

Quick, easy, inexpensive cortisol testing should soon be available on all smartphones

June 24 2014



Diseases of the adrenal gland have long been difficult to diagnose. But now, researchers have found an affordable and easy way to diagnose and monitor endocrine diseases of the adrenal gland by using saliva and a smartphone. Credit: Intermountain Medical Center

Researchers have developed a device that uses any smartphone to measure the cortisol concentration in saliva. The device was presented Tuesday, June 24, at ICE/ENDO 2014, the joint meeting of the International Society of Endocrinology and the Endocrine Society in Chicago.

"We have developed a method for measuring [cortisol](#) in saliva using a [smartphone](#) and a disposable test strip. This innovation enables anyone with a smartphone to measure their salivary cortisol level quickly, accurately, and affordably," said lead study author Joel R. L. Ehrenkranz, MD, director of diabetes and endocrinology of the Department of Medicine at Intermountain Healthcare in Murray, Utah.

Cortisol is a hormone made by the adrenal glands that's essential for the body's response to stress, and measuring cortisol can help diagnose adrenal diseases and monitor stress levels. Current testing for salivary cortisol levels involves collecting a [saliva sample](#) and sending it to a clinical lab for analysis.

"A lab charges about \$25 to \$50 for a quantitative salivary cortisol test and has a turnaround time of days to a week. This test, taken in a medical office or at home, will cost less than \$5 and take less than 10 minutes," Dr. Ehrenkranz said. "The device is a reader that includes a case, a light pipe, and a lens and costs about a dollar to make. There is no battery power and it's unbreakable, passive and reusable."

Doctors worldwide can use the smartphone test to help them diagnose adrenal insufficiency and hypercortisolism and monitor physiologic variations in cortisol concentration; and individuals can monitor their own cortisol levels whenever they like.

The software is "operating-system-agnostic," he explained, meaning that the device can be used on all platforms, including iOS, Android,

Windows, and BlackBerry, and it has a universal form factor that works with all smartphones.

The person being tested inserts a straw-like saliva collector under the tongue. The collector wicks the saliva by capillary action to an immunoassay strip housed in a cassette and the cassette is inserted into the reader. The smartphone uses its camera and flash to take a picture of the saliva-coated strip and an algorithm converts the image's pixel density to a cortisol value.

Marketing this [test](#) as a cortisol assay would make it a class 2 medical [device](#), Dr. Ehrenkranz explained. He and his research team are now collecting clinical data for the FDA submission, and hope to attain approval in 2015.

Provided by The Endocrine Society

Citation: Quick, easy, inexpensive cortisol testing should soon be available on all smartphones (2014, June 24) retrieved 18 April 2024 from <https://medicalxpress.com/news/2014-06-quick-easy-inexpensive-cortisol-smartphones.html>

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