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PRIORITIZE RESEARCH TO MINIMIZE SUFFERING

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With almost two months remaining of the hurricane season, the Hawaiian Islands have narrowly escaped roughly a dozen hurricanes.

How long can we be lucky? The increased hurricane risk generated by El Nino is associated with global warming. Patterns of injury and disease worldwide are being profoundly affected by this progressive warming of the atmosphere and the oceans. Calamitous natural disasters cause unintentional injuries, while floods result in food- and water-borne diseases and mosquito-borne illnesses. Droughts lead to dehydration and malnutrition. Governments, with the resources to plan ahead, now focus their efforts on disaster response and public health strategies. It is time to think even further ahead and prioritize investment toward research in the biological sciences. Doing so will shape the more proactive solutions that minimize human suffering.

The capacity to perform groundbreaking basic science research begins with quality education that supports science, technology, engineering and mathematics (STEM), together with an academic culture that encourages creativity and collaboration. Upon this foundation, robust resources must be directed toward building sustainable, world-class facilities where scientists can engage in longitudinal endeavors. These incubators must be insulated from political agendas, conventional academic governance and the commercial sector, which is driven by return on investment and limited only by what the market will bear.

Imagine a large facility in Hawaii where biomedical engineers, chemists, biologists and geneticists at the top of their fields have the security of longitudinal access to resources that promise to sustain their teams' ability to conduct high-quality research. Freedom from the distraction of competing for grants enables scientists to become both optimally productive and highly collaborative.

Once the labor of robust, basic science research bears fruit, the next step is to translate these breakthroughs into practical applications and, guided by policy and public health considerations, implement solutions toward the benefit of many. Policy and public health informed by knowledge on how climate change affects disease vectors can help direct, not dictate, the best use of resources for both basic science research and its translation.

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Consider mosquito-borne illnesses. While serving as medical officer on a traditional-style Polynesian voyaging canoe through the South Pacific, New Zealand and Australia, it has been critical for me to protect the crew against dengue, zika, chikungunya and Ross River fevers, all illnesses for which there is no vaccination. Until now these diseases have been primarily limited to lower latitudes and developing regions. That could change.

Mosquitoes are now beginning to appear in far greater numbers in the Arctic because of rising temperatures. Survival rates of arctic mosquitoes increase by 50 percent with an increase in 2 degrees Celsius, according to a recent study at Dartmouth University. Fortunately, these mosquitoes are not known to carry infectious disease. Nevertheless, all mosquitoes respond to changes in temperature and moisture, and there is the possibility that what is currently a developing-nations illness expands into developed nations. In addition to those mentioned above, malaria and yellow fever also could move north.

While the lead time to expanded manufacturing, distribution and delivery of existing vaccinations is substantial, the lead time to develop a new vaccine is far greater still. Governments and philanthropists alike should look further down the road and direct resources toward basic science research that anticipates the impact of climate change on human disease patterns.

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