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**Forum:** GC3: Natural Sciences

**Issue:** Improving water sanitation to eliminate the spread of water borne diseases in rural areas with special emphasis on East Africa and Yemen

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**Position:** President Chair

## Introduction



Picture 1: A man collecting water from a contaminated source.

Over years, mankind experienced many viral and bacterial diseases. To prevent their devastating effects on civilians and the environment, scientists searched for ways to treat and cure the infected. This goal was achieved for numerous, yet experts are still trying to find the treatment for many other diseases. Some diseases can be transmitted through contaminated water, such diseases are referred as ‘water borne diseases’.

There are certain water borne diseases which possess the danger of possible outbreaks. Two of the most common water borne diseases are Cholera and Polio, which have been affecting humanity for decades. As medical technology and research accelerated, prevention methods for such diseases were found. In many cases, this treatment was ‘vaccination’. This improvement allowed humankind to take an important step towards preventing fatal water borne diseases such as cholera and polio.

Currently, there are approximately 790 million people around the world who do not have access to clean water. The most effective and core method of eliminating water borne diseases is to improve the water quality by providing effective water sanitation systems. Sanitation systems can be hard and expensive to provide, especially for post-conflict countries, which are countries experiencing a conflict such as a war or countries who do not have a stable or strong economy to fund such services. As such diseases are the results of the consumption of contaminated water, water sanitation is essential in the process of curing them.

Especially after the ongoing conflicts and wars in the Middle East and Africa, polio and cholera, two of the most common water borne diseases, were diagnosed and reported in various regions, especially in East Africa and Yemen. Unfortunately, many reports were of severe cases. As governments could not provide necessary vaccinations and treatment methods, their citizens got even more affected by the diseases. In addition to lack of treatment and vaccinations, governments could not prioritize sanitation services as the current nature of the state lead them to invest in other



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necessary aspects such as military, which lead to an acceleration in the number of severe cases of water borne diseases in the regions.

For many years, scientists have found ways to adapt themselves to tackle these diseases with the best way possible. However, due to recent conflicts, these diseases are still major problems for human health and the environment. Once again, the international community must combat possible outbreaks of such diseases and improved sanitation is the key for these operations as it is the most promising

## Definition of Key Terms

**Less Economically Developed Countries (LEDCs):** Countries who have less economic development and are usually known to have low standards of social services (health, education, etc. services).

**Contagious:** A disease is said to be contagious if it spreads from one living being to another.

**Sanitation:** The process of cleansing water from the harmful substances in it such as but not limited to harmful bacteria.

**Paralysis:** A physical shock that causes a person to lose the control of his/her certain body parts and makes that person unable to move those body parts.

**Immunity:** If a person has high immunity, it means that he/she will not be affected from a certain disease at all and that his/her body is strong against that particular illness. It is essential since some diseases do not have cures yet.

**Vaccine:** A kind of treatment for certain diseases that is usually applied with a syringe into an individual's immunity system. They make an individual immune to a certain disease and are the most effective way of treating preventable diseases. There are some required vaccinations of every country which are the most fundamental way of preventing the possible outbreaks of preventable diseases such as cholera and polio.

**Epidemic:** A disease that has spread to a large area in a certain period of time.

**Endemic:** A disease that is commonly found in a particular region, area or country.

**Pandemic:** A disease that has increased its effect immensely and is almost impossible to control or prevent its spreading.

**Contaminate:** To disturb the purity of a substance by imposing it to a poisonous or harmful component



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**Excretory System:** The system of an individual which is responsible for disposing waste and toxic products out of that person's body.

**Defecation:** It is the process in which excrement of an individual is thrown out of the body.

**Open Defecation:** When the defecation process does not take place in a toilet, but in an area which is not sterile nor hygienic such as bushes or open bodies of water.

## Background Information

### Most Common Water Borne Diseases:

#### Cholera:

Cholera is a disease caused by the bacterium *Vibrio cholerae*. It is mostly present in the contaminated water supplies and nutrients. The bacterium that causes cholera causes extreme diarrhea and pain and dehydrates the victim which can even result in death. It is a fatal disease but can be treated easily under proper circumstances. It is almost always transported via food and water supplies so consuming clean nutrients is the easiest way to avoid getting cholera.

