Stanford School of Medicine Dean, Dr. Lloyd Minor, on Apple Heart Study, Biomedical Revolution and Precision Health

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Margaret Flinter: Welcome to Conversations on Health Care with Mark Masselli and Margaret Flinter, a weekly show where we speak to the top thought leaders in health innovation, health policy, care delivery, and the great minds who are shaping the health care of the future. This week, Mark and Margaret revisit their conversation with Dr. Lloyd Minor, Dean of Stanford University School of Medicine, where he's overseeing a culture of transformation in care delivery and medical training, building a culture of collaboration between the university's many science and health divisions. He'll talk about Stanford's partnership and the groundbreaking Apple Heart Study.

Lori Robertson also checks in, the Managing Editor of FactCheck.org, looks at misstatements spoken about health policy in the public domain, separating the fake from the facts. We end with a bright idea that's improving health and well being in everyday lives.

If you have comments, please email us at chcradio@chc1.com, or find us on Facebook or Twitter. We love hearing from you. Plus, you can find us on iTunes, or Stitcher, or wherever you listen to podcasts. Please feel free to leave a review for us there. Now, stay tuned for our interview with Stanford Medicine Dean, Dr. Lloyd Minor, on Conversations on Health Care.

Mark Masselli: We're speaking today with Dr. Lloyd Minor, the Carl and Elizabeth Naumann Dean at the Stanford School of Medicine, where he's established a strategic vision to lead the biomedical revolution in precision health, a scientist and surgeon. He's also professor of otolaryngology and head of neck and surgery as well as professor of bioengineering and neurobiology at Stanford University.

Before coming to Stanford, Dr. Minor was Provost and Senior Vice President for Academic Affairs at Johns Hopkins University, where he served as Chair of the Department of head and neck surgery at Johns Hopkins University School of Medicine. Dr. Minor earned his bachelor's in medical degree from Brown University and completed his residencies at Duke University's Medical Center and the University of Chicago Medical Center. Dr. Minor, welcome to Conversations on Health Care.

Dr. Lloyd Minor: Thank you very much, Mark. It's great to be here.

Mark Masselli: Yeah. As you know, Stanford School of Medicine is one of the most recognized medical teaching institutions in the world, which is also supported by some of the best scientists at Stanford University across a number of disciplines. You've launched a very bold strategic vision at Stanford to break down the barriers between all of these disciplines to accelerate the pace of

biomedical discovery to bring us closer to the promise of true precision medicine. I'm wondering if you could share with our listeners more about the 21st century strategic vision and your goals in this endeavor.

Dr. Lloyd Minor: For years, we've been treating disease after the fact, making diagnoses far too late to achieve the outcomes that we would really like to achieve. Certainly, when we have a severe acute disease like cancer, we want precision medicine. We can think of precision health as encompassing precision medicine, but very importantly focusing on health. There are really three components to our vision of leading the biomedical revolution in precision health.

First is to predict, and then prevent, and then to cure disease precisely using the same levers of genomic medicine, big data science, regenerative medicine, but applying those in a predictive, preventive, and proactive way. The way we know we will have succeeded in precision health is that the incidence of those diseases requiring precision medicine will be far less. Isn't that what we all seek is to have healthy lives, and when disease does come up, to either diagnose it much earlier, so we can treat it more effectively or prevent it all together.

Margaret Flinter: Well, Dr. Minor, we had one of your colleagues on with us a few years ago, Dr. William Newsome, who's Head of the Stanford Neurosciences Institute, and as you know is Co-Chair of President Obama's BRAIN Initiative. He said to us then that in order to unlock the secrets of the human brain, that long, siloed scientific disciplines would have to come together and start working collaboratively, computer science, neurology, biomedical engineering, physics, advanced mathematics.

Talk with us, if you will, about how the academic landscape is being fundamentally restructured to facilitate this new approach that will help you realize that grand vision?

Dr. Lloyd Minor: This is the century of biomedicine. We're seeing so many disciplines from science and technology converge on biomedical problems. Biology as a discipline has grown up. It's now firmly a quantitatively rooted discipline. Therefore the techniques from the physical sciences, from engineering, the techniques that have been so successful in other areas can now be applied in biology and medicine.

At Stanford, we do have the advantage of everyone being on the same campus. Our Academic Medical Center with the School of Medicine and Stanford Hospital and Lucile Packard Children's Hospital, we are on the campus of Stanford University. My office, it's literally across the street from the chemistry department, the biology department, and the engineering school. There's a very fluid interchange of faculty and students between and among the various different disciplines at the university.

