The Animal Connection:

Policies to prevent another global health crisis

THE HUMANE SOCIETY OF THE UNITED STATES

HUMANE SOCIETY LEGISLATIVE FUND™

CONTENTS

Executive summary

THE COVID-19 PANDEMIC IS A WAKE-UP CALL for humanity to reassess our relationship with animals.

Time and again—as with avian influenza, swine flu, Ebola, mad cow disease and SARS—we see human health emergencies that can be traced back to how humans use animals in commerce. Whether in agricultural production, the wildlife trade, animal testing or the pet industry, these issues highlight the dire need for policy changes.

The COVID-19 pandemic underscores the urgency of policy shifts and strong action at the intersection of animal protection and public health. Like COVID-19, some 73% of emerging infectious diseases in humans are zoonotic, originating in animals. In addition, more than 58% of known infectious diseases affecting humans, like the rabies virus and salmonella, are transmitted by animals. Together, zoonotic diseases account for billions of illnesses and millions of deaths across the globe. Their spread has direct connections to our use and misuse of animals, connections that should rise to the forefront of public policy discussions in the immediate future.

When zoonotic diseases spill over from animals to people, human activity is frequently the cause—whether in the form of our intensive confinement of farm animals, our destruction of natural habitats, the poaching of wild animals or the multibillion-dollar international wildlife trade (the likely source of COVID-19). The current crisis demands deeper scrutiny and stronger policies surrounding such areas of animal use as the trade and consumption of wildlife, intensive confinement agriculture and the operation of commercial pet breeding enterprises.

The COVID-19 pandemic has forced the United States to impose severe restrictions on its citizens, restrictions that are having massive economic costs and a myriad of other much-talked-about consequences for human culture. But there has been less discussion about identifying and modifying the institutions and practices that contribute to the emergence of zoonotic diseases and the role of public policies that would enhance human safety. Scrutiny and reform of several key arenas of human-animal interactions could hardly be more timely or imperative.

The Humane Society of the United States and Humane Society Legislative Fund have long championed science-based public policy measures in areas where the treatment of animals and the interests and demands of public health converge. Nowhere is this more important than in the case of pandemic disease. In such exigent circumstances, an action agenda targeting key areas of risk and danger is vital to humanity's safety and well-being.

The Humane Society of the United States and Humane Society Legislative Fund have developed nine key policy recommendations that federal and state governments can and should implement to reduce the risk of another global health crisis rooted in our poor treatment of animals.

COVER: GRETTEL DELGADILLO/HSI

POLICY SUMMARY

POLICY RECOMMENDATION SUMMARIES

1. Wildlife markets have been the origin of multiple disease outbreaks. Shut them down permanently.
Live and dead wild animals are kept in extremely close proximity at these markets, which are typically unsanitary and facilitate the mix of animal blood, feces and bodily fluids, allowing viruses to easily migrate to humans.

2. To protect people from zoonoses, end the trade of live wild animals.
Whether captive-bred or wild-caught, wild animals bought and sold for the exotic pet trade or other commercial purposes can spread a variety of viral, bacterial, fungal and parasitic infections that pose serious health risks to humans.

3. Ban public contact with wild animals and their use in traveling shows to limit the potential of disease transmission.
Exhibitors that allow the public to handle and interact with captive wild animals can spread zoonotic diseases. Animals stressed by transport, confinement, crowding and handling—conditions common in traveling shows—are more likely to shed pathogens.

4. End fur farming and the fur trade.
Animals commonly killed for their fur—such as raccoon dogs, foxes and mink—have tested positive for SARS-CoV-related coronaviruses, and it is "very likely" that factory farmed mink spread COVID-19 to humans in the Netherlands.

5. Intensive confinement of farm animals provides a breeding ground for pathogens. Transition to better systems.
Intensive confinement of farm animals, including caging egg-laying hens and mother pigs in unsanitary, overcrowded facilities, risks facilitating the development of zoonotic pathogens with the potential to infect human populations.

6. Expand and innovate alternative proteins in the food industry.
In addition to moving away from intensive animal confinement systems, the food system should end its overwhelming reliance on animal proteins. Governments and the private sector should play a role in the shift to more plant-based proteins—and eventually cultivated meat—to ensure a greater availability of more diverse, safe and dependable protein sources.

7. Fund alternatives to animal testing to speed up treatment and vaccines.
The current approach for developing effective diagnostic tests, vaccines and treatments relies heavily on the use of animals, which is slow, expensive and often results in failures. Governments and science funding bodies have an important role to play in creating incentives for the pursuit of non-animal approaches to more quickly find a vaccine and treatments to address this pandemic.

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8. End the sale of dogs from puppy mills, a frequent disease vector.
Pet stores that source dogs from puppy mills have been the source of zoonotic disease outbreaks because bacteria can run rampant in the unsanitary and crowded conditions found in puppy mills.

9. Pass and enforce stronger laws on cockfighting.
Cockfighters maintain game-fowl yards that present a major public health risk, with hundreds—sometimes thousands—of birds kept for fighting. During and after the fights, cockfighters routinely engage in unsanitary practices that bring them into contact with blood and other fluids from the birds, which greatly increases the risk of disease transmission.

TREVOR MOGG/ALAMY STOCK PHOTO

Wildlife markets

THERE IS SCIENTIFIC CONSENSUS that the novel COVID-19 coronavirus originated in bats, was likely passed on to an intermediate host species through that animal's ingestion of bat feces, and subsequently jumped to humans through contact with that animal. Scientists also concur that the spread of the COVID-19 virus from this intermediate animal to humans most likely occurred in a wildlife market in Wuhan, China, that sold live wild animals for human consumption. Demonizing any given species involved in transmission of disease is not the answer. But examining the origin of COVID-19 is necessary to preventing future pandemics, and that origin requires that we rethink our exploitation of wildlife.

In live wildlife markets, animals are kept in cramped, stressful and unsanitary conditions and are sold and often slaughtered on site for human consumption. The suffering of animals in these markets is extensive. Bodily fluids such as saliva, blood and feces may be present on surfaces and packaging that humans touch. This intermingling of fluids has a clear connection to disease transmission, and these unsanitary conditions are a risk to vendors and consumers alike. Wild animals, whether taken from the wild or captive bred, are transported to these markets, overcrowded (often without food and water), and typically slaughtered on site in an inhumane fashion.

