



The Beat

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Wearable Devices and Heart Health: What's the Buzz?



Daniel Yazdi

Wearable devices (smartwatches and fitness trackers) can tell us a lot about ourselves, from how many steps we've taken in a day to how much water we've had and how many calories we've burned. But can they accurately flag heart abnormalities? We spoke with Dr. Daniel Yazdi from Brigham and Women's Hospital to find out more.

Q: Let's start with the concept of "precision health." It's a term we hear often. What exactly is it?

Precision health, in a very broad sense, refers to data and signals that we can use to provide personalized, targeted health care to an individual. There's a wide spectrum of data that we can use, ranging from information we obtain from blood samples to data we can collect from wearables and other devices. Precision health allows us to reach patients at points that are convenient for them, so I think it allows for the decentralization of health care to some degree.

Q: How are these data being used or implemented?

Precision health has actually been around for some time. For example, we've been using genetic analysis for several years to optimize treatments in patients with cancer. But now, there are more consumer precision health tools on the market, such as "23andMe" and other genome sequencing services that can provide information about your susceptibility to certain diseases and things like that.

We're using devices to target heart health, too. In patients with hypertension, for instance, we have blood pressure monitors that patients can use at home. We're trying to extract more information from patients out of the clinic and in their everyday lives.

Q: In the vein of heart health devices, let's talk about the preliminary results from the Apple Heart Study that were recently released. In this study, patients used the Apple Watch to identify irregular heart rhythms such as atrial fibrillation (Afib). Can you unpack some of the key findings from the study?

The first point to note is that study participants wore Apple Watch models 1, 2, and 3 to look at heart rate variability. The study did not include the most recent iteration of the watch, Apple Watch 4, which has a built-in electrocardiogram (ECG) monitor.

The study investigators wanted to see if a mobile app on the watch could detect episodes of Afib using data from a heart rate sensor. Because Afib is a disorder that comes and goes, the researchers sent some patients a heart rate patch to wear on their skin after their watches detected Afib. Roughly 30% of the patients who were wearing both the watch and the patch were found to have Afib.

The watch had a high positive predictive value, meaning that when it detected Afib, the patients actually had Afib 70-80% of the time—although again, because

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Meet Our First Titan of Thrombosis: Professor Henri Bounameaux



We're pleased to launch Titans of Thrombosis, a new series dedicated to honoring experts in the thrombosis field and showcasing their important contributions.



Professor Henri Bounameaux

Professor Henri Bounameaux was born in Belgium and spent most of his childhood in the Belgian Congo. He finished secondary school in Basel, Switzerland and received his medical degree from the University of Basel in 1978. After completing his medical

Upcoming Events

European Society of Cardiology Meeting

September 2, 2019

Paris Expo Porte de Versailles
Paris, France

Thrombotic Management of Cardiovascular Diseases and the ESC Guidelines

2019 NATF Thrombosis Summit

September 12, 2019

The Fairmont Copley Plaza
Boston, MA

Hand-in-Hand Against Cardiovascular Disease: A Patient and Provider Journey

2019 Celebration of Gratitude

November 14, 2019

Museum of Science
Boston, MA

NATF cordially invites you to the Celebration of Gratitude, our premier fundraising event. Our enlightening keynote speaker, Dr. C. Michael Gibson, will discuss the intersection of art and science. Guests will also have exclusive access to the exhibits in the Museum's Blue Wing.

In-Person Blood Clot Support Group at BWH

There will be no in-person support group over the summer. We look forward to seeing you in the fall!

Upcoming Online Blood Clot Support Groups

NATF's Online Blood Clot Support Group provides an opportunity for patients to share common concerns, offer support to one another, and access the latest information about blood clot prevention and treatment. Dates and speakers for our upcoming meetings can be found at natfonline.org/patients/support-groups. To register for this online support group, please email info@natfonline.org.

June 18: Dr. Margaret Fang

Update on Anticoagulant Reversal Agents

July 9: Dr. Steven Deitelzweig

Atrial Fibrillation

August 13: Dr. Alec Schmaier

Update on VTE Prevention & Treatment

September 17: Dr. Geoff Barnes

Recent Trials Related to VTE

October 1: Drs. Umberto Campia,

Jean Connors, and Gregory Piazza
Panel Discussion

November 26: Dr. David Jenkins

Vitamins for CVD Prevention & Treatment

December 10: Dr. Arvind Pandey

I've Had a DVT/PE: Now What?