Cholera has been troubling humankind for many years and it is, in fact, a treatable disease. However, due to the fact that dehydration happens quickly, a dehydrated individual can die even before he/she realizes that he/she was diagnosed with cholera. As diarrhea is a common symptom of many diseases, people can ignore it and be reckless towards the symptoms of cholera in general. There are available vaccinations to gain immunity against cholera and they are important if one wishes to avoid being infected. However, supplying clean water is as much important as vaccinations as contaminated water is the primary way cholera spreads.

The World Health Organization (WHO) has taken many initiatives against Cholera. The most significant of those initiatives is forming 'The Global Task Force on Cholera Control (GTFCC)'. This task force has the purpose of bringing countries and partners with a common goal of eradicating cholera and the goal of reducing the amount of cholera cases by more than 90% until 2030.

Cholera is mostly common in war zones or LEDCs that have poor living conditions. In such places, access to fresh water is limited, and they are not provided with proper sewage systems which results in water getting contaminated. Thus, people get easily infected and cholera threatens the entire population living in mentioned places. In fact, the world's cholera map and the poverty map are almost similar which highlights the importance of clean water as in LEDCs, the water sources are most likely to be contaminated. This results in an evident increase in the amount of cholera cases and links poverty with cholera on the base of water quality.



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## Polio:

Polio is a viral and highly contagious disease. It is caused by a virus and is mostly seen in 0-5 year-olds. Polio usually spreads through the organs of excretory system of an infected person which enters the body through contaminated nutrients or water. Even though it is highly rare, in more serious cases the virus invades the nervous system which results in paralysis and even death. It is a serious disease as even though some patients are recovered from polio, the effects are visible throughout the individual's life.

Due to ongoing conflicts and wars, similar to cholera, the effects and amount of polio cases have increased excessively. This outpour of polio was also triggered by the fact that limited vaccination resources, which are essential for preventing, were provided in necessary regions. Even though polio was seen to be cured after its vaccination was found, the increase in the amount of polio cases worried scientists and put them in a position in which they had to find ways to combat the possible outbreaks of such diseases.

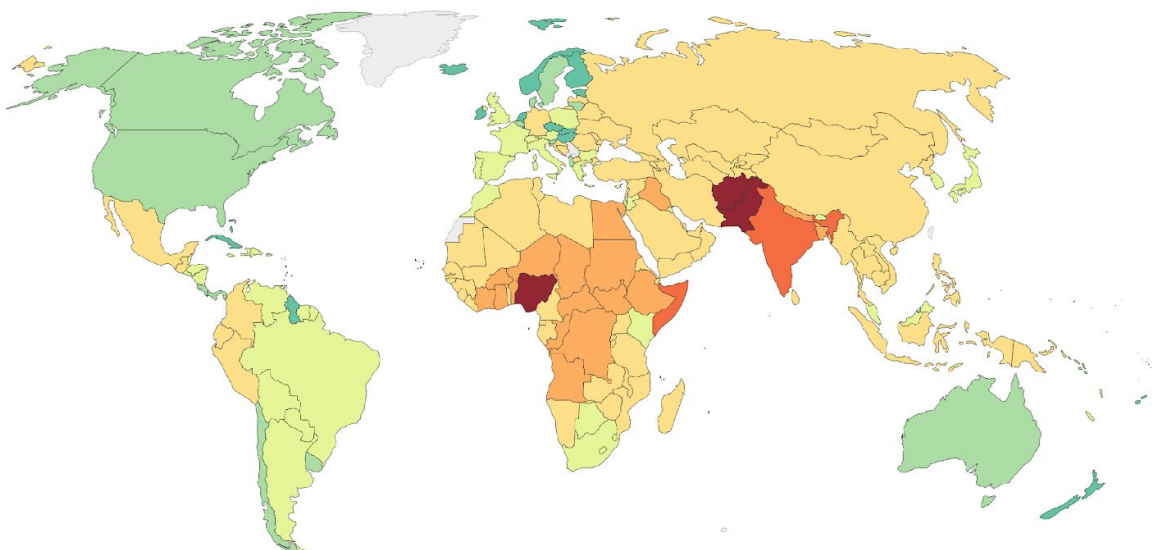
As it can be seen from the map below, while some countries eradicated polio within their borders many decades ago, some are still struggling to deal with the effects of it. In addition, even though some eradicated polio this decade, they still possess the possibility of hosting polio if environmental conditions and/or the quality of their government's health services change.

