

## Two Examples of Strong Student Response to ChatGPT Activity:

### *Example 1:*

**Generate a 3 - 4 paragraph essay that proposes a solution to the following problem definition: Since the onset of the COVID-19 pandemic, there has been a surge in medical waste, especially single use products, such as personal protective equipment (Lee & Lee, 2022). This is causing hospitals and organizations to step back and consider more sustainable options. Biohazard waste, including needles, syringes, and any personal protective equipment or IV tubing that has been contaminated, cannot be recycled. However, only about 15% of medical waste is hazardous, leaving the remaining 85% to be single-use plastics and other wastes similar to what may be produced in any other setting. An example of this includes plastic gloves which are often used to complete tasks that do not require them (Ngo, 2020). UVA has several institutions which likely unintentionally contribute to this problem, such as, the University Hospital, the Medical School, and the Nursing School. At UVA, there are systems in place like the MERCI program that helps to recycle medical waste by taking donatable supplies and distributing them to different organizations in need (*Recycling Medical Supplies: Reducing Waste | UVA Health*, n.d.). Even so, there remains a significant amount of waste that is unable to be donated. This waste ends up in a landfill, incinerator, or our oceans, which has only been exacerbated due to the pandemic (Van Zeebroeck, 2022). Waste is being produced at ten times the amount since before the pandemic began, only adding to the yearly eight million tons of plastic getting dumped into the ocean (Bateman, 2022). If a way to reduce medical waste is not found soon, UVA will continue to contribute to the masses of medical waste produced by the US each year. Ideally, a solution to this problem would include be compostable, biodegradable, and or recyclable, following that United States Environmental Protection Agencies recycling guidelines. The improved product should still provide the same quality and safety as the current available market, but also limit its impact on the environment.**

Title: Sustainable Solutions to Mitigate the Surge in Medical Waste During and After the COVID-19 Pandemic

### Introduction

**(1)**The COVID-19 pandemic has brought to light an alarming issue in the healthcare industry - the surge in medical waste, particularly single-use products such as personal protective equipment (PPE). This surge in medical waste poses a significant environmental challenge as hospitals and healthcare institutions grapple with the **(2)growing volume of non-recyclable waste**, including plastics, gloves, and contaminated PPE. This essay explores potential solutions to this problem, emphasizing the need for more sustainable alternatives that align with the United States Environmental Protection Agency's recycling guidelines while maintaining the quality and safety standards of medical supplies.

## Sustainable Alternatives

One promising solution is the widespread adoption of compostable and biodegradable medical supplies. **(3) By shifting from traditional single-use plastics to materials that naturally break down, hospitals can significantly reduce their environmental footprint.** Compostable PPE, for instance, can be designed to provide the same level of protection as conventional PPE while being environmentally friendly. These products can be disposed of safely, either through composting or in regular landfill waste, without the fear of long-term environmental harm.

**(4) In addition to compostable materials, the healthcare industry can also explore recyclable alternatives for certain single-use medical products.** Innovative recycling processes can be developed to handle materials **(5) like IV tubing, which often ends up as non-recyclable waste.** By investing in research and development, healthcare institutions can work towards creating medical supplies that adhere to recycling guidelines. Furthermore, hospitals can establish robust recycling programs that prioritize the collection and recycling of recyclable medical waste, diverting it from landfills and incinerators.

## Conclusion

The surge in medical waste during the COVID-19 pandemic demands immediate attention and sustainable solutions. By transitioning to compostable and biodegradable materials and exploring recycling options for certain medical supplies, hospitals, including those within the University of Virginia, can significantly reduce their contribution to the environmental crisis while still ensuring the quality and safety of patient care. Such measures not only align with the United States Environmental Protection Agency's recycling guidelines but also serve as a vital step towards a greener and more sustainable healthcare industry. It is essential for healthcare institutions to act now to mitigate the adverse environmental impacts of medical waste and contribute to a healthier and more sustainable future for all.