Let's Heal Together: An In-Person Post-Thrombotic Limb Support Group

[Sponsored by NATF]

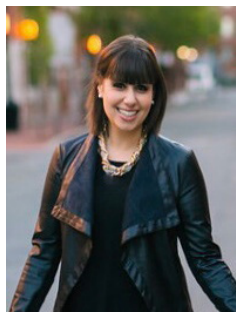
June 19, 2019

NYU Langone Health
New York, NY

Let's Heal Together: A Post-Thrombotic Limb Support Group is a newly formed, monthly support group for NYC-based patients, family members, and caregivers affected by post-thrombotic syndrome. If you've suffered from a DVT and your leg has just never felt the same since, please join this support group. For more information and to register, please email Heather Paulson-Soussou at hpaulson26@optimum.net

For more information about any of these events, please email events@natfonline.org. We look forward to hearing from you!

Meet the Newest Member of the NATF Team!



Aviva Schwartz

Aviva is the Director of Content Development at NATF and oversees the writing, editing, and production of NATF's patient and provider resources. She frequently collaborates with the Board, Scientific Advisory Committee, and other experts to develop content for articles, videos, and educational materials. She is also the editorial manager for NATF's Anticoagulation Action Initiative.

Prior to joining NATF, Aviva was a Senior Editor at Aptus Health, Inc. where she managed the cardiology, pulmonology, and hospital medicine content portfolios for a clinician education website. She has previously been in writing and editing roles at Harvard Health Publications and Inflexxion, a behavioral health company.

Aviva graduated from Simmons College with a dual degree in Sociology and Spanish. In 2011, she received her master's degree in Health Communication from a joint program at Emerson College and Tufts University School of Medicine. Outside of work, Aviva enjoys reading, spin class, traveling with her husband, and spending time with family and friends.



MEET OUR FIRST TITAN OF THROMBOSIS: PROFESSOR HENRI BOUNAMEAUX

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training in Switzerland and Belgium, he returned to the University of Geneva in 1985 and has since served in several roles. In 1992, he founded the Division of Angiology and Hemostasis at the University. He was the Chairman of the Department of Medicine from 2002-2010 and has been the Dean of the Faculty of Medicine since 2011. After more than 40 years of dedicated work in the venous thromboembolism (VTE) field, Professor Bounameaux will be retiring this summer. We had the privilege of chatting with him about his fruitful and far-reaching career.

Q: You've had an incredible career in the thrombosis field. What originally drew you to this area of study?

My father was a clinician-scientist and was interested in blood platelets. In my studies in Basel, I became interested in thrombosis and how it manifested in arteries and veins. I ended up doing my thesis on the topic of hemostasis, so I've really been in the field since I was a medical student. After that, I continued to be interested in lab-focused matters related to thrombosis, such as thrombophilia and anticoagulation.

Q: What has been the most important development in the field over the years?

I've been involved in all aspects of VTE and have witnessed a lot of changes over the past four decades! First, deep vein thrombosis (DVT) and pulmonary embolism (PE) are, in fact, the same disease, but they were managed by different departments when I started in the field. Cardiologists or pulmonologists handled PE and internal medicine providers managed DVT. Clinicians didn't communicate outside of their respective units, even though they were all caring for the same disease. Luckily, VTE has since emerged as a "unified condition" and has become more multidisciplinary.

I've seen changes in prevention and diagnosis, too. Prevention started in the 1970s when small doses of heparin were used in surgical patients to prevent post-procedure blood clots. Prevention now extends beyond surgical patients to patients in the hospital, patients who are immobilized, or patients who are otherwise at risk of developing a clot. There are now more medications and indications to prevent clotting.

We also used to use invasive tests to diagnose DVT, like venography of the lower limbs where you had to inject contrast dye into veins and then get x-rays to see the clot inside the veins. Another potentially dangerous procedure called pulmonary angiography was used to diagnose PE. These techniques had high complication rates in some cases. Since then, new tests have been developed that allow for noninvasive diagnosis in 99% of cases. VTE is also diagnosed more frequently because today's methods are more sensitive.