Frankly, every nation has this possible threat, as it takes only one infected person to travel to a country and infect a nation which had already eradicated polio. This emphasizes the fact that collaboration is the key to eradicating such diseases as well as preventing possible outbreaks. This also shows that the possible outbreaks do not necessarily have to be within endemic countries, and that they can happen anywhere in the world, even in a polio-free country. Every child is in danger of getting polio, even if only one child remains affected.

## The decade of the last recorded case of paralytic polio by country

Shown is when the last case of wild-type polio was recorded. It remains endemic in three countries today.

Our World  
in Data





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## **Typhoid Fever:**

Typhoid fever is a severe disease that is caused by the bacteria called *Ucrw qpgmrc 'ugt qv{rg'V{rj k0'*. The deposited bacteria in water and food sources is the main reason as to why people get infected from this disease. More than 21 million individuals suffer from this disease annually and it is most commonly seen in areas where water quality is low and sanitation services are inadequate.

In this disease, bacteria first invade the small intestine and then transfers to veins and therefore the bloodstream from which they find themselves a path to liver, spleen and bone marrow. After they enter the mentioned organs, they multiply in large numbers and they go back into the bloodstream, after which the body starts to show the symptoms of the disease.

Headaches are the most significant symptoms of this disease along with extreme fever. However, treatment of this disease is available in the version of antibiotics and the process towards eliminating this disease is accelerating. However, as contaminated water is the primary way of spreading for the bacteria that causes this disease, sanitation is the solution that would eliminate this disease once and for all. As antibiotics cure an individual but do not eliminate the bacteria in that individual's body, that individual becomes a carrier for that particular bacteria and therefore still cause the spreading of it. That's why, antibiotics are seen as temporary solutions, for the international community, and sanitation to be a more precise and effective one.

## **Diarrhea:**

Diarrhea is seen to be a simple disease that can occur at any time and can be treated very easily. However, in some cases, diarrhea causes deaths and possess a great threat to the well-being of many individuals. If an individual does not consume enough water and also experiences diarrhea at the same time, dehydration may occur which can even lead to death after some time. As access to fresh water is limited in East Africa and Yemen, when an individual experiences diarrhea, the chances of getting dehydrated is very high and that's why diarrhea is actually a fatal disease in the parts of world where sanitation services lack adequate quality.

## **Sustainable Development Goal 6:**

Sustainable Development Goal 6 is the goal that covers the aspect of water borne diseases as it refers to clean water and sanitation. As the aim of this SDG is to achieve a future in which contaminated water is not consumed and quality sanitation facilities provide clean water, SDG 6 needs to be taken into consideration while tackling the issue of improving water sanitation with the aim of preventing water borne diseases since contaminated water sources are a major threat to the wellbeing and good health individuals. The improvements in



Picture 3: Sustainable Development Goal 6



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sanitation facilities should generate will also contribute to this sustainable development goal as the issue at hand it parallel to it.

This goal was created as so many countries were suffering from water borne diseases. Since adopting this goal, nations have thrived to improve the water sanitation in their borders and there were many accomplishments and improvements in terms of sanitation for a few years. As contaminated water affects the economy and sustainability of a region, this sustainable development goal should be taken into consideration if those are wished to be achieved in East Africa and Yemen.

## **Water, Sanitation and Hygiene (WASH):**

Water, sanitation and hygiene, shortly known as WASH, is a collective initiative that has the aim of improving water and sanitation quality, as well as hygiene in regions where they lack. As access to clean water and sanitation was seen to be a human right by the General Assembly in 2010, this initiative thrives to improve water and sanitation quality. According to World Health Organization (WHO), half of the child malnutrition is caused by the consumption of contaminated water and every year almost 840.000 people die from the same reason.

### **Water:**

As the primary and most effective way of transportation of water borne diseases, water is the most essential component that should be focused upon while eliminating water borne diseases. As most of the living beings depend on water, it is extremely crucial and also vital to provide clean and accessible water for all.

### **Sanitation:**

As it was outlined in the definition of Key Terms section, sanitation is simply defined as the process of cleansing water from the harmful substances in it such as but not limited to harmful bacteria. 2008 was declared to be the International Year for Sanitation as the water borne diseases increased their effect immensely and necessary sanitation services were of vital importance.

### **Hygiene:**

The last component of the WASH initiative is hygiene. Hygiene is very essential in this process as after the sanitation of water, it can easily get contaminated once more and this situation can only be prevented if the hygiene standards of a region is increased. This is also the case with water borne diseases as they hold the possibility of re-occurring once they are eliminated. That's why the issue on hand does not only relate to water quality and sanitation, but also to hygiene.

