

GE Healthcare

STAR TREK IN YOUR DOC'S OFFICE

The 200 year-old Stethoscope will be Obsolete

A WHITE PAPER ON INNOVATION AND CHANGE By Drs. Jackie and Kevin Freiberg

VSCOT



PRIMARY CARE OR SPECIALIST. it won't matter, the next time you walk into your physician's office for an exam, she might use a high-tech, portable ultrasound device instead of a stethoscope. GE's Vscan looks like a flip-phone with a smartphone screen. Attached is a probe that looks like a small microphone. The lightweight, handheld device functions like an iPod with a thumb dial and fits in your pocket.

THE POWER OF REVERSE INNOVATION

Developed by GE, the inspiration for the product came not from the U.S., but rather from physicians in rural India and China who essentially said, "The bulky, hard-to-use, expensive, \$300,000 machine, the one that's the size of a chair, that you wheel around in hospitals, we can't use it. We are not going to haul that equipment in a van, into a remote Indian village and then wheel it down a dirt road to the patient. It's not practical. It's not affordable. It's just not going to happen."

Mind you, Indian physicians are not technophobic. They all use smartphones. Some of the brightest people on the planet are from India, and they are savvy. The innovators at GE listened and observed. Then came the "Ah Ha" moment. Engineers at GE Health said, "What if we design a device that's as portable and as user-friendly as the cell phone?"

THE RESULT WAS THE VSCAN.



THE ORIGINAL IMPETUS for a portable ultrasound device was a request from DARPA (U.S. Defense Advanced Research Projects Agency) back in 2005. The idea was to empower medics with a device that could be used on the battlefield to spot blockages, detect internal bleeding, and save lives. Then, GE started to explore it as we've described.

Our colleague Vijay Govindarajan calls it reverse innovation. Usually, we think of innovation being developed in the West and then exporting it to the Third World. Reverse innovation is exactly the opposite. Inspired by geographical and resource-constrained markets in the developing world, physicians and medics in the U.S. saw the application for the Vscan in the West as well.

What if, through a portable ultrasound device, a physician or nurse could immediately assess the fluid around the heart, heart valve function or myocardial thickness in patients? What if they could determine if shortness of breath is due to chronic obstructive pulmonary disease or congestive heart failure?

What if clinicians could quickly identify whether leg swelling is caused by cellulitis or a blood clot, if murkiness at the base of the lungs comes from pneumonia or a fluid next to the lung? What if a physician in rural America or one treating elderly urban patients who aren't ambulatory could do a portable scan and send it to a specialist, 3,000 miles away, in real-time? As we move to consumerism healthcare, what if a patient could self-assess for the early signs of breast cancer?

WELL, NOT SO FAST.

The Vscan is an amazing technological innovation and it works magnificently. But there are several challenges. First, a clinical and business case must be made for the use of the device in order for physicians and health systems to adopt it. That is, does it really allow the clinician to detect more, faster? As the world of healthcare speeds toward preventative care, can it provide early detection of issues, that if treated in a timely fashion, could help patients not get sick in the first place? Will it elevate the quality of care and reduce costs? And, in emergency situations, does it ultimately save lives?

Assuming the clinical and business case can be made, can you get the healthcare community, particularly physicians, to let go of a 200-year, time-held tradition they are comfortable with? Can you make a compelling case for them to trade their stethoscopes



for a Vscan and overcome the intimidation of using ultrasound technology? On the other side of the fence, can you overcome political pushback from radiologists?

Then, there is the challenge of critical mass. Right now the Vscan costs approximately \$8,000, a sliver of the cost of the big machines. Yet, not an insignificant number when you are equipping an entire hospital or physician practice of care givers each with a device. For example, with a limited number of Vscans in a hospital, it can be inconvenient and time-consuming to track one down. Even a physician or nurse who is an early adopter and loves the technology probably isn't going to take the elevator up three floors to get one from a colleague who just used it.

Also, learning to use a portable ultrasound device requires consistent practice. If you use it long enough to be competent and then don't use it, you lose it. Just like using the stethoscope, you stay current by using it multiple times a day, multiple times a week. Of course, this assumes good training and mentoring in the first place. By the way, how much training does a medical student get in interpreting what they hear when using a stethoscope? Or, is it pretty much jump in and sink or swim?

