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Sep-Scan – An effort to beat the deadly sepsis

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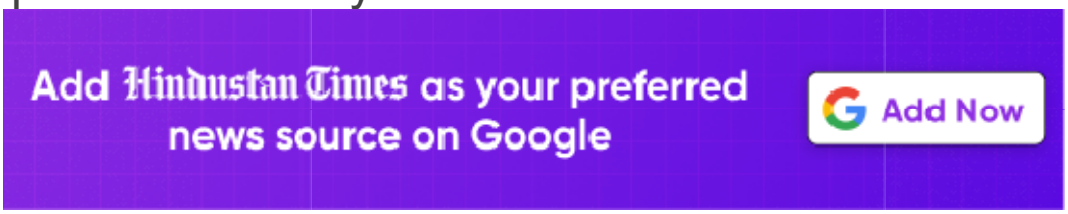
Preeti Joshi co-founded Fast Sense Innovations, developing Sep-Scan, a rapid sepsis detection device, aiming to transform healthcare and save lives.

Pune

What we have done is detect sepsis in just 20 minutes, says Preeti Joshi. (HT)

Problems abound or existing solutions can be made better, often leading to the beginning of a startup. Preeti Joshi was trained at IIT Varanasi in MEMS (Micro Electronic Mechanical Systems), doing research at NCL when her mother was diagnosed with

pancreatic cancer and later passed away. Says she, “That incident shook me. I thought why are we doing research that has intellectual value but does not impact people’s lives more directly? Why shouldn’t I use my time and energy to do something that can help people more directly?”



And that led to the setting up of a company that has now developed the Sep-Scan

Recalling the time, Preeti says, “Together with my husband Harish Joshi (IIT Kharagpur and ISB Hyderabad) and Sailendra Mishra (Also IIT Kharagpur and ISB Hyderabad) we decided that we need to build a platform that could detect cancer. With our collective expertise in Biotechnology, AI, ML, MEMS and Business Management we applied for a grant to BIRAC and started our company, Fast Sense Innovations in 2018 with ₹1 Cr.”

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They worked and developed a point-of-care platform to detect liver cancer. This involved meeting doctors to understand the biomarkers and then working on creating a chip and a device. However, during the process of doing their field trials, Covid struck the world.

“And we had to stop all our work. It came to a complete standstill. It threw our supply chains into chaos and stalled collaborations. Components were delayed, funding was uncertain, and progress seemed impossible.”

Around that time, Preeti’s three-year-old son fell ill and was diagnosed with sepsis caused by an infection. This again became a turning point for the three of

them. While her son recovered from the illness, she learnt how deadly Sepsis can be.

“Our doctors informed me that 54% of child deaths are on account of sepsis. On studying further, I found out that during Covid time, 5.4 per cent of hospitalisations were due to SARS-CoV-2 infections in the US and of those, 28.2 per cent had SARS-CoV-2-associated sepsis. A diagnosis of sepsis was reported in 9.3% of all COVID-19-related deaths, ranging from 6.7% to 12.8%. Sepsis occurs when an infection makes our body’s defence mechanism get into overdrive and starts attacking itself. So, sepsis can be caused by a viral or bacterial infection (in India it’s mostly bacterial), but the effect is that it can hit all organs and if it is not detected soon, it can result in multiple organ failure and death,” she says.

Sepsis was different as compared to cancer since there were generally just four biomarkers that needed to be detected.

“Cancer is a complicated disease, and one has to delve deep into the biomarkers for that. We spoke to several doctors and understood that there were just four biomarkers, and we already had developed a

platform for our liver cancer work. We had to tweak some things and make changes on the strip, and the software and by 2023 we succeeded in building Sep Scan a device that could detect sepsis in 20 minutes!" Preeti states.

Why will this work?

Traditionally sepsis is diagnosed by taking at least five ml of blood from the patient. It is then transported to the lab and many a time the sample can get destroyed or deteriorated. Then it can take 24 hours to get the result if the lab is not in the hospital where the patient is. A culture test done to find out which antibiotic will work for those particular bacteria takes up to 72 hours. This is a precious time for a person who is suffering from sepsis. And if the doctor needs to test if the medicine is working, he has to go through the same rigmarole all over again. It's very inefficient and dangerous.

"What we have done is detect sepsis in just 20 minutes. Moreover, we test it for all the biomarkers in one go, unlike traditional tests where they test for one biomarker at a time and charge separately for it," Preeti informs.

“In addition to giving results on sepsis, we also provide results on the antibiotics that will work for that particular infection. Moreover, if a doctor wants to test again after a day of medication he can because it’s fast and does not need large amounts of blood. And importantly it is much cheaper and far more affordable than what is used currently. We are not just another diagnostic company; we are building a clinical decision-making tool that bridges the gap between laboratory testing and real-time patient management. Sep-Scan is designed as a point-of-care test capable of delivering rapid results with high specificity. It is crafted for bedside use and tailored for resource-constrained regions. Our products align with WHO’s ‘sustainable development goals’, transforming healthcare by enabling swift, informed decisions that save lives and reduce the global healthcare burden. Sep-Scan’s breakthrough features position it as a transformative tool in the early detection and management of sepsis, reducing mortality, treatment time, and healthcare costs while supporting global efforts to combat AMR,” she adds.

The journey so far

Since every diagnostic tool needs to be tested, Fast Sense Innovations had to follow the procedure.

“We tested our gadget and chip with 150 samples. Their diagnostic tool had an accuracy of 98%. As of now they have filed for three patents and have been granted one while two are in the process.

Fast Sense Innovations has received over ₹1 Cr in grants from BIRAC, DST-Nidhi Prayas and MeitY.

“This wouldn’t have been possible without the grants we have received so far as well as our multidisciplinary team—complementary minds from different fields, including MEMS microfabrication, AI-driven analytics, biomedical engineering, and business strategy, all working together towards a common goal.”

Go-to-Market plan

Their market strategy is built on targeted market entry, focusing on ICUs, emergency departments, and diagnostic labs where rapid sepsis detection is critical. The company has already developed a network of doctors and influencers. Says Preeti, “By securing early adoption in top-tier hospitals and research institutions, we aim to establish credibility and generate real-world validation. Strategic partnerships

with government health bodies, hospital networks, and global NGOs will help integrate Sep-Scan into standard sepsis screening protocols, while collaborations with industry leaders will drive wider market penetration. To scale globally, we are pursuing regulatory approvals, leveraging fast-track regulatory pathways for critical diagnostics. Our affordable and scalable pricing models, including subscription-based analytics and cost-effective PoC deployment, will ensure accessibility even in resource-limited settings. Sep-Scan's capabilities set us apart from traditional tests and slow culture-based methods, reinforcing our technological edge. We want to make Sep-Scan the global standard for sepsis and AMR diagnostics, transforming how infections are detected and managed worldwide.

As Fast Sense Innovations readies itself to enter the market, what happens to its initial work on a liver cancer detection tool? Preeti says, "We are also working on that as well since we have already done considerable work and are close to completing it. We will shortly launch that product as well."

Small start-ups with bold ideas will make this world a better place.