In response to this global pandemic, our global arm, Humane Society International, has called for a worldwide ban on live wildlife markets. But what many people may not realize is that live wildlife markets also exist in the United States. These U.S. markets sell wildlife—commonly including reptiles and amphibians, with sightings of birds and mammals—for human consumption. Although the wildlife species sold for consumption in the U.S. may differ from those commonly found in live wildlife markets abroad, the same threats of zoonotic disease transmission exist, because the conditions for that transfer are the same.

Human, animal and ecosystem health are inextricably linked, and the well-being of one will inevitably impact another. According to the Centers for Disease Control and Prevention, scientists estimate that animals can spread six out of every 10 known infectious diseases in people, and three out of every four new or emerging infectious dis-

eases in people originate in animals. These statistics are alarming and necessitate taking a precautionary approach when regulating the sale of wildlife for human consumption to avoid the risk of future novel zoonotic disease outbreaks.

In addition, pandemics have a massive impact on domestic and global economies regardless of where they originate. COVID-19 was preceded by SARS and MERS, which were coronaviruses of similar origins that had the potential to become global crises, yet the policy shifts that would have served to prevent future issues were not made in their wake. The virus that caused SARS in 2003 emerged from the sale of wildlife (a civet) for consumption in China. The International Monetary Fund has stated that the current pandemic could be far worse than the Great Depression and projects the global economy will contract by 3% in 2020, which will create lasting impacts.

State legislatures must take action to pass laws to combat the dangers associated with live wildlife markets and related trade by prohibiting them within their own borders and banning the intrastate transport of wildlife for human consumption. Selling wild animals for human consumption is extremely risky. By prohibiting it at the state level we can reduce demand and provide additional oversight while addressing any regulatory gaps at the federal level.

The federal government also has the capacity and responsibility to shut down live wildlife markets and regulate the interstate shipment and import of wildlife into the U.S. By swiftly passing legislation to this effect, we can protect against invasive species and future disease outbreaks from this source. It is critical that the U.S. uses its existing authority and works to strengthen the federal framework to prohibit live animal imports that can potentially spread disease and harm humans, livestock and native wildlife populations. There will be national security implications if we fail to act.

Lawmakers have an opportunity to protect the American people and should not delay. Without urgent policy reform, another virus could once again send catastrophic ripple effects across the globe.

Since selling wildlife for human consumption is risky and inhumane, and acting now will safeguard human health, defend wildlife from cruelty and exploitation and protect our economy, we are calling for:

- State legislatures to pass laws prohibiting live wildlife markets and banning the intrastate transport of wildlife for human consumption.
- The federal government to ban live wildlife markets domestically and ban the importation of live wildlife into the United States.
- State and federal efforts to complement international endeavors to close live wildlife markets across the globe to ensure we never experience another pandemic like COVID-19.

FROM TOP: DANIEL MARCUS MACVAN; LOESKIEBOOM/ISTOCK.COM

JEZPHOTOS/ISTOCK.COM

Live wild animal trade

IN THE U.S., KEEPING WILD ANIMALS AS PETS has contributed to the proliferation of invasive species. But wild animals kept as companions can also spread viral, bacterial, fungal and parasitic infections that pose serious, even deadly, health risks to people. Importers and dealers often keep these animals in crowded, stressful conditions, which increases the likelihood of infectious diseases spreading among animals being sold to the pet trade. Conditions are so poor that standard industry mortality rates at exotic animal wholesale facilities are as high as 70%.

According to a 2010 report by the Government Accountability Office warning of the dangers of animal-related diseases from live animal imports, more than a billion live animals, largely destined for the pet trade, were legally imported into the U.S. between 2005 and 2008. The GAO report found that multiple federal agencies enforce a patchwork of laws relating to wildlife trade, but "no single entity has comprehensive responsibility for the zoonotic and animal disease risks posed by live animal imports." The U.S. is the world's largest importer of live wild animals but fails to conduct adequate disease surveillance on most of them. It is vital for the U.S. to address this dangerous oversight by banning the import of live wild animals and their possession as pets at the state and federal levels.

The lack of sufficient monitoring was evident in 2003, when the exotic pet industry caused the first human monkeypox outbreak outside of Africa. A Texas dealer imported hundreds of animals from Ghana, including African giant pouched rats, dormice and rope squirrels who were infected with monkeypox, and subsequently shipped them to a suburban Chicago vendor. The infected animals transmitted monkeypox to prairie dogs who the Illinois vendor sold as pets.

A total of 47 confirmed and probable cases of monkeypox were subsequently reported across six states. A lack of record keeping hampered officials' capacity to locate all the infected animals. The outbreak could have been much worse if any of the ill prairie dogs had been turned loose—as often happens with exotic pets—and transmitted the virus to other animals. The CDC has since placed restrictions on the importation of African rodents but more needs to be done.

In 1975, the Food and Drug Administration banned the sale of turtles with shells less than four inches in length because pet turtles were linked to about 280,000 salmonella infections yearly. While this ban prevented an estimated 100,000 cases of turtle-associated salmonellosis in children annually, baby turtles, sold illegally, continue to be a source of salmonella infections.

All reptiles and amphibians can transmit salmonella. Since 2011, the CDC has reported numerous multistate salmonella outbreaks involving crested geckos (17 states), bearded dragons (36 states) and water frogs (42 states). Reptiles commonly spread a variety of other patho-

gens to people that cause upper respiratory infections, conjunctivitis, gastritis, skin infections, profuse diarrhea, fever, abdominal pain and/or vomiting. Marine animals also pose zoonotic disease risks.

Outbreaks have been associated with other exotic pets. Hedgehogs were linked to salmonella outbreaks in 2019 (23 states) and 2012 (12 states). Confirmed zoonotic diseases carried by hedgehogs include Yersinia pseudotuberculosis, Mycobacterium marinum, rabies, herpesvirus and ringworm. Sugar gliders can spread salmonellosis, giardiasis, leptospirosis, clostridiosis and toxoplasmosis. Veterinary professionals take precautions when handling sugar gliders, as the animals' eye, nose, gastrointestinal, genital and urinary system discharges must be treated as potentially infectious.

In 2011, the CDC reported several cases of the parasite Baylisascaris procyonis infecting pet kinkajous in three states. Infected persons can develop incoordination, coma and blindness and can die. Kinkajous have also spread blastomycosis, a fungal infection that can spread through the body, and a previously unknown bacteria, Kingella potus.

In 1975, the CDC banned the import of primates for the pet trade because primates carry dangerous infectious diseases. But captive-bred primates continue to be sold as pets. Macaque monkeys kept in households with children have tested positive for the deadly herpes B virus. According to Congressional testimony by a representative of the American Veterinary Medical Association, "Each species of nonhuman primate has the capacity to introduce or spread illnesses that threaten human and domestic animal health."

