School-Related Environmental Exposures: Louisiana, 2006-2015

Rosalind M. Green, ScD

In recent years, there has been an increase in public awareness of potential health effects related to releases of hazardous chemicals into the environment. Community members have become more active in advocating for their own safety and for education about what risks chemical releases pose to their communities. Particular concern has arisen about the safety of children in the school setting.

In order to identify any trends or relationships in reports of school-related environmental exposures, the Louisiana Department of Health (LDH), Office of Public Health (OPH), Section of Environmental Epidemiology and Toxicology (SEET) reviewed ten years of data from five databases. The resulting summary will be used to make recommendations for "best practices" to reduce risks of exposures.

Methodology

To compile this summary, SEET reviewed reports of school- related exposures from the following five sources:

- the Louisiana Poison Center (LPC) database;
- SEET's database documenting calls reporting indoor environmental quality concerns to the section's Indoor Environmental Quality program (IEQ);
- the Hazardous Materials (HAZMAT) database of reports called in to the Louisiana State Police's HAZMAT hotline;
- the SENSOR Pesticide Incident Data Entry & Reporting (SPIDER) database, which collects and manages data on acute pesticide exposure events; and
- the National Toxic Substance Incidents Program (NTSIP) database, which funded state surveillance of hazardous substance release incidents by SEET from January 2010 - December 2013.

Each database was queried using the keyword "school" for a 10-year period ranging from January 2006 to December 2015. The query results were manually filtered to remove cases that did not fit appropriate parameters, such as cases lacking sufficient information to positively identify them as being school-related; exposures to animal-related hazards; or intentional consumption of recreational or medicinal drugs. Since the databases did not all use the same identifiers to record details of reported exposures, similar types of exposures or health effects were grouped into general categories.

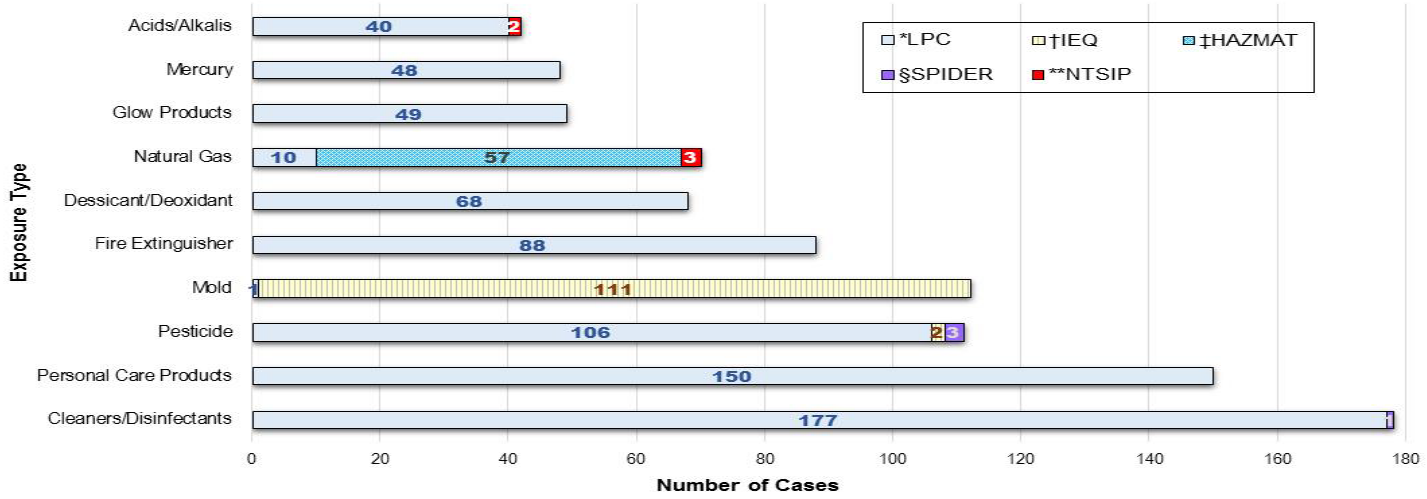
Results and Recommendations

Table 1 and Figure 1 show the most frequently reported exposures across the five databases SEET reviewed. However, examining results from each database individually revealed differences in environmental exposure frequency that were not visible in the summary across databases. This was due to the difference in sizes between query results (for example, 1,059 cases were evaluated from LPC, while only six cases from SPIDER and NTSIP fit the summary parameters).