Also, I think Stanford and our peer institutions as well are moving towards a more collaborative interdisciplinary culture. We provide incentives like seed grants. In some of our seed grant programs, we require that faculty from different disciplines collaborate in preparing the grant proposal. Oftentimes, the catalyst that brings laboratory groups together is the student, who has expertise in and is gaining expertise in relatable complimentary [PH] fields that really brings the faculty together. All those are mechanisms that are being used to encourage and promote interdisciplinary scholarship and research.

Mark Masselli: Dr. Minor, the notion of precision medicine is certainly taking hold across the health care landscape. We have the National Institute of Health's All of Us Precision Medicine Initiative. We're also seeing this explosion of targeted drug development in the world of pharmaceuticals. For the first time, we're harnessing personal health data from wearables to gain better understanding of population health. I'm wondering if you could tell us what are you most excited about.

Dr. Lloyd Minor: Several things. There's explosion in terms of basic biological, biomedical discovery. Our knowledge of receptors on the surface of cells, our knowledge of -- that knowledge is increasing at a prodigious pace. In the past, a scientist makes a discovery. That scientist thinks that might be a druggable target. Then there's a big gap between that fundamental discovery and answering the question, whether or not this is a target. If it is a target, then making the compounds that interact with it as a target.

Classically, what people would do, they would file for the intellectual property, then seek to get commercial funding, and work it up from there. That's easy to say in two or three sentences. It turns out to take a lot of time and effort, and years. We're trying to shorten that lag time in a number of different ways through partnerships with industry to bring the benefit of medicinal chemists on campus, to provide incentive funds that will help a faculty member to cross that first valley of death, and really determine if that receptor or ligand is indeed a target.

Another area relates to this rapid development of the field that's known as digital health. I think of digital health as having two components, a consumer-facing component, wearables and other devices, and second, an analytical, artificial intelligence machine learning-enabled component, which is extracting information from the treasure troves of data, data that are locked in our electronic medical record systems, but being able to decipher relationships, and therefore develop better care delivery pathways based upon this enormous amount of data. Getting from basic discovery to therapeutics, second, being able to more meaningfully gather data about health, and then extract information from those vast quantities of data.

Margaret Flinter: I'm thinking, listening to you, it's changed in the way we train our next generation of health care professionals too if we're going to be

successful. You're certainly one of the most renowned campuses for training of health professionals. What are you seeing in the changes in the education and training of future physicians, and other health care professionals at Stanford?

Dr. Lloyd Minor: One of my friends in the venture capital world would usually turn to me on the panel and say, you know, we're going to put you out of business and your medical school out of business in the next decade. There will be a need for physicians. Everything will be handled by data scientists. Now, I worry about a lot of things in life, right? That's not one thing that I tend to worry about. The need for physicians and other health professionals to understand what can be accomplished through data science, that need is increasing prodigiously. During the first two years of medical school, we basically follow the same calendar as the rest of the university. We have first and second year medical students taking courses in computer science and engineering, as well as in the humanities and social sciences. Medical students get combined degrees in law or in business as well as in more traditional scientific disciplines.

Today, more than ever, the need to train physicians to be valuable members of teams, we also want to have physicians graduating from our medical school that have competencies in other areas as well. I like to think of what we're moving into in health care is being high tech enabling high touch. I don't believe that health care professionals are going to be put out of business by high tech.

When we ask people in our health care delivery system, do you want to receive all of your care virtually, or do you want to have a primary care health provider, and be able to access others virtually? No one elects to eliminate a primary care provider. They also want the immediacy that virtual interactions and digital health provide today. Those of us who are responsible for training the health care workforce of the future, that's what I think we want to focus on.

Mark Masselli: We are speaking today with Dr. Lloyd Minor, Dean of the Stanford School of Medicine, where he has established a strategic vision to lead the biomedical revolution in precision health. Dr. Minor, I think that probably the area where we need the most is in sort of managing all of this big data. We had Apple's Chief Operating Officer, Jeff Williams, on the show, who talked about their plans for entering the health care space. Now, Stanford is partnering with Apple and the telemedicine company, American Well, on the Apple Heart Study to accelerate research in population health. I'm wondering if you could talk to our listeners about this collaboration. How might it inform the future of population health research?