The zoonotic disease risk is also significant for birds kept as pets. The table below, from "Zoonoses in pet birds: review and perspectives" in a 2013 issue of the journal *Veterinary Research*, lists 13 zoonotic diseases from birds; nearly half can be fatal.

Given that public health officials recommend that states ban the private ownership of wild animals (particularly rabies vector), and the Association of Zoos and Aquariums also advises against keeping wild animals as pets, we are calling for:

- State and federal bans on both live wildlife imports and keeping exotic pets, which would reduce the risks of zoonotic diseases caused by the commercial wildlife trade.

Table 3 Summary of main pet bird zoonotic diseases

Disease	Pathology	Clinical issue	Asymptomatic shedding	Transmission route	OIE listed disease	Risk for humans*
Chlamydophilosis	Systemic	Fatal	yes	D/I/V	Yes	high
Salmonellosis	Digestive to systemic	Treatable	yes	D/I/V	No	moderate
Tuberculosis	Respiratory to systemic	Fatal	no	D/I/V	Yes	high
Campylobacteriosis	Digestive to systemic	Treatable	yes	D/I/V	No	moderate
Lyme disease		None	no	V	No	low
Avian Influenza	Systemic	Fatal	no	D/V?	Yes	high
West Nile fever and other arboviruses	Respiratory to systemic	Fatal	yes	V	Yes (WNF)	moderate
Avian Bornavirus	Digestive/nervous to systemic	Fatal	no	D	No	null
Newcastle disease	Ocular To Systemic	Mild to fatal	yes	D/I/V	Yes	low
Toxoplasmosis	Digestive	Digestive	yes	I	No	Null to low
Giardiosis *(G. duodenalis)*	Digestive to systemic	Treatable	yes	I	No	moderate
Cryptosporidiosis	Digestive	Treatable	yes	I	No	moderate
Cryptococcosis	Digestive	Treatable	yes	I	No	moderate

*when handling a bird without hygienic precautions.
Legend: D = direct contact; I = Indirect contact; V = vector-mediated contact.

ANDREA IZZOTTI/ISTOCK.COM

Traveling shows and close encounters with wildlife

MANY ZOOS AND TRAVELING SHOWS present a variety of wild animals for public handling, allowing adults and children to pet, feed, kiss, ride, swim with and otherwise interact with captive animals who may pose zoonotic disease risks to people. And people may pose disease risks to the animals as well: Recent reports confirm that people may be able to transmit COVID-19 to tigers and lions.

Such activities also have an adverse impact on animal welfare. Pay-to-play programs often feature baby animals who are prematurely removed from their mothers and subjected to stress, neglect and mistreatment. The use of wild animals for public handling, as ambassador animals, and in traveling shows is both dangerous and inhumane. It should be prohibited.

Rabies vaccines are not licensed for use in wild animals. If a visitor is bitten or scratched by a wild animal during public handling, they may need rabies prevention shots that cost as much as $10,000. Public health agencies may require that the animal be euthanized for testing.

Traveling shows transfer animals—and the diseases they might carry—from state to state. Animals stressed by frequent transport, prolonged confinement, crowded conditions, rough and excessive handling, weather extremes, and inconsistent food and water supplies—conditions common in traveling shows—are more likely to shed pathogens. To date, six states and more than 160 other localities in 37 states have banned or restricted the use of numerous wild animal species in traveling shows.

Using wild animals as ambassador animals is often presented as an educational activity, but such use inspires people to obtain exotic animals as pets and miseducates the public about their conservation status. Many of the animals described in the previous section on exotic pets are commonly used by zoos as ambassador animals.

The following are additional examples of infectious diseases associated with animals used in public handling and in traveling shows:

- The Humane Society of the United States' undercover investigations of roadside zoos found tiger cubs infected with ringworm, coccidia and giardia being used for public handling.
- Animal handlers in zoos, circuses and a sanctuary have tested positive for tuberculosis after working with or near infected elephants. Elephants infected with TB have been used in traveling shows and for giving rides to the public, and TB-infected elephants used in circuses have died while on the road.
- Q fever, Cryptosporidium and ringworm are some of the zoonoses that have been found in captive bears.
- In 2016, the U.S. Department of Agriculture cited a traveling sea lion show—one that performs at fairs and allows the public to pose with and be "kissed" by sea lions—for failure to check for active leptospirosis infections in two sea lions after titers for the disease had previously been found in both animals. Pinnipeds have also transmitted sealpox to people.
- Sloths are growing in popularity in the pet trade and for use in commercial public handling enterprises, causing hundreds of sloths to be removed from the wild every year and shipped to the United States. Sloths are a major reservoir for American cutaneous leishmaniasis, which causes thousands of human infections annually. Sloths also host numerous arboviruses.
- The CDC warns that direct contact with camels is a risk factor for MERS infection.
- Animals in the viverridae family—civets, genets and binturongs—can transmit numerous zoonotic pathogens. The CDC placed restrictions on the import of civets because they are known to be an intermediate host for the highly infectious SARS virus.

The Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, published by the National Association of State Public Health Veterinarians and the CDC, details extensive risks associated with animals used in exhibitions and recommends prohibiting direct contact with certain dangerous animals.

The misguided demand for selfies and other close encounters with wild animals is fueling an industry that causes massive damage to biodiversity, contributes to the illegal wildlife trade and creates the potential for zoonotic disease transmission. Costa Rica now prohibits direct contact with wildlife both in captivity and in natural habitats. And dozens of travel companies, including TripAdvisor and Expedia, no longer sell tickets to some types of captive wildlife interactions. At least six U.S. states ban public contact with bears, big cats and/or primates. With social distancing between people being the new normal, wildlife distancing must be mandated to protect both human and animal health and safety, and to prevent the spread of infectious diseases.

Tiger Safari in Oklahoma (left) and Myrtle Beach Safari in South Carolina (right) used tiger cubs infected with ringworm for public handling.

Entertainment in the form of encounters with wild animals is dangerous and has been linked to numerous diseases, so we are calling for:

- A ban on close encounters with wild animals, including at zoos, fairs and circuses.
- The prohibition of wild animal traveling shows.

VSHINE

Fur farming and trade

THE FUR TRADE POSES SERIOUS HUMAN HEALTH AND ANIMAL WELFARE CONCERNS. Recent reports from mink fur farms abroad have revealed dangerous links between the industry and the further spread of the SARS-CoV-2 virus (the virus that causes COVID-19) to humans. As human, animal and ecosystem health are inextricably linked, it is vital for our health, economy and security that the U.S. and countries across the globe shut down the cruel, risky and unpopular fur farming industry and end the fur trade.