### **Open Defecation:**

Open defecation is when people who do not have access to a toilet and therefore needs to defecate in somewhere else such as bushes, open bodies of water, etc. Not only it is a huge threat in terms of



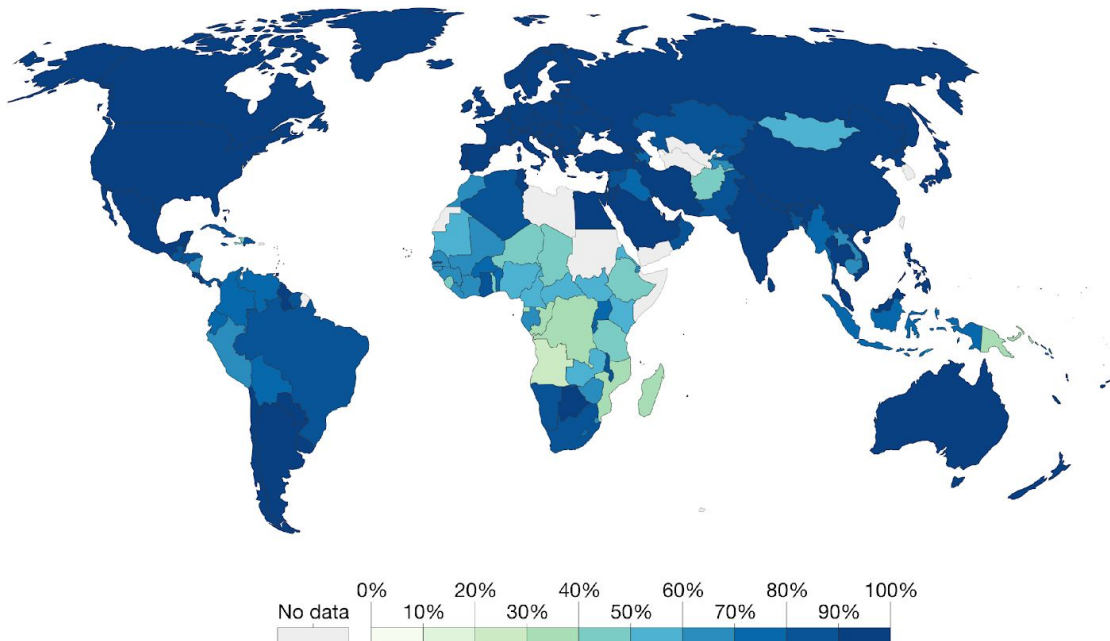
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hygiene to many people, it also causes open bodies of water to get infected and therefore host water borne diseases. In addition to that, while open defecating, people are open for any attacks from animals such as snakes or other people which makes this practice more dangerous than it already is. Furthermore, in some cases, people in poor conditions such as wars or in post-conflict zones are consuming defecated water as they cannot find any adequate water supply. There are approximately 892 million deaths around the world due to defecation every year which further emphasizes the severity of the problem.

## Access to Clean Water:

### Share of rural population with access to improved water sources, 2015

Access to an improved water source, rural, refers to the percentage of the rural population using an improved drinking water source. The improved drinking water source includes piped water on premises (piped household water connection located inside the user's dwelling, plot or yard), and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection).



Picture 4: Map showing the distribution of improved water sources.

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As it can be seen from the map above, the percentage of access to improved water varies from one country to another. Many countries, especially the ones located in Africa and Middle East do not have access to such quality water sources. This is primarily caused by the difference in the quality of their countries' water sanitation systems. Less Economically Developed Countries (LEDCs) who do not have enough funds to build proper sanitation facilities struggle the most while providing clean water to their citizens. As previously stated, water borne diseases are spread through contaminated water sources. Since the sanitation quality differ among states, water borne diseases are still found in particular parts of the world. Lower quality sanitation increases the possibility of the



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spreading of the water borne diseases and therefore are significant to prevent their harmful effects, most significantly being death.