And finally, we've seen huge changes in treatment options. When I started in the field, the only available medications we had were heparin and vitamin K antagonists (like warfarin). Over the years, we've been able to use things like low-molecular-weight heparin, fondaparinux, and direct oral anticoagulants (DOACs). The DOACs are now beginning to replace older medications. They're more user-friendly, have fewer complications, are easier to take, and don't need routine monitoring.

The field has changed in all aspects and has moved in the right direction!

Q: How has general awareness of VTE changed? Is it more recognized now than it was in the past?

Yes, awareness of the disease has definitely increased in the population. Some important people in the world have had thrombosis. We've all probably heard anecdotes about people who have had VTE after a long flight—those stories make headlines in the newspapers. However, I think patients still know less about this disease than about heart attack or stroke. General awareness could be further improved.

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Afib is so transient, all episodes may not have been identified. A very small percentage of the patients received Afib notifications (0.5%), so there weren't a lot of "false positives," either.

Q: What do these findings tell us?

What they tell us on a basic level is that a wearable, like an Apple Watch, has the ability to detect Afib. It's important to identify Afib because it can lead to stroke.

So, what do we do with this data? Well, we already know that patients with paroxysmal Afib (Afib that occurs off and on) benefit from blood thinners (anticoagulation). Generally, we say that the primary risk of anticoagulation is a major bleed while the major benefit is stroke prevention. We also say that a patient needs to fall roughly 200 times for the risk of a serious bleed to outweigh the benefit of preventing stroke. But, of course, we haven't had this level of granularity before where patients can be monitored 24/7— that's an exciting development. At the same time, we're entering uncharted territory with this continuous monitoring and we're going to have to reassess if risk/benefit analyses favor using anticoagulation in these patients. I'm sure researchers will be doing that in the future.

Q: Afib typically doesn't affect younger people. What does it mean if a younger patient receives an Apple Watch alert?

I think that looking at probability is important when it comes to Afib. Younger patients (under 55 years old) are less likely to have Afib. Of course, risk factors like hypertension, diabetes, and other conditions can increase those odds, so an alert for a young patient should still be taken seriously.

If your watch tells you that you're in Afib—even if you're under the age of 55—it's important to contact your primary care provider or cardiologist and let them know. They should have a discussion with you about the nature of the episode(s) and symptoms and should address any other medical conditions that may increase your risk for Afib. Some clinicians may want to further investigate with an event monitor. If Afib is detected, the patient and clinician will have a conversation about anticoagulation treatment.

Again, with the Apple Watch 4, you can download a PDF of a heart rhythm strip and send it to your healthcare provider, which can be helpful in guiding discussion and management.

Q: Are these devices actually reliable or is it too early to tell?

Newer devices are reliable in that they can actually detect Afib—the sensitivity and specificity are over 98%. I think there's definitely a signal benefit. It's too early to tell if clinicians are seeing lots of patients who are receiving Afib notifications, but again, only 0.5% of participants in the Apple Study were notified that they had Afib. I personally haven't encountered a big uptick of patients who've received alerts.

Q: One of the drawbacks of these technologies is that they can't really tell a patient's full story. They don't account for genetics, environmental factors, etc. What are your thoughts on this?

Right, these devices only offer one piece of evidence. Of course, clinicians should always take the whole patient story into consideration and patients should be forthcoming about their histories. If you have a history of heart disease, high blood pressure, or other risk factors for Afib, those things should be discussed.

Again, age is also a factor to consider with Afib. If you're a healthy 20-year-old patient, I'd think twice about Afib and would need to inquire about your medical history and order additional studies if warranted. I definitely agree that devices only represent one piece of data.

Q: Is there anything else to be aware of when purchasing one of these devices?

We know these devices can be really helpful in chronic conditions like hypertension or diabetes. They can help patients collect organized metrics, which, in turn, can help clinicians optimize treatment and management. On the other hand, people should be aware that these devices can identify abnormal values that aren't truly meaningful. Our bodily signals change a lot throughout the day with exercise and activities. These devices will make us more aware of how our bodies are operating, which is exciting but may also pose challenges.

The bottom line is that patients should listen to their bodies and talk to their providers if they have specific questions or concerns. Likewise, providers will have to work on filtering data from wearable devices and determining if it's clinically meaningful or not. We need to be careful about overburdening the healthcare community with potentially spurious results. I think we'll all continue to learn more as these devices become more widespread.