Killed solely for their fur, undomesticated mink, raccoon dogs and foxes are kept in intensive confinement systems for their entire lives. These systems present conditions ripe for disease transmission. Cage confinement means that these naturally wide-roaming animals are unable to act out even their most basic natural instincts, such as establishing large home territories, digging, hunting for food, living in family groups and, for mink, accessing swimming water. These conditions can lead to psychological disorders that cause stereotypical pacing, self-mutilation and cannibalism. At the end of their short lives, the animals are anally electrocuted, gassed or beaten to death. Some animals are even skinned while still alive.

According to a 2016 report released by the Chinese Academy of Engineering, 75% of China's wildlife trade is dominated by fur production—and China is the world's largest producer of fur products despite decreasing popularity for these products. Mink, raccoon dogs and foxes are common sights at wildlife markets in China. At these markets, animals have tested positive for coronaviruses at the heart of recent pandemics: Foxes and raccoon dogs were found to have been infected with the SARS coronaviruses in 2003 and 2004.

In 2020, mink on multiple fur factory farms in the Netherlands and Denmark tested positive for SARS-CoV-2. In fact, according to the Dutch government, it is "very likely" that the farmed mink spread the virus to at least two humans—the only known animal-to-human transmission outside the original source. To protect public health, the Dutch government decided to kill hundreds of thousands of mink at infected farms, which remain reservoirs for the SARS-CoV-2 virus, and will look at phasing out fur farming before 2021.

Indeed, scientific studies have linked several of the animal species used for their fur to a variety of coronaviruses:

- Mink could be a potential intermediate host of SARS-CoV-2, according to scientists. Scientists have also found that mink have proteins that function as receptors for SARS-CoV that are 87% similar to human receptors, meaning that they could be a potential reservoir of SARS-CoV-like viruses.
- Raccoon dogs in a wildlife market in Shenzhen were found to have been infected with SARS-CoV, and the virus was found to be genetically almost identical to that found in palm civets, leading scientists to suggest that both palm civets and raccoon dogs could be intermediate hosts for SARS-CoV. According to Christian Drosten, Germany's leading coronavirus expert, the "[SARS] virus was found in civet cats, but also in raccoon dogs—something the media overlooked. Raccoon dogs are a massive industry in China, where they are bred on farms and caught in the wild for their fur. If somebody gave me a few hundred thousand bucks and free access to China to find the source of the virus, I would look in places where raccoon dogs are bred."
- Foxes in a wildlife market in Guanzhou were found to have been infected with SARS-CoV. Scientists found that fox host cell binding sites were capable of binding to SARS-CoV-2, which causes COVID-19, and SARS-CoV, which causes SARS.

The fur trade presents clear human health and animal welfare risks. Fur farming and trade is also a failing industry. Designers and retailers—including Gucci, Prada, Versace, Burberry, Macy's, Bloomingdale's, YOOX Net-a-Porter, Farfetch and Michael Kors—have all committed to stop using fur, opting instead for alternatives that are better for animals and the environment. Fur auction houses have reported reduced sales, lower prices for pelts and financial difficulties. As a result, the North American Fur Auctions had its funding cut off by its bank in 2019.

Governments have also taken action to ban or restrict the fur trade. Since 2000, when the United Kingdom became the first country to ban fur farming, 18 European countries have either banned or restricted the practice. In addition, São Paulo, Brazil, has banned fur imports and sales, and India has banned the import of fur skins. In 2019, California became the first U.S. state to ban the sale of new fur products. In June 2020, the Dutch Parliament voted to shut down the nation's mink farms following transmission of COVID-19 from infected minks to farm workers. These are all positive trends, but more needs to happen to protect human health and animal welfare.

Because mink, foxes and raccoon dogs are possible transmitters of SARS-CoV-related coronaviruses and pose a serious threat to human, economic and environmental health, we are calling for a holistic, precautionary response that includes:

- Banning the trade in these animals.
- Urging apparel companies, governments and other entities globally to ban fur farming and end the sale of animal fur.

FROM TOP: VSHINE; BIRDIMAGES/ISTOCK.COM

ERIN VAN VOORHIES

Intensive confinement of farm animals

KEEPING FARM ANIMALS IN OVERCROWDED CONFINEMENT FACILITIES IS A RISK FACTOR for facilitating the development of zoonotic pathogens with the potential to infect human populations. When thousands of animals are tightly confined, it creates a larger "laboratory" in which pathogens can develop the ability to infect people. Viruses can become more virulent as they circulate through these large groups of closely confined animals. A 2013 review published in the *Proceedings of the National Academy of Sciences* found "strong evidence" that "intensified [farming] systems can be linked to disease emergence and amplification."

Despite these risks, farm animals are still predominantly kept by the thousands in close confinement at large-scale, industrial agriculture operations (also known as "factory farms"). Historically, these operations have been hosts to deadly zoonoses with the ability to cause pandemics. Highly pathogenic avian influenza and swine flu—the latter of which spread to 30 countries in 2009 by human-to-human transmission—are serious concerns. Certain strains of avian influenza have a 60% mortality rate, and the World Health Organization cautions that if a highly infectious form of this virus were to develop, it could spark the next global pandemic.

This is particularly concerning as avian influenza outbreaks are ongoing, including in North and South Carolina in the spring of 2020. Eliminating the intensive confinement of farm animals would reduce the risk of generating new diseases with the potential to spread to people.

In addition to disease risk, factory farms do not provide an acceptable level of animal welfare. For example, hens kept for egg production are tightly confined in small, barren cages inside giant warehouses, where row after row of wire enclosures are stacked on top of each other. This allows tens of thousands of birds to be confined under one roof. The cages are so small that hens are unable to express natural behaviors such as perching, nesting, foraging, dustbathing and even walking more than a few steps. Crowding the hens in stacked cages forces them to live in filthy, unsanitary conditions.

In the pork industry, pregnant mother pigs, known as "sows," are confined in "gestation crates," metal cages barely larger than their own bodies. These cages are so narrow that the pigs cannot even turn around; they are only able to take one step forward and move one step back. The pigs are forced to urinate and defecate in the same small space where they stand, eat and sleep. Pigs are highly intelligent, sentient beings, and these barren conditions can lead to the development of abnormal, repetitive behaviors—such as biting the bars of the crates—that indicate psychological distress. Mother pigs are confined in cages like these through perpetual cycles of pregnancy and birth, resulting in several sequential years of crate confinement before they are finally sent to slaughter.

