

Q&A: This med student company's product could make hospitals safer

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Kevin Tyan is a busy man. A third-year medical student at Harvard Medical School who volunteers at his teaching hospital's COVID-19 response clinic in addition to his typical course load, Tyan is also one of three co-founders of Kinnos.

Now in its sixth year, Kinnos was started by Tyan, an AMA member, and a couple of his undergraduate classmates to help prevent healthcare-associated infections. The company's signature product is Highlight, an additive for disinfectants that colorizes them blue to ensure full coverage on surfaces and then fades to clear to indicate in real-time when decontamination is complete. The product won first prize in the 2019 AMA Accelerating Change in Medical Education Consortium Health Systems Science Student Impact Challenge, which recognizes students' application of health systems science to improve the health systems in which they are working.



Kevin Tyan

With a highly transmissible virus gripping the nation, combating infection is as important as ever. Tyan recently spoke with the AMA about his work in the entrepreneurial and clinical spaces during COVID-19.

AMA: You started Kinnos six years ago. How has the company evolved and what have the past few months been like for you and your colleagues?

Tyan: We originally started this company to help health care workers during the 2014 Ebola outbreak. Our mission was to extend our technology to prevent all health care associated infections. Then, all of a sudden, we have a global outbreak that was magnitudes worse than the Ebola crisis. Six years in, it feels impactful that we are fully equipped to be part of the front lines.

AMA: Your experience with Kinnos inspired you to go to medical school. What has your clinical workload been like during the pandemic?

Tyan: At Harvard, we do clerkships during M2 year. So, I was bouncing around seeing patients throughout COVID-19 as well as helping run Kinnos. My mentor at Harvard, Dr. Pieter Cohen at Cambridge Health Alliance, helped start a COVID-19 response clinic here in Somerville [a city of 80,000 northwest of Boston]. I'm right on the front lines and that helps me understand what a lot of our health care workers are facing.

AMA: Boston was a COVID-19 hot spot, one of the first. What were the early weeks of the pandemic like for you?

Tyan: Actually, I was one of the first few cases in early March. While I was visiting my girlfriend in New York City, we both became sick with the typical symptoms, but were unable to be tested for many weeks due to test kit shortages. Fortunately, our cases were relatively mild, but I had about 1 month of cough, shortness of breath and loss of smell. It was only months later that I was able to confirm I had COVID-19 through IgG antibody testing.

At school, we transitioned to remote learning, so I helped my mentor by doing some research and work on COVID-19 while I was recovering. At the time, my mentor was looking to fill a critical knowledge gap by authoring the UpToDate article on outpatient management of COVID-19. During the first few days of the outbreak, no one knew what was going on. Nobody knew, for instance, when shortness of breath starts to happen. What are the sequence of symptoms? How do they differ from the common cold?

A lot of what I did in the early days of the outbreak was scour the research and really have my finger on the pulse of all these new case studies coming out of China. I passed that research along to my mentor, who was able to incorporate a lot of this into the UpToDate article. It felt meaningful to be able to take the load off physicians who are incredibly busy and contribute to building our knowledge base during this pandemic.

AMA: What have your experiences been working with patients who had the virus?

Tyan: Because of the research I looked into when the COVID-19 response clinic was started in Somerville, I was able to help answer a lot of questions. For example, how do you test if a patient has shortness of breath when they are walking around? We couldn't do that in the tiny clinic rooms, and you can't have patients walk up and down the hall because that's an infection risk. I dug up some old pulmonology studies on how you could have patients step in place or do squats to measure ambulatory oxygen saturation, and many providers implemented that at the COVID-19 clinic.

When I first started working at the COVID-19 response clinic, personally experiencing and recovering from the virus really helped me communicate with patients while evaluating their symptoms. One of the biggest challenges for providers during this pandemic is building trust with patients given all the anxiety and fear going around, and I feel grateful to be able to help.

AMA: What did you do at Kinnos once the pandemic hit?

Tyan: Right before the COVID-19 pandemic started, we closed our Series A investment round, meaning we raised \$6 million in funding from venture capitalists. That was really exciting for us as first-time founders, as it's not very easy to get venture capital funding in the first place. The fact that

they invested in us even before COVID-19 started shows they believed in our mission of tackling the huge problem of healthcare-associated infections in the U.S.

Once the pandemic began, the importance of preventing infections has become an even greater priority. Having that funding in place allowed us to greatly extend our operations. We started getting orders from all over the place. We were sending pallets of Highlight to China, the Philippines. Some EMS agencies in the U.S. also tested it out. We wouldn't have been able to scale up so quickly if we hadn't had that investment support.

AMA: Has the pandemic changed the trajectory of the company?

Tyan: We've been able to adapt to where there is need. When supplies of hand sanitizer started to run out around the country, considering we are a chemical company, we had the materials and manufacturing capacity, so we started producing hand sanitizer to help with the shortage. We got rapid FDA registration and produced tens of thousands of units for various organizations like nonprofit health care organizations and colleges here in Massachusetts.

We are really growing fast. We went from five employees—three co-founders and two scientists—to 17. This concept of colorized disinfection will be important in reducing human error during disinfection and combating COVID-19 transmission.

AMA: How has your medical school experience informed your work with Kinnos?

Tyan: Starting Kinnos has given me a unique perspective for a medical student. The question I want to ask is how do we support the people who clean our hospitals? Our environmental services workers have long been marginalized, because their work has been seen as janitorial as opposed to impacting patient outcomes. During the beginning of the pandemic, I published a perspective piece in the *Annals of Internal Medicine* to highlight how important environmental services (EVS) workers are during COVID-19 and what strategies hospitals can take to better support their work and elevate their stature in the health care hierarchy.

In my work at the COVID-19 clinic, I'm observant on how infection-control procedures are being done. I ended up interviewing one of our EVS workers at our clinic to accompany an article in *Annals of Internal Medicine*. We discussed some of the shortfalls in the way the U.S. health care system currently treats environmental services workers. It was great to get her perspective and have that interview to spur potential change in this field.

AMA: What's next for Kinnos?**Tyan:** Our goal is to continue to expand our Highlight technology to help hospitals fight infections in the U.S. On the international side, we recently formed a coalition called BASICS, Bold Action to Stop Infections in Clinical Settings, in conjunction with some of the world's top NGOs, like Save the Children and WaterAid.

The mission is very similar to what Kinnos had been doing for the previous Ebola outbreaks. It's to prepare health systems in low and middle-income countries against disease outbreaks by improving their health care sanitation systems and protocols for disinfection. The goal is to institutionalize the use of Highlight and deploy millions of units to the workers that need it.