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The emergence of single-use plastics in the mid-20th century revolutionized the fields of healthcare and medicine. This new form of technology brought about unprecedented sanitation capabilities due to its flexibility and disposability. For decades since, plastic has been selected as the primary material produced and discarded in healthcare on an international level. However, current worldwide efforts are being made in order to reduce the amount of non-recyclable and non-biodegradable plastic waste generated in hospitals as well as other healthcare facilities.

The use of single use plastics serves as an appealing choice for healthcare workers, as its sterility minimizes the risk of cross contamination. Plastics are easily disposable so as to not become a biohazard to waste handlers, and they tend to be significantly less expensive than more sustainable alternatives.

The average hospital produces 25 pounds of waste per day per patient and generates over 5 million tons of waste per year, including infectious waste such as bandages and gloves, hazardous and chemical waste, radioactive waste, and other general waste such as paper and single-use plastics. The World Health Organization estimated that roughly 80% of the hospital waste produced is general waste, 55% of which is plastic with a recycling rate of 20%.

Plastic use in hospitals consists of polyvinyl chloride (PVC), polyurethane, and polyethylene. PVC yields hazardous environmental effects due to its release of toxic chlorine-based chemicals into the air and water that produce major disruptions within the food chain. PVC is primarily used for building applications such as

flooring and walls, but it is also utilized for disposable medical devices, despite deleterious consequences towards humans health and the environment.

Exponential manufacturing and utilization of such non-reusable and non-biodegradable substances has created various environmental emergencies regarding the hazards of plastic manufacturing and its breakdown into microplastics. It can take up to 1,000 years for plastic to decompose in a landfill, which is where an estimated 79% of the world's plastic waste is disposed, and most of it eventually enters the oceans. Microplastic fibers are expected to be toxic to organisms, and are thought to be absorbed by certain aquatic life in the lowest levels of the food chain, like algae and other microorganisms.

Since plastics like polyurethane and polyethylene are derived from fossil fuels, emission of greenhouse gases occurs through their lifespan. The Center for International Environmental Law (CIEL) estimated that more than 850 million metric tons of greenhouse gas was emitted in 2019 as a result of plastic production and incineration. CIEL estimates these emissions to be equivalent to those from 189 five-hundred-megawatt coal power plants. While plastic manufacturing emissions are lower than those for paper, they are still significant, and coupled with the facts that plastic production provides another source of revenue to the high-emitting fossil fuel industry and that plastic brings these additional decomposition and health concerns, it may be worth exploring plastic alternatives in healthcare facilities.

There is a strong need for an efficient material to best serve expansive healthcare demands while also keeping its environmental impact in mind. But finding suitable and affordable alternatives to plastic while maintaining the level of sterility and sanitation required for the safety of patients and staff poses a challenge. The growing world population adds additional pressure by requiring wide-scale and timely production of material to provide medical care.

Various corporations have initiated research into how to meet these challenges. In 2019, the FDA approved the Enviropouch, which is a reusable steam sterilization pouch meant to replace single-use plastics used to maintain sanitation standards. A separate company called ecoMedSupply has released an array of biodegradable and compostable hospital materials including patient gowns, gloves, sharps, gauze, bedpans, and various medical containers to stock hospitals with sustainable products. NewGen Surgical, a company that specializes in biomedical engineering, has proved to be another pioneer in the manufacturing of sustainable medical equipment with the development of a plant-based skin stapler. For every 10,000 staplers used, 500 pounds of plastic waste is saved. Other sustainable NewGen Surgical developments include a needle counter box that reduces plastic waste by approximately 93% in comparison to the non-sustainable counter box that it would be replacing. While still not in use on a large scale, these innovations have served as remarkable steps towards sustainability in modern healthcare products.

While various companies strive towards making technological developments, other organizations have focused on systematic healthcare revisions through the provision of environmental solutions and funding. Practice Greenhealth, a nonprofit health organization, has been pivotal in the growth and guidance of medical centers towards sustainability. This organization provides resources and strategies for healthcare facilities to help reduce the amount of waste generated per facility. The integration of sustainability offices in hospitals has been able to establish meaningful change in the production of plastic waste in healthcare. Many such hospitals reported that they were able to avoid the generation of over 140,000 tons of waste and 180,000 metric tons of carbon emissions through environmental intervention.

Through guidance provided by Practice Greenhealth, Kaiser Permanente in California became the first major healthcare system to reach carbon neutrality last month. The organization has estimated that this will significantly offset the 800,000 ton carbon footprint, which they equate to the emission of approximately 175,000 cars.

Practice Greenhealth has implemented Environmental Excellence Awards to encourage sustainability in healthcare by recognizing hospitals making efforts to cut back on waste. Such hospitals include Boston Medical Center, The University of Vermont Medical Center, Abraham Lincoln Memorial Hospital, and Seattle Children's Hospital. Honouring the performance of sustainable hospitals drives incentive for other centers to facilitate change from within.

Sustainability in healthcare has vast room for improvement. Society is far away from having zero-waste hospitals, if that is even an option. However, local effort is being made that holds the potential to stimulate valuable, global change.

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