Dr. Lloyd Minor: One of the things that excites me the most about the Apple Heart Study is it's starting to put information about health into the hands of each of us as a health care consumer. Technology has transformed every other aspect of our lives and our economy, except for health care. You and I can use our ATM card pretty much at any ATM on the planet. Likewise, the way we order

essential goods and services has changed dramatically. The way we access information about our health has undergone very little change.

We still walk into doctors' offices and we see fax machines that in other sectors have gone out of business a long time ago. One essential next step is to make information about our health more accessible to us. That's exactly what the Apple Heart Study is intended to do. It's looking for the arrhythmia of atrial fibrillation. We know it's the most common arrhythmia. We really don't know today the true incidence and prevalence of atrial fibrillation. We have designed a study to look for indicators of atrial fibrillation. Then as you described working with American Well to, when the watch picks up that there may be an arrhythmia for the consumer to contact American Well and get information about next steps to screen further for the possibility of atrial fibrillation.

This will, first of all, give us a treasure trove of data about the true incidence and prevalence of atrial fibrillation. It's an essential first step towards ultimately designing a monitoring system that will enable people to know if they have the arrhythmia and enable physicians to make a much more informed judgment about when it needs to be treated, or when it can simply be observed.

Margaret Flinter: Dr. Minor, maybe focus for a minute on prevention. Do you talk about the next big thing in health being precision health, and you believe it will be a game changer to population health in the future? Talk about this precision health system that you have at Stanford and what would you like our listeners to know about it?

Dr. Lloyd Minor: There are several components addressing the social, environmental, and behavioral determinants of health. We look at health and health care as a pie. Our traditional health care delivery system only addresses maybe a quarter of that pie. Social, environmental, and behavioral determinants account for 75% of the pie. We also know that those are the most difficult components to address.

One project we're doing here, obesity among Latino American children is very high in the United States. Prevalence is about 39%. We know that children who have obesity, many of them morbid obesity, go on to develop a very high incidence of diabetes, heart disease, kidney failure, a host of complications triggered by obesity. We have a group of our faculty, who receive funding for a project, called SPHERE, Stanford Precision Health for Ethnic and Racial Equity. One component of that project looks at obesity among Latino American children in Santa Clara County.

What we're doing in that study, yes, we're doing the traditional scientific medical analysis of genomics and other biological indicators, and markers, but we're also looking at how we can encourage and enable activity, very practical types of interventions like offering to replace all of the cooking and serving utensils in a

household with smaller utensils, hopefully leading to smaller portions. We're studying all of these interventions to see what's effective in specific patients according to their social, environmental, and behavioral determinants.

I think being rigorous about the way we study the interventions is the way that we're ultimately going to understand how to address these determinants. I also think this revolution in digital health, both the consumer-facing component and the machine learning AI-enabled component, this revolution will help as well because each of us is going to have a lot more information about our health than we've been able to garner in the past. All of those things make me optimistic about being able to achieve this vision of precision health.

Mark Masselli: Dr. Minor, we have tens of millions of Americans who don't have access to health insurance. Yet on the other hand, we're talking today about these 21st century innovations, genomics, proteomics, AI. We're facing this much larger concern about how do we bend the cost curve. Then we have these announcements, most recently a collaboration between Amazon, Berkshire Hathaway, and JPMorgan vowing to reduce the health care cost burden.

There seems to be lots of skepticism in these quests to transform health care. In your vision of the future, where is the opportunity to bring these disparate groups together to form a sort of a more perfect union for the health care delivery system?

Dr. Lloyd Minor: I, like you, am just now learning about the collaboration between Amazon, JPMorgan, Berkshire Hathaway. Let me offer a few thoughts. To the extent that we can simplify and make more efficient the supply chain in health care delivery, that will increase value, that will lower cost, and conceivably improve outcomes by making what is today a rather fragmented supply chain, more cohesive and coherent. Also making information available, one can imagine that 10 years from now, the way we will access health care delivery services or other health-related services can similarly be dramatically different, and different in a way that adds value, lowers cost, improves outcomes, and makes the entire system more efficient for us to engage in healthy behaviors.

For example, if we're able to get healthier sources of food in an accessible and affordable way, that will promote health. If people don't have barriers to shopping for foods that are healthy, that is going to translate into better health. You can imagine it across the board with multiple aspects of the economy related to health, making those more accessible, more affordable will help us to achieve a healthier society. That is my understanding of the overall intent. How it translates into specific programs and opportunities, I think we'll have to wait and see.

