

COVID-19 Effect on The Environment

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Chapter 1: Introduction

COVID-19 was discovered in late December of 2019 with cases in Wuhan, China. This was later identified as a coronavirus (crown virus) or SARS-COV2.

The outbreak of coronavirus disease-2019 (COVID-19) first emerged at the end of December 2019, from the Hunan seafood market in Wuhan City, China, and was declared an international public health emergency in a couple of weeks by the World Health Organization (WHO, 2020a). It is an infectious disease caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) (Rume, 2020)

COVID-19 causes respiratory and flu-like systems in the beginning. Today the virus has mutated multiple times creating many variations with different transmission rates. Some strains are less transmissible but can cause long-term side effects or death.

According to the CDC, “COVID-19 is a respiratory disease caused by SARS-CoV-2, a coronavirus discovered in 2019. The virus spreads mainly from person to person through respiratory droplets produced when an infected person coughs, sneezes, or talks. Some people who are infected may not have symptoms. For people who have symptoms, illness can range from mild to severe.” (CDC, 2022)

In the last 3 years of the pandemic the environment has changed drastically. The carbon footprint has been able to decrease with emissions and cleaner water. Places like China and Italy have seen a positive impact from the lack of travel and manufacturing. Waterways have been found to be cleaner and less connected with tourism.

Another unexpected environmental impact of coronavirus has been observed in Venice, Italy. As the tourist’s numbers culled due to the coronavirus, the waters in Venice’s canals are cleaner compared to the past. While motorboats, sediment churning and the water pollutants have dropped efficiently, residents got amazed by seeing the clear water and the fish could be seen once again in the canals. (Saadat, 2020)

Showing promise that the pandemic could help society see how much damage has been done but can be reversed if greenhouse gas admission, manufacturing, agriculture, travel, transportation, etc. could be halted or limited.

With the positive comes the negative aspect of the pandemic. This was a trying time for the entirety of civilization with the economy, penitent up demand, and uncertain future. No wonder recycling when to the wayside, focusing on the present and not the future. Plastic impacts the environment because it doesn’t decompose in landfills. Some plastics can take 20 to 500 years to biodegrade, but that depends on the type of materials and structure of the plastic that was used. Also, sun exposure plays a decent part in

breaking down plastic, but in landfills, there are multiple layers of waste that it is impossible for the sun to penetrate to the final layer.

Shifting the safety issue to the forefront, the COVID-19 pandemic has also revealed a few, somewhat inconvenient, consumer misconceptions on how the virus is transmitted on different materials, firing an unsubstantiated trust in the use plastic packaging to protect them. These misconceptions have tactfully been exploited by lobbying groups and the plastic industry, who using anecdotal evidence that the virus might be lurking on the surface of the single-use plastics, they discouraged the reuse of the plastic bags and/or packages, and instead encouraged their disposal. (Ebner, 2021)

Plastic and PPE (personal protective equipment) waste has been such a major impact on the environment. All COVID-19 byproducts like masks, gloves, and face shields have severely impacted ecosystems such as waterways and oceans. The waste ends up in river systems that cause displacement for living creatures such as fish and wildlife.

Among the environmental problems of the 21st century, waste production and management are particularly pressing. Despite policy efforts, waste volumes are still increasing worldwide and landfilling remains the main disposal option in several parts of the world. Together with the huge environmental impacts of the large amounts of waste landfilled, it would be possible to save enormous amounts of resources improving reuse and recycle options. The impact of the COVID-19 outbreak has been significant also in the waste cycle, leading to an increase in the amount of non-recyclable consumption in response to sanitary needs, as well as to new consumption practices. (Argentiero, 2022)

Hopefully soon, this issue will have more incentives not to improperly dispose of medical and PPE waste. Also, with the heightened workforce and need for recycling, these issues will have solutions. Plastic has had a lasting effect since the 1950s, and future generations can reverse our past.

Background

The research shows the conflict between how COVID-19 has impacted the environment in a positive and negative manner. Do the pros of less carbon emission outweigh the cons of lack of recycling and increased PPE/plastic waste? The pandemic gave the whole world a different perspective and allowed people to realize this can happen even with medical advances. This won't be the last of these types of zoonotic diseases.

Chapter 2: Literature Review

As of March 2020, COVID-19 has been declared a pandemic and is spreading the globe with millions of cases each day. With the lockdowns and curfews, there was a positive effect on the environment due to human inactivity. With the reduction of fossil fuels, restrictions on factio and economic activities due to travel restrictions, business, and quarantine. These factors slowed the global economy, decreased fossil

fuel use and natural resources reduction, and put limits on waste disposal. They allowed less air, water, and land pollution in many parts. In 2022, greenhouse gas emissions were significantly lower, well below Paris Agreement's regulations mentioning climate change. On the other hand, these articles will investigate the adverse effects on the water supply and natural resources for life on this planet. This shows that transportation and everyday human activity had significant impact on the earth.

