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There I was, an American woman, up to my knees in muck, wielding these strange metal boxes. I was in rural Bangladesh, deploying sensors that we'd built in order to understand why the ground water was making people sick. And I attracted some attention. But my tech simply measured the problem. The local communities that I'd really come to connect with were expecting a solution. So I raised funds, hired engineers from the city in order to dig a deep well and bypass the arsenic and provide access to clean water. And we celebrated. But as I boarded the plane, I thought, "What if it breaks?"

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I'm an engineer. I know that's not if but when. When the well breaks, who will fix it? How will they pay for it? And will they even know there's a problem in the first place? And I soon learned that this is all too often how lifesaving equipment is deployed globally in countries with limited electricity and infrastructure. I kept thinking, I don't want to just build sensors that measure a problem once it's very bad. What if instead we brought together the tech built to measure together with the equipment built to solve? What could we unlock?

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Take vaccines. Vaccines won't work if they get too hot or, surprisingly, too cold, so distributing vaccines requires refrigerators, big and small, to function reliably. Fridges can save lives, but all too often, like any kitchen appliance, they break. One study in South Asia found that over half of vaccine doses showed evidence of temperature damage by the time of the end of their journey. This means that the children that would have received those vaccines may not have actually been protected. Fridge failure is a big problem, and it can happen anywhere. Here in California, in 2015, Stanford Children's Health discovered a fridge that had been malfunctioning for up to eight months. Staff contacted 1,500 families about revaccinating those children. But what if you can't just get the families on the phone? What if they live a six-hour walk away? What if that first shot is your only shot?

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The stakes are high, especially now with COVID vaccines. Now, in May 2021, in Tanzania, a failing fridge with our smart sensor prompted an immediate response from the regional immunization officer, and a technician was out to the site and fixed some faulty wiring, and all the vaccines at that site stayed safe. Real-time sensor data made all the difference. We built a simple solution that continuously monitors the temperature and keeps that fridge in Tanzania connected. It sends an immediate text message automatically when the fridge fails, and importantly, the nurses and the technicians are ready and equipped to respond and fix the

problem. My team and our partners have scaled this technology to over 15,000 sites across Asia and Africa, protecting the vaccine supply for one in 10 babies born on Earth each year.

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(Applause)

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And the same data that's used to actually detect the broken equipment can also be used to reveal the strongest links in the chain. These are the best sites and routes to use in an emergency. My team is working now with countries to reveal these pathways for COVID vaccines, so using sensor data for identifying the best vaccine sites in terms of temperature control. In turn, these sites can then serve as a backbone for all vaccine delivery. Now and in the future.

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So here's what I've learned. Sensor data can change the game by providing a common source of ground truth that enables coordinated action required to maintain lifesaving equipment. Not just vaccine fridges but any equipment deployed to save lives, from solar panels on hospitals to ventilators and oxygen tanks. But in order to realize these benefits, we need to invest in data and ensure that local communities and countries are in the driver's seat and that they have access to the resources they need to act on what their data is telling them.

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It's worth it. I know, because I have seen how the same tech can be used to measure, solve big problems and sustain those solutions. Just as my friends in Bangladesh were right to expect all along.

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Thank you.

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(Applause)