Pharmaceuticals in Drinking Water: An Analysis of the Problem in the Charleston Area and Finding a Solution Through Awareness

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INTRODUCTION

Recent studies have shown contamination of drinking water by pharmaceuticals in 29 metropolitan areas across the US. This has raised concerns about the health implications and the impact on human health is uncertain. For a long time, this issue has been studied, but recently, there has been an increase in public awareness as more reports have surfaced. This growing concern has led to the implementation of new regulations and policies. The goal of our project is to increase the awareness and ability for each pharmacy to prevent water contamination through multiple intervention strategies.

Goals of our project:
- Comprehensive literature review to evaluate the potential harm of pharmaceuticals in the water system
- Determine how Charleston Water System is addressing the issue locally
- Create an awareness campaign to educate local and federal pharmacists, and the creation and distribution of an educational flyer on the proper disposal of medications

METHODS

The environmental and pharmaceutical drug study was created and brought together by various literature reviews, interviews, surveys, and data collection tactics to increase the awareness and ability for each pharmacy to take back expired and/or unused prescriptions. The methods include:

- Literature Reviews: Over the course of 6 months, vigorous literature reviews were retrieved and compiled to build an array of background information.
- Environmental Impact: An internet website was created on behalf of the committee to organize and disseminate information to the public.
- Public Support: Networked amongst public support groups and agencies to clarify expired or unused pharmaceutical drugs.
- Interviews: Mr. Andy Fairley, Chief Operating Officer of the Charleston Water System was interviewed and served as the Environmental Liaison for the Presidential Scholar Environmental Committee. Mr. Fairley was instrumental in the committee to gather additional information as to policy and procedure the water system implements to avoid pharmaceuticals from entering the water system, the awareness of the water system, and ways to begin educating the public of the long-term effects.
- Pharmaceutical Information Interviews: Each member of the committee informally interviewed an employee of CVS, Target, Walgreens, and Wal-Mart to gain information as to the pharmacy's involvement and awareness of pharmaceutical drugs in the water system.
- Questionnaires: Surveys were conducted throughout the City of Charleston to gain a new perspective as to know the knowledge and awareness on how the majority dispose of a pharmaceuticals liquid/pills.

RESULTS

The survey was available to a diverse population.

LESSONS LEARNED

1. Educational programs provide an immediate impact.
2. Preventing water contamination through multiple intervention strategies.
3. The impact of water contamination by pharmaceuticals on human health and ecological systems needs to be addressed.
4. Local and federal public support groups need to be networked amongst public support groups and agencies.
5. Pharmacies need to take back expired or unused pharmaceuticals.

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SUMMARY

The short and long term risks associated with pharmaceuticals in drinking water are currently unknown. These substances could cause illness to those who are not employed in healthcare, 54% (41 of 76) had prior knowledge of the issue. The short and long term risks associated with pharmaceuticals in drinking water is pertinent to all, but will affect those with exposure. We must also think about the marine ecosystems, which have already shown damage from pharmaceuticals.

The problem of pharmaceuticals is a multi-faceted issue and requires a multi-sectoral approach. As the title suggests, what could make a huge difference in years to come.

Several ways that we have to raise awareness in our local community include:

- Submitted an article on the problem to public for the City-Paper, Skirt, Charleston, Daily Gazette, and The Post.
- Posted “Don’t Flush Your Pills” flyers around the MUSC campus and distributed to students and patients, as well as local pharmacists.
- Collected samples from these waters as well as from our area.
- Received invitation from Lowcountry Environmental Education Program (LEEP) to speak in public schools about problem.

Interprofessional Collaboration:

- Every single professional can play an important role in addressing this issue.

- Pharmacists, Dental Physician Assistants, and Nurse Practitioners should be aware of the problem so they can properly educate their patients on disposal of unused medication.

- Nurses should also be aware of the problem since part of their job involves medication disposal.

- Pharmacies can also educate the public about proper medication disposal.

- Pharmaceutical companies can make their products more environmentally friendly.

- Nurses can also help patients to come up with a safer way to dispose of medication.

- Continuous research is vital in order to better understand the results of this problem, the potential risks, and how to best deal with the problem.

Lessons Learned:

- There is not much known about the magnitude and long term effects of this problem. However, there are a number of studies that exist.

- Pharmaceutical disposal is not currently required in any pharmaceuticals. However, many different studies are taken into account.

- Studies have shown that this problem has already begun to affect marine life.

Questions that remain unanswered:

- Are there any long term risks associated with continuous exposure to pharmaceuticals in the drinking water?
- Are the drug risks associated with ingesting multiple chemical contaminants in combinations that were never studied?
- Are there any ways to efficiently screen all for the pharmaceuticals in the water?
- What is the most efficient way to remove pharmaceuticals from drinking water?
- What is the most effective way to convey proper medication disposal to health care professionals and the general public?

Recommendations for continued work:

- Continue increasing public awareness via flyers, articles, and social media.

- Collaborate with pharmacies to receive medication take back programs.

- Public health officials at the local, state, and national level to act on this problem.