To create a healthier, more humane and safer farming system, state governments need to de-intensify animal factories. As a first step, state governments should create minimum space standards and phase out the cage confinement of animals altogether, particularly egg-laying chickens, mother pigs in gestation crates and calves in veal crates. To date, a dozen U.S. states have moved to phase out, limit or ban all or some use of these intensive confinement systems. Other states should follow suit.

Additionally, as the federal government already spends billions of dollars on agricultural subsidies, it should provide economic incentives to support farmers transitioning from caging systems to less intensive cage- or crate-free systems. Federal government bailout and stimulus packages should only be provided to producers that have eliminated or have verified plans to eliminate confinement systems and make other animal welfare improvements.

In the private sector, food companies—such as restaurant chains, packaged food companies and grocery stores—that have pledged to make animal welfare reforms, including eliminating the sale of eggs from caged chickens and pork from operations that cage mother pigs, should fulfill their commitments. Companies that have not made such public pledges should set a date to phase out their purchases of meat and eggs from cage operations completely.

Investors in publicly traded food companies should demand they take these actions. Banks and other lenders should not provide loans for the construction, remodeling or expansion of cage systems, instead funding only cage-free systems. Food companies—such as restaurant chains, consumer packaged goods companies and grocery stores—should mandate that their suppliers eliminate, or at least take tangible steps to eliminate, the confinement of animals in cages and crates. All food companies should set a date to phase out their purchases of meat and eggs from cage operations completely. Further, investors in publicly traded food companies should demand they take these actions.

To reduce the risk of disease spread from confining animals on factory farms, we are calling for the following initial steps:

- Elimination of the intensive confinement of farm animals, particularly for egg-laying hens in cages, mother pigs in gestation crates and baby cows in veal crates.
- Federal economic incentives to assist farms transitioning from cage confinement systems to cage-free production.
- Bailouts and stimulus funds to only go to producers that have eliminated—or have plans to eliminate—cages and make other animal welfare improvements that lead to safer systems.
- Food companies in the private sector to make and fulfill animal welfare pledges to stop purchasing eggs from caged hens, pork from operations that cage mother pigs and veal from caged calves.
- Banks and lenders to only financially back cage-free production systems and investors to hold food companies accountable for mandating that suppliers shift to cage-free production methods.

THE HSUS

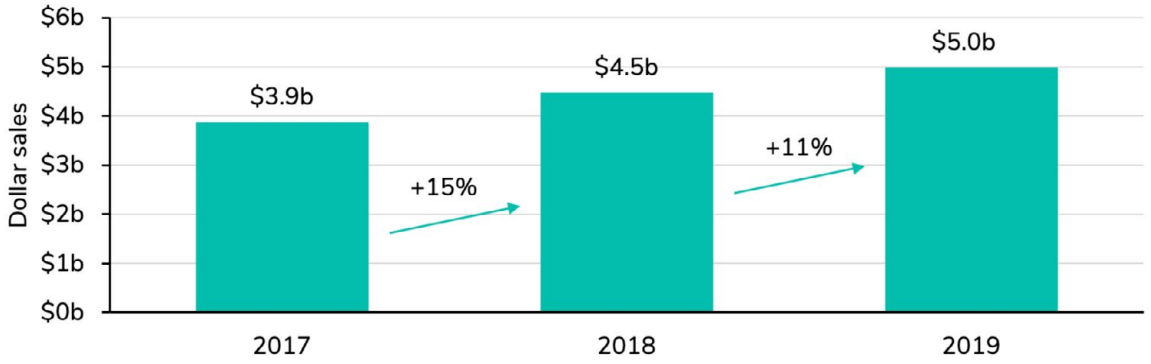
Alternative proteins in the food industry

IN ADDITION TO MOVING AWAY FROM INTENSIVE ANIMAL CONFINEMENT SYSTEMS, there is an increasingly recognized need for closer scrutiny of our food system and its reliance on animal protein. Governments and the private sector must play a larger role in the shift to more plant-based proteins to ensure a greater availability of diverse, dependable and healthy protein sources. Plant-based options include no animal-derived ingredients and do not carry the same environmental, public health or animal welfare threats associated with factory farming.

Plant-based "meat" can be made from a variety of plants, such as peas, grains and beans, such as soy. Some of today's plant-based meats closely mimic the taste, texture and sensory characteristics of animal meat. However, despite rapid development in the private sector, federal government financial support for research programs to develop plant-based technologies is still needed to explore new plant proteins, improve taste and texture and lower the cost of consumer-ready products.

Further, governments at all levels—federal, state and municipal—can play a key role in ensuring that plant-based meats and other plant-based options are available for consumers. They should start by passing laws requiring public institutions to offer plant-based options at every meal. New York passed a law mandating that its hospitals do so; similarly, California adopted a law in 2018 and Maryland lawmakers introduced a bill in 2020 requiring that hospitals and prisons make plant-based meal options available. While these measures are a step in the right direction, governments should enact policies ensuring quality plant-based foods are available at all government-run institutions and that more than one choice is available.

Total U.S. Plant-Based Food Market



Source: SPINSscan Natural and Specialty Gourmet (proprietary), SPINSscan Conventional Multi Outlet (powered by IRI), 104 weeks ending 12-29-2019

The food industry should also play a greater role in promoting public health and animal welfare by investing in plant-based innovations, offering more plant-based menu options and making more grocery shelf space for plant-based proteins. Whether because they see how profitable plant-based meat can be or understand the importance of diversifying, multiple animal meat companies have already either invested in other companies' plant-based meats or developed their own line of animal meat alternatives. For example, Tyson Foods, a multinational corporation that produces chicken, pork and beef, first invested funds in Beyond Meat before developing its own line of alternative proteins (although not fully animal product-free). Pork company Hormel launched its own brand of plant-based products in 2019.

In addition to investing in and creating plant-based brands, grocery stores are offering more plant-based items on their shelves. However, more shelf space is needed to keep up with demand and to ensure companies are incentivized to keep making these products. One way to do this is by supermarkets offering plant-based meats alongside animal-sourced meats. This model has already been adopted by some chains, including Kroger and Whole Foods. Other grocery chains should follow this model, just as every major grocer already offers plant-based milks in the animal-based dairy section.

Restaurants are also following suit and providing diners with more plant-based options. Burger King, White Castle and Carl's Jr. all offer innovative veggie burgers on their menus. McDonald's offers plant-based proteins abroad and should extend its plant-based offerings to its United States restaurants—a development which McDonald's CEO has publicly stated is just a matter of "when." Restaurants that do not currently offer a plant-based protein option should begin doing so to remain competitive and appeal to more customers, and food chains that have piloted plant-based items should make these products a permanent fixture on their menus.