Finally, right now physicians and health systems can bill payers each time a traditional ultrasound machine is used. If a device such as the Vscan becomes the standard of care, a ubiquitous part of the patient's exam, will payers stop reimbursing for its use?

All of these challenges conspire against what seems like a no-brainer—the widespread adoption of a seriously superior diagnostic device, that in the long-run, could dramatically increase the quality of care, reduce costs and buy the medical community more time when trying to save a patient's life.

ENTER DR. BRUCE KIMURA

Our neighbor, Liz Morrell, is the Senior Director of Patient Care at Scripps Health in San Diego. Liz invited us next door for what was an enlightening presentation billed only as "Something that Will Replace the Stethoscope." The presenter was Dr. Bruce Kimura, a cardiologist who specializes in cardiac ultrasound and the creator of CLUE (Cardiovascular Limited Ultrasound Examination) at Scripps Mercy Hospital in San Diego.

Dr. Kimura is working with a small team to do outcomes research on the viability of portable ultrasound devices. The research is designed to answer the questions and address the challenges we just talked about. The team is well on its way to building indisputable evidence that Vscan-like devices are the future of diagnostic healthcare.

CLUE begins with an innovative training program for Mercy Hospital's three-year residents on how to use the Vscan. Residents compete with each other to see who can diagnose a patient the fastest and with the highest accuracy. The results are updated on a website and the winners receive virtual trophies. Kimura told us that learning through competition is fun for the students and has proved to be very successful.

More than 7,000 Scripps Mercy patients were examined using Vscan devices in 2015. Dr. Kimura himself is often called into Code Blue emergencies to use the device for immediate diagnosis. Code Blue is the hospital code used to indicate a patient requiring immediate resuscitation, usually from respiratory or cardiac arrest.



DR. BRUCE KIMURA AND TEAM

By Drs. Jackie and Kevin Freiberg



HERE'S WHAT THE TEAM'S STUDIES SHOW

Using the Vscan, Dr. Kimura can see the inner workings of the heart and immediately tell via tiny (good) bubbles if medication is getting to it, if there is fluid around it, and if there are any blockages. He can tell if a heart stopped beating minutes or seconds ago which obviously makes a huge difference when ER doctors are in the midst of resuscitation. Eric Topol, a cardiologist and Chief Academic Officer for Scripps Health is the author of The Creative Destruction of Medicine and The Patient Will See You Now. Topol asks a pertinent question, "Why just listen to the heart when you can see it?"

SEEING IS BELIEVING

After his presentation, Dr. Kimura demonstrated how the Vscan is used by conducting a brief exam with each of the Morrell's guests. Jackie was first up. In a matter of minutes, sitting on the edge of the bed while she laid down, Dr. Kimura showed Jackie inside her carotid arteries, esophagus and heart valves. He told her that most people her age have some fatty build up in their carotid arteries; she had none. He looked at her thyroid, liver and spleen—all okay. This vivid, living demonstration showed us several things immediately.

IMPROVED DIAGNOSIS. First, even though we aren't clincians, you can see how much more you can see. It increases the accuracy of diagnosis by orders of magnitude. According to a study by the American Journal of Cardiology, first-year medical students using handheld ultrasounds detected 53 percent more cardiac abnormalities than cardiologists using conventional stethoscopes.

PATIENT ENGAGEMENT. Second, we were amazed by the immediacy of it all. As Dr. Kimura moved the probe around and we watched the screen, he shared with Jackie what was going on inside each part of her body and what it means. The interaction was interpersonal and totally engaging because we were seeing everything in real-time. In an age where patients want to partner with their doctors, it is not a stretch to see how using this device can increase the bond between the patient and physician.

CONFIDENCE AND ASSURANCE. Finally, the exam gave us peace of mind. Fortunately, everything with Jackie checked out positively. Of course, that was a relief. But even if it hadn't, the worst thing about experiencing medical symptoms is not knowing for sure, what's causing the problem. You can't attack a problem you haven't identified.

If you can detect a cardiovascular or lung abnormality or a disease at an earlier stage, when you still have time to address it, you'd want to, right? If, by increasing diagnostic accuracy in an emergency, you can improve triage, you'd want to, right? And if it enables the physician to do a better, more accurate job of referring you to a specialist, that's a good thing, isn't it?

