GoodRx Health

How Green Chemistry Could Make the Healthcare Industry Cleaner and Safer


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Key takeaways:

- Green chemistry is an approach to making chemical products that reduces the hazardous substances created in the making of or contained in products.
- Green chemistry can improve soil and water quality, reduce waste, reduce people's exposure to toxins in the workplace, and increase a company's profits.
- Healthcare providers can support green chemistry by encouraging their organizations to purchase greener chemicals and by advocating for public policy that promotes sustainability.

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Green chemistry promises to transform society by allowing us to enjoy and benefit from the numerous chemical products we interact with regularly, while minimizing the risks their production brings to the environment.

In healthcare, one of the most active areas of research into green chemistry is in medication manufacturing. But there are a number of other healthcare sectors that can benefit from green chemistry's innovations.

What is green chemistry?

Green chemistry is defined by the U.S. Environmental Protection Agency (EPA) as the design of chemical products and processes that reduce or eliminate the generation of hazardous substances.

Green chemistry is concerned with reducing hazardous substances not only that end up in a final product but also that are created or used during the synthesis of a product. It also looks at the ultimate disposal or degradation of the product and the agents used during its synthesis.

The principles of green chemistry

The EPA outlines 12 underlying principles of green chemistry. These principles span the entire lifecycle of the product — from minimizing the formation of hazardous substances to designing more degradable chemicals and less toxic syntheses, chemicals, and auxiliary substances. They also cover areas like energy use and minimizing the potential for accidents.

Green chemistry is an ongoing, active area of research that is applicable not only to healthcare but also to a wide range of industries, like agriculture, dry cleaning, and even solar energy.

In healthcare, green chemistry often refers to rethinking the synthesis of medications. However, medications are hardly the only chemical products that healthcare facilities use. Disinfectants, cleaners, soaps, fertilizers for landscaping, and products for the lab are just some of the chemicals facilities rely on for daily operations.

Why is green chemistry important?

Green chemistry promises to produce numerous benefits for society and the environment, as well as for the organizations that put these methods into practice.

Environment

One of the principles of green chemistry is to prevent waste, which could reduce the use of hazardous landfills. Green chemistry could also help combat climate change by eliminating substances that act as greenhouse gasses.

Cleaner air and water are important for both human health and the health of the environment, including the plants and wildlife that inhabit it. Also, fewer toxic materials in the workplace means fewer opportunities for workers to be exposed to hazardous substances.

Business

Green chemistry is also great for business. Reduced waste means less purchases and disposal fees and more money in a company's pocket. Fewer and simpler manufacturing steps reduce manufacturing costs and, in some cases, can even reduce the required plant capacity by lessening the need for chemical reagents and associated equipment. All that can have a positive effect on a company's bottom line.

Some healthcare organizations, like Kaiser Permanente, have leveraged their purchasing power to prohibit a wide range of chemicals from being used in the products in their facilities. For Kaiser, this means eliminating triclosan in hand soap and polyvinyl chloride, or PVC, in both IV products and building materials, among other things.

When businesses take these steps, they can proudly display their efforts through the EPA's Safer Choice program, giving them an edge over competitors who choose not to move toward sustainability.

In fact, a 2021 report found that green-chemistry-marketed products significantly outperform their conventional competitors. And the market for these products continues to grow because consumers, industry players, policymakers, and investors all have an interest in more sustainable, greener products.

How healthcare providers can promote green chemistry

One way healthcare providers can advocate for green chemistry is by encouraging their organization to use its purchasing power to promote sustainable practices and products, like those participating in the Safer Choice program.

A good first step an organization can take is to first generate a list of chemical products used at its facilities, including in the maintenance and food services departments. After generating the list, creating safety data sheets (SDSs, formerly MSDSs) for the most commonly used products can help identify those with the highest potential benefit of being substituted. Once these are identified, organizations can search the Safer Choice program or elsewhere online to find better alternatives.

Another way to support green chemistry efforts is through policy changes. The Sustainable Chemistry Research and Development Act of 2019 is a landmark piece of legislation designed to help facilitate federal agencies' support of green chemistry. It created a working group tasked partially with creating metrics that assess sustainable chemistry.

Still, more work needs to be done to fully realize the benefits of green chemistry, including the creation of more incentives for businesses and more funding for research, as well as the integration of these practices into the education system.

Conventional products are often so cheap that businesses can be at a disadvantage when trying to move toward sustainability. Subsidizing more sustainable products or placing additional environmental taxes on conventional products would make sustainable products more competitive in the marketplace.

Green chemistry in action

Green chemistry is transforming the pharmaceutical industry, not only through new medications but also through existing therapies.

One example of this involves simvastatin, which was approved in 1991 and has become one of the most widely-prescribed medications in the U.S. since going generic in 2006. The original process for synthesizing simvastatin led to both low yields and large quantities of toxic byproducts. But, in 2012, a professor at UCLA developed a new synthetic process that significantly improved yields (from 70% to 97%), while also reducing the amount of toxic waste produced. To date, over 10 metric tons of simvastatin have been produced globally using this new process.

Sitagliptin is another medication that has been transformed by green chemistry. In 2006, the medication's manufacturer, Merck, won the Presidential Green Chemistry Challenge by improving the process for synthesizing its top-selling antidiabetic. In doing so, it reduced 220 pounds of waste for every 1 pound of sitagliptin produced, while also increasing yields. Over the lifetime of the patent, Merck anticipates reducing at least 330 million pounds of waste.

The bottom line

Green chemistry is an exciting field that can revolutionize society by giving us access to safer and cleaner chemical products, including medications. It has the potential to benefit society, the environment, and the economy, and healthcare is a significant area of research. Healthcare providers can make an impact by advocating for green chemistry practices in their organizations.

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