposed to EPFRs and their associated health risks.

Building Resilience in Our Communities

LSU researchers are engaging people who live close to Superfund sites and sites where hazardous wastes are remediated to learn about their concerns and share scientific information as well as new research findings.

Visit srp.lsu.edu or niehs.nih.gov/srp to learn more, or email us at lsusrp@lsu.edu.

LSU SRP WORKS FOR A HEALTHIER LOUISIANA

Our Team

The Superfund Research Program at LSU has many components that work together. We do basic and biomedical research; train future scientists; and educate and collaborate with impacted communities.

EPFRs Cause Asthma and Childhood Obesity

Dr. Stephania Cormier has shown that:

- Childhood obesity is associated with EPFR exposure in utero.
- Influenza virus infections can be more severe after EPFR exposure.
- EPFR exposure can lessen the efficacy of drugs, altering drug metabolism.
- EPFR exposure can increase the risk of developing severe, non-steroid-responsive asthma.

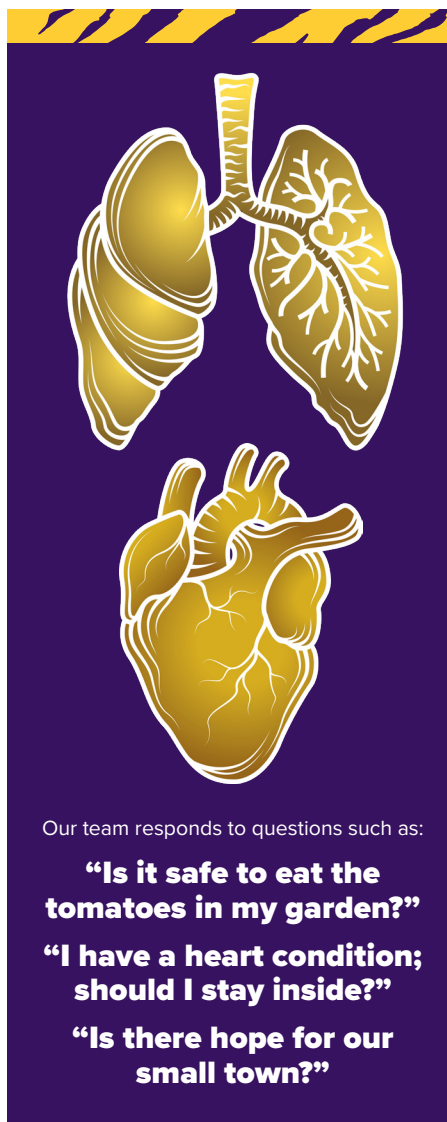
EPFRs Cause Diminished Cardiovascular Function

Dr. Kurt Varner's laboratory at the LSU Health Sciences Center–New Orleans and Dr. Tammy Dugas' laboratory at the LSU School of Veterinary Medicine have shown that EPFR exposure:

- Causes hypertension in blood vessels, typically resulting in heart disease.
- Makes it harder for patients to recover from heart attacks.

Destroying EPFRs

Dr. Phillip Sprunger's research group is working to understand how environmental conditions (e.g., humidity, light, and temperature) dictate the reactivity and decomposition of EPFRs, and predict how EPFRs will either form or degrade. This knowledge will help us develop methodologies to enhance their degradation.



Our team responds to questions such as:

“Is it safe to eat the tomatoes in my garden?”

“I have a heart condition; should I stay inside?”

“Is there hope for our small town?”

Documenting Community Exposure

Led by Dr. Jennifer Richmond-Bryant, our researchers are investigating how:

- Community engagement in study design can itself promote public health.
- Exposures among community residents who live near a source depend on EPFR size and composition.
- EPFRs can infiltrate homes, causing multiple exposures.

Community Engagement

When Camp Minden in Webster Parish exploded in 2012, residents became acutely aware of the hazards of storing deteriorating explosive materials in what had been the Louisiana Military Ammunition Plant, listed as a Superfund site.

In 2015, Dr. Margaret Reams helped bring concerned residents, regulatory agencies, and research scientists (including Dr. Slavo Lomnicki) together to develop consensus around a solution, which became a closed thermal treatment disposal method. Next, our team will work with residents in Colfax and Alsen.

We are also launching the LaCARES (LSU Clean Air Research Engagement for Superfund communities) program to:

- Build partnerships between residents, local government officials, business owners, regulators, and researchers.
- Disseminate information about EPFRs as a component of thermally remediated hazardous wastes.
- Collaborate with the community in our ongoing research.
- Encourage exposure-mitigation practices at both the household and community levels.

Training Future Scientists

The LSU SRP has trained over 30 graduate students and postdoctoral fellows in chemistry, physics, environmental sciences, and toxicology to reshape environmental health in Louisiana as well as in Tennessee and California, with recent expansions to North Carolina and Australia.