Has COVID-19 affected the environment, and what is the connection? Since this is a very new study within the last 3 years, the direct evidence for climate change and environmental research connection to COVID-19 is in its infancy. Researchers are also looking into the possibility of the spread of COVID-19 due to climate change.

Climate change is when the planet heats up, and small to large animals leave their usual habitat on land or sea. These animals either relocate to a moderate climate that suits their needs or die. The hypothesis from Harvard University is that "That means animals are coming into contact with other animals they normally wouldn't, and that creates an opportunity for pathogens to get into new hosts." according to Dr. Aaron Bernstein, Director of Harvard Chan C-CHANGE.

Many of the root causes of climate change also increase the risk of pandemics. Deforestation, which occurs mostly for agricultural purposes, is the largest cause of habitat loss worldwide. Loss of habitat forces animals to migrate and potentially contact other animals or people and share germs. Large livestock farms can also serve as a source for spillover of infections from animals to people. Less demand for animal meat and more sustainable animal husbandry could decrease emerging infectious disease risk and lower greenhouse gas emissions. (Bernstein, 2020)

Not only does climate change connect to COVID-19, but so does the production of greenhouse gases and PPE (Personal Protective Equipment) wastes. The decline of greenhouse gases is due to the lack of transportation, shipping, mining for raw materials, production of products, commuting, airline travel, cruise ship travel, and various other ways of creating greenhouse gas admissions, such as CO₂.

Probably the environment is the only sector that got an immensely positive impact from this COVID-19 scenario. International energy agency reported that global coal use was 8% lower in the first quarter in 2020. Due to the Locked down, transport, industry, and all non-essential sectors were closed, which reduced emission significantly. (Nundy, 2021)

With this drastic decrease in admissions, air quality has significantly decreased. Venice, Italy, showed the clearing of the waterways, and smog fell from San Francisco to San Diego, according to the EPA (the United States Environmental Protection Agency).

This pandemic has helped the nature in rejuvenating itself. Rivers are clean and skies are clearer. A study on the outbreak of SARS reported that the mortality rate in China's most air polluted areas was twice as high as in the least polluted ones [41]. The pathogens along with pollutants can

form a strong bond, which might help them to stay intact in atmosphere for long duration and gives them an easy way to enter into the human body. (Kumar, 2021)

With these declines, there was an increase in PPE waste due to the CDC (Centers for Disease Control and Prevention) mandates.

The relationships between the environment and COVID-19, the factors that caused the virulence of the respiratory disease, the measures to control the pandemic and the future impacts associated with the disease, are issues that need to be well understood scientifically. This article aims to synthesize key topics about the environment and COVID-19, thus providing recommendations for future epidemic threats. These may be useful for government decision-makers and researchers. (Espejo, 2020)

These mandates of masks in public places such as supermarkets lead to PPE waste pollution. People would dispose of gloves, shoes, and other PPE in parking lots, parks, and any public place where people need to be within 6 feet of each other.

This shows a lack of care from humanity. The gloves in waterways, masks lying on the ground while walking in a supermarket, and bottles of hand sanitizer scattered. It has been a tough few years, but these seemingly minor wastes will impact more significantly, such as ending up in a fish instance. This fish could be fished in the future and then ingested, but a human or animal creates a circle. No one wants to know if they are eating plastic or harmful waste. Also, these wastes are harming the habitats of natural species and killing or inhibiting plants, animals, or bugs from reproducing due to habitat destruction. As humans, there needs to be more thought behind improperly disposing of PPE materials.

Environmental economics studies the impact on ecological systems and the environment stemming from economics. The main focuses are the monetary value of the environment and the benefits of political economics. Economics studies the world's markets' functions and how they incentivize people, businesses, politics, and institutional behaviors. Within this structure, the environment and natural resources have been at the blunt end of the world's economies. Natural resources economics are one of the principles of world development, such as fossil fuels and gold—environmental economics studies how much these elements are needed and the impact globally.

According to the EPA, economic research is essential for developing environmental policies. The EPA makes strategies and research objectives in the United States by peer-reviewing policies by an Advisory Board. The five objectives behind the design are human health, ecological impact, environmental behaviors, market incentives, and environmental benefits. Listing these objective strategies will require sound research and data.

