

Medical Cases and Topics for Health Care Providers are based upon inquiries received by NPIC, as well as relevant publications in the scientific literature. They are intended to educate health care providers about pesticide toxicology.

## Changing Trends in the Epidemiology of Insecticide Exposures

### Scenario:

An emergency room physician contacts the National Pesticide Information Center, reporting a 3-year-old child was found in his garage with an open pesticide container. The child is asymptomatic, but a chemical odor was noted and his shirt was wet upon arrival to the emergency room. The emergency room staff has already removed the child's clothing and washed his skin. The physician reports that the name on the label of the pesticide product was Buzz-Gone. He is calling to find out whether this product contains organophosphates, and if so, what lab he can send a blood specimen to for cholinesterase testing.

### Discussion:

It is not always possible to accurately identify the active ingredients in a pesticide formulation, based on the product name. Some pesticide products with similar sounding names may contain different active ingredients. For this reason, when a health care provider is evaluating a possible pesticide exposure, they should try to identify the EPA Registration number on the label of the product. The EPA Registration number is a unique identifier, usually found on the back panel of the label. The EPA Registration number can be used to get more specific information about the formulation, including the active ingredients in the formulation. There are online databases where the EPA Registration number can be entered to locate additional information about a specific pesticide formulation.

In the current example, when the EPA Registration number of the pesticide product was queried, the formulation was not found to contain organophosphates. The active ingredient in the formulation was a pyrethroid insecticide. The pyrethroid insecticides are not cholinesterase inhibitors, and cholinesterase testing of a blood sample would not provide useful clinical information.

Over the past ten years, there have been some significant changes in the types of insecticides that have been implicated in cases of accidental human exposures. Organophosphate insecticides, which used to be commonly found in pesticide formulations intended for residential uses, have largely been phased out of home and garden uses in the United States by the U.S. EPA. Some epidemiological studies have reported that during the time period that organophosphates have been phased out of residential uses, the number of human exposure incidents involving this class of insecticides has declined.(1, 2) Other studies have found that during the same time period, the number of human exposure incidents involving other classes of insecticides, specifically the pyrethroids, has increased.(3)

Health care providers should be aware of some of the changing trends in the different types of insecticides that are associated with human exposures. Organophosphates are still important insecticides for health care providers to be aware of, as containers of old formulations may still be present in locations accessible to children and adults. In addition, organophosphate insecticides continue to be utilized in agriculture, which presents health risks to workers and others who may have opportunities for exposure to these chemicals. Health care providers should also be aware of the signs and symptoms associated with [exposure to pyrethroid](#) and other types of insecticides that are now commonly found as active ingredients in pesticide formulations accessible to consumers.

In this case example, the child was observed in the emergency room for six hours and did not develop any symptoms of toxicity. The ability to identify the active ingredients in the pesticide product provided important information to assess the potential health risks associated with the exposure. Health care providers are encouraged to utilize the National Pesticide Information Center as a resource to get additional information about pesticide products and their toxicology.

## References

1. Stone DL, Sudakin DL, Jenkins JJ. Longitudinal trends in organophosphate incidents reported to the National Pesticide Information Center, 1995-2007. *Environmental health : a global access science source* 2009;8:18.
2. Sudakin D, Power L. Organophosphate exposures in the United States: a longitudinal analysis of incidents reported to poison centers. *J Toxicol Environ Health A* 2007;70:141 - 147.
3. Power LE, Sudakin DL. Pyrethrin and pyrethroid exposures in the United States: a longitudinal analysis of incidents reported to poison centers. *J Med Toxicol* 2007;3(3):94-9.

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