

# Building a better lab test

**The need for a better hormone testing model:** Physicians have three options for hormone testing – serum, urine, or saliva. Each of these testing methods is a viable option, but has significant limitations, which can be improved upon.



**Saliva testing** – While the free cortisol pattern in saliva has clinical value, there is a significant missing piece to surveying a patient’s HPA-Axis function with saliva testing – measuring metabolized cortisol. To properly characterize a patient’s cortisol status, free and metabolized cortisol should be measured to avoid misleading results when cortisol clearance is abnormally high or low. Likewise with sex hormones, measuring estrogen and androgen metabolites gives a fuller picture for more precise clinical diagnosis of hormonal imbalances and HRT monitoring.

**Serum testing** – While the most universally accepted testing method (due to the availability of FDA-cleared analyzers that are reliable and inexpensive), serum testing is lacking in some areas. **Adrenal hormones cannot be effectively tested in serum** because free cortisol cannot be tested throughout the day. There is also **a lack of extensive metabolite testing** (especially for cortisol and estrogens).

**24-Hour Urine Testing** – There are two primary drawbacks to urine testing of hormones. First, the collection is cumbersome, and **as many as 40% of those who collect, do so in error** (Tanaka, 2002). Secondly, **dysfunction in the diurnal pattern of cortisol cannot be ascertained from a 24-hour collection**. The daily free cortisol pattern was formerly only available with salivary testing.

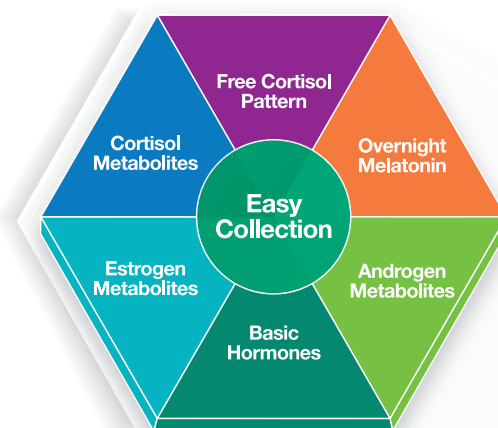
## **dutch** – Dried Urine Test for Comprehensive Hormones

This advanced hormone testing was developed to improve on the available hormone testing options. DUTCH offers the **most extensive profile of sex and adrenal hormones along with their metabolites**. Additionally, the daily (diurnal) pattern of free cortisol is included along with melatonin. This unique combination of clinical information is not available by any other method.

**Effective HRT Monitoring:** DUTCH testing was specifically made to be optimally effective for most forms of hormone replacement therapy. Unique methods are used for improved monitoring of oral progesterone and vaginal hormones.

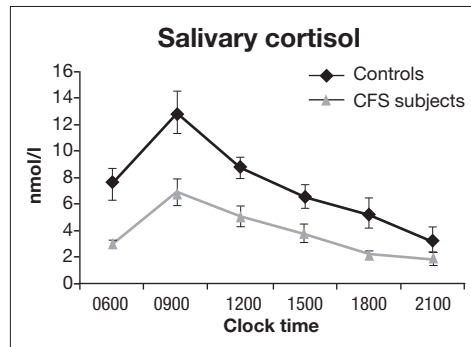
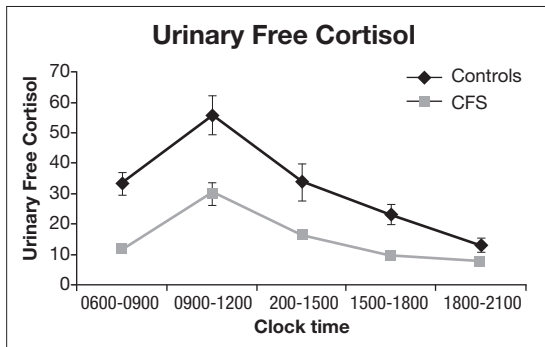
**The Easiest Patient Collection:** Patients collect just four or five dried urine samples over a 24-hour period. Dried specimen shipments are convenient worldwide. Dried samples are stable for several weeks.

**Analytical and Clinical Validation:** Precision Analytical testing methods go through a rigorous validation process to verify accuracy, precision, recovery, linearity, etc. We pride ourselves in relentlessly pursuing the most accurate and precise techniques available for testing. See the following data (back side) to support the analytical and clinical validation of this powerful new testing model.



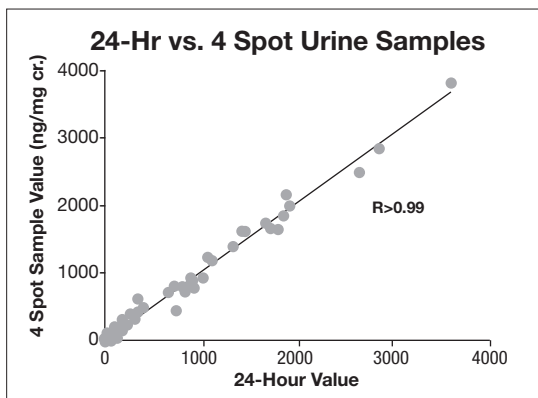
## Validating the Concept:

### Is there literature support for measuring diurnal free cortisol in urine?



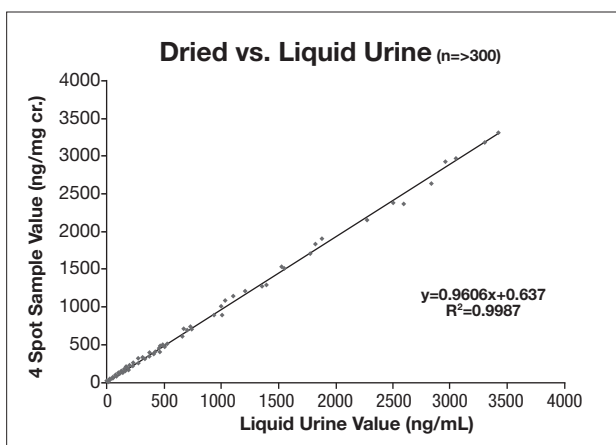
Jerjes (2005, 2006) studied the diurnal pattern of free cortisol in chronic fatigue patients (CFS) in both saliva and urine, finding very good agreement between the two lab tests (see graphs, left).

### Do values compare favorably to 24-hour collections?



The DUTCH correlation to 24-hour collections is excellent (see graph, left). Because the dried samples span about 12-14 hours of the day (6-8 hours overnight plus 2 hours per day collection), they represent the entire day's hormone production. A weighted average of the four samples is combined and measured for all hormones other than cortisol and cortisone. Values must be presented relative to creatinine (ng per mg of creatinine) to correct for hydration. This replaces the 24-hour value. The excellent correlation to 24-hour collections makes this model a very respectable alternative to 24-hour collections. With the addition of diurnal free cortisol, it becomes an improvement.

### Do dried samples compromise the analysis?



Dried samples are accurate for hormone testing, and values correlate to liquid samples (see graph, left). Samples are more stable once they are dried and also much easier to ship than liquid samples.

#### Methods Used for Testing

Cortisol, cortisone and related metabolites are tested by LC-MS/MS. The remaining hormones are tested by GC-MS/MS. The most accurate methods available are used for all tests. These methods show increased accuracy over immunoassays used in typical serum and saliva testing.



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