Governments and the private sector also have an opportunity to help fund technology that has the potential to transform the food system: animal meat grown outside of animals. Cultivated meat is produced by in vitro cell cultures of animal cells instead of by slaughtering animals. In the long term, cultivated meat can offer a more ethical and safe solution to our dependence on farm animals.

Governments and universities in multiple countries have supported the development of cultivated meat. Government funding in the Netherlands for research on cultivated meat began in 2005, and several universities have hosted research fellows in their laboratories to help develop cultivated meat. Similarly, cultivated meat companies throughout the world have received investments from the private sector to develop the necessary technology. But more private investment and government funding of research programs is crucial to speed the development of cultivated meat technologies. The United States should start funding research and development programs for cultivated meat as an alternative to factory farming.

AMY WEBSTER/THE HSUS

Only by reducing the number of animals in intensive confinement systems and shifting away from reliance on factory farm-raised animal protein can we reduce the risk of another public health crisis. Without addressing the inherent risks in factory farming, the next global pandemic can easily arise from within our own food system.

We are calling for:

- Public institutions to offer plant-based meals at every meal to consumers.
- Government and private sector financial support for the research and development of plant-based and cultivated meat technologies.
- Food manufacturers to invest in creating more plant-based protein offerings, restaurants to offer more plant-based menu items, and grocery stores to provide more shelf space—specifically in the "meat" section—for plant-based proteins.

UNOL/ISTOCK.COM

Alternatives to animal testing

THE EMERGENCE OF THE COVID-19 PANDEMIC HAS HIGHLIGHTED the scientific community's significant reliance on the use of animals as researchers scramble to find the most appropriate animal models with which to decipher this condition, discover treatments and ultimately develop a vaccine. Millions of dollars (and an untold number of animals) have already been invested in COVID-19 research on animals for therapeutics and vaccines, an approach that has historically proven to be time and resource intensive and has a high failure rate, specifically for drugs. The pressure is understandable, considering the critical public health emergency we face. In situations of such high uncertainty, we reflexively turn toward what we have always done, which is not always what would work best.

We need to reevaluate our approach to therapeutics and vaccines and ask why we are spending valuable time and resources engineering genetically modified animals who may be used as models of infection instead of focusing on the species of interest: the human. We need a thoughtful policy strategy to prioritize investment in, and use of, approaches that are more cost effective, take less time and are human-relevant to tackle this devastating pandemic swiftly and effectively.

Animals are not infected by COVID-19 in the same way that people are. Mice (the most commonly used animal in biomedical research) are not naturally susceptible to this virus. Even monkeys (our closest relative within the species commonly used for research), when deliberately infected with COVID-19, do not develop the severe viral pneumonia and acute respiratory distress syndrome that is so devastating to many people with COVID-19. We also know that, in human patients, COVID-19 severity is associated with risk factors, such as obesity and age, that are not present in the experimental animal models.

The promising news is that there is a plethora of existing human-relevant models for COVID-19 research to support ongoing efforts to engineer and produce vaccines and treatments. They are already providing valuable information without harming animals. For example:

- COVID-19 initially attacks the respiratory tract. Researchers are using very small samples of human tissue taken during routine surgical procedures to find out which elements of the human lung are enabling the virus to enter the body. These studies are not possible using animals, and they are vital for

understanding how and why COVID-19 can affect individuals so differently and for finding out how to treat everyone more effectively.

- "Lung chip" models, which are sophisticated cultures, can be created using cells from different areas of the respiratory system (e.g., the nasal passages, the upper airways, the alveoli) and allow researchers to study the dynamics of infection.

Researchers have also created complex, vascularized models where human cell-based blood vessels are cultured underneath the airways model to mimic normal lung physiology. These models allow infection of the airways through the airways channel, followed by delivery of possible antiviral drugs through the vascular channel. This closely mimics what would happen in an infected patient undergoing treatment and the models have been used to screen previously clinically approved drugs for potential COVID-19 activity.

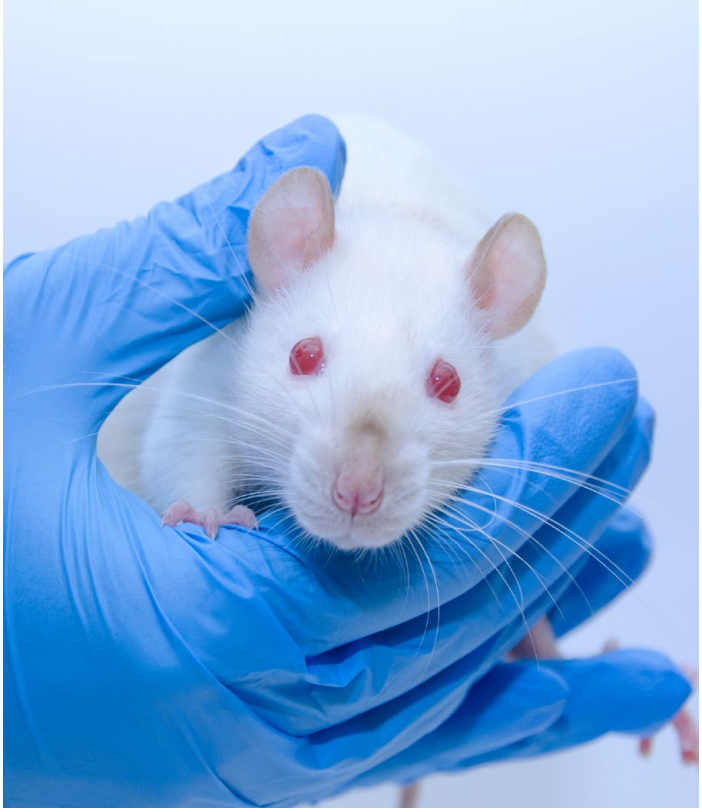
- Mathematical models offer an accelerated route toward identifying where existing drugs may be rapidly "repurposed" in the fight against COVID-19. Researchers can exploit the rich body of information that exists regarding approved drugs as well as the structure of the virus and its infection strategy. Then they can run computer simulations to test how existing drugs might interact with and block viral entry to the body. Researchers can also "mine" existing scientific knowledge, using algorithms to search thousands of articles, to identify human risk factors and recommend new directions for COVID-19 research.

Ultimately, these approaches allow for more flexibility to gain knowledge quickly as we learn more about the virus to prioritize treatments.

