

# Chapter 7

## Pesticide Contaminated Drinking Water and Health Effects on Pregnant Women and Children

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### ABSTRACT

*In the recent years, pesticide research and regulatory efforts have focused on the prevention of acute health effects from pesticide poisonings and pesticide residues on foods, but more attention is being given to the deleterious chronic health effects. Children and pregnant women's exposure to contaminated water in particular are at high risk for subsequent adverse health outcomes. The chapter summarizes the health effects of water contamination.*

### INTRODUCTION

Pesticides have well-documented impacts on human health, and researchers have noted associations with cancer, neurological disease, respiratory impacts, birth outcomes, and other adverse conditions in human populations (Bonner & Alavanja, 2017). Children, in particular, are at greater risk for pesticide exposure and subsequent adverse health outcomes (Ferguson et al., 2017). Historically, pesticides research and regulatory efforts have focused on the prevention of acute health effects from pesticide poisonings and pesticide residues on foods, but more attention is being given to the deleterious chronic health effects resulting from low-level, ambient pesticide exposures.

For many years, the primary focus of public health surveillance has been on acute pesticide illnesses; yet, these acute outcomes are likely undercounted. Pesticide illness reports are often made only when the exposure is reported by the victim, the outcome is very serious and/or requires hospitalization, and

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it is recognized as such by the attending medical provider. Furthermore, less policy attention has been paid to chronic health outcomes associated with pesticide exposures. With increasing knowledge about pesticides' impacts on cancer, diabetes, lung function, neurodegenerative disorders, intelligence quotient, birth defects, and reproductive impacts (Bonner & Alavanja, 2017), it will be important for public health research and surveillance efforts to improve the ability to identify and monitor chronic health impacts related to pesticide exposure.

Due to their size, physiology, and behavior, children are more vulnerable than adults to environmental hazards. Children on getting exposed to high toxic chemicals in proportion to their body mass index, suffers for more years of life ahead of them due to the earlier exposure in their life-time. Health at birth is predictive of important child outcomes, including educational attainment and adult earnings. Exposure to environmental pollution during pregnancy is a common source of potential fetal health shocks (Wang et al., 2016). Recent research shows that, even at levels below current air quality standards, air pollution can harm fetal health as measured by the incidence of low birth weight and pre maturity. Drinking water contamination is another, potentially important, source of in utero exposure to pollution.

Special attention should therefore be paid to harmful substances to which pregnant women might be exposed. While a good deal of recent research focuses on the effects of air pollution on fetal health, there has been little attention paid to the potential harm caused by contaminated drinking water. First, the study shows that the women who live in areas with contaminated water supplies differ from other women in ways that one would expect to be correlated with worse fetal health. It is therefore important to control for these differences. Second, women may respond to contaminated water by moving elsewhere. We show that more educated women are more likely to vote with their feet. Third, there is a mechanical positive correlation between length of gestation and the probability of being exposed to most fetal health insults. It has been shown that correcting for the bias can have an important impact on the estimated magnitude of the effect. Fourth, there is good reason to expect effects to differ by socioeconomic status. Just as they are more likely to move, more educated women are more likely to take measures to protect themselves and their children from contaminated water (Currie *et al.*, 2013). The present chapter summarizes that water contamination may be an important source of human pesticide exposure, and higher versus lower maternal residential water consumption has been associated with children's health and growing fetus.

## **PESTICIDE USE AND ITS EFFECT ON CHILDREN'S HEALTH AND PREGNANT WOMEN**

More than 700 pesticide chemicals, including insecticides, herbicides, rodenticides, and fungicides, are currently registered with US EPA. These are chemicals deliberately engineered to kill or repel living things and thus have inherent toxic potential. Synthetic pesticides introduced after World War II are now ubiquitous. A 2000 US EPA survey demonstrated that 74% of US households use 1 or more pesticides around the home. Over time, insecticide use has evolved from chlorinated compounds such as dichlorodiphenyltrichloroethane (DDT) to organophosphates (OPs) and, more recently, pyrethroids. Though having low acute toxicity, organochlorine pesticides are persistent and associated with chronic health concerns. In making the switch to the OPs, we have substituted for the acute and neurodevelopmental toxicity of OPs.

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