Bartlett Brief

A Disease Outbreak is a Bad Time to Ban Disposable Plastics & Paper

March 19, 2020

Forcing people to carry reusable food and beverage containers in public could accelerate the spread of microbes that cause infectious diseases, multiple academic studies suggest.

As government strives to suppress the spread of the novel coronavirus, policymakers should immediately repeal laws, regulations and ordinances that ban disposable food and beverage containers, utensils and plastic straws.

Attempts to ban "single-use" plastic grocery bags, water bottles and straws, as well as non-recyclable utensils and to-go containers, have spread worldwide in recent years. New Hampshire legislators make annual efforts to impose such bans or restrictions, and several municipalities already have banned plastic grocery bags. Concord, Mass., banned single-serving plastic water bottles in 2013.

As these bans were debated, concerns about public health tended to be dismissed, even though studies have shown genuine potential health hazards. This briefing paper outlines the public health reasons why policymakers should reject these bans.

Reusable grocery bags have been shown to pose genuine health risks. They are carrying cases for bacteria and viruses.

- In a 2018 study by the Loma Linda University School of Public Health, researchers sprayed reusable polypropylene grocery bags with a safe norovirus surrogate and asked grocery store customers to shop with the bags. The researchers then swabbed surfaces touched by the shoppers. They found the virus surrogate everywhere — on food packages, fresh produce, cart handles, checkout touch screens and checkout clerks. The highest concentrations were on the hands of both the store clerks and the shoppers. Most importantly, "even the lowest average concentration of virus particles detected on any surface in the study… would represent a virus transmission risk for most individuals."

- A 2012 University of Pennsylvania study of San Francisco's 2007 plastic bag ban found that the city experienced a 25 percent increase in bacteria-related emergency room visits relative to neighboring counties that did not ban plastic bags.

- A 2012 Oregon study published in the Journal of Infectious Diseases examined a norovirus outbreak among a youth soccer team. It traced the outbreak to a reusable shopping bag. "The data indicate that virus aerosolized within the hotel bathroom settled upon the grocery bag and its contents, and it was touching the bag and consumption of its contents that led to the outbreak," the researchers found.

- A now widely reported University of Arizona study from 2011 found so much bacteria in reusable grocery bags that the study's lead author called reusable bags "a serious threat to public health, especially from coliform bacteria including E. coli, which were detected in half of the bags sampled." When bags contaminated by meat juices sat in cars for two hours, the number of bacteria increased ten-fold. The study's author warned that "consumers are alarmingly unaware of these risks and the critical need to sanitize their bags on a weekly basis."

Reusable water bottles are intended to replace the disposable plastic bottles many environmentalists want to ban, but they also have been shown to carry extremely high levels of microbial contaminants, both inside and out.

A 2019 Brazilian study found bacterial contamination on 83% of water bottles randomly selected from gym members.

A 2017 study of reusable water bottles published in the journal Food Protection Trends found "marked microbial contamination." Researchers concluded that "the exterior bottle surfaces may serve as fomites that facilitate the transmission of infectious organisms."

A 2017 Chinese study found that reusable water bottles contained bacteria levels many times higher than even the weakest government standards for drinking water. "Considering the extremely high level of HPC bacteria content in the reusable drinking water bottles, it may be necessary to have some control measures to reduce the bacteria level and to minimize the associated likely health risk of the disease spreading since many people use reusable water bottles every day," the authors concluded.

Disposable beverage containers are a new target of environmentalists. Berkeley, Calif., last year placed heavy restrictions on disposable utensils and containers at restaurants, including a

25-cent tax on disposable cups to encourage the adoption of reusable ones. Yet disposable cups were shown to have public health benefits immediately after paper cups were invented in the early 20th century.

Invented in Boston, paper cups and a vending machine for selling them entered production in 1908, the same year a biology professor named Alvin Davison published a study titled “Death in School Drinking Cups,” which showed how shared drinking cups in schools spread disease. The Massachusetts State Board of Health distributed Davison’s report that year, and the movement to adopt paper cups to halt the spread of disease rapidly spread nationwide.