Dr. Yazdi is an internal medicine resident interested in the intersection of digital health and clinical medicine. His current research focuses on noninvasive devices and their role in promoting cardiac health. He currently serves as the Clinical Innovation Lead in the One Brave Idea program at Brigham and Women's Hospital.



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I do think awareness has improved in the medical community with the development of the diagnostic tools and “friendlier” treatments that I mentioned. The US Surgeon General’s Call to Action in 2008 also contributed to this awareness.

Q: What should a patient know after a VTE event? What’s an important take-home message?

Patients need to know that having one VTE event is the biggest risk factor for having a second event. So, if you’ve had the one, the risk of having a second one increases a lot. There are some “triggering” risk factors, like surgery or cancer, but VTE can recur in patients even without these “triggers.” Patients should recognize that VTE is a chronic condition, too. In fact, PE is the third leading cause of vascular death, so any patient who has had an event should receive treatment to reduce future risk.

Q: In your experience, what’s the best way to encourage patients to take their medication after an event?

This is an important issue that’s not specific to just VTE. For example, we know that only half of patients with high blood pressure will still be taking their medication 6 months after diagnosis. Treating VTE can be especially difficult because at the time of the event, patients usually take their medications. But 6 months later, some patients seem to have forgotten the event and stop taking their medications, which can be dangerous. Chronic disease is just that—it’s chronic—and many patients need lifelong treatment, whether or not they have symptoms.

I think that education is the only real solution to this issue. We need to repeatedly educate patients about VTE and what it means for them, and we need primary care providers to help us with this task. I guide my patients through the most active phase of their disease, but their primary care provider will follow them after that. Specialists and primary care providers need to work together to educate patients about how to take their medication properly and we must make sure that patients understand our instructions. We also need to have a discussion with patients about the risks and benefits of the medications.

One of the challenges we face with VTE medications is that the drugs can cause bleeding, so we need to balance the benefits and risks of the treatment. We need to check in with our patients and periodically reassess their medications because the risk of bleeding is something that can change over time. The role of the general practitioner cannot be overemphasized in all parts of this process.

Q: What do you think have been your most important contributions to this field? What are you most proud of?

First, I had a big goal when I began my career at the University Hospital [of Geneva]: I wanted to link the hemostasis lab with the clinical division of angiology. I envisioned a unified service that encompassed DVT and PE. I was exposed to this type of system during my fellowship and was impressed with what clinicians were able to accomplish when the lab and clinical unit were structurally linked. I was lucky enough to bring the model to my hospital in 1992. I just had to convince the authorities that this was a good idea—it took five years to make my idea a reality!

I think another major contribution linked to my name is the use of the D-dimer lab measurement in VTE/PE diagnosis. D-dimer is a protein fragment from the breakdown of a blood clot. If D-dimer isn’t present in a patient’s blood test, or if you find very low levels of it, you can rule out the disease. This was a big development in the late 1980s because it helped inform a noninvasive diagnostic approach to VTE. In 1991, I published the first paper on using D-dimer as a diagnostic tool in *The Lancet*. Having a tool to easily rule out VTE was useful at that time and remains useful now. It helps us avoid irradiating and expensive diagnostic scans in patients.

Q: And now for the million-dollar question: what will you do in your retirement?

Well, most importantly, I’ll be working less! I’m going to concentrate on a few interesting things, the first being my family. I have six grandchildren and I’m very happy that I’ll get to spend more time with them. My wife and I enjoy horses as well. We actually have our own horses, so I’m looking forward to investing more time in this hobby. I’ll ride my motorcycle from time to time, too!

I’ll also stay involved in several intellectual activities. I’ll continue to serve as Chairman of the Board of the Academic Society of Geneva, which is a foundation that collects and allocates money for research at the University of Geneva. I will also maintain my position as the Vice President of the Swiss Academy of Medical Sciences. Finally, I’ll serve on the writing committee for the American College of Chest Physicians CHEST Guidelines for the Treatment of Venous Thromboembolism. I was a panelist on the last two iterations of these guidelines and am thrilled to contribute to the next edition. So, I think all of these things will keep me busy enough!



From left to right: Dr. Bounameaux and his granddaughter, Lou, enjoying time with their family pony, Ubaye de Givry, and horse, Grain d’espoir; the Bounameaux family; Dr. Bounameaux with NATF’s President, Dr. Goldhaber, in Dublin, Ireland; Dr. Bounameaux on his motorcycle.



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