



**Accession # 00268795**  
Male Adrenal



**Advanced Adrenal Assessment**

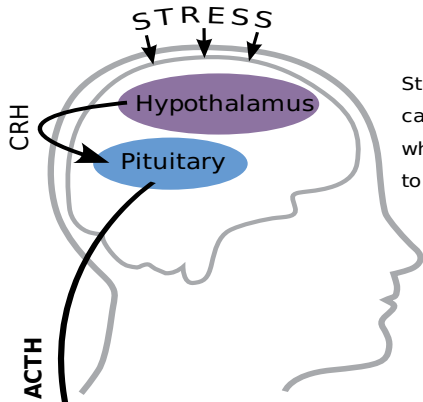
**Last Menstrual Period:**

**Ordering physician:**  
Precision Analytical

**DOB:** 1967-08-09  
**Age:** 50  
**Gender:** Male

**Collection Times:**  
2017-08-09 06:01AM  
2017-08-09 08:01AM  
2017-08-09 05:01PM  
2017-08-09 10:01PM

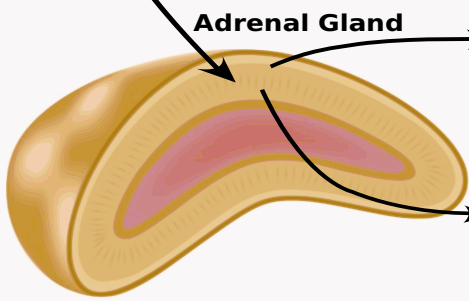
Category	Test	Result	Units	Normal Range
<b>Creatinine</b>				
	Creatinine A (Waking)	Within range	2.05 mg/ml	0.3 - 3
	Creatinine B (Morning)	Within range	1.5 mg/ml	0.3 - 3
	Creatinine C (Afternoon)	Within range	0.9 mg/ml	0.3 - 3
	Creatinine D (Night)	Within range	1.63 mg/ml	0.3 - 3
<b>Daily Free Cortisol and Cortisone</b>				
	Cortisol A (Waking)	Within range	30.6 ng/mg	18 - 80
	Cortisol B (Morning)	Within range	84.2 ng/mg	50 - 200
	Cortisol C (Afternoon)	Low end of range	17.7 ng/mg	11 - 45
	Cortisol D (Night)	Within range	6.3 ng/mg	0 - 25
	Cortisone A (Waking)	Below range	19.3 ng/mg	50 - 140
	Cortisone B (Morning)	Below range	54.7 ng/mg	100 - 240
	Cortisone C (Afternoon)	Below range	29.6 ng/mg	40 - 115
	Cortisone D (Night)	Low end of range	9.4 ng/mg	0 - 70
	24hr Free Cortisol	Low end of range	139.0 ng/mg	100 - 310
	24hr Free Cortisone	Below range	113.0 ng/mg	250 - 500
<b>Cortisol Metabolites and DHEAS</b>				
	b-Tetrahydrocortisol (b-THF)	Low end of range	2136.0 ng/mg	1750 - 4000
	a-Tetrahydrocortisol (a-THF)	Within range	494.0 ng/mg	175 - 700
	b-Tetrahydrocortisone (b-THE)	Low end of range	2358.0 ng/mg	2350 - 5800
	Metabolized Cortisol (THF+THE)	Low end of range	4988.0 ng/mg	4550 - 10000
	DHEAS	Low end of range	64.0 ng/mg	60 - 2000



Stress (or inflammation) causes the brain to release ACTH, which stimulates the adrenal glands to make hormones

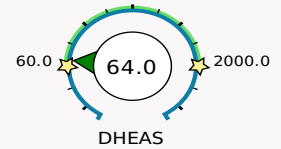


DHEAS Ranges	
Age	Range
20-40	100-2000
40-60	30-300
>60	20-100



**DHEA**

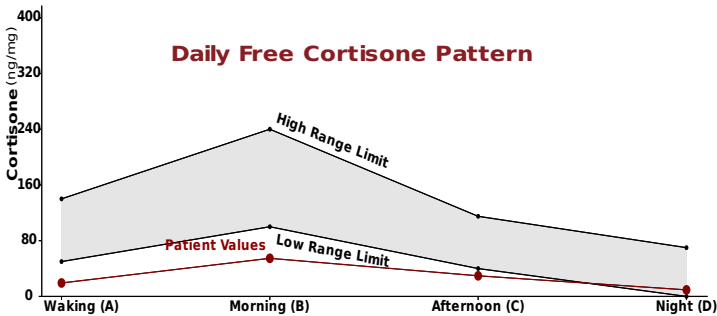
A patient's catabolic vs anabolic balance can be estimated by observing relative DHEA (anabolic) vs cortisol (catabolic) production



