

EDITORIAL

Rise of the superbugs

The emergence of drug-resistant bacteria poses a grave challenge for the world

BY THE EDITORIAL BOARD

The first thing microbes like fungi and bacteria must battle in order to thrive is not the humans to which they can be so deadly, but each other.

And left to their own devices, scientists say, the varying strains of these microbes tend toward balance. In any given hospital or human, plot of soil or livestock yard, strains of bacteria and fungi exist that are helpful, harmful or have no discernable impact at all.

However, when humans have identified microbes as dangerous — like the bacteria that cause pneumonia in people, anthrax in livestock or leaf blight in crops, or the fungi that infect people and animals with ringworm or plants with leaf rust — we've used chemicals and medicines to stymie those microbes.

We've worked wonders to reduce the cost and difficulty of crop and livestock production, and to increase the health and lifespan of humans. But by depressing the population of microbial organisms humans are fighting, we also have eliminated competition for other microbes that are now on the rise, and we have pushed organisms toward

mutations that make them resistant to our medicines.

Deaths due to drug-resistant bacterial superbugs have made headlines for years, but the world has been slow to act. Now the United States faces a new type of outbreak. The deadly, drug-resistant fungus *Candida auris*, or *C. auris*, is centered in New York, difficult to eradicate and deadly. Practically nothing is being done to combat it, and hospitals and governments won't even reveal where it's been found.

In many cases, these newly prevalent microbes are just as dangerous as the ones we've been killing for decades, but were rare or had not yet developed before humans attacked their brethren. Now these strains thrive because their immediate competition has declined, and because these strains have either always been impervious to the antifungal and antibacterial agents used by farmers and doctors, or have adapted to become so.

According to a United Nations panel, resistant infections caused by these bacteria and fungi could be killing 10 million people annually by 2050.

The overuse of antibiotics and antifungal agents in crops, humans and livestock is an

epidemic, and has been for decades. It is creating crises to which government officials, medical personnel and farmers have no ready response, and from which society has little protection.

Drug-resistant infections already do claim 700,000 lives a year worldwide, including 230,000 annually from drug-resistant tuberculosis, a disease scientists once thought could be easily defeated by the antibiotic "wonder drugs" that began to hit the market in the 1940s. And more and more drug-resistant bacteria strains are popping up. The most famous is known as methicillin-resistant *Staphylococcus aureus*, or MRSA, which infects about 90,000 Americans each year and kills about 20,000. It is highly resistant to a wide variety of antibiotic treatments.

Because of the prevalence of MRSA, and the spread of other antibiotic-resistant bacteria that can cause illnesses like pneumonia, tetanus, typhoid fever, diphtheria, syphilis and leprosy, industrialized societies like the United States and Western Europe are realizing that pumping crop fields, livestock and humans full of antibiotics can lead to devastating results. Doctors are refus-

ing to prescribe unneeded antibiotics. Patients are learning not to ask. And farmers in the United States have slashed the use of antibiotics in meat and milk by a third since the use of antibiotics to make animals grow more quickly was banned in 2017. The European Union passed a similar ban in 2001, and the United Kingdom has pushed hard for reductions since 2013.

But the shift away from overuse of antibiotics is coming too slowly even in nations with strict regulations. And in countries with fewer controls, antibiotic use to promote growth in animals and fight illness in humans is skyrocketing. That opens the door for bacteria these products can't kill. And those bacteria travel the world with ease.

Doctors and government officials have worked for years to grapple with highly infectious bacteria that resist antibiotics and are tenaciously difficult to eradicate.

Their new worry, the drug-resistant *C. auris*, was first reported in the United States in 2017. About 600 instances of the infection have been diagnosed nationwide. More than 300 confirmed cases were in New York, nine of them in Nassau County. The state

Department of Health won't say in which hospitals the fungal infection has been diagnosed. It first appeared in Japan in 2009, carries a mortality rate of about 35 percent, is highly resistant to the antifungal agents called triazoles, once indiscriminately used to combat fungi in crops and livestock and provide medicine for humans, and is nearly impossible to eradicate from a room once it arrives.

The *New York Times* reported that after an elderly man died at a Brooklyn hospital in 2018, his hospital room had to be stripped down to the studs to eradicate the *auris* germ after everything in the room tested positive.

Drug-resistant infections are becoming one of world's most devastating dangers. The response — in how we treat crops, livestock and human illness — must be international and aggressive. New antibiotics and antifungal treatments must be invented, and policies must be created to stop the excessive use of such products, and to inform people when and where outbreaks occur. And so far, hardly anything is being done at all.



A computer illustration shows a microscopic view of the unicellular fungus *Candida auris*. New York has recorded more cases of the multi-drug-resistant fungus than any state in the country.