Table 1 - Top Ten School Environmental Exposures - Louisiana, January 2006 - December 2015

	†LPC	‡IEQ	§HAZMAT	**SPIDER	††NTSIP
Cleaners/Disinfectants	177			1	
Personal Care Products	150				
Pesticide	106	2	1	3	
Mold	1	111	1		
Fire Extinguisher	88				
Dessicant/Deoxidant	68				
Natural Gas	10		60		4
Glow Products	49				
Mercury	48				
Acids/Alkalis	40				2

Figure 1 - Top Ten School Environmental Exposures - Louisiana, January 2006 - December 2015



†LPC = Louisiana Poison Center database
‡IEQ = Indoor Environmental Quality database
§HAZMAT = Hazardous Materials database
***SPIDER = SENSOR Data Pesticide Incident Entry & Reporting database*
††NTSIP = National Toxic Substance Incidents Program database

As shown in Table 2, the highest number of reported school exposures occurred in OPH Administrative Region 1*, followed by Regions 2 and 5. However, Region 5 also had the lowest population average during this 10-year period. The higher than expected number of cases reported from Region 5 may be due to more frequent occurrences of school-related environmental exposures in this region, or to a higher reporting rate among school workers in this region (Figure 2).

** Map of Regions on Page 7*

(continued on page 4)

(Summary of Ten Years ... continued from page 3)

Table 2 - School Environmental Exposures by OPH Administrative Regions – Louisiana, January 2006 - December 2015

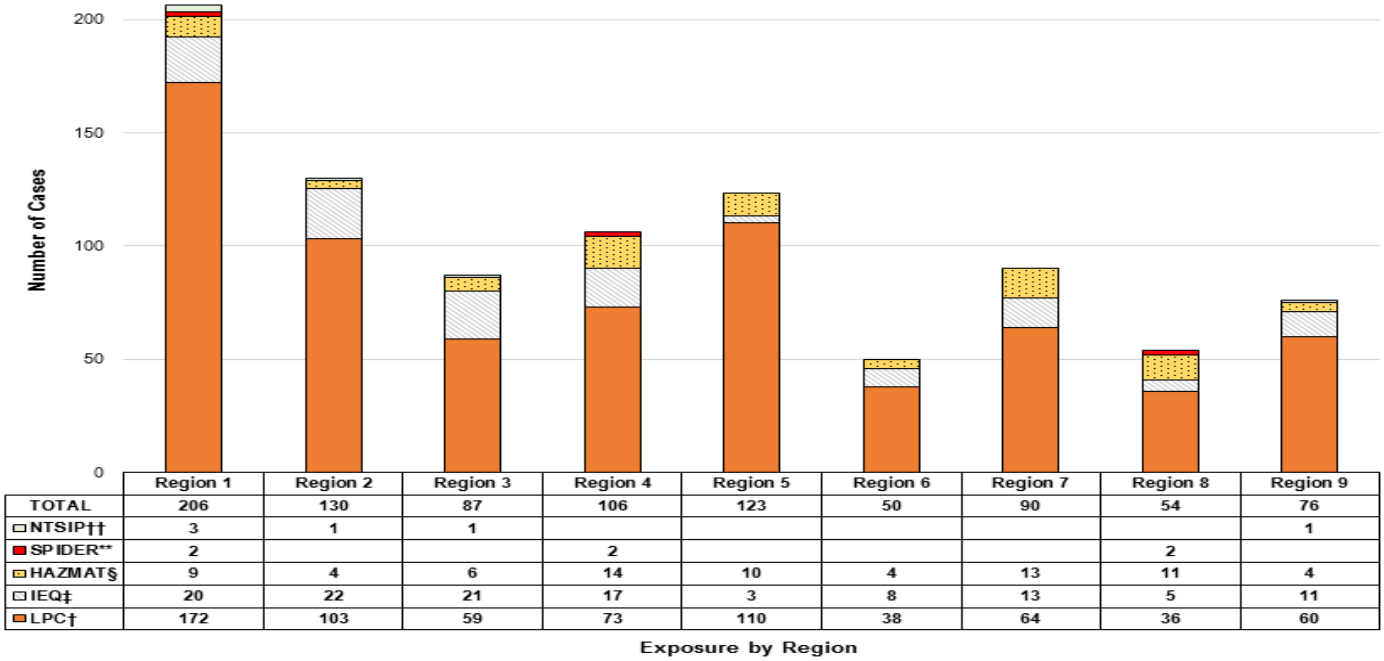
	†LPC	‡IEQ	§HAZMAT	**SPIDER	††NTSIP	TOTAL
Region 1	172	20	9	2	3	206
Region 2	103	22	4		1	130
Region 3	59	21	6		1	87
Region 4	73	17	14	2		106
Region 5	110	3	10			123
Region 6	38	8	4			50
Region 7	64	13	13			90
Region 8	36	5	11	2		54
Region 9	60	11	4		1	76
Grand Total	715	120	87	6	6	934

