



Davidson Hamer, M.D.'87, professor of global health and medicine at Boston University School of Public Health and School of Medicine and co-principal investigator of the GeoSentinel Surveillance Network

# On Track

Davidson Hamer, M.D.'87, keeps tabs on the world's most dangerous diseases.

By Erin Post



**W**hen the SARS-CoV-2 pathogen began to spread across the globe in early 2020—country after country responding with shelter-in-place orders, mask mandates, and calls for solidarity with overstretched physicians and nurses—Davidson Hamer, M.D.'87, watched the virus' emergence with a grim determination.

As co-principal investigator of the GeoSentinel Surveillance Network, a project of the Centers for Disease Control and Prevention (CDC) and the International Society of Travel Medicine (ISTM), Hamer has seen the beginnings of infectious disease outbreaks take shape many times, sometimes while monitoring from his office at Boston University, other times while he is out in the field. With 68 locations in 28 countries, the network compiles data from travelers, immigrants and refugees presenting at clinics with various illnesses, using the network's reach across the globe to track the emergence of infectious disease and prevent its spread.

In the early days of the COVID-19 pandemic, reports from network locations began to show that this outbreak was different—and not the seasonal flu. GeoSentinel uses a special code for new diseases or particularly dangerous established diseases—called an “alarming final diagnosis”—and the core team receives an email when this type of report is recorded. Hamer, who had just returned to the U.S. from Japan, remembers the first emails coming in for COVID-19.

On February 1, a person in New York City from Wuhan, China, was reported with a COVID-19 diagnosis. A few days later, another traveler from China was diagnosed. Then two diagnoses in Tokyo, and one half a world away, in Liverpool.

“It was late February that it started to go haywire,” Hamer says. “The volume of cases reported by our sites grew really rapidly. We knew from what was happening globally that there was a problem.”

In March, Hamer and colleagues watched the epicenter shift from Asia to “cases of people who had been exposed in Italy and Spain and other parts of Europe, traveling within Europe.”

As we now know, the rampage didn’t end there. COVID-19 traversed the globe in a matter of months, leaving hundreds of thousands of people dead and many more critically ill. And the fight continues. Kristina Angelo, D.O., M.P.H., an infectious disease physician at Emory University School of Medicine and a medical epidemiologist with the CDC and GeoSentinel Surveillance Network, says the network is beginning to shift under Hamer’s direction to projects related to COVID-19, while keeping existing research going as best they can. The relationships he’s developed over his decades of work in the field—bridging cultures and countries—have helped to move the organization forward even in this unsettled time.

“One of the things that makes him exceptional in this role is his collegiality and his ability to make friends wherever he goes,” Angelo says. “He has a natural gift for camaraderie.”

It would be an understatement to say that this year has been busy for Hamer, a professor of global health and medicine at Boston University School of Public Health and School of Medicine. He’s taken on dozens of media requests for interviews, has become a consultant to organizations including Major League Soccer, and has played a key role in crafting Boston University’s plan to bring students back to campus safely in the fall.

“[The plan] includes testing every student on arrival and testing them twice a week, mask use, de-densification of classrooms and enhanced air filtration systems and all sorts of things to try and make the campus safer and healthier,” he says.

Hamer has provided this same expertise to Major League Soccer, an organization that includes 26 teams from the U.S. and Canada. Phyllis Kozarsky, M.D., special advisor to the GeoSentinel Surveillance Network and professor of infectious disease at Emory, worked with Hamer on a plan that has allowed the teams to resume their season through extensive testing and isolation protocols.

“We spent a lot of time helping Major League Soccer figure out how to be successful,” she says. “And being able to play in a place like Orlando, which was one of the hottest spots in the United States.”

Hamer and Kozarsky are now starting to create plans to safely allow other groups, like orchestras and bands, to resume tours. Kozarsky—a leader in the field of travel medicine who co-founded the ISTM and has served in numerous roles since GeoSentinel’s founding in 1995—says Hamer brings to his leadership position an ability to see a challenge from multiple angles and bring the right resources to bear.

“Not only is he brilliant, but he can synthesize a lot of information, very, very quickly,” Kozarsky says. “And he is able to multitask, probably better than anyone I’ve ever known.”

For the past two-plus decades, Hamer has been putting that multitasking ability to good use, with roughly 275 publications and four books to his name. In addition to his work with the GeoSentinel Surveillance Network over the past seven years, he has spearheaded more than 50 projects in 20-plus countries, with a particular focus on improving neonatal and child health in addition to research on infectious disease.