Economists can influence environmental policy in so many different aspects by advocating using a particular natural resource to achieve a better environmental outcome through data, research, and policymakers and by analyzing the benefits and costs of regulations and standards supported by scientific research and development. Research how policies are made by examining the data behind the political economy of environmental law. Each of these approaches could impact a different branch of government.

The toll that COVID-19 has had on the economy has been devastating. The global GDP (Gross Domestic Product) has fallen significantly. Each wave and shutdown have moved the economy back another step. The recovery has been prolonged by increased inflation and a lack of consumer goods.

Due to this stall in the economy, this has been a breather of the environment. As industry stopped, this gave the environment a little healing time and allowed people to see our effect on the planet. Yes, this has done crippling damage to GDP, jobs growth, industry, globalization, society, education, and so much more. This breather should reflect on creating new ways of decreasing our footprint on the world, investing in green renewable energy, and thinking of cleaner sourcing of raw materials. This could be the future of the economy after COVID-19.

This literature review shows the effect of COVID-19 on the environment and everything connected. They offer the pros and cons of how this pandemic has impacted many aspects, such as the economy, education, society, and other elements. These studies are still in their infancy stages, but there will be a long-term effect on how the environment will be impacted. Hopefully, these studies will show a positive outcome in this bleak time.

Chapter 3: Methods

Introduction: Interviews from 2022 and podcast

The data collection was done by reviewing peer-reviewed journals and interviews. The code has been listed in each interview a consultation:

Key:

General: Light Blue

Background Answers: Green

Climate Change: Yellow

Climate/ Environment Change and COVID: Red

COVID Answers: Pink

The benefits were getting a perspective from a different opinion than my own and understanding how others felt about the topic. The drawback was that people were opinionated and thought their viewpoint was correct. All the interviewees believed in global warming and climate change, which made the interview easy. The hypotheses would be more diverse if I had more time and a bigger sample size.

Selection criteria

I took a sample size of people in the age group of 29 to 32 from Orange Country, New York. This is a minimal sample size for this kind of research. My findings are interesting in my second interview with Staci from the first interview sessions. Some of the results have deviated from the original discussion. Also, the interview turned into a podcast and became organic with the hour and half-conversation.

Search terms

COVID-19, pandemic, environment, sample size, hypotheses, interviewees, methods

Data collection and analysis methods: Interviews/podcast

All the interviewees had different personalities and backgrounds, such as education levels and careers. Also, how they were involved with the COVID-19 pandemic. Inserted below are the interview questions and responses from all 4 subjects. With one of the subjects, we turned an interview into a podcast. This was a fun, creative out for the research. Her background as a first responder really gave some extra influence to this capstone. It helps with some of the hard reading for reference since this is mainly based on others' research. Also, adding some personality to the paper.

Subject: Dennis Deuerline

Date: 4/23/2022

1. Ask for a reasonable time frame from the interviewee?
➤ 45 minutes to 1 hour
2. Ask the interviewee if they have any questions about the interview?
➤ He asked about the context and how many people have I interviewed before?
3. What is your career?
➤ Groundskeeper at Suffern High School
4. What is your age?
➤ 32
5. What is your educational background?
➤ High School regions diploma
6. What is your background?
➤ Mostly custodial and landscaping
7. What is ethnicity or race?
➤ White; Caucasian
8. Where are you from?
➤ Tuxedo Park, NY
9. Are you aware of climate change?
➤ Yes, I mostly hear about it on the news or on podcasts (for example was, the Joe Rogan Podcast)
10. How has COVID-19 affected you?
➤ It has affected how I interact with people and I react around others. People are more sensitive and not willing to interact with each other. Keeping in a close-knit group has been my key to coping and keeping active outdoors.
11. Have you noticed any environmental changes since COVID-19 started?
➤ Yes, there have been way more hikers than average. People don't care about polluting and discarding their trash on trails. Finding these bottles, masks, and trash waste destroy the novelty of getting away from the stresses of COVID.
12. Has the COVID-19 pandemic changed how you treat the environment?
➤ Yes, I have been helping with cleaning up the trash whenever possible. I would hate to see the state parks like Harriman get destroyed.
13. Have you noticed an improvement or decline in how the environment changed?
➤ DECLINE! People don't care.
14. Have you noticed PPE pollution (gloves and masks)?
➤ Yes, people leave them everywhere on the trails, especially the face masks.
15. How do you feel about pollution, climate change, recycling, and renewable energies?
➤ It would happen no matter what, but I can only do my best to help in small ways.
16. What is your vision for the future after COVID-19 and the environmental changes?
➤ All I know is very unsure, but I hope it ends soon.