QUESTION THE UNQUESTIONABLE. Like the iPhone, GE has developed a product that is revolutionizing the way medicine is practiced at the bedside. But this phenomenal piece of technology only changes the game if people use it.

Everyone likes to talk about breakthrough innovation, but to have breakthroughs you have to break things. That means you have to disrupt the way things are by challenging people's deeply-held, taken-for-granted assumptions. In this case, about the way medicine is practiced.

Physicians can be pretty cavalier about using the stethoscope. After all, Dr. Kimura and his team are challenging deep-seated assumptions about a tool that's been used for 200 years. But rightly so, they are doing it with data. The CLUE team is leading the next phase of this game-changing innovation by building the clinical and business case for its widespread adoption. In this, the innovators at Scripps Mercy Hospital are giving the world a gift.

GIVING HISTORY A SHOVE

What if every nurse on a life flight or paramedic bent over the victim of a severe motorcycle crash on the freeway could know exactly what next steps to take to save a person's life because of a more accurate diagnosis? Back to DARPA, what if every combat medic could determine the source of internal bleeding in a soldier wounded in battle? And, what if these medics could do their jobs more effectively with remote guidance by experts such as ER physicians or cardiologists trained to interpret the images?

What if a hospital equipped with Vscans became a recruiting tool for tech-savvy students coming out of med school? What if radiologists saw portable ultrasound, not as a threat, but rather as an enhancement to their practice? What if a critical mass of portable ultrasound users inspires more competition, bringing the cost of the device way down?

Approximately 20 million echocardiograms are conducted in the U.S. every year at \$1500 a pop. Each require a return appointment for approximately 45 minutes using bigger and more expensive diagnostic devices. What if the mass adoption of devices like the



Vscan could eliminate wasteful and unnecessary practices, managing hundreds of millions of dollars out of a broken healthcare system? Steve Jobs talked about putting a "dent in the universe." Few innovations come along that can live up to that. But this one could. Given the ubiquity of the stethoscope, when replaced by the Vscan, portable ultrasound truly does have the potential to change the world.

And if it does, history will write that guys like Bruce Kimura were on the pioneering edge of making it happen.

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INSIGHTS FOR INNOVATION

1. CHANGE IS INEVITABLE. What you do with it and how you grow from it is your choice. Healthcare is changing right before our eyes. The question is, will the changes you evoke over the next 24 months be opportunity-led or crisis-driven?

2. EMPATHY DRIVES DESIGN. Empathy just might be the most underestimated weapon in an innovator's arsenal. GE's empathy for India's rural doctors led to the Vscan. Bruce Kimura's empathy for patients, for wellness and helping them not get sick, drives his need to validate this elegant device.

3. QUESTION THE UNQUESTIONABLE. The "unquestionables" are the assumptions we make about healthcare and the way medicine is practiced. What if, for a period of time, you looked at medicine with a completely open mind? What if you never made the assumptions you've made? If you took **NOTHING** for granted? What might you discover?

4. ASK: WHAT IF? Ideas are fragile in their infancy. They need to be nourished, given a fair hearing. Trade "Yeah but..." for "What if?" and "Why not?" Why not this, why not us, why not now?

5. THINK LIKE AN OUTSIDER. Someone else's best practice in another industry could become a next practice in yours—if you are willing to look outside. Can anything good come from the developing world? Who would've guessed that GE's insights for such a profound product would come from India?

6. GET COMFORTABLE BEING UNCOMFORTABLE. Innovation and growth demand change, and change produces insecurity. Insecurity creates fear because it takes us out of our comfort zones. But safe can also be risky. More people die at crosswalks each year than jay-walking. Why? Because they have a false sense of security and are less likely to look both ways. To innovate, you must be willing to step through fear.





Drs. Jackie and Kevin Freiberg are the Founding Partners of the San Diego Consulting Group, a **LEADERSHIP**, **CHANGE**, **INNOVATION and FUTURE TRENDS** consultancy that provides keynotes, seminars and retreats to some of the most exciting and formidable brands in the world. **The Freibergs** are business owners and international bestselling authors of seven books including NUTS! Southwest Airlines' Crazy Recipe for Business and Personal Success and most recently, CAUSE! A Business Strategy for Standing Out in a Sea of Sameness.



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