Susan Coffin, M.D.’87, came to know Hamer as a research collaborator years after graduating medical school with him. Back on campus in Burlington for a medical reunion, they struck up a conversation and found intersecting interests in child health. As a pediatrician with expertise in infectious disease at Children’s Hospital of Philadelphia and a professor of pediatrics at Perelman School of Medicine, Coffin has a long track record of influential research on

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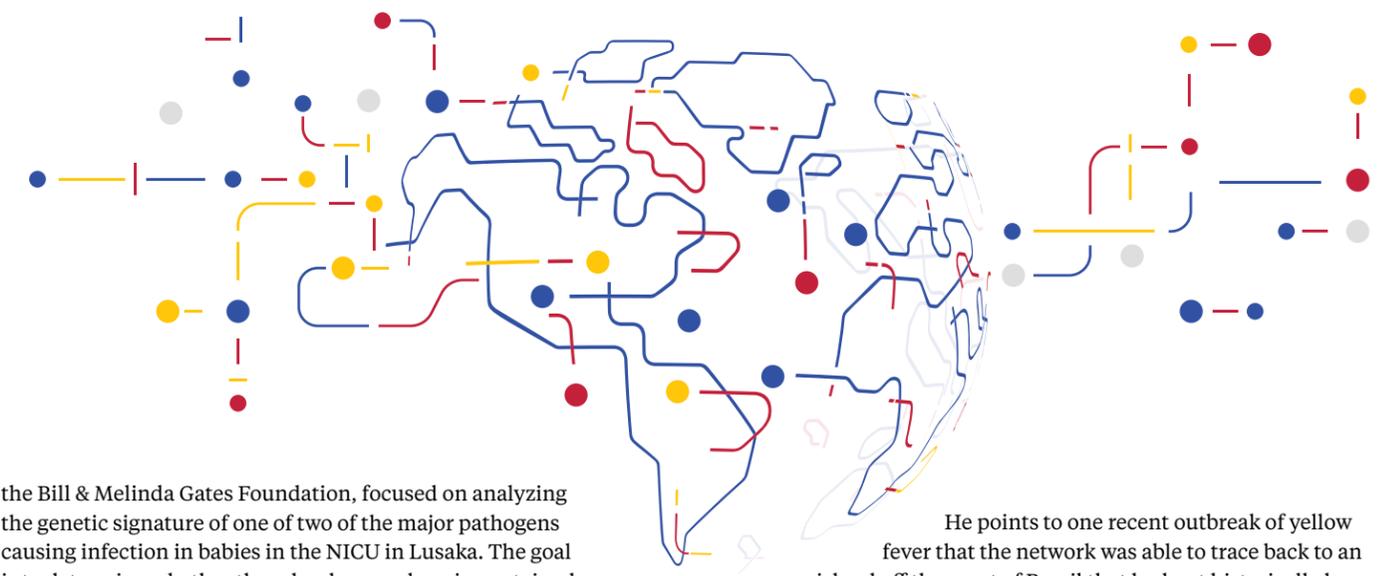
— DAVIDSON HAMER, M.D.’87

healthcare-associated infections as well as pediatric influenza; she has led infectious diseases prevention projects in Botswana, Ghana, Vietnam, Egypt, Greece and China. Soon, Hamer and Coffin were headed to Zambia together, where Hamer had lived from 2011 to 2014 to lead a partnership between Boston University and a Zambian research group.

The project focused on preventing bloodstream infection in neonatal intensive care units. As the proportion of women giving birth in healthcare facilities has increased in Zambia, so too has the need for protocols to prevent sepsis in vulnerable infants. Their research, published in *Clinical Infectious Diseases* in 2019, showed that a bundle of interventions—including infection prevention and control training, text message reminders, use of an alcohol hand rub, environmental cleaning, and weekly bathing of babies with a specific cleansing formula—effectively lowered hospital-associated mortality rates in neonates at the University Teaching Hospital in Lusaka, Zambia. Key to their work, says Coffin, was Hamer’s longstanding relationships with Zambian healthcare professionals. The time he had spent in the country allowed the team to home in on interventions that made sense.

“[The research] has demonstrated that it is possible to make a measurable and sustained difference in both infection and mortality outcomes,” she says. “And the interventions needed aren’t necessarily fancy.”