Subject: Sergio Camba

Date: 4/20/2022

1. Ask for a reasonable time frame from the interviewee?
➤ 1 hour
2. Ask the interviewee if they have any questions about the interview?
➤ He asked if there was some coffee
3. What is your career?
➤ Emergency Room Doctor
4. What is your age?
➤ 32
5. What is your educational background?
➤ Doctor Degree in Medicine, M.D.
6. What is your background?
➤ I'm originally from Mexico and immigrated to the United States to study medicine. I completed my education in Grenada.
7. What is ethnicity or race?
➤ Latino; Spanish
8. Where are you from?
➤ Puerto Vallarta, MX
9. Are you aware of climate change?
➤ Yes, of course!
10. How has COVID-19 affected you?
➤ Where do I start..... Mostly long hours in the emergency room, being on the front lines completing my residency. What a time to become a doctor, right?
11. Have you noticed any environmental changes since COVID-19 started?
➤ Yes and no, I can see all the clean air reports on the news, but I'm working all kinds of hours at the hospital that I don't have enough time to see in actual life.
12. Has the COVID-19 pandemic changed how you treat the environment?
➤ Yes! I never could think this stress could be natural. Wearing PPE 16 to 18 hours a day takes a toll on the mental aspect of taking care of patients.
13. Have you noticed an improvement or decline in how the environment changed?
➤ It seems to have gotten better when there was less traffic on the roads, and people left their houses more.
14. Have you noticed PPE pollution (gloves and masks)?
➤ Yes, I do see PPE in parking lots and sidewalks.
15. How do you feel about pollution, climate change, recycling, and renewable energies?
➤ I do my best to leave as small of a footprint as possible. Recycling responsibly is essential.
16. What is your vision for the future after COVID-19 and the environmental changes?
➤ This will change a lot of health care forever, and we need to find a new normal.

Subject: Sheila McCloud

Date: 4/21/2022

1. Ask for a reasonable time frame from the interviewee?
➤ 1 hour or over
2. Ask the interviewee if they have any questions about the interview?
➤ Where is this interview being submitted? And what is it used for?
3. What is your career?
➤ Warehouse receiver
4. What is your age?
➤ 30
5. What is your educational background?
➤ High School regions diploma
6. What is your background?
➤ I worked as a receiver from High School at Shoprite, and now I work for a pharmaceutical supply company
7. What is ethnicity or race?
➤ White
8. Where are you from?
➤ Cornwall, NY
9. Are you aware of climate change?
➤ Yes
10. How has COVID-19 affected you?
➤ Yes, working long shifts and getting COVID twice
11. Have you noticed any environmental changes since COVID-19 started?
➤ Yes, it seems the air is cleaner since people have been traveling less.
12. Has the COVID-19 pandemic changed how you treat the environment?
➤ I am much more aware of where I throw out my masks and gloves.
13. Have you noticed an improvement or decline in how the environment changed?
➤ It seems the air is cleaner, and less there is trash on the highway. But people don't care when they are in parking lots or just missing the trash can.
14. Have you noticed PPE pollution (gloves and masks)?
➤ Oh yes, I always see it in parking lots on the ground blowing everywhere.
15. How do you feel about pollution, climate change, recycling, and renewable energies?
➤ I know I am not the best, but recycling is critical in my house.
16. What is your vision for the future after COVID-19 and the environmental changes?
➤ This needs to end soon

Subject: Staci Kerdesky

Date: 4/19/2022

1. Ask for a reasonable time frame from the interviewee?
➤ No time, but if I get called, I need to leave. (On-call shift)
2. Ask the interviewee if they have any questions about the interview?
➤ How are you using these questions? Am I going to get tapeworm?
3. What is your career?
➤ Funeral Director
4. What is your age?
➤ 29
5. What is your educational background?
➤ BA in Kanji; AS in Mortuary Science
6. What is your background?
➤ I taught Japanese students English for three years in Japan. I've been an acting Funeral Director for two months. During the pandemic, I was completing my residency.
7. What is ethnicity or race?
➤ White and Middle Eastern
8. Where are you from?
➤ Wilkes-Barre, PA
9. Are you aware of climate change?
➤ Yes
10. How has COVID-19 affected you?
➤ Yes, picking up bodies due to COVID death and getting COVID. It wasn't the best time to make a career change.
11. Have you noticed any environmental changes since COVID-19 started?
➤ Yes, so much less traffic at the beginning of the Pandemic, but things seem more normal now.
12. Has the COVID-19 pandemic changed how you treat the environment?
➤ I've always been environmentally conscious, but it has heightened since.
13. Have you noticed an improvement or decline in how the environment changed?
➤ Both seemed to help when people were staying home at home. The background had a rest, but people were traveling much more. There is more trash on the side of the road.
14. Have you noticed PPE pollution (gloves and masks)?
➤ Most definably, people suck at throwing away their trash.
15. How do you feel about pollution, climate change, recycling, and renewable energies?
➤ It's so important! We need to try better; things need to change.
16. What is your vision for the future after COVID-19 and the environmental changes?
➤ I hope we find a new normal and no more peaking of COVID