## Timeline of Major Events

1820	After the first outbreak of cholera in India, the first major outbreak happens in Thailand and results with approximately 100.000 deaths, becoming the first pandemic.
1829	Second pandemic of cholera reaches Europe, and both North and South America, causing worries as it spreads overseas.
1852	The third and deadliest epidemic affects the whole world.
1855-1860	The first sewer systems in United States are built.
1894	Moritz Traube, a German scientist, put <i>Vibrio cholerae</i> as the cause of cholera.
1854	During the third pandemic, in United Kingdom, it is discovered that cholera is spreading through contaminated water.
1883	<i>Vibrio cholerae</i> , which is the bacterium that causes cholera, is identified.
1892	The development of the cholera vaccination by a Russian scientist, Waldemar Haffkine.
June 17 <sup>th</sup> , 1894	The first epidemic of polio in United States kills 18 people and paralyzes 132.
1905	The disease (polio) is discovered to be contagious.
1908	Polio is identified.





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1952	Dr. Jonas Salk started testing the polio vaccine he developed on his family and ran tests about the efficiency of his discovery.
1981-1990	UNICEF-WHO Joint Monitoring Programme on water quality, sanitation and hygiene is put into practice on a regional, national and international scale with the aim of surveilling water, sanitation and hygiene (WASH).
1988	In 1988, there were more than 120 countries that were polio epidemic.
1990	UNICEF-WHO Joint Monitoring Programme on water quality, sanitation and hygiene is put into practice on a regional, national and international scale with the aim of surveilling water, sanitation and hygiene (WASH).
2001	World Toilet Organization is established with the aim of improving toilet conditions as well as sanitation quality.
2003	The report on the polio epidemic countries is released, reporting that there were only 6 countries who were polio epidemic.
2008	Prime Minister of India used a quote from Mahatma Gandhi, saying 'Sanitation is more important than independence.'
28 July 2010	Right to Water and Sanitation is decided to be a human right by the General Assembly.
2015	Sustainable Development Goals, SDGs, are established which included 'Clean Water and Sanitation' as goal number 6.
2018	Only three countries remain polio endemic: Afghanistan, Nigeria and Pakistan.

## Major Countries and Organizations Involved

### Yemen:

Currently, Yemen experiences the biggest and the worst cholera outbreak in the world. According to reports, there have been more than 10,000 cases of cholera per week which is an extreme number that threatens its citizens. Due



Picture 5: Boy trying to carry water to his family



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to the economic crisis, the government of Yemen failed to pay the salaries of workers in sanitation centers which resulted in them refusing to work. In addition, due to damages on water sanitation facilities as a result of the war - specifically air strikes, providing clean water became much more difficult for the government. Thus, the consumption of contaminated water caused cholera outbreaks. All in all, due to the lack of medical and sanitary services, Yemen is currently suffering from the biggest outbreak of cholera. Moreover, even though Yemen eradicated polio within its borders before, it got re-infected in 2005, which makes Yemen a country which has both cholera and polio, two of the most common preventable diseases.

## World Health Organization (WHO):

WHO is the leading United Nations (UN) agency that focuses specifically on health which is why it plays a significant role upon all the agenda items concerning health issues. It gathers all of the information about preventable diseases and leads the researches and experiments which are aimed to find measures to prevent them. Assistance by WHO is fundamental to find measures to fight the possible outbreaks of preventable diseases. It has the proper knowledge and funds to assist countries while taking these measures. In other words, it will act as a binding power between countries for them to work collaboratively.



Picture 6: Logo of WHO

## Democratic Republic of the Congo (DR Congo):

DR Congo currently experiences Vaccine-Derived Poliovirus Type 2 (cVDPV2) within its borders which has already led to three major outbreaks of polio in the nation. The first outbreak occurred in early 2017, the second in late 2017 and the third in early 2018. These dates emphasize how recent these outbreaks were. Due to the threat these outbreaks possessed, the government even announced this virus as a public health emergency.

In addition, DR Congo is suffering from an immense outbreak of cholera. Since the beginning of 2018, cholera has taken over 800 lives in DR Congo and could be seen on more than 25.000 people. In 2017, it killed more than 1000 people and over 50.000 cases of cholera were reported.

