

The links between climate change and viral infection

Global warming has taken vector-borne viral diseases such as dengue to new dimensions



IFTIKHAR AHMED

CLIMATE change is one of the most complex challenges of this century. Globalisation and climate change have caused an unprecedented impact on emerging and re-emerging diseases including zoonoses (diseases that can be passed from animals to humans) in recent years. Emerging infectious diseases refer to diseases caused by newly identified and previously unknown infectious agents; they have the potential to cause immense burden on public health both locally and internationally. On the contrary, re-emerging infectious diseases, caused by agents that have been known for some time and have fallen to very low levels, are now showing an upward trend in incidence worldwide. It is worth noting that viruses and biological vectors (e.g. mosquitoes) swim in the evolutionary stream—they swim so fast that even any thoughtful intervention usually fails to stop them from infiltrating the system.

Global warming and climate change have taken diseases like dengue and other vector-borne viral diseases to new dimensions. Climatic factors, particularly temperature and rainfall, affect the ability of viral disease propagation and potential mosquito

vectors to coexist long enough to maintain and increase the rate of transmission. The decreased prevalence of infectious diseases in western countries in the 20th century was due to urban sanitation, improved housing, personal hygiene, antiseptics and immunisation. Since the last quarter of the 20th century, there has been a resurgence of infectious diseases: certain viral diseases (Avian influenza, Ebola, Marburg, Rift Valley fever, chikungunya, dengue, Japanese encephalitis) have emerged or re-emerged while others (smallpox, poliomyelitis, measles) have declined significantly.

Zoonotic transmission of infectious agents from animals (wild and domestic) to humans constituted more than two-thirds of emerging infections. Contact among animals and people is another driving force behind the emergence of new infections. Deforestation forces wild animals into closer contact with humans. Increased possibility for agents to breach species (host) barrier between animals and humans is responsible for the spread of diseases like Lassa fever, yellow fever and swine flu while global warming facilitated the spread of vector-borne diseases such as dengue, chikungunya and Japanese encephalitis.

Rapid urbanisation and population displacement have given rise to the growth of densely populated cities with substandard housing, unsafe water, poor sanitation, overcrowding, indoor air

pollution (triggering incidence of viral diarrhoea), acute respiratory tract infection, and many other microbial infections. Recognising the complexity of the diverse sociocultural processes involved in the emergence/re-emergence of infectious diseases, many researchers in the fields of biology, medicine, and public health are calling for inputs from experts in the social, economic and behavioural sciences. With its integrative approach to complex bio-cultural issues, anthropology is well-positioned to make significant theoretical and practical contributions. Climate change has been responsible for at least one emerging or re-emerging disease in many countries and the number of such countries is gradually increasing.

Diseases such as severe acute respiratory syndrome (SARS), one of the first emerging viral diseases of the 21st century, in one country are an alarming threat to all travellers with a tremendous negative economic impact on trade, travel and tourism. Nipah virus infection is becoming endemic in Bangladesh as cases have been continuously detected since 2001. Avian influenza (H5N1) has been detected since November 2003 in birds and affected 60 countries across Asia, Europe, Middle East and Africa, and more than 220 million birds were killed by the virus or culled to prevent further propagation. Swine-origin influenza A (H1N1) which leads to swine

flu causes respiratory diseases in pigs; pigs can get infected by human, avian and swine influenza viruses. In late 2009 and early 2010, the global pandemic of swine flu caused great panic. Although a few cases of swine flu were detected, there were only two recorded deaths in Bangladesh.

The outbreak of dengue has taken place over the past 40 years with a 20-fold increase to nearly 0.5 million cases from 1990 to 1998. The medical community of Bangladesh was fairly unfamiliar about the presence of dengue in the country before 2000. Since its outbreak beginning in the summer of 2000, cases have been reported every year. Chikungunya fever is also a re-emerging condition in previously unaffected areas with possibly changing epidemiology and severity of the disease. This tends to be clustered geographically and overlap with dengue because they share some common clinical features.

The role of climate as well as environmental changes on the growing burden of emerging and re-emerging infections calls for a new approach so as to prevent these threats. The response options need to be appropriate keeping in mind the nature of vulnerabilities that might affect demographic transitions due to climate change. Health, nutrition and population experts must address these areas of public-health issues related to climate change with the required responses.