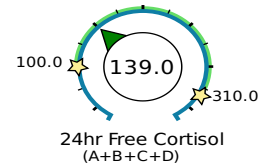
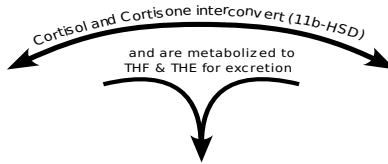
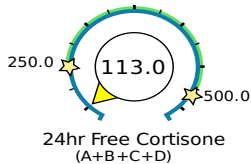
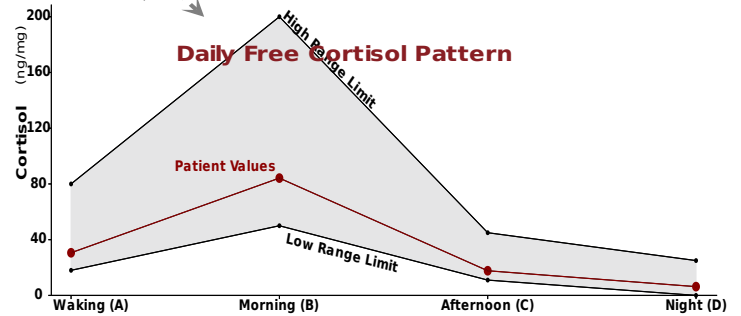
**Cortisol**

**Cortisol Metabolism**

**Circulating Free Cortisol**



Note: "Waking" samples reflect overnight production



More cortisone metabolites (THE)

More cortisol metabolites (THF)

NOTE: The balance between free cortisol and free cortisone reflects the kidney's conversion of cortisol to cortisone. See below for the overall preference between cortisol and cortisone.

NOTE: This 11b-HSD index measures the balance of cortisol and cortisone metabolites which best reflects the overall balance of active cortisol and inactive cortisone systemically.

# Provider Notes

Thank you for testing with us! If this is your first report, you are encouraged to watch our educational videos on how to read the report. There are hyperlinks to these videos on the first page of a DUTCH Complete or in these comments (below). The videos can also be seen by going to [www.DutchTest.com](http://www.DutchTest.com) and visiting the video library. Comments in the report that are specific to the patient ARE IN ALL CAPS or may be **bold**. The other information is general information that we hope you will find useful in understanding the patient's results. These results are not intended to diagnose any specific conditions. Treatments based on results should be made by a qualified healthcare provider.

The following video link(s) may help those new to dutch testing to understand the results. If you only have a hardcopy of the results, the video names can be easily found in our video library at [www.DutchTest.com](http://www.DutchTest.com). These results and videos are NOT intended to diagnose or treat specific disease states.

This video may assist with the interpretation of the Adrenal (cortisol) results: [Cortisol tutorial video](#)

**DUTCH Adrenal:** The HPA-Axis refers to the communication and interaction between the hypothalamus (H) and pituitary (P) in the brain down to the adrenal glands (A) that sit on top of your kidneys. When a physical or psychological stressor occurs, the hypothalamus tells the pituitary to make ACTH, a hormone. ACTH stimulates the adrenal glands to make the stress hormone, cortisol and to a lesser extent DHEA and DHEA-S. Normally, the HPA-axis production follows a daily pattern in which cortisol rises rather rapidly in the first 10-30 minutes after waking in order to help with energy, then gradually decreases throughout the day so that it is low at night for sleep. The cycle starts over the next morning. Abnormally high activity occurs in Cushing's Disease where the HPA-axis is hyper-stimulated causing cortisol to be elevated all day. The opposite is known as Addison's Disease, where cortisol is abnormally low because it is not made appropriately in response to ACTH's stimulation. These two conditions are somewhat rare. Examples of more common conditions related to less severely abnormal cortisol levels include fatigue, depression, insomnia, fibromyalgia, anxiety, inflammation and more.

Only a fraction of cortisol is "free" and bioactive. This fraction of cortisol is very important, but levels of metabolized cortisol best represents overall production of cortisol therefore both should be taken into account to correctly assess adrenal function.

**The Daily Free Cortisol Pattern:** In healthy adrenal function, cortisol levels are expected to rise in the early morning and fall throughout the day, reaching the lowest point around 1am and peaking 30-60min after waking. The waking sample represents the total of free cortisol throughout the sleeping period. Cortisone is the inactive form of cortisol. Its pattern is of secondary importance, but at times can give additional clarity and is provided on the adrenal page. Typical urine testing (24-hour collection) averages the daily production of cortisol. This approach is not able to properly characterize individuals whose cortisol patterns do not fit the typical rise then fall pattern through the day. Dysfunctional diurnal patterns have been associated with health-related problems such as fatigue and insomnia.

The first value reported for cortisol is intended to represent the "overnight" period. When patients sleep through the night, they collect just one sample. In this case, the patient woke during the night and collected (see the top of the report for the times collected). We call this value "A1" and the value from the sample collected at waking "A2." These values are used to create a "time-weighted average" to create the overnight value. The individual values are listed here for your use:

**The middle-of-the-night "A1" sample registered a cortisol value of 7.9ng/mg.**

**The waking "A2" sample registered a cortisol value of 56ng/mg.**

**These two values are averaged together, taking into account the amount of time each one represents, to create the "A" value of approximately 31ng/mg that you will see on the report.**

The daily total of free cortisol is approximated by summing the four measurements. This calculated value correlates to a 24-hour free cortisol value. It is helpful to compare the relative level of 24-hr free cortisol with metabolized cortisol to understand HPA-axis activity. The total of free cortisol for the day only represents about 1-3% of the total production. The total of the metabolites is a better marker for overall cortisol production.

