Using Smartwatch Data to Detect COVID-19 Cases Early

Early this year, investigators at the Scripps Research Translational Institute found that resting heart rate and sleep data from wearable sensors could predict population-level trends in influenza-like illness. Now, a new study from the same team suggests that wearable sensor data combined with self-reported symptoms might aid in the early detection of coronavirus disease 2019 (COVID-19).

The COVID-19 findings are from the ongoing Digital Engagement and Tracking for Early Control and Treatment (DETECT) study, a collaboration with health care technology company CareEvolution. The researchers analyzed data from 333 participants who entered both symptoms and test results into the DETECT smartphone app, which also collected heart rate, sleep, and activity data from the individuals’ commercial wearable devices.

Fifty-four participants reported testing positive for COVID-19. A model that analyzed both sensor data and symptoms more accurately discriminated between positive and negative cases than one that considered symptoms alone. The approach looks for changes in an individual’s own biometrics, a better health indicator than deviations from population averages, the researchers said.

“DETECT could play an important role in alerting individuals that they may have contracted the virus,” Giorgio Quer, PhD, director of artificial intelligence at Scripps and the study’s lead author, said in an email. Quer’s team is now working on an algorithm that also identifies presymptomatic or even asymptomatic individuals. “This would be especially valuable, as people may be already infectious during this period, and may unknowingly spread the virus,” he said.

Only 1 in 5 people in the US wear a smartwatch or activity tracker, however. If future research confirms the devices can be used to improve health the “gap in usage will need to be proactively addressed to assure health equity,” the researchers wrote in *Nature Medicine*.

Long-acting Cabotegravir Shot Prevents HIV Among Women

For the first time, a long-acting shot has been shown to prevent HIV among women in a large-scale trial, the National Institute of Allergy and Infectious Diseases (NIAID) said in a statement. The institute announced interim phase 3 trial results for an injectable form of cabotegravir, an investigational HIV drug.

Preexposure prophylaxis (PrEP) involving a cabotegravir injection every 8 weeks outperformed daily oral tenofovir disoproxil fumarate and emtricitabine (Truvada) among 3223 women in Africa. Of the 38 women who acquired HIV, only 4 were receiving the experimental drug.

Based on its planned interim analysis, which also found no safety concerns, an independent data and safety monitoring board recommended that the study be unblinded and results shared. The trial’s participants can continue to receive the regimen they were assigned to and those receiving the pills can switch to the injection as soon as it’s available.

Investigators will report more detailed findings as soon as feasible, the NIAID said. Further analysis could reveal whether low adherence to daily pills affected the results.

Earlier this year, the NIAID announced that cabotegravir injections outperformed tenofovir disoproxil fumarate and emtricitabine in a study involving men and transgender women who have sex with men.

Neurodegenerative Dementias Are Differentiated on PET Scans

In a recent study, positron emission tomography (PET) could distinguish Alzheimer disease from frontotemporal lobar degeneration (FTLD) disorders among living patients based on the location of tau protein deposits in the brain.

Alzheimer disease and FTLD, which underlies frontotemporal dementia, are marked by abnormal tau deposits in different brain regions. The deposits are less abundant in FTLD disorders, making them harder to detect with existing PET technology. In the new study, researchers used a modified contrast agent called PM-PBB3 that’s metabolized more slowly than its predecessor.

The modification roughly doubled uptake in the brain, allowing for sensitive imaging of tau deposits among 39 patients with both clinically diagnosed Alzheimer disease and frontotemporal dementias including Pick disease and progressive supranuclear palsy. Biopsies and autopsies supported the PET scan findings among patients with FTLD disorders.

The study, published in *Neuron*, “indicates that a single PET tracer can cover the diagnosis and differentiation of a wide range of neurodegenerative dementias and is applicable to clinical workup in hospitals equipped with PET scanners,” the study’s co-senior author, Makoto Higuchi, MD, PhD, of the National Institutes for Quantum and Radiological Science and Technology in Chiba, Japan, said in a statement.

The approach also detected tau deposits among participants with mild cognitive impairment and differentiated them from those with Alzheimer disease. Because tau aggregates show up in disease-specific brain regions decades before clinical signs, “it is anticipated that the diagnosis and differentiation of Alzheimer’s disease, FTLD syndromes, and related disorders can be made at a preclinical or very early clinical stage according to the presence and absence and localization of tau aggregates,” Higuchi said. – Jennifer Abbasi

Note: Source references are available through embedded hyperlinks in the article text online.