Ingestion was the route of exposure most often identified in the reviewed cases. When communicating information about how to prevent or minimize environmental exposures, SEET emphasizes that children often engage in hand-to-mouth activities. Therefore, recommendations for minimizing chemical exposures in school settings should reinforce the oral (by mouth) route as an important pathway of potential exposure to chemicals for children.

SEET will continue to monitor reports of school-related environmental exposures and to do outreach through the development and distribution of materials that promote safety and well-being in school settings. The results of this summary will allow SEET to refine its data collection process for documenting these exposures and to more effectively deliver information to school officials, employees, and other interested parties to minimize the occurrence and impact of these exposures.

For more information, contact Dr. Green at (504)568-8814 or *rosalind.green@la.gov*.

Figure 2 - School Environmental Exposures by OPH Administrative Regions – Louisiana, January 2006 - December 2015



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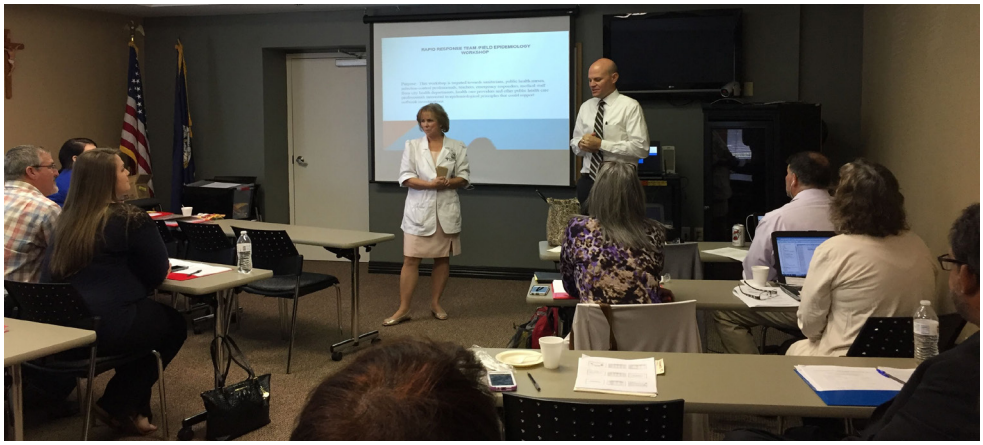
Rapid Response Team (RRT) / Field Epidemiology (FET) Workshop

Photo: Rene Ragas, CEO of Our Lady of the Angels Hospital, Bogalusa with Janice Augustine, Infection Preventionist greeting workshop attendees on October 12, 2016