FREE CORTISOL LEVELS ARE ON THE LOWER SIDE OF THE REFERENCE RANGE. LEVELS OF METABOLIZED CORTISOL CONFIRM THAT OVERALL CORTISOL PRODUCTION IS REASONABLE, AND THE ACTUAL DIURNAL PATTERN OF FREE CORTISOL SHOULD BE EXAMINED TO FURTHER EXAMINE CORTISOL PRODUCTION.

**The Cortisol-Cortisone Balance:** Cortisol, which is the active hormone, can convert into cortisone, the inactive form. They convert back and forth in different parts of the body. We tell which one you make more of by looking at whether cortisol metabolites (aTHF, bTHF) or cortisone metabolites (bTHE) are made more (compared to what is normal) in the gauge at the bottom of the adrenal page. The deactivation of cortisol to cortisone (via enzyme 11b-HSD II) occurs predominantly in the kidneys, colon, and saliva glands. The local formation of inactive cortisone from cortisol in the kidney is strongly reflected in urine. Activation of cortisone to cortisol takes place primarily in the liver, adipose tissue, gonads, brain, and muscle. Within these same tissues (mostly the liver) the free hormones are also converted to their metabolites (cortisol to a/b-THF, cortisone to THE). Balance between the two is usually preferred, but making more cortisol than cortisone is sometimes good to help give you enough cortisol if your levels are low however a preference for the active cortisol is enhanced by central adiposity, hypothyroidism, inflammation, and supplements such as licorice root extract. Cortisone formation is enhanced by growth hormone, estrogen, coffee and hyperthyroidism.

**Reading the Report:** The first page of the Dutch Complete lab report is a summary page while the second page of the

Dutch Complete lab report and first page of the Dutch sex hormone and Dutch adrenal test are a classic lab report showing each result and the respective range of each hormone. Reference ranges shown are those of young healthy individuals. The graphical representation of results on the page that follows allows the viewing of hormone results within the biochemical flowchart to more easily see the relative level of each hormone. The gauge format shows the patient result (represented by the "needle" of the gauge) and the area between the stars represents the reference range.

Reference ranges are typically set at the 20th to the 80th percentile of young, healthy individuals (DHEAS for example). This means that a result at the low end of a range is lower than 80 percent of young, healthy individuals. Likewise a result at the high end of a range is higher than 80 percent of the population. Some reference ranges are set more widely. For example, slightly elevated progesterone is not generally considered problematic, so its metabolites have reference ranges that extend further (90th percentile instead of 80th).

The "fan" style gauges are used for indexes/ratios such as on 5a-reductase activity, cortisol/cortisone, and estrogen methylation. Because these values are all based on ratios there are no values or units, but they give a general idea of a particular relationship and can tell you how 'turned up' or 'turned down' a particular process is. The middle of the gauge represents an average value, while the lines towards the edge represent results lower or higher than most (80%) of the population. Being outside of any range is not always considered unfavorable. For example, on the estrogen methylation gauge an elevated level means someone methylates estrogens very effectively which may have positive consequences.

What is actually measured in urine? In blood, most hormones are bound to binding proteins. A small fraction of the total hormone levels are "free" and unbound such that they are active hormones. These free hormones are not found readily in urine except for cortisol and cortisone (because they are much more water soluble than, for example, testosterone). As such, free cortisol and cortisone can be measured in urine and it is this measurement that nearly all urinary cortisol research is based upon. In the DUTCH Adrenal Profile the diurnal patterns of free cortisol and cortisone are measured by LC-MS/MS.

All other hormones measured (cortisol metabolites, DHEA, and all sex hormones) are excreted in urine predominately after the addition of a glucuronide or sulfate group (to increase water solubility for excretion). As an example, Tajic (Natural Sciences, 1968 publication) found that of the testosterone found in urine, 57-80% was testosterone-glucuronide, 14-42% was testosterone-sulfate, and negligible amounts (<1% for most) was free testosterone. The most likely source of free sex hormones in urine is from contamination from hormonal supplements. To eliminate this potential, we remove free hormones from conjugates. The glucuronides and sulfates are then broken off of the parent hormones, and the measurement is made. These measurements reflect well the bioavailable amount of hormone in most cases as it is only the free, nonprotein-bound fraction in blood/tissue that is available for phase II metabolism (glucuronidation and sulfation) and subsequent urine excretion.

Disclaimer: the filter paper used for sample collection is designed for blood collection, so it is technically considered "research only" for urine collection. Its proper use for urine collection has been thoroughly validated.