[COVID-19 has created a medical waste surge, the WHO reports | World Economic Forum \(weforum.org\)](#)

The above link supports the first two highlighted sections. Although COVID-19 didn't highlight the alarming issue of the "surge in medical waste", it created it. This is still a very factual statement, COVID did highlight the underlying issues in medical waste disposal and its effect on the environment. Also the "growing volume of non-recyclable waste" is also a fact due to the growing amount of PPE use and all of it being counted as contaminated.

[Replacing Plastic: A Biodegradable Alternative • The Center for Research Innovation \(northeastern.edu\)](#)

The above link supports the third highlighted section. Just like in any other case, replacing single use plastics with a better option like compostable or biodegradable (if there are no toxic chemicals when they biodegrade) will help any group reduce their environmental footprint. Biodegradable options are definitely a viable option, especially since a lot of the biodegradable products give a relatively similar quality level compared to the plastic alternative.

## [Recycling of medical plastics - ScienceDirect](#)

The above link supports highlighted section 4. While recycling medical waste is intensive, and a bit complicated, its certainly something that can be done, and implemented by medical or lab facilities. There are ways that can simplify the process and, but also, putting in the extra effort to save our planet is important. Additionally, a lot of medical equipment can be reused if properly sterilized, which would also fit under recycled medical supplies.

## [Medical Waste | Quinte Waste Solutions \(quinterecycling.org\)](#)

The above link supports the highlighted section 5. The link lists several sources of medical waste and if they can be recycled or not. According to this source, IV tubing cannot be recycled. According to a few other links I saw while finding this though, many hospitals are looking into other ways solve this issue, which supports the idea that ChatGPT gives that hospitals can look into something like this.

### · **Does this argument make sense?**

It makes “sense” but it is very poorly written. It jumps all over the place, adds a few random facts, but mostly just restates the same general sentence with different words. It also pulls directly from the prompt I gave it, by using “United States Environmental Protection Agency recycling guidelines” twice.

### · **Do the “facts” support the argument?**

Yes, but technically no. The argument includes facts but the way they are presented leaves it to be untrustworthy. Along with how poorly it is written, the facts are not supported with proper citations. The argument is also so short that the facts don’t have much to lean on, facts support the argument, but facts without much of an argument to support just look like a list of a few facts. Despite all this, the facts do align with the topic in question, so its not entirely useless, its just not presentable.

### · **Was there even an argument made or does it leave the reader with more questions than answers?**

Not much of an argument was made, it was just boring to read. And similar to what I mentioned in the previous question, it just left you wanting more, more of an explanation of those facts, why does this issue matter, who is affected? I think it would leave anyone not researching the issue with more questions than answers.

### · **What do you agree with in this essay and what do you question or disagree with in this essay?**

I agree with all the facts of course, along with the fact that it is a widespread issue, that it poses a significant environmental challenge, and that it requires immediate attention. Just like every other environmental issue, we must work towards solving things at least or we will just keep digging ourselves in a deeper hole. I disagree with how the essay

writes that landfill waste doesn't pose any problems for the environment. Landfill waste is a solution to the environmental issues we are facing, they result in pollution by releasing toxic chemicals into the sediment and ground water, which can end up in nearby waterways, and the environment which puts people and ecosystems at risk.

**· What could you do to make the argument or answer to your prompt stronger and more convincing?**

I would add much more context of the problem to give a better scope and understanding of the issue. I would then take the facts presented, and the sources found for them and just add more, there should be more facts, more evidence, more explanation of the problem. I would add the who, what, where, when, why, and how pretty much. I'd also add proper citations and remove all the repetitiveness. Most importantly, I'd add a more clearly defined solution, the essay mostly just restates parts of the problem it was given, with a few possible solutions sprinkled in there with nothing to support them. I would take those and create a set of limitations, and success of criteria to better define the solution.

**· Based on this activity, what role do you think Generative AI could play in the engineering design process? Explain.**

I think generative AI can possibly be a brainstorming resource, because then you can take the ideas it presents, and do your own further research. It would end up being way more reliable, but at least you have a starting point. For example, if I had no idea how my problem definition could be solved, AI could give me a starting place, and then my ideas could stem from that. I don't think there is a place for it in any kind of professional writing or anything though.