Hamer and Coffin are now working on a project, with funding from



the Bill & Melinda Gates Foundation, focused on analyzing the genetic signature of one of two of the major pathogens causing infection in babies in the NICU in Lusaka. The goal is to determine whether there has been a chronic, sustained outbreak or whether new strains of the same bacteria continue to be reintroduced, and to characterize the strains as an early step for vaccine development.

“Figuring this out speaks to the next level of interventions,” says Coffin. “We might act differently for a chronic outbreak as compared to multiple reintroductions.”

Hamer’s interest in answering this type of question—at the intersection of infectious disease and child health—dates back to the beginning of medical school, when he arranged to spend the summer between his first and second years in Dhaka, Bangladesh. He worked three days per week at a nutrition science lab and spent another several days every week working on research projects at the International Centre for Diarrhoeal Disease Research, known as icddr.b.

“That piqued an interest in new infectious diseases, but also, the health of children and nutrition, because I saw a lot of vitamin A and iodine deficiency,” he says.

He cites the late UVM Professor of Pathology and Laboratory Medicine, Washington Winn Jr., M.D., as a mentor who inspired his interest in disease processes. Another experience towards the end of medical school, in La Paz, Bolivia, solidified his interest in international work. But when it came time to choose a specialty, he found himself wavering.

“I went into an internal medicine program and I was thinking about neurology and cardiology and gastroenterology, again all specialties,” he says. “But eventually I realized that infectious disease interested me the most.”

In the early 1990s, when global health research fellowships were few and far between, Hamer sought out Tufts Medical Center for their well-established international program, which had a particular focus on diarrheal disease in children. His work has over time expanded to include research on other infectious diseases, such as HIV/AIDS and malaria, as well as the implementation of community-based interventions like the formation of mothers’ groups in Zambia and using community health workers to improve early childhood development in rural South Africa.

When the CDC approached him about helping to lead the GeoSentinel Surveillance Network, he saw the opportunity to combine public health intervention with big picture analysis. As reports of individual infectious disease cases come in from network locations, the team can aggregate the data and respond in real time.

“We use this to look at both trends in infectious disease acquisition during travel, but also to try and identify hotspots of new outbreaks,” he says.

He points to one recent outbreak of yellow fever that the network was able to trace back to an island off the coast of Brazil that had not historically been associated with this disease. After reports of ten travelers returning to their home countries with yellow fever came in—four of whom died—the network was able to quickly issue a report.

“That led the CDC, the Pan American Health Organization and the Brazilian government to change the areas of the country that were considered at risk for yellow fever, so that people would be appropriately vaccinated before travel there,” he says. “It’s a nice example of using these data to drive a change in public health practice.”

Longer-term research, including a recent analysis of typhoid fever antibiotic resistance patterns in South Asia, also regularly comes out of the network.

“We can show how antibiotic resistance varies in different parts of the world and also show how intense of a problem it is,” he says.

Now, in the era of COVID-19, the network has received supplementary funding for several projects, including one focused on identifying biomarkers for the disease. Another monitors for sentinel cases to help identify areas at risk, leveraging the network’s extensive reach to respond quickly. Hamer has been “instrumental in helping to coordinate and execute” these large, complex COVID-19 projects, says Angelo, his GeoSentinel colleague.

As the world waits and hopes for a vaccine, Hamer points to widespread testing as critical to control COVID-19. Unfortunately, in many parts of the world, the resources and infrastructure are just not available, leading the disease to spread undetected.

“The end result is that they’re seeing a lot of people get sick and die from COVID-19, but never making that diagnosis,” he says.

And in a metropolis like Dhaka, Bangladesh, where Hamer has colleagues and friends, the need to practice social distancing meets a reality that may not support it.

“You’ve got a city of 17 million people that live on top of each other,” he says. “How do you tell them to keep apart or not go to work if they’re in the service industry? There are a lot of challenges in terms of delivering testing, but also trying to deliver public health messages that people can follow.”

If there is a bright side, says Hamer, it’s that the world is now paying attention. His hope is that investment in disease surveillance and public health will follow.

“[COVID-19] has raised awareness of how vulnerable the global population can be in the context of a new disease arising,” he says.

Through it all, Hamer and his colleagues will be closely monitoring the landscape, trying to stay at least one step ahead of the infectious diseases threatening humanity. **WM**