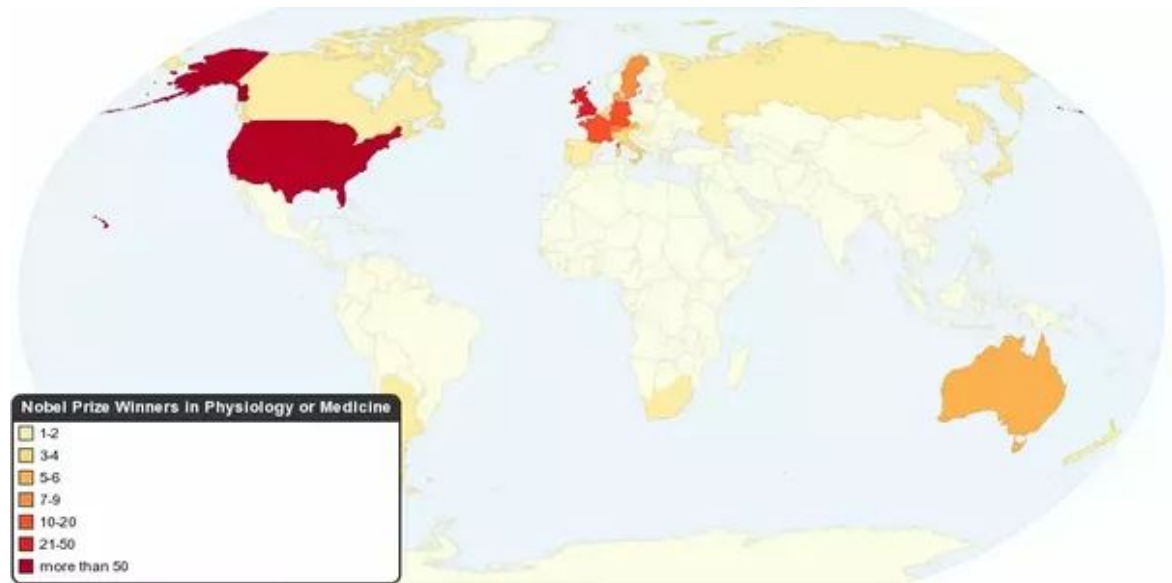
## United States of America:

Even though USA does not have many reported cases of such preventable diseases, authorities from USA should prioritize their investments upon these diseases before many more get affected all around the world. In fact, USA has been one of the best countries in health facilities and medicine. They have won the most amount of Nobel Prizes for



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medicine as it can be viewed from the map below. That is why they are expected to lead the researches and experiments upon preventable diseases to increase the efficiency of the process of finding ways to combat possible outbreaks of such diseases.



Picture 7: Map showing the distribution of Nobel Prizes for medicine.

## United Nations International Children's Emergency Fund (UNICEF):

UNICEF, along with WHO, started the water, sanitation and hygiene (WASH) initiative to improve the water quality in regions where water borne, and water transmitted diseases are common. As children who have less developed and weaker immune systems are getting affected by such diseases in a drastic way, UNICEF decided to start this initiative to improve the living conditions of children by providing them access to fresh water sources. As this initiative directly involved the improvement of sanitation services, UNICEF contributes to the elimination of water borne diseases and therefore can assist countries while implementing the WASH initiative in their own borders.

## UN Water:

United Nations Water is the United Nations' leading agency for water quality and sanitation which makes it extremely relevant for the issue at hand. It provides extensive reports regarding the improvements towards Sustainable Development Goal 6. As they have the adequate surveillance and funds in terms of water, their contributions is essential as the leading agency of UN.

## Previous Attempts to Solve the Issue

As water borne diseases are not present in every country nowadays, there are no current



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conventions and treaties upon those diseases. However, there were some conventions and treaties that were signed when these diseases were affecting almost every nation. Even though they are outdated, these documents themselves have possible solutions that can be implemented today.

## [International Sanitary Convention on Cholera and The Plague](#)

Many countries gathered in this convention in order to find ways to prevent the spreading of cholera when it first began to appear. They found measures to slow down cholera's spreading; however, as the disease increased its effect since this convention, every nation needs to focus on finding more solutions. Therefore, an updated version of this convention is a strong possible solution for this issue.

## [Global eradication of poliomyelitis by the year 2000 \(WHA41.28\)](#)

This is the resolution which was submitted to the World Health Assembly in 1988 in order to set a goal to eradicate polio for good by the year of 2000. Nevertheless, they did not succeed due to the rapid spreading of polio. In addition, the lack of medical technology and poor life conditions increased the spreading of polio, especially in LEDCs which prevented the eradication of polio.

## **Possible Solutions**

First of all, while taking measures to improve the water sanitation with the aim of eliminating water borne diseases, governments should bear in mind that assistance of WHO is fundamental and it would increase the effectiveness of the process due to their medical knowledge and global surveillance system. Summits among UN member states can be organized with the help of WHO with the aim of discussing upon the sanitation processes and how to use them while eliminating water borne diseases.