Subject: Staci Kerdesky

Date: 12/14/2022

Podcast

The overall theme was COVID-19 and how it affected the funeral industry environment. Staci gives several points on how this and past pandemics have affected the environment. She provides a broad view not only from COVID-19 but the black death plagues from 1346 to 1353 and the Spanish flu in 1918. She shows a pattern in human nature with pandemics and the environment with some back-and-forth banter.

Podcasting was a fun, unexpected turn for this research, but the recording helps disprove my original hypothesis that the pandemic benefits the environment more. Staci has changed some of her outlooks and perspectives from the initial interview in April. It is fascinating how only a few months can change someone's opinion. As COVID-19 becomes more integrated into our lives, this is becoming the new normal. Hopefully, as a society, we aren't too late to fix the wrongful impact that has been committed against the environment.

Study quality and risk of bias

The age samples were all between 29 to 32, so that is a small sample size. They were getting interviews from the Baby Boomer, Gen Y, or Gen Z could have changed or altered the data samples. This sample was from a millennial perspective. All the subjects agreed on Climate Change. The variable was how they treated COVID-19 and how much they saw happening to the environment. All the issues state opinions from their perspective, but Dennis uses Joe Rogan to support his information. Podcasts can be a good source of information, but it depends on the qualifications. From my knowledge of Joe Rogan's Podcast, he is not qualified, but he interviews subjects with capabilities. He is still waiting on the Podcast number from Dennis to review more. I trust the subjects to give me the best possible information from their perspective, especially Sergio and Staci. They had the most on-hand interaction with the pandemic. The pattern is that they all believe in COVID-19, want it to stop, and believe climate change is happening.

Conclusion: a brief recap

I found that the subjects are tired of the COVID-19 pandemic and want what is best for the environment. It was interesting to talk about PPE pollution with Staci and Dennis. Sheila seemed numb to it, and Sergio was overworked due to the front line's call as a doctor. I did find it interesting that Staci and Sergio started careers heavily involved in the pandemic work and how

much it affected them. They rethought their career and education choices several times as we spoke after the interview. Dennis and Sheil loved it because they did not have to deal with people's stress but did not like the workload stress. Overall, this was an exciting group to sample.

Discussion from the podcast helped improve my understanding of first responders, COVID-19, and how this pandemic impacted almost forgotten industries, i.e., the funeral industry. The open dialogue with some bantering gave crucial insight into the direction of the paper and research that has been found—overall doctoring my original hypothesis in 2020 of the pandemic helping the environment more than negatively affecting it.

Chapter 4: Findings

With the research, the immediate cons of PPE, plastic, health, and other wastes will cause future issues that will last for decades to come. Unless this is taken care of by humanity. Solutions need to be executed, or the future will suffer from our consequences.

Reusable makes and PPE could help with taking the blow off the disposable latex and plastic materials used to manufacture these products. Using cleaner manufacturing, plastic is made from oil and does not biodegrade in most circumstances. Moving away from products such as these for PPE will help significantly. Creating a safe and responsible future for the next generation.

Chapter 5: Conclusions

Since December 2019, COVID-19 has impacted so many aspects of life and will forever change the world's landscape. The economy, supply chain, travel, transportation, manufacturing, agriculture, socializing, education, and so much more have been changed in the COVID-19 present. 3 years into the pandemic, the new normal has created a division in politics in multiple parts of the United States and the world. This has not helped with the environmental pollution from PPE and other COVID-related waste products. The division has slowed the progress of creating a positive impact on the environment.

In the near future, policies need to be revised to help the progress of recycling and influence reusable products that can biodegrade. Funding and research are needed to help come up with a resolution for all the miss-doings from COVID-19 waste disposal.

Creating clean green energy is needed to save the planet from human carbon footprints. Having clean energy emplace will help the impact from COVID-19 and allow us to enjoy pros of clean water and air in different parts of the world like Italy and China. Lastly, this will persevere our home. Or until 2029 when Elon Musk colonizes Mars. All jokes aside, as a society there needs to be a solution no matter the cost. Saving our home should be the first priority.

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