**Waterborne Diseases**

Waterborne diseases are mostly caused by pathogenic micro/macro-organisms that are commonly transmitted in contaminated fresh water. Infection usually results during bathing, washing, drinking, in the preparation of food thus infected etc.

<table>
<thead>
<tr>
<th>Types</th>
<th>Transmission modes</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterborne diseases</td>
<td>Contaminated drinking water</td>
<td>Cholera and typhoid etc.</td>
</tr>
<tr>
<td>Water washed diseases</td>
<td>Lack of clean water for washing</td>
<td>Polio, skin and eye infections etc.</td>
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<tr>
<td>(water-scarce)</td>
<td></td>
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<tr>
<td>Water based diseases</td>
<td>Contact, insufficiently cooked aquatic species, recreational swimming etc.</td>
<td>Schistosomiasis, dracunculiasis etc.</td>
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<tr>
<td>Water vector diseases</td>
<td>Vector such as mosquitoes</td>
<td>Malaria, dengue, elephantiasis etc.</td>
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</tbody>
</table>


**Waterborne Diseases & Causal Organisms**

- **Virus** (Microscopic organisms)
  - Polio, Japanese encephalitis, Hepatitis A, Dengue/Chikungunya, Diarrhoea etc.

- **Bacteria** (Microscopic organisms)
  - Salmonella typhi
  - Typhoid, Cholera etc.

- **Allergies**
  - Contaminated drinking water causes: skin irritation, itchy eyes etc.

- **Macroscopic organisms**
  - Flat worms: Schistosoma mansoni
  - Roundworms: Wuchereria bancrofti, Ascaris lumbricoides
  - Guinea worms: Dracunculus medinensis

- **Fluoride ion**
  - Fluorosis: Excess amount of fluoride in drinking water causes Skeletal and Dental Fluorosis

- **Protozoa**
  - Mostly microscopic organisms

- **Symptoms**
  - Skeletal
  - Dental
  - Malaria
  - Giardiasis

**Fix the source, not the Symptoms!**
**Facts ‘n’ Effects**

- 1 in 10 people lack access to safe water
- 1 in 3 people lack access to a toilet
- Water, sanitation, and hygiene related diseases kill nearly 1 million people each year.
- 160 million children suffer from stunting and chronic malnutrition linked to water and sanitation.
- Diarrhoea is the 3rd leading cause of child death, a majority of which are water-related.
- About 240 million people are affected by schistosomiasis – an acute and chronic disease caused by parasitic worms contracted through exposure to infected water.
- Dengue infects 50 to 528 million people worldwide a year, leading to half a million hospitalizations, and approximately 20,000 deaths


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**Indian Stats**

- In India, > 1,00,000 people die of water-borne diseases annually – United Nations Report
- Groundwater in one-third of India’s 600 districts is not fit for drinking as the concentration of fluoride, iron, salinity, and arsenic exceeds the tolerance levels – United Nations Report
- India’s water quality is poor – it ranks 120th among the 122 nations in terms of quality of water available to its citizens – United Nations Report
- About 70% of India’s water supply, is seriously polluted with sewage effluents – World Resources Report

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**WAYS TO COMBAT**

- There are many methods to prevent and control waterborne diseases:
  - Waterborne diseases can be interrupted through proper treatment of water. Drinking water should always be treated through boiling / chlorination / potassium permanganate etc.
  - For water washed (water – scarce) diseases, interruption is achieved through effective sanitation, washing and personal hygiene. Regular washing of hands, especially after going to the toilet is the most effective measure. Hygiene during food preparation, waste disposal, and fly control is also necessary.
  - In case of water vector diseases, vector control is the ultimate solution. Use of mosquito repellents and / or mosquito nets is required. Water stagnation needs to be avoided.
  - Drinking water should be boiled for at least one minute before use.
  - Bottled water may not be always safer than tap water; therefore, one should always check the bottled label before drinking for manufacturing/expiry date.
  - To reduce the risk of fluorosis, filtered or distilled water (use of ion-exchange resins / activated alumina) should be used. De-fluoridation kit developed by CSIR – NEERI can also be used at domestic and community levels of water purification.
  - Raw food should never be eaten without proper washing.
  - Washing of hands using soap / hand sanitizer before and after food.
  - Hygienic practices to be adopted at personal level:
    - Washing of hands thoroughly every time after using the toilet, preferably by a push-pump soap dispenser which doesn’t allow bacteria to collect.
    - Always flush the toilet with the toilet lid down in order to reduce the spread of bacteria in the room.
    - Clean the toilet daily with a product specifically designed to reduce the spread of bacteria
    - Use of toilet seat sanitizer in places of common lavatory use.
    - Safe and proper disposal of feaces, diapers, and sanitary pads.