Historically, animals have been used as human surrogates in biomedical research. But we urgently need a solution for people, not mice, hamsters, ferrets or monkeys. Vaccine and drug research, development, production and testing ought to be based on the best available science rather than on outdated methods. Regulatory frameworks should strive to critically evaluate and incorporate those innovations that allow us to reach the new, more human-biologically-relevant future that we need to enable faster and more effective drug development and delivery.

To enable this shift to a research approach that relies on human-relevant methods that do not involve animal suffering, we are calling for:

- Prioritized federal and state funding for continued development and application of the human cell-based, nonanimal approaches to address COVID-19.
- Prioritization of the application of existing human-relevant, nonanimal approaches for COVID-19 research by government agencies and research institutions.
- Continued international and federal coordination of development and implementation of human-relevant, nonanimal approaches to COVID-19 intramural and extramural research to ensure maximum impact of funding.



FROM TOP: THE HSUS; OLENA KURASHOVA/ISTOCK.COM

USDA

Dog breeders and zoonotic disease

RECENT ZOONOTIC DISEASE OUTBREAKS of drug-resistant Campylobacter jejuni infections and canine brucellosis linked to the commercial pet trade have highlighted the risks to unsuspecting citizens who purchase or handle puppies raised by large-scale breeders. Poor veterinary oversight and crowded, unsanitary conditions at large-scale commercial pet breeding operations—known as puppy mills—and throughout the pet distribution chain have led to disease outbreaks that have already sickened many people.

The CDC recently investigated two outbreaks of Campylobacter jejuni linked to pet store puppies, primarily puppies sold by Petland, the largest chain of puppy-selling stores in the United States. The CDC found that commercially bred puppies sold through pet stores were the primary source of the multistate antibiotic-resistant outbreaks of Campylobacter (2016-2018 and 2019), which sickened at least 148 people between the two cases, at least 27 of whom had to be hospitalized. Lawsuits filed after the initial outbreak suggest some individuals had lasting health problems as a result of their infections.

The CDC's laboratory testing confirmed that the infections were linked, and the strain was resistant to seven of the nine different drugs that are common first-line options for treating Campylobacter infections. The CDC found over 30 dog breeders and distributors connected to infected puppies in the 2016-2018 case; however, because the commercial dog breeding, transport and sale model involves significant co-mingling, with disease transmission risks at every point, no single breeder, distributor or transporter was identified as the infection source.

As part of their 2018 investigation, the CDC reported that researchers visited 20 pet stores in four states and collected antibiotic administration records for 154 puppies: "Of the 149 puppies with available

information, 142 had received one or more antibiotic courses before arriving or while at the store, 78 had received antibiotics prophylactically, and 54 received antibiotics both prophylactically and for treatment." The CDC concluded that a more judicious use of antibiotics by the pet industry, along with "enhanced infection prevention measures throughout the distribution chain," would help prevent drug-resistant strains of disease.

Canine brucellosis is another zoonotic disease that is on the rise and has been linked to poorly regulated commercial pet dealers. Human infection with Brucella canis bacteria can cause flu-like symptoms, arthritis and fevers, and in rare cases, can "involve the nervous system, eyes or heart," according to an Iowa State University fact sheet.

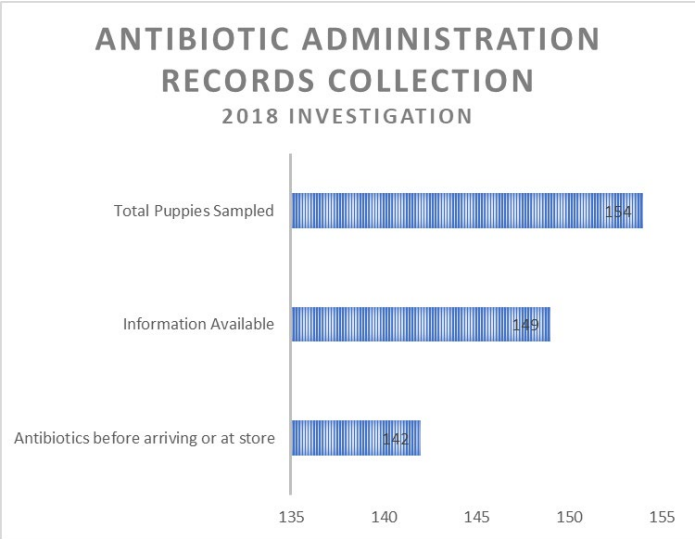
One of the most recent outbreaks occurred on May 4, 2019, when a dog dealer operating under the business name Iowa Puppies, also known as Double G Kennels, sold about 200 dogs at an Iowa auction, some of whom tested positive for Canine brucellosis after they had already been transferred to new owners, according to the state veterinarian and news reports. This resulted in quarantining several properties across the state and necessitated widespread warnings to reach consumers who may have purchased some of the dogs and who could not immediately be traced.

In May 2020, the USDA issued a new rule that will require dog dealers to keep more detailed veterinary records and obtain annual hands-on examinations of each dog. The rule does not require breeders to have dogs tested for campylobacter, brucellosis or any other zoonotic diseases, even if the dogs are symptomatic. The rule also does not require commercial breeders to keep veterinary records on individual dogs but only records on health trends for the kennel, which will continue to make accurate disease tracing almost impossible.

The risk of widespread human illness linked to puppy mill dogs will only escalate until laws require more stringent veterinary oversight at commercial pet breeders and dealers, until firm enforcement of animal health and welfare laws becomes a priority, and until the convoluted pet supply chain is drastically reformed. More than 350 localities and multiple states have banned the sale of commercially raised puppies in pet stores. These humane pet store ordinances help close the market to the puppy mills most often linked to puppies who are infected with zoonotic diseases.

Given that large-scale commercial pet breeding operations are a known source of disease outbreaks, we're calling for:

- Strict enforcement of health and welfare laws as they relate to puppy mills.
- Stringent veterinary oversight at commercial pet breeders and dealers.
- A ban on the sale of commercially raised puppies in pet stores.



