Tackling the health toll of climate change

By Goran Mijuk | Apr 07, 2022

Climate change is not only set to impact ecosystems and weather patterns across the planet, it will also take a toll on human health. While new diseases may be the consequence of this development, the most likely scenario is that patterns of existing infectious and noncommunicable conditions will change.

The World Health Organization, for its part, estimates that between 2030 and 2050, climate change could cause around 250 000 additional deaths per year from malnutrition, malaria, diarrhea and heat stress, among other factors.

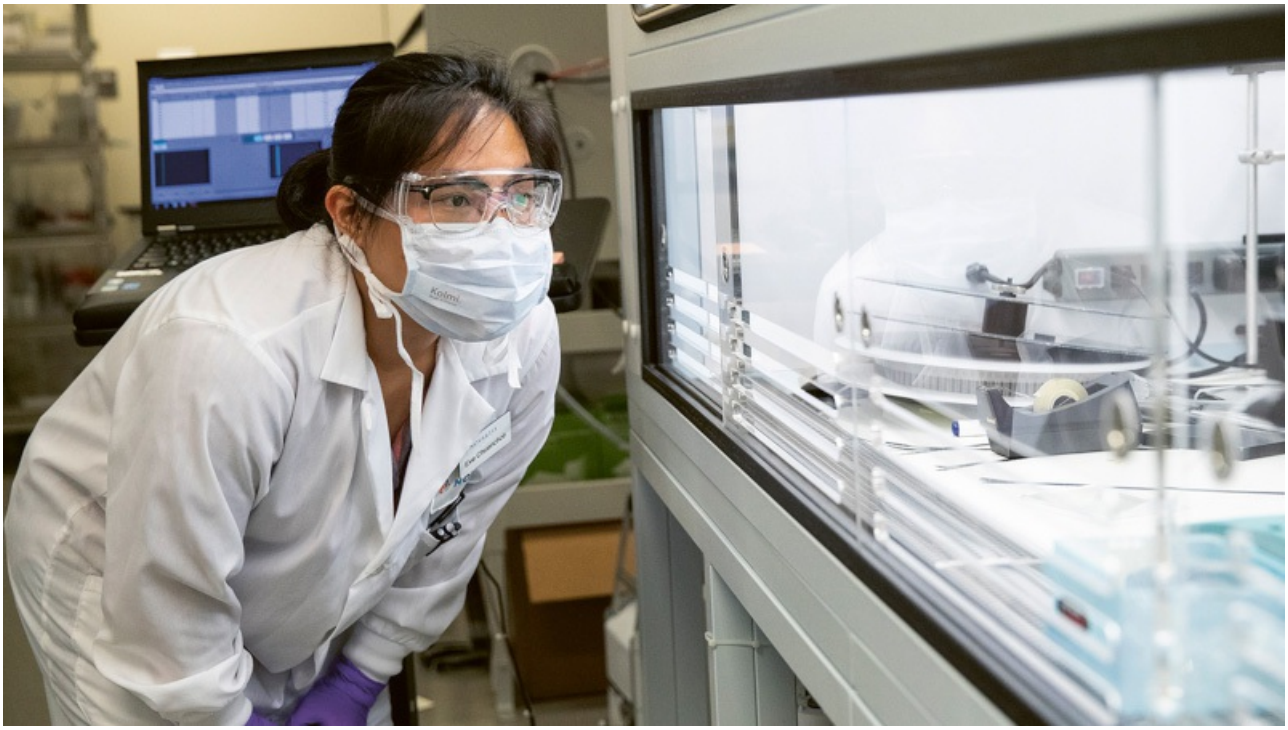
“There are clear signs that climate change will have a substantial impact on health,” says Jonathan Spector, Head of Global Health Strategy and Access to Innovation at the Novartis Institutes for BioMedical Research. “This includes infectious diseases as well as noncommunicable conditions, areas in which Novartis has been active for decades.”

Managing malaria

In the realm of infectious diseases, malaria has long been a focus area of the company. Despite significant progress, the challenges to eliminate the disease are still huge: More than 200 million people are affected and around 500 000 die from malaria every year – most of them children. And worse: The disease-causing parasite’s ability to adapt to current drugs is increasing resistance risks, while climate change is feared to spread its occurrence. “The Malaria Initiative’s great success gave our research an added impetus from the start,” said Thierry Diagana, Head of the Novartis Institute for Tropical Diseases (NITD). “But the key reason for us to push our research was the fact that we were aware early on that resistance to malaria drugs is a reality and that we need to continually work on new treatments. From today’s point of view, climate change, of

course, is another factor to accelerate the development of new drugs."

As part of its research efforts, the NITD is currently working on multiple experimental malaria compounds. Two drug candidates for uncomplicated and severe malaria, KAF156 (ganaplacide) and KAE609 (cipargamin), respectively, are in clinical trials in Africa and Asia. These compounds could potentially address resistance to current therapies. In 2021, a Phase IIb study of KAF156 and its partner medicine, lumefantrine, in adults and children with malaria reported positive results, supporting continued development of the combination treatment. Furthermore, NITD has discovered INE963, a fast acting and long-lasting drug candidate against malaria that is currently in a phase I clinical trial. "With these compounds we are optimistic that we can further contribute to the elimination of this disease," Diagana said.