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Office of Public Health - Infectious Disease Epidemiology Section
P.O. Box 60630, New Orleans, LA 70160 - Phone: (504) 568-8313
www.ldh.louisiana.gov/LMR

Infectious Disease Epidemiology Main Webpage
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Feral Hogs and Trichinellosis: Louisiana, 1961-2016

Gary Balsamo, DVM, MPH&TM; Dwight LeBlanc, Louisiana State Director, USDA APHIS Wildlife Services

The widespread distribution of feral swine in the state of Louisiana and the popularity of hog hunting may increase the risk of several diseases in Louisiana's population. One such disease is trichinellosis (also called trichinosis), a parasitic disease of swine that, when acquired by humans, may cause significant morbidity.

Feral swine (*Sus scrofa*) are now present in all of Louisiana's 64 parishes. They are listed in the top 10 of the world's most injurious invasive species, and are so prolific scientists estimate that more than 70% of the population must be removed annually in order to reduce populations (Figure).

Figure: Feral Pig

Photo courtesy of the National Aeronautics and Space Administration

Due to the following negative impacts on wildlife and plant communities, reduction of feral swine populations is encouraged. Feral swine compete for resources and issue direct effects due to predation and habitat damage. They are deleterious to row crop agriculture, livestock, and timber. Feral hogs contaminate surface and drinking water with coliform bacteria, as well as increase soil erosion.

Feral swine are potentially important reservoirs for several zoonotic diseases and parasites. Some, such as pseudorabies, can be transmitted to wild and domestic animals and are often lethal. Other diseases, however, can also be transmitted to humans by dermal contact, mucosal contact, or by ingestion. Humans may contract bacterial diseases such as brucellosis (namely *Brucella suis*) and leptospirosis from feral swine. Studies conducted by the Louisiana Department of Wildlife and Fisheries (LDWF) and U.S. Department of Agriculture (USDA) Wildlife Services indicate that approximately 3.5% of the feral hog population is sero-positive for *Brucella suis*; seropositive animals may approach 50% of the population in some areas of the state.

Nematodes (roundworms) of the genus Trichinella cause trichinellosis. In swine and carnivores worldwide, the most historically significant species has been *Trichinella spiralis*; however, other Trichinella species are capable of causing the disease. These species include: *T. pseudospiralis*, a non-capsule forming species found in mammals and birds throughout the world; *T. nativa* in arctic bears; *T. nelson* in several African mammalian species; and *T. britovi* in European and western Asian carnivores. It is very likely that anyone who prepares food for consumption recalls the insistence by health officials that all pork products be thoroughly cooked. Trichinellosis is the zoonotic disease most responsible for this well-established, safe-cooking rule.

When ingested, gastric pepsin and acid digest the cyst-like capsule of the Trichinella nematode and releases the larvae, which proceed to colonize the small intestine's mucosa and develop into adults. These adults live approximately four weeks, but after one week the females are capable of producing larvae that migrate to skeletal muscle and encyst. Rodent species are responsible for maintenance of the parasite, but higher carnivores and omnivores (e.g., swine) become infected by consumption of muscle from living or dead animals. Humans can also be secondarily infected if undercooked muscle from these animals is eaten. Bears, swine, wild felines, foxes, dogs, wolves, horses, seals, and walruses are some of the most common species infected with Trichinella.

In humans, abdominal symptoms resulting from effects on the small intestine can begin one or two days after ingesting the capsules and may include pain, diarrhea, fatigue, fever, nausea, and vomiting. Symptoms associated with muscle cysts usually begin two to eight weeks after consumption of infected muscle tissue. These symptoms may include headache, fever, chills, cough, swelling of the face and/or eyes, arthralgia, myalgia, urticaria, and further abdominal symptoms. The severity of the symptoms is often related to the number of infectious organisms within the consumed meat. In very heavy infections, problems with muscle coordination, cardiac and respiratory disease, and even death may result. Mild cases often subside within a few months, while heavier parasite loads may cause symptom persistence for several months.

Diagnosis is made most often when a patient's condition reflects the aforementioned symptoms and the patient recalls consumption

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