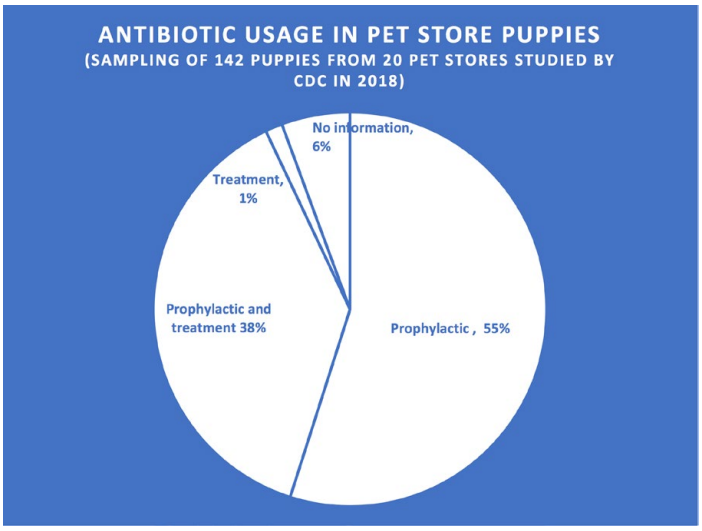


CHART: THE HSUS

CHRIS KEANE/AP IMAGES FOR THE HSUS

Enforcement of cockfighting laws

THE WORLD HEALTH ORGANIZATION RECOGNIZES H5N1, a highly infective form of avian flu, as a serious threat to human health. Although not nearly as contagious as COVID-19, the reported mortality rate of H5N1 is 60%. According to the WHO, as of May 2020 there have been 864 verified cases of H5N1 in the world and 455 deaths. The CDC also reminds us that flu viruses are constantly mutating and animal flu viruses can change to become more infectious, causing a pandemic. The threat of this disease has prompted the United States government to stockpile vaccines for pandemic preparedness.

Avian flu is also a threat to the commercial poultry industry. In 2015, Iowa lost $1.2 billion and 8,444 jobs because of the disease. As recently as April 2020, a highly infectious form of bird flu was detected on a commercial turkey farm in South Carolina. The USDA determined that the outbreak was a mutation from an outbreak of avian influenza in North Carolina that occurred the month before.

One critical way to prevent a potential pandemic in the United States is to address illegal cockfighting, a risk factor in the spread of avian flu. Since 2005, at least eight people died from avian influenza because of their involvement in cockfighting. In 2005, a man in Thailand who sucked the blood out of roosters injured in cockfights—a common practice—was the first known human casualty of bird flu since the disease made a comeback in Asia. In 2007, the USDA's Inspector General testified to Congress that birds used in animal fighting present a health risk to humans and animals because the birds may carry infectious diseases such as avian influenza.

Cockfighters maintain game fowl yards with hundreds, sometimes thousands, of birds for fighting. The congregation of this many birds in one area creates an ideal environment for the spread of disease. Cockfighters also routinely engage in unsanitary practices, such as handling bloody birds and putting their own mouths over injured roosters' beaks to suck fluids and blood from their airways.

Many American cockfighters travel abroad with their birds to countries where cockfighting is legal. Nations such as Thailand—where people have died from avian flu after their exposure to cockfighting—and the Philippines—which has reported cases of avian flu as recently as March 2020—routinely host American cockfighters and their birds for large cockfighting events. After being exposed to blood and bodily fluids from injured fighting birds, roosters and their handlers return to the U.S.—potentially bringing disease with them. The international transport and sale of fighting birds is a federal crime but lacks meaningful enforcement; it is a surprisingly big business in the U.S. with little, if any, oversight or testing for zoonotic diseases.

The Humane Society of the United States and Humane Society Legislative Fund, along with local partners, have successfully pushed all 50 U.S. states to outlaw this gruesome activity and Congress to strengthen the federal law against animal fighting five times since 2002. We have also worked with Congress to obtain provisions in the annual appropriations bills for many years directing USDA to strengthen enforcement against animal fighting enterprises. Still, to reduce the risk of an H5N1 pandemic, more needs to be done.

The 10 states that do not prohibit the possession and sale of birds for cockfighting, and states that have no meaningful penalties for this crime, should pass legislation to ensure they have effective laws that give local law enforcement the tools they need to prevent the spread of disease through this cruel and pointless activity. State laws against possession and sale of fighting birds are especially urgent to stop the interstate and criminal transport of birds who may be carrying disease.

On the federal level, in appropriations measures and communications with USDA and the Department of Justice, Congress should call attention to the connection between cockfighting and pandemic risks that threaten human health and the economic stability of the poultry industry as an additional compelling reason for stronger enforcement within the United States and its territories. USDA must take the necessary steps to better enforce federal animal fighting law and prevent the spread of disease, working with state and local agencies to complement their efforts to shut down cockfighting enterprises and engaging in meaningful oversight to stop interstate and foreign commerce in birds used for cockfighting. States should vigorously pursue illegal cockfighting just as the Department of Justice should aggressively pursue enforcement actions against violators.

To lower the risk of the spread of H5N1 and other strains of avian flu, we are calling for:

- Meaningful enforcement of federal laws banning the transport and sale of fighting birds.
- A ban on the possession and sale of birds for cockfighting in all U.S. states and territories.

FROM TOP: THE HSUS; TROY TOMLINSON/ SC WATERFOWL RESCUE

MEREDITH LEE/THE HSUS

Conclusion

COVID-19 HAS DEMONSTRATED just how far reaching and devastating the consequences of a pandemic can be. Just as COVID-19 has affected nearly every facet of life, so could a future pandemic, including one with dramatically higher mortality rates. Therefore, it is critical that government and the private sector make key policy changes to help prevent future disease outbreaks.

With most emerging infectious diseases that infect humans originating in animals, it is crucial that industries change their interactions with and treatment of animals now. Policymakers play a central role in ensuring reforms are made. Since zoonotic diseases have already been the cause of millions of human deaths across the world and could be the source of many more, it is imperative that lawmakers and businesses take immediate action.

Whether it's trading wild animals, intensively confining farm animals or breeding dogs in puppy mills, scientists have identified and warned us about the activities that promote disease spread and could lead to future pandemics. The COVID-19 crisis is a reminder that we must not only examine the use of animals in various arenas, but that we should use this knowledge to create meaningful change.

The Humane Society of the United States and Humane Society Legislative Fund's science-based policy recommendations to reduce the risks of another global health crisis would not only help limit future outbreaks of disease—and stop the resulting human and economic toll—but they would also strengthen our social, cultural, economic and political commitments to the better treatment of animals.

Our Promise

We fight the big fights to end suffering for all animals.

Together with millions of supporters, we take on puppy mills, factory farms, trophy hunts, animal testing and other cruel industries. With our affiliates, we rescue and care for thousands of animals every year through our animal rescue team's work and other hands-on animal care services.

We fight all forms of animal cruelty to achieve the vision behind our name: a humane society. And we can't do it without you.

THE HUMANE SOCIETY
OF THE UNITED STATES

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