Moreover, raising awareness by any means, such as but not limited to public health announcements, brochures, billboards and education given to both children and adults, would increase the public's knowledge about these diseases, and thus, will guide them to take necessary measures against them and/or go to the nearest community clinic/hospital if they think they are affected. Raising awareness is needed in order to address the importance of sanitations while preventing these diseases.

Financial support to research institutions and scientists for their experiments upon the subject is also important. By this support, scientists as well as engineers can work on ways to develop already existing sanitation systems and even create new and more efficient ones. This financial support can be given to LEDCs too for them to improve health care in their borders. Opening local health centers in the region is also essential since the medical attention in such areas is insufficient. By providing health care or even information to citizens, the spreading of these diseases in LEDCs can be slowed down. In this process what is expected from More Economically Developed Countries



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(MEDCs) is their financial and moral support for LEDCs. Financial support is also essential for the building of the water sanitation facilities and in addition to that, forming a group or an organization with the responsibility of regulating such facilities would increase their sustainable quality.

However, the most fundamental measure to eliminate these diseases is the adjustments of government policies to improve the efficiency of their initiatives and government perspectives towards water borne diseases as it will be the base of every other possible solution. Commitment is the key for the eradication of such diseases.

## Useful Links For Further Research

How war brought cholera and polio back to the Middle East

([https://www.washingtonpost.com/news/worldviews/wp/2017/06/21/how-war-brought-cholera-and-polio-back-to-the-middle-east/?noredirect=on&utm\\_term=.3385d008cf1f](https://www.washingtonpost.com/news/worldviews/wp/2017/06/21/how-war-brought-cholera-and-polio-back-to-the-middle-east/?noredirect=on&utm_term=.3385d008cf1f))

Water Borne Diseases- Types and Information

(<https://www.disabled-world.com/health/water-diseases.php>)

Water Borne Diseases Fact Sheet

(<http://www.waterwise.co.za/site/water/diseases/waterborne.html>)

Water, Sanitation, Hygiene (WASH)

([https://www.who.int/water\\_sanitation\\_health/diseases-risks/en/](https://www.who.int/water_sanitation_health/diseases-risks/en/))

## Bibliography

WpkeghlKfkc, unicef.in/whatwedo/11/eliminate-open-defecation.

“About WASH.” WPKEGH, 10 Apr. 2016, [www.unicef.org/wash/3942\\_3952.html](http://www.unicef.org/wash/3942_3952.html).

“Diarrhea - Why It Happens and How to Treat It Using Medications and Diet.” YgdOF,

WebMD, [www.webmd.com/digestive-disorders/digestive-diseases-diarrhea#2](http://www.webmd.com/digestive-disorders/digestive-diseases-diarrhea#2).

“Diseases and Risks.” Yqtrf "J gcnj "Qti cpl/ cvkqp, World Health Organization, 31 Jan.

2019, [www.who.int/water\\_sanitation\\_health/diseases-risks/en/](http://www.who.int/water_sanitation_health/diseases-risks/en/).

“Goal 6 .. Sustainable Development Knowledge Platform.” Wpkxf "Pc vkqpu, United Nations, [sustainabledevelopment.un.org/sdg6](http://sustainabledevelopment.un.org/sdg6).

“Launch of the SDG 6 Public Dialogue Report.” WP/Y cvgt, 31 Jan. 2019,

[www.unwater.org/launch-of-the-sdg-6-public-dialogue-report/](http://www.unwater.org/launch-of-the-sdg-6-public-dialogue-report/).

“Timeline of Sanitation.” Vko grkpg"qhUr qvkh " "Vko grkpgu,

[timelines.issarice.com/wiki/Timeline\\_of\\_sanitation](http://timelines.issarice.com/wiki/Timeline_of_sanitation).