Margaret Flinter: We've been speaking today with Dr. Lloyd Minor, Dean of the Stanford School of Medicine. You can learn more about his work by going to

medicine.stanford.edu, or follow on Twitter @StanfordMed. Dr. Minor, thank you so much for the pioneering work that you are doing and for joining us on Conversations on Health Care today.

Dr. Lloyd Minor: Thank you, Margaret. It's been a pleasure talking to you and to Mark.

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Mark Masselli: At Conversations on Health Care, we want our audience to be truly in the know when it comes to the facts about health care reform and policy. Lori Robertson is an award-winning journalist and Managing Editor of FactCheck.org, a nonpartisan, nonprofit consumer advocate for voters that aim to reduce the level of deception in U.S. politics. Lori, what have you got for us this week?

Lori Robertson: With the controversy over family separations at the border, much of the political rhetoric in recent weeks has focused on illegal immigration. We thought it would be helpful to take a step back and look at some measures of illegal immigration in a larger context. First, there were 12.1 million immigrants living in the country illegally as of January 2014 according to the most recent estimate from the Department of Homeland Security. The Center for Migration Studies estimates the number at 11 million people in 2015, and says that 44% were visa overstays. That's people who had entered the country illegally on visas, but overstayed the limits on those visas. As for those trying to cross the border, apprehensions on the southwest border peaked in 2000 at 1.64 million and have generally declined since, totaling 303,916 in 2017.

In recent years, the number of families trying to cross the border has increased, both in number and proportion of those apprehended. In fiscal year 2013, according to Customs and Border Protection data, there were 14,855 people apprehended on the southwest border who were part of a family unit. Those are individuals, including children under 18, parents or legal guardians apprehended with the family member. That was 3.6% of all those apprehended on the border that year. In 2017, 24.9% of apprehensions, or 75,622 people were in a family unit. As for unaccompanied children, the number of children under age 18 apprehended crossing the border without a parent or legal guardian was 18,411 in fiscal year 2010. The figure was about 40,000 by fiscal 2013 and it was about the same in 2017. It fluctuated in the years in between, spiking in fiscal 2014. Unaccompanied children are referred to the Department of Health and Human Services, Office of Refugee Resettlement.

HHS said in late June that there were 11,800 children in its shelters, with 2047 of those being children who had been separated from their parents. About 80% or more of all unaccompanied children referred to HHS over the last several years

have been aged 13 and older. About 90% or more have been from Honduras, Guatemala, and El Salvador.

That's my fact check for this week. I'm Lori Robertson, Managing Editor of FactCheck.org.

Margaret Flinter: FactCheck.org is committed to factual accuracy from the country's major political players and is a project of the Annenberg Public Policy Center at the University of Pennsylvania. If you have a fact that you'd like checked, email us at chcradio.com. We'll have FactCheck.org's Lori Robertson check it out for you here on Conversations on Health Care.

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Mark Masselli: Each week Conversations highlights a bright idea about how to make wellness a part of our communities and everyday lives. Tinnitus is a vaccine condition that afflicts millions of Americans, a condition for which there is really no viable treatment to date, but a University of Michigan researcher may have found a solution.

Dr. Susan Shore says tinnitus, marked by a constant ringing in the ears, is really the results of misfiring brain signals. Her team has developed a device aimed at getting to the root cause of tinnitus, neurons in the region of the brain stem. When those cells become hyperactive, they create a signal that is transmitted to the part of the brain where hearing perception occurs and the constant ringing can wreak havoc on sufferers' lives.

The device is called a targeted bimodal auditory-somatosensory stimulation and works on two fronts. It uses both weak electrical impulses targeted to the brain stem region responsible for the problem, and also sends time sound to interrupt the auditory sensation caused by the tinnitus.

Dr. Susan Shore: We developed this treatment for a particular class of tinnitus in which the person who has the tinnitus is able to modulate either the pitch or the loudness of their tinnitus by pushing on their face, or pushing on their forehead, or clenching their jaw.

Mark Masselli: The study group has been relatively small so far, but the results have been quite promising. Dr. Shore says that the severity of the tinnitus was greatly reduced in most of the participants and some got to the point where it no longer interfered with their daily lives.

Dr. Susan Shore: We need a good solution for tinnitus as it's affecting millions of people.

Mark Masselli: A relatively simple targeted device that could potentially help millions of tinnitus sufferers from the worst effects of their condition. Now, that's a bright idea.

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Mark Masselli: You've been listening to Conversations on Health Care. I'm Mark Masselli.

Margaret Flinter: I'm Margaret Flinter.

Mark Masselli: Peace and health.

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