The contamination of water by pharmaceuticals is a very complex problem. This complexity is partly due to the relatively recent recognition of pharmaceutical contamination itself. New information and technology are constantly changing the dynamics of this issue, as are fluctuating social and political attitudes towards environmental concerns such as this one. Due to the ever changing nature of this specific environmental concern, the Environmental Defense Fund (EDF) must consistently work to understand the intricate policy environment in which pharmaceutical contamination of water is situated.

In the history of water regulation, the most influential laws are The Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). Both the CWA and SDWA have improved water quality since they were first enacted by instituting pollutant level standards for surface, waste, and drinking waters, as well as pollution control regulations. Despite these regulations, the US EPA currently has no standards for pharmaceuticals in water and water suppliers are not required to analyze samples for them. However, in 2008 the US EPA did state that pharmaceuticals were considered “contaminants of emerging concern.” The EPA is currently gathering information and recommendations, as well as launching studies on pharmaceutical detection techniques, effects of pharmaceuticals in water, and contaminant management. These actions taken by the EPA illustrate the increasing interest of the government in regards to this specific issue. Future statements and action, such as regulation, by the EPA or other government agencies will have a major effect on who EDF may partner with and how EDF will approach the problem.

Current national primary drinking water regulations mandate water utilities to provide customers with a yearly water assessment, stating the water source used, levels of regulated contaminants measured throughout the year, and potential health effects of contaminants detected over health standards. The information contained in these reports can be very technical and leave it up to the customer to interpret and figure out what the information means. These annual reports are not required to include information about potentially harmful contaminants that are unregulated and usually unmeasured, including pharmaceuticals. Public awareness and understanding of the issue is important. If the public is oblivious to a problem, there obviously cannot be public input, support, or pressure for action. EDF should continue to educate the public so the public can take action including urging public officials to act in their interest.

Although public knowledge and awareness of this specific issue are currently limited, water pollution, in general, is the top environmental concern in the US. In a recent Gallup poll more than half of Americans state they are “greatly concerned” with environmental water problems. In fact, these issues have been the top concern since the annual poll began in 1989. Among the wealthiest countries, the US also has the lowest overall satisfaction with local water quality. The overall public dissatisfaction
and concern with water quality in general may increase the amount of public attention the specific issue of pharmaceutical contamination obtains. Public participation and partnerships can be a great advantage for EDF in trying to improve conditions and solve this problem.

The public and government are not the only stakeholders in this issue; this issue also affects the pharmaceutical and healthcare industries. Depending which position they decide to take they could either be resistant to progress or they could participate and help find solutions. Some pharmaceutical companies have already participated in drug take-back and other educational programs to prevent improper disposal of pharmaceuticals. EDF may consider cooperating with the pharmaceutical and healthcare companies to come up with programs, processes, and other new ideas and solutions for reducing or eliminating the contamination of water by pharmaceuticals.

Although interest in this matter is escalating, future federal involvement may be an issue because of funding. Unfortunately, the proportion of the federal budget apportioned to the US EPA has been slowly decreasing since 2000, and the total amount allotted for the EPA will also decrease after 2010. This decrease in budget appropriations may affect the amount of resources the EPA will be able to allocate in order to deal with this developing problem. Reduced federal involvement may slow progress resulting in fewer studies funded, and therefore less information for researchers to rely upon.

Despite the decreasing EPA budget, science and technology will improve and we will have more information on the problem. Improvements in detection may enhance abilities to measure pharmaceuticals more extensively. Trends can now begin to be established with the available technology. Trend data will include information on how the problem is changing over time and whether the problem is getting worse or is static. Trend data will also aid in understanding the effects pharmaceuticals in water have on humans and the ecosystem. With the greater amount of information and understanding trend data will enable EDF to make informed decisions on what actions to take. Of all these technological advancements, the enhancement of water cleaning techniques may be the one to have the most positive influence; a more consistent and efficient reduction of pharmaceuticals in the water treatment process can be achieved with such technology. As these treatment technologies improve, EDF will be able to focus more resources on the implementation of them on a much larger scale where the benefits will be significant.

Future trends in consumption of water and pharmaceuticals may also affect how EDF should approach the problem. Although the average amount of water used by an individual has remained steady over the last few decades, the overall amount of public water used in the US has increased because of population increase, as the comparisons of figures 1 illustrates. Increases in the amount of water used directly correlates to the amount of water that needs to then be cleaned or treated. The increased demand on water treatment may tax the existing infrastructure. The increased demand on an already stressed system may prevent water treatment of high quality. Trying to alter water treatment processes and requirements to reduce pharmaceuticals in water may be more difficult when a system is already struggling to keep up with demand. This point in particular strengthens the claim that immediate action would be most beneficial.
Just as water consumption has increased, so has the use of prescription drugs. However unlike water consumption, the amount spent on prescription drugs has increased much faster and more dramatically when compared to population growth. The increase in the amount of money spent on prescription drugs per individual each year in the US, shown in Figure 2, indicates a rapid growth of pharmaceutical consumption.\textsuperscript{11,13} If this trend remains, it will cause the amount of pharmaceuticals in the environment to accumulate rapidly. The longer we wait to address this problem the greater and more cumulative the negative effects will be. This startling trend in pharmaceutical use highlights the urgent nature of the situation and the need to find proper, effective solutions. EDF must work swiftly to prevent the potential danger this issue poses to the nation’s water supply.
The public, government, and industry have a stake in working towards a solution to the pharmaceutical contamination of water. The existing policy environment will change with the varying interests, actions, and interactions of these different actors. EDF must remain flexible for this reason and also because new information, science, and technology will constantly alter the policy environment.