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- “Typhoid Fever Causes, Symptoms, Treatment and Vaccine.” *Y gdOF*, WebMD, [www.webmd.com/a-to-z-guides/typhoid-fever#2](http://www.webmd.com/a-to-z-guides/typhoid-fever#2).
- “Water, Sanitation and Hygiene.” *WP/Y cvgt*, [www.unwater.org/water-facts/water-sanitation-and-hygiene/](http://www.unwater.org/water-facts/water-sanitation-and-hygiene/).
- “Waterborne Diseases Factsheet.” *Y cvgt 'Y kug' 'Uwduwpegu'Ecwukpi 'Rqmwkqp'kp'Tkxgt u*, [www.waterwise.co.za/site/water/diseases/waterborne.html](http://www.waterwise.co.za/site/water/diseases/waterborne.html).
- Weiss, Thomas C. “Water-Borne Diseases: Types and Information.” *F kucdrxf 'Y qtrf*, Disabled World, 2 Sept. 2018, [www.disabled-world.com/health/water-diseases.php](http://www.disabled-world.com/health/water-diseases.php).
- Vko grkpg'qhl'Ej qrgt c*, [ipfs.io/ipfs/QmXoypizjW3WknFiJnKLWHCnL72vedxjQkDDP1mXWo6uco/wiki/Timeline\\_of\\_cholera.html](http://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLWHCnL72vedxjQkDDP1mXWo6uco/wiki/Timeline_of_cholera.html).
- “All Timelines Overview.” *Vko grkpg'-'J kwqt { 'qhl'Xceekpgu*, [www.historyofvaccines.org/timeline#EVT\\_101044](http://www.historyofvaccines.org/timeline#EVT_101044).
- “Cholera.” *Y gdOF*, WebMD, [www.webmd.com/a-to-z-guides/cholera-faq#1](http://www.webmd.com/a-to-z-guides/cholera-faq#1).
- “Cholera: Causes, Symptoms & Diagnosis.” *J gcnj rkp*, Healthline Media, [www.healthline.com/health/cholera](http://www.healthline.com/health/cholera).
- “Does Polio Still Exist? Is It Curable?” *Y qtrf 'J gcnj 'Qti cpk'cvkqp*, World Health Organization, 14 Mar. 2018, [www.who.int/features/qa/07/en/](http://www.who.int/features/qa/07/en/).
- “For Parents: Vaccines for Your Children.” *Egpygt u'lqt 'F kugcug'Eqpv qrl'cpf 'Rt gxgpkqp*, Centers for Disease Control and Prevention, 10 Nov. 2014, [www.cdc.gov/vaccines/parents/diseases/child/polio.html](http://www.cdc.gov/vaccines/parents/diseases/child/polio.html).
- “Global Health.” *Egpygt u'lqt 'F kugcug'Eqpv qrl'cpf 'Rt gxgpkqp*, Centers for Disease Control and Prevention, 25 July 2017, [www.cdc.gov/polio/about/](http://www.cdc.gov/polio/about/).
- “Homepage.” *I RGK* [polioeradication.org/](http://polioeradication.org/).
- Loveluck, Louisa. “How War Brought Cholera and Polio Back to the Middle East.” *Vj g' Y cij kpi vqp'Rquw*, WP Company, 21 June 2017, [www.washingtonpost.com/news/worldviews/wp/2017/06/21/how-war-brought-cholera-and-polio-back-to-the-middle-east/?noredirect=on&utm\\_term=.3385d008cf1f](http://www.washingtonpost.com/news/worldviews/wp/2017/06/21/how-war-brought-cholera-and-polio-back-to-the-middle-east/?noredirect=on&utm_term=.3385d008cf1f).
- “Partners in Eradicating Polio Timeline.” *J qo g*, [www.rotary.org/en/partners-eradicating-polio-timeline](http://www.rotary.org/en/partners-eradicating-polio-timeline).
- “What Is Polio?” *Gpf 'Rqtkq*, [www.endpolio.org/what-is-polio](http://www.endpolio.org/what-is-polio).
- “Cholera Outbreak: 175 Dead, over 10 000 Affected in Nigeria.” *Pgy u46*, 12 Nov. 2018, [www.news24.com/Africa/News/175-dead-over-10-000-affected-by-nigeria-cholera-outbre](http://www.news24.com/Africa/News/175-dead-over-10-000-affected-by-nigeria-cholera-outbre)



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“Circulating Vaccine-Derived Poliovirus Type 2 – Democratic Republic of the Congo.” *Y qtrif "J gcnj 'Qti cpk/cvkap*, World Health Organization, 10 July 2018, [www.who.int/csr/don/10-july-2018-polio-drc/en/](http://www.who.int/csr/don/10-july-2018-polio-drc/en/).

Afp. “Death Toll from DRC Cholera Outbreak at 857.” *Gf gy kpguul'Pgy u*, 14 Nov. 2018, [ewn.co.za/2018/11/14/death-toll-from-dr-congo-cholera-outbreak-at-857](http://ewn.co.za/2018/11/14/death-toll-from-dr-congo-cholera-outbreak-at-857).