Member countries have given the World Organisation for Animal Health a mandate to address the issue by using its scientific capabilities and networks at the global, regional and sub-regional levels. The aim is to prevent or reduce the effects of climate change on animal diseases which are transmissible to humans. In order to offer a multidisciplinary perspective to mitigate the problem, infectious disease specialists, epidemiologists, geneticists, microbiologists, and population biologists need to join hands to address questions about the definition, identification, factors responsible for and multidisciplinary approaches to viral infections. There is also a need for monitoring at the national, regional and global levels which can be done by taking an epidemiological, laboratory-based, ecological and anthropological approach and adopting early control measures.

The role of public-health professionals is to establish monitoring and surveillance for unusual diseases and drug-resistant agents as well as ensure laboratory capacity to identify new agents and develop plans to handle outbreaks of unknown diseases. Finally, socio-political commitment at both the national and international levels is crucial for effective containment of these dangerous diseases.

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PROJECT SYNDICATE

What's behind America's mass shootings?



ELIZABETH DREW

AFTER every mass shooting in the United States, Americans and others around the world are confronted with the question of what lies behind this distinctly American horror. Though total gun deaths in the US have actually declined

over time, mass shootings (those with at least four victims) have become deadlier and more frequent. Some have had an especially strong emotional impact on the country.

The back-to-back mass shootings in El Paso, Texas, and Dayton, Ohio, on the first weekend of August are widely being viewed as the straw that will break the back of the US gun lobby, particularly the National Rifle Association (NRA), which has long stood in the way of congressional passage of gun-control measures. Yet we have heard similar predictions before. After the massacre at Sandy Hook Elementary in Connecticut on December 14, 2012, when a 20-year-old man gunned down 20 first-graders and six adults, then-President Barack Obama, wiping tears from his eyes, vowed to take action.

On the face of it, adopting meaningful gun-control legislation after such a horrendous tragedy should not have been a problem. Polls showed that 92 percent of the public supported closing loopholes in the requirement for background checks—which at present don't include examinations of individuals purchasing firearms at gun shows, privately from another individual, or online—and that 62 percent supported a ban on high-capacity magazines. It was hard to ignore the emotional appeal of the shattered parents who'd come to Washington to plead their case. Yet, even in the wake of Sandy Hook, the US Senate voted down two measures to tighten gun-control laws.

To understand why, it's important to keep in mind that the politics of gun control emanate from the same counter-majoritarian principle that gave Americans the Electoral College. In the Senate, far less populous western, mid-western, and southern states—home to hunters and conservative-leaning John Wayne wannabes—have the same

representation as far larger states like New York and California. So, even when most Americans favour stronger gun-control laws, that majority position isn't necessarily reflected in the makeup of the Senate.

At the same time, gun-control opponents have benefited enormously from a seemingly nonsensical interpretation of the Second Amendment. Adopted in 1791, the Second Amendment states that, "A well-regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed." Books have been written about the amendment's true meaning, but to gun-rights advocates, neither the plain text nor the historical context of the amendment matters. By ignoring the governing clause—"a well-regulated Militia, being necessary" (an awkward comma, to be sure)—they assert an individual "right to keep and bear arms" as if it had been handed down from Mount Sinai.

In reality, the Second Amendment is a product of its time, reflecting the former colonies' perceived need to protect themselves from a standing government army. Moreover, the weapons of the time were simple objects

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compared to the deadly semiautomatics and magazines that the NRA tries to convince "sportsmen" they must have, and for which there is no appropriate civilian purpose. (Needless to say, gun manufacturers have contributed millions of dollars to the NRA.)



Flowers are placed in a bullet hole a few buildings away from where the shooting took place in Dayton, Ohio. PHOTO: MEGAN JELINGER/AFP

Arguments over the meaning of the Second Amendment remained at an impasse for over two centuries. Then came the Supreme Court's landmark 5-4 decision in *District of Columbia v. Heller* (2008), which invalidated the District of Columbia's ban on privately owned handguns in the nation's capital. With the Court having become even more conservative since then, new gun-control laws that come before it may well suffer a similar fate, especially if President Donald Trump wins re-election.

The last major gun-control legislation enacted in the US was the 1994 Violent Crime Control and Law Enforcement Act, which included a ban on assault weapons. As a compromise, that provision came with a number of loopholes, as well as a "sunset" clause requiring that it be explicitly renewed after 10 years. In the event, the ban was allowed to lapse in 2004, during George W. Bush's presidency.

