**How Does Online Shopping Influence the Environment?**

One of the biggest changes to the daily lives of humans over the past decade is the ability to order items online and have them delivered to our door step. The emergence of online shopping has had a major influence on how we make purchases and acquire items. Since 2016, it is estimated that greater than 50% of all purchases are made through online shopping.[1] Online shopping is especially prevalent this time of year, during the holiday season, when retailers experience up to 30% of all annual sales.[2]

Online ordering has not only become prevalent in the commercial retail market, but also within the scientific community. The NIH utilizes various online shopping tools, such as the Purchasing Online Tracking System (POTS), AMBIS, and the NIH Supply Center, on a near-daily basis to acquire necessary items. The prevalence of online shopping throughout our culture raises a very important question: **How does online shopping affect the environment?**

Online shopping makes it convenient for buyers to conserve fuel and reduce emissions from their personal vehicles. However, this method adds additional mileage to package delivery truck routes, thus contributing to vehicular emissions from a different source. Companies have begun using algorithms and analytical tools to make the delivery process as efficient and streamlined as possible. Delivery companies face the challenge of planning their operations to achieve maximum fuel-efficiency with delivery trucks that are typically less efficient than the average commercial vehicle.[3] Currently, it is unclear whether online shopping deliveries have a net positive or negative effect on vehicle emissions, or on the environment as a whole.[4] This stems from the wide range of variables in vehicle fuel efficiency, trip distance, the number of items per trip, and many more.

Another consideration for the effect of online shopping is the large amount of waste generated from packaging, such as cardboard boxes, bubble wraps, plastic bags, etc. When items are shipped to a retail store, they are often ordered in a larger quantity and packaged efficiently. Contrast this with online shopping, which commonly uses a cardboard box and bubble wrap to ship one or two items. According to the EPA, containers and packaging make up nearly 30% of all municipal solid waste, which is greatly influenced by the extra packaging used in online shopping.[5] However, only around 26% of this waste is currently being recycled.[5] Since online shopping continues to increase each year, we must attempt to limit the waste associated with home delivery and recycle whenever possible.[6]

Based on transportation emissions and packaging waste, additional research is needed to determine whether online shopping has a net positive or negative influence on the environment. However, it is clear that the environmental impacts associated with online shopping are dependent on our individual circumstances. It is, therefore, critical that each of us learn to make informed decisions when deciding how to acquire our purchases. With this is mind, here are some tips that could help minimize our effect on the environment, regardless of whether you buy items in person or using online shopping:

Options for the NIH:

- Use the Collaborative Research Exchange (CREx) website to share NIH resources and reduce the purchase of specialty equipment.

- Visit the Self-Service Stores located in Buildings 10 and 31 on the Bethesda campus, which stock office and laboratory supply items. Since these stores order more items in bulk, their package delivery is more efficient than individual orders.
- Check out the NIH FreeStuff website to see all the free new and used items, chemicals and equipment that are available. In return, please post any of your unwanted and reusable items on the NIH Free Stuff website, the Lab Operations Listserv or the Greenserve Listserv. Using these services helps reduce unnecessary acquisitions and their associated environmental impacts.
- Consult with your lab members to combine orders from the same supplier. This will allow orders to be consolidated and eliminate extra delivery trips and packaging.

Options for commercial shopping:

- Place a single large order instead of many small orders. This reduces the number of trips a delivery truck will need to make to your house and can reduce the amount of packaging required for your items. Additionally, you should consider shipping flexibility when choosing shipping options. Overnight and 2-day shipping require less efficient transportation methods and force delivery trucks to make less efficient trips to meet these rigid deadlines. Some online retailers provide incentives to choose a "slower" (more efficient) delivery method.
- Purchase local products, if possible. This option removes or greatly reduces the transportation needed to reach your home or the retail store.
- Plan ahead so you can purchase multiple items in a single trip. Eliminating single-item trips to the store will greatly reduce vehicle emissions, in addition to saving you time and money. One idea for reducing dedicated trips is to stop at stores close to your daily commute on your way home from work! Don't forget to bring your own reusable shopping bags! These help reduce the amount of single-use plastic and paper grocery bags to be recycled.
- Look for companies that emphasize sustainability by reducing environmental impact throughout the entire lifecycle of a product. Many companies offer products that contain less plastic, can be completely recycled, or use less packaging.
- There are also many programs that can help us make informed decisions about purchasing with the environment in mind. One such program was recently launched by the Montgomery County Department of Environmental Protection. Visit their website to learn about the "Gift Outside the Box" program.

We hope these suggestions help you make more environmentally-friendly choices while you shop for the holidays (and in general)! Making our preferred method for acquiring products into an environmentally-friendly option is often as easy as making a few select choices. Always "Reduce, Reuse, and Recycle" to begin making a difference!