Hamidah Oderinwale, 15 - Cardinal Léger Secondary School

PPE Pollution: *Could the mitigator of COVID-19 be harming the environment?*

Within a year, Canadian society has adopted various forms of Personal Protective Equipment (PPE) to limit the spread of COVID-19. Throughout this period, masks, in particular, have gone from prized commodities to a standard possession amongst the public. Although healthcare institutions are still suffering from supply shortages, the average Canadian has moderate access to the recommended PPE to keep themselves safe. However, despite the immense feats that manufacturers have overcome in the former months, masks' mass production has arguably come at the expense of the deteriorating environment.

Photo of mask littered on the ground of a road in Toronto (Image courtesy of CBC News)

As it became a common sight to see an individual donning a face mask, it has also become an even more frequent site to see disposable masks littered everywhere.

The Issue

According to the Environmental Science and Technology scientific journal, an estimated 129 billion face masks are being used every month. A large proportion of that number is being disposed of incorrectly. In Canada alone, it was projected that at the end of 2020 there were 63,000 tons of wasted COVID-19 related PPE.

A combination of mass production and improper disposal practices has caused masking to emulate another significant contributor to plastic pollution - plastic water bottles. The main issue with plastic pollution in high amounts from a substantial source like masks and plastic bottles is that plastic is a non-biodegradable material that doesn't decompose but instead breaks down into microplastics for centuries and even millennia. Single-use masks, in particular, are made from polypropylene alongside other materials such as polystyrene, polycarbonate, polyethylene, and polyester. Polypropylene - among other plastics, is derived from petroleum and is incredibly popular in consumer products due to its alleged safety. However, the scientific community has proven its adverse effects on the environment, because it's infiltrating our precious water bodies and being mistaken as food by unsuspecting creatures and even entering our food supply.

'COVID litter' is a term used to describe the scattered disposable PPE seen in predominantly large municipalities like Toronto. Justine Ammendolia and Jackie Saturno - marine biologists studying plastic pollution in aquatic landscapes, shifted their focus to disposable PPE in Toronto. They explain that there are also human health risks from a lack of a proper disposal system, stating that COVID-19 has the potential of staying on plastic surfaces for extended periods, therefore creating an opportunity for COVID-19 to spread.

What about the animals?

Currently, there are 13 million metric tonnes of plastic waste in the ocean alone. By 2050, there will be a projected 850-950 million metric tonnes of plastic in the ocean. Our nation's adoption of disposable PPE has the potential to increase this number dramatically. The danger that plastics place on humans and wildlife, in particular, is incredibly high. The ingestion of plastic materials can lead to starvation in most animals as they cannot receive adequate nutrition, and animals are also faced with the risk of entanglement, suffocation or even drowning due to plastics. Masks are especially dangerous due to their non-biodegradable nature and their structure, which contains loops making it easy for animals to become entangled and suffocate.

A Light at the End of the Tunnel

Reusable N95 mask prototype by Precision ADM (Image courtesy of CBC News)

In an article by CBC News, it is estimated that it would take three to four years to make the switch to reusable PPE. However, the Canadian government is promoting innovation in the reusable PPE sector, funding Precision ADM initiatives', a rapidly growing firm developing reusable N95 masks in Manitoba. Reusing disposable masks is not a viable solution, as they become more ineffective as they are reused. Therefore, reusing single-use masks is not a viable option for frontline workers. However, for the average individual, reusable masks made from cloth or linen are an option. In most situations, they can meet an adequate efficacy as long as they are multi-layered, appropriately fitted, and washed correctly.

A seemingly menial but mighty change municipalities could make is creating PPE collection bins, making it easy for people to drop off their used PPE in contained areas that can then be disposed of properly and not cause harm to the public or wildlife. Receptacles could be stand-alone similar to the ones in hospitals or attached to existing recycling and garbage disposals for easy access. The most important thing for PPE disposal is not spreading the virus, so receptacles need to be automated to prevent excessive touching, alongside proper hygiene measures.

An Evaluation

As a developed nation, Canada can create, implement, and promote plastic recycling systems, disposable mask alternatives, and other infrastructures necessary to circumvent single-use (plastic) masks' adverse environmental effects. However, it is crucial to understand the privileges and luxuries that our nation has compared to less developed countries with non-existent or inadequate functioning recycling systems. Plastic pollution is an ever-growing problem in which only good-hearted innovation can be used to solve it. With a trend of rising cases of COVID-19 throughout the country, and multiple variants being presented, it is unlikely that going completely maskless as a world will be a reality for at least a few months. Therefore, it is necessary to look further into ways that more

sustainable systems can be put into place without putting civilians or front-line workers at risk.

References

Crawley, M. (2020, September 11). A stranded plastic pollution researcher maps COVID litter in her backyard Social Sharing. CBC News. https://www.cbc.ca/news/canada/manitoba/reusable-ppe-covid-19-manitoba-1.5628089https://www.cbc.ca/radio/quirks/sep-12-summer-science-special-fishing-with-the-boys-covid-garbage-and-more-1.5720234/a-stranded-plastic-pollution-researcher-maps-covid-litter-in-her-backyard-1.5720238

Frew, N. (2020, June 27). Shift to reusable PPE “an immediate need” for public health — but transition won’t be simple, experts say. Https://Www.Cbc.ca/News/Canada/Manitoba/Reusable-Ppe-Covid-19-Manitoba-1.5628089. https://www.cbc.ca/news/canada/manitoba/reusable-ppe-covid-19-manitoba-1.5628089

Increased plastic pollution due to COVID-19 pandemic: Challenges and recommendations. (2021, February 1). PubMed Central (PMC). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7430241/

Prata, J. C., Silva, A. L. P., Walker, T. R., Duarte, A. C., & Rocha-Santos, T. (2020). COVID-19 Pandemic Repercussions on the Use and Management of Plastics. Environmental Science & Technology, 54(13), 7760–7765. https://doi.org/10.1021/acs.est.0c02178

Photos

1. https://www.cbc.ca/news/canada/manitoba/reusable-ppe-covid-19-manitoba-1.5628089

2. https://www.cbc.ca/news/canada/thunder-bay/thunder-bay-spring-litter-ecosuperior-1.5952054