The North Carolina Board of Health in 1913 lauded the paper cup as having largely solved the problem of disease spread at soda fountains. “Customers that are served with the sanitary cup drink out of a cup that no one has used, and that has not been touched with human hands or lips."

Soon called Health Kups, those paper products replaced the tin cups and dippers common at railroad stations, schools and other public spaces, and poorly washed glassware in many soda fountains. (The company later changed the name from Health Kup to Dixie Cup.)

Today’s industrial dish washers have made restaurants immensely safer, but reusable personal beverage containers still pose potential public health risks. Starbucks in early March suspended its acceptance of patrons’ refillable mugs, citing the risk of spreading the coronavirus.

There are fewer opportunities for single-use containers to carry contamination to multiple people, as they are quickly disposed of. Reusable containers are carried around all day, touching numerous surfaces between their repeated journeys from hand to mouth.

Modern drinking straws, like the paper cup, were quickly adopted, in part for their health benefits, after their invention in the late 19th century. Eventually municipalities mandated their use to curb the spread of infectious diseases.

“Temperance and public health grew up together in the disease-ridden cities of America, where despite the modern conveniences and excitements, mortality rates were higher than in the countryside,” The Atlantic documented in 2018. “Straws became a key part of maintaining good hygiene and public health. They became, specifically, part of the answer to the scourge of unclean drinking glasses. Cities begin requiring the use of straws in the late 1890s. A Wisconsin paper noted in 1896 that already in many cities ‘ordinances have been issued making the use of wrapped drinking straws essential in public eating places.’”

To help reduce the spread of disease, straws were given out in workplaces that had not yet replaced the common drinking cup with disposable cups. By 1911, the “sanitary straw dispenser” for individually wrapped straws was on the market, advertising protection from “flies, dust, and microbes.”

Restaurant hygiene has come a long way since then, but as with Starbucks’ paper cups, straws and the lids that go with them might offer some health benefits in places that fill beverage containers to go.

A 2010 University of Arizona study of disposable coffee cup lids examined tops obtained straight from the manufacturer and others that had been placed onto cups by coffee shop employees. “The average concentration of bacteria on coffee lids placed on the coffee

containers were 10,000 greater than that of lids that had not yet ben used," the study found. "Coliforms were only found on lids that had been handled by facility personnel. Coliforms can originate from fecal material and are an indicator of unsanitary conditions. The results demonstrate that significant bacterial contamination of coffee lids occurs during handling by restaurants/coffee shop personnel."

Though we've found no recent study that looks directly at drinking straws, the coffee lids study suggests that individually wrapped straws would offer significant health benefits, just as they were shown to have done more than a century ago. Drinking straight from the rim of the cup or glass that has been handled by staff is obviously less safe than drinking from a freshly unwrapped straw.

Incidentally, straws can have other health benefits as well. A 2005 study published by the Academy of General Dentistry concluded that drinking soft drinks and other acidic beverages through a straw can minimize the risk of tooth decay.

Commenting on plastic straw bans last year, Delta Dental noted that "straws can help curb how much acid or sugar comes in contact with your teeth."

People with certain disabilities prefer plastic drinking straws to paper ones, for their durability and ease of use. And hospitals rely on plastic flexible straws for patients who have trouble sitting up in bed.

Conclusion

Every policy has unintended consequences. There is strong evidence that forcing people to stop using certain disposable items has the very real potential to facilitate the spread of dangerous microbes and make infectious disease outbreaks worse.

Government should not forcibly increase the public's exposure to infectious diseases. These policies can be dangerous, particularly to individuals who are more vulnerable to microbial infection.

Rather than forcing people to choose environmental protection over other competing values, the government should leave individuals free to weigh their own risk factors and make the decisions that best fit their own individual circumstances and values.