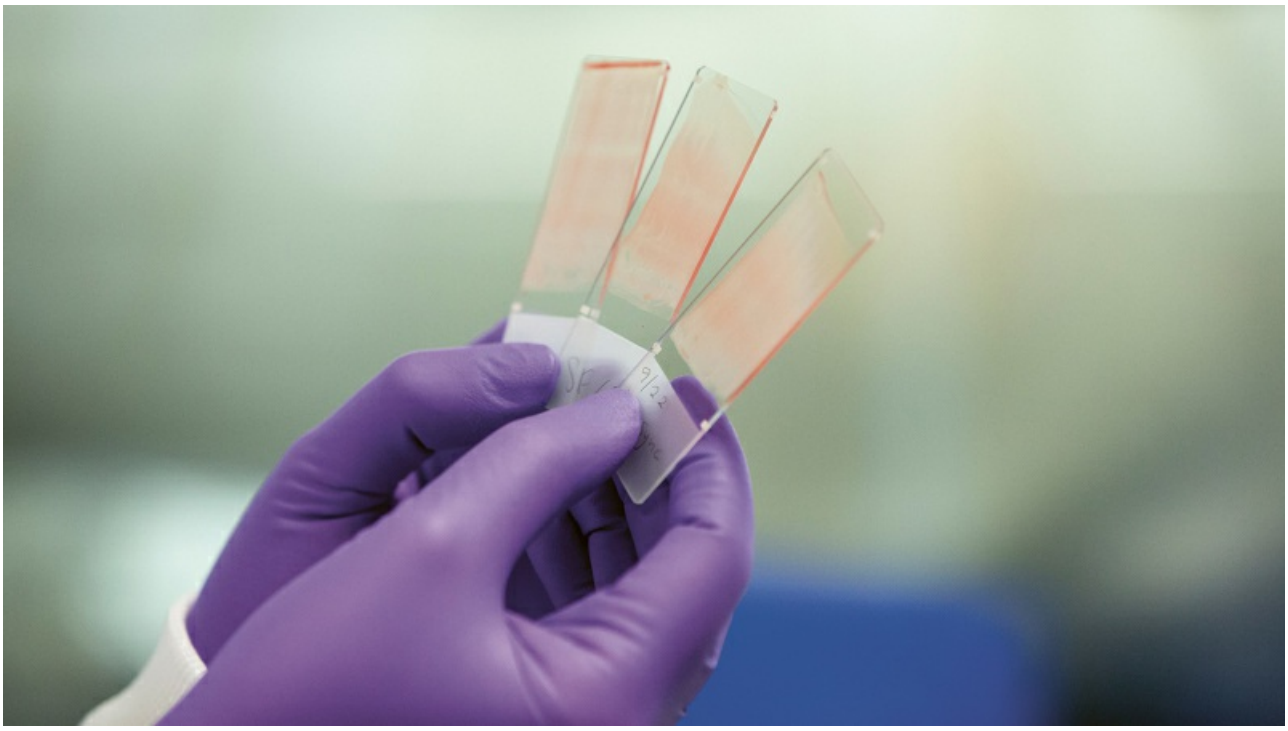
Malaria scientist Eve Chuenchob uses the mosquito machine to test a compound.

Driving dengue

While malaria is set to spread with increasing temperatures, researchers today also believe that another infectious disease, dengue, could affect more people due to climate change patterns. Today, it already causes about a 100 million symptomatic infections each year and kills around 20 000 people.

"Dengue is certainly one of the tropical diseases for which there is growing evidence that climate change could have a strong impact," says Feng Gu, who leads the dengue drug project at the NITD, noting that in recent years there have been major outbreaks in Pakistan, Bangladesh, Nepal, in addition to many countries in Southeast Asia and Latin America.

Currently, Gu and her team are working on a compound known as NITD688, a pan-serotype dengue inhibitor, which directly binds to the viral NS4B protein that causes the disease. According to early test results, the compound demonstrates efficacy in both acute and delayed treatment in in vivo models, has favorable pharmacokinetic properties and was well tolerated in preclinical toxicology studies.



Scientist examines smear test samples.

Chronic diseases

While Novartis remains steadfast to broaden treatments and access for infectious disease, the company is also acutely aware that chronic diseases are on the rise around the globe and affect an ever-growing number of people in industrial and developing countries.

“The consequences of climate change and pollution will lead to an increased need for chronic disease management,” Jonathan Spector says. “A substantial part of our work is inherently already concentrated in this area as we have industry-leading research and development programs focused on a wide range of noncommunicable diseases.”

A researcher retrieves stored cells from the liquid nitrogen storage at the Novartis campus in Emeryville, California.

Besides a strong focus on oncology, Novartis has also built research and development franchises in areas such as lung and heart disease, which are set to rise due to increased pollution, especially in urban centers. Exposure to air pollution is estimated to cause 7 million premature deaths every year and is linked to health impacts such as respiratory infections, aggravated asthma, ischemic heart disease and stroke.

“There is a clear need for our activities to continue to help address chronic diseases, which now constitute the main disease burdens in both industrial nations and developing countries,” Spector says. “We will learn over time how climate change will further impact disease patterns and we need to stay vigilant so we can, to the extent possible, predict where the greatest needs will be and be ready with essential treatments.”

For this reason, both Gu and Spector say that, besides increased scientific and medical research, disease management also needs “to be tackled from a political, economic and healthcare system point of view, including raising disease awareness, providing access to treatments and doing more to curb climate change by reducing pollution. Addressing major challenges in global health always requires cross-sector collaboration.”

Learn more about our efforts to address global health challenges.

Learn more about our efforts to address climate change.

Climate change is not only set to impact ecosystems and weather patterns across the planet, it will also take a toll on human health.
