Contaminants in water  

Contaminants are generally defined as anything other than water molecules, that is two atoms of hydrogen and one of oxygen. For the purposes of the federal Safe Drinking Water Act, water contaminants are typically broken down into four categories: physical, biological, radiological, and chemical. Each type can have serious health impacts. Public health goals for water contaminants have been determined by health scientists. They are used to indicate water quality and filtration effectiveness (such as whether disease-causing bacteria are present) and the limits of allowable contaminant levels. The following table identifies some of these contaminants and lists their corresponding public health goals.

**Physical Contaminants**

- **Turbidity**  
  - **Public health goal:** 0.5 NTU  
  - **Key factor:** A measure of the cloudiness of water caused by suspended particles. High turbidity can reduce the effectiveness of filtration and disinfection processes.

- **Water additive used to control microbes**  
  - **Public health goal:**  
  - **Key factor:** Chemicals such as chlorine are added to water to kill bacteria and viruses. Their effectiveness can vary depending on the water's characteristics.

- **Human and animal fecal waste. Some of the bacteria that cause** **Legionnaires’ Disease**  
  - **Public health goal:** 0.006 mg/L  
  - **Key factor:** Legionnaires’ Disease is a serious lung infection caused by a bacteria that can survive in water systems. Preventative measures include disinfection and prevention of water stagnation.

**Chemical Contaminants**

- **Chlorine**  
  - **Public health goal:**  
  - **Key factor:** Chlorine is a disinfectant used to kill bacteria and viruses. Its concentration must be monitored to ensure it is effective without causing health risks.

- **Beryllium**  
  - **Public health goal:**  
  - **Key factor:** Beryllium is a toxic metal that can cause severe health effects, including lung disease and cancer. It requires stringent regulations to prevent exposure.

**Radiological Contaminants**

- **Radiological contaminants:** 
  - **Public health goal:** 
  - **Key factor:** These are broken down into four categories: 
    - **Man-made materials.** 
      - **Public health goal:** 
      - **Key factor:** Man-made materials can include isotopes of natural elements that have been altered by human activities, such as plutonium.
    - **Naturally occurring man-made materials.** 
      - **Public health goal:** 
      - **Key factor:** These include man-made isotopes of natural elements, such as those used in nuclear medicine.
    - **Artificial radioactive isotopes.** 
      - **Public health goal:** 
      - **Key factor:** These are isotopes of elements that are artificially produced and can be used in medical or industrial applications.
    - **Plutonium.** 
      - **Public health goal:** 
      - **Key factor:** Plutonium is a highly toxic and radioactive element that is a byproduct of nuclear fusion.

**Biological Contaminants**

- **Giardia Lamblia**  
  - **Public health goal:**  
  - **Key factor:** Giardia is a parasite that causes a diarrhea-like illness. Its presence in water can be detected using filtration and testing.

- **Cryptosporidium**  
  - **Public health goal:**  
  - **Key factor:** Cryptosporidium is another parasite that can cause gastrointestinal illness. It is resistant to many disinfectants but can be killed by boiling or chlorination.

- **Bacterial pathogens**  
  - **Public health goal:**  
  - **Key factor:** These include bacteria such as E. coli and Salmonella, which can cause illness if ingested. Prevention includes filtration and disinfection.

- **Parasitic protozoa**  
  - **Public health goal:**  
  - **Key factor:** These are single-celled organisms that can cause gastrointestinal illness. They can survive in water systems and require robust disinfection.

**Health Impacts**

- **Health impacts:** 
  - **Key factor:** Health impacts can range from mild gastrointestinal illnesses to severe infections and, in some cases, death. Prevention includes water filtration, disinfection, and regular monitoring.

- **Health impacts:** 
  - **Key factor:** These are often associated with higher levels of disinfection by-products and can cause cancer, liver damage, and other health effects.

- **Health impacts:** 
  - **Key factor:** These can cause respiratory illness, and exposure to high levels can be fatal.

- **Health impacts:** 
  - **Key factor:** These can cause skin irritation, eye irritation, and respiratory problems.

- **Health impacts:** 
  - **Key factor:** These can cause gastrointestinal illness, and exposure to high levels can be fatal.

- **Health impacts:** 
  - **Key factor:** These can cause respiratory illness, and exposure to high levels can be fatal.

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**Public Health Goal**

- **Public health goal:** 
  - **Key factor:** Public health goals are set by health agencies and are based on the severity of known health impacts and the likelihood of occurrence. They are used to guide water treatment practices.

- **Public health goal:** 
  - **Key factor:** The public health goal for water contaminants is determined by the highest level of the contaminant that is known to cause no known adverse health effects.

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**Health Crisis in Flint, Michigan**

The health crisis in Flint, Michigan, has receded as the water situation slowly improves. A trainee generally wouldn't be assigned to a municipal system until after two years. The EPA does not believe the public has a right to see that list. "All of our systems are ranked within the region as they're planning their inspections," she said. "In a year, if they know they can't get to all of their facilities, they take the ones which are the highest priority ranking where there's the greatest risk."