The prevailing evidence shows that mass-shooting deaths fell during the years when the assault-weapons ban was in place, and then rose after it lapsed. If a tightened new

ban were enacted, along with a reduction in the legal magazine capacity to 10 (from as much as 100 now), that would be a sign that Trump and Congress are serious about curbing mass slaughters. But there is little likelihood of it happening.

Still, in the wake of the El Paso and Dayton shootings, Trump has begun to strike a somewhat different tone on the issue, indicating that he would support "very meaningful background checks." But Trump talked the same way after a gunman murdered 17 people at Marjory Stoneman Douglas High School in Parkland, Florida, in February 2018. He soon backed off under pressure from the NRA (which, it is worth remembering, was implicated in Russia's efforts to help Trump in the 2016 election).

Following the latest two massacres, Trump also called for a "red-flag" law, which would allow courts temporarily to confiscate firearms from individuals deemed to be a danger to themselves or others, following notification by a family member or law-enforcement official. Such laws are already on the books in more than a dozen states,

but many conservatives oppose them on the grounds that they deny due process. Nonetheless, some prominent Republicans, such as Senator Lindsey Graham of South Carolina, feel they have to do something about the mass shootings, and are now championing red-flag legislation.

Of course, neither background checks nor a red-flag law would have prevented the slaughter at Sandy Hook (the guns, after all, belonged to the shooter's mother, whom he killed first). But such measures would allow Trump and his fellow Republicans to claim that they have "done something" about the problem. Hence, even Senate Majority Leader Mitch McConnell—who chronically obstructs anything supported by the Democrats, but wants the Senate to remain in Republican hands—has said that he might consider legislation on background checks and red-flag laws.

Trump has once again painted himself into a corner. Since the latest massacres, he's been at pains to present himself as a reasonable fellow who can get behind gun reform (and perhaps mollify suburban women, his most dangerous foes on this issue). But he's also noticeably (and typically) anxious to maintain the loyalty of the rural voters who form an important part of his base. Trump has also taken the gamble of using racial politics and white supremacy as instruments for winning in 2020. When faced with the dilemma of trying to assuage suburban voters or keeping the base close, time after time his instinct has been to shore up the base. (That didn't work very well in 2018.)

Whatever happens in the next few months, the fact that there are more privately owned guns than people in the US means that any new gun-control law would have only a marginal effect, at best. Despite the American public's urgent and desperate demand that lawmakers "do something," Trump is currently on a golfing vacation, and Congress is on its annual August recess. A lot, including a change in the national mood, could happen before it reconvenes.

Elizabeth Drew is a Washington-based journalist and the author, most recently, of *Washington Journal: Reporting Watergate and Richard Nixon's Downfall*.

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QUOTABLE Quote

CHARLES DICKENS
(1812–1870)

English writer and social critic, who is regarded by many as the greatest novelist of the Victorian era.

There are dark shadows on the earth, but its lights are stronger in the contrast.

CROSSWORD BY THOMAS JOSEPH

ACROSS

1 Maligns in print	Puente	6 Utter
7 Going rate	27 Starting bid	7 Leg bone
11 Lack of vitality	29 Prepare potatoes	8 Mean
12 Continually	33 Take place	9 Soothing
13 Only just	34 Date qualifier	10 Makes blank
14 South-western	35 Eccentric fellow	16 Regular hangout
sight	36 Oil vessel	18 Preside over
15 Doorway	37 Goofing off	20 Copying
16 Smarts	38 Car part	22 Address ender
17 Reduced amount	39 Beatty and	23 Freezing
18 Wine holder	Buntline	24 Famed tenor
19 Pearl Harbor	40 Makes amends	25 Swindled
setting		28 Microwaves, slangily
21 Astronaut	DOWN	30 Alan of "Argo"
Grissom	1 Clothing brand	31 Act part
22 Red choice	2 Laughable	32 Fast runners
25 Peculiarity	3 Lahr and Parks	34 Jargon
26 Salsa legend	4 American essayist	36 Assam export
	5 Symbol of purity	

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BEETLE BAILEY by Mort Walker

WELL, THERE'S THE SPEECH I'M GOING TO MAKE TODAY

I'LL BET IT WILL INSPIRE EVERYONE TO GET MOVING AND TRY HARDER

BABY BLUES by Kirkman & Scott

I HOPE THE KIDS BEHAVE TONIGHT, CHLOE.

THEY WILL. I BROUGHT ALL MY BABYSITTING GEAR.

GAMES

CARDS

SNACKS

ART SUPPLIES

TASER...

WHAT WAS THAT LAST THING?

JUST DRIVE.