

## 52-year old Female, irregular cycles and other sx

**DDX:** perimenopause, hypothyroidism, hypoadrenalism, anemia  
**Consider:** insulin resistance **Evaluate for:** breast cancer and osteoporosis risk

	Serum	Saliva	24-Hour Urine
Female Hormones	Estrone Estradiol Estriol Progesterone  FSH LH	Estrone Estradiol Estriol Progesterone	Estrone Estradiol Estriol Estrogen quotient 2-hydroxyestrone 16 $\alpha$ -hydroxyestrone 2/16 $\alpha$ ratio 4-hydroxyestrone 2-methoxyestrone 2-methoxyestradiol Pregnanediol
	<p><b>Commentary:</b> Any of these three methods would be acceptable for baseline measurements. FSH and LH can be used to confirm reproductive decline. Saliva has an advantage over serum in that it is measuring free hormone. 24-hour urine also measures bioavailable hormone and has the advantage of the 24-hour perspective. The 24-hour urine profile also measures metabolites that can give insight into estrogen metabolism, risk for breast cancer and risk for osteopenia.<sup>26</sup></p>		
Androgens	Total Testosterone Free Testosterone DHEA or DHEA-S	Testosterone (free) DHEA-S	Testosterone DHEA & DHEA-S 5 $\alpha$ -androstenediol 5 $\beta$ -androstenediol Androsterone Etiocholanolone
	<p><b>Commentary:</b> Any of these three methods would be acceptable for baseline measurements. All three measure free hormone. Saliva requires careful attention to collection procedures to avoid falsely elevated testosterone levels. 24-hour urine has the advantage of the 24-hour perspective and includes metabolites that allow assessment of 5<math>\alpha</math>-reductase activity. This may point to risk for insulin-resistance.<sup>27</sup></p>		
Adrenal Hormones	Cortisol Cortisone	Cortisol, 4-point	Cortisol Cortisone Tetrahydrocortisone (THE) Allo-tetrahydrocortisol Tetrahydrocortisol (THF) 11 $\beta$ -hydroxyandrosterone 11 $\beta$ -hydroxyetiocholanolone Aldosterone Allo-tetrahydrocorticosterone Tetrahydrocorticosterone 11-dehydro tetrahydrocorticosterone
	<p><b>Commentary:</b> 4-point saliva collection allows assessment of diurnal pattern of cortisol secretion. 24-hour urine includes glucocorticoid metabolites that give comprehensive information about adrenal reserves and health. Aldosterone and mineralocorticoid metabolites give further information about the extent of adrenal depletion (or lack thereof).</p>		
Thyroid	TSH T4 (Total and/or free) T3 (Total and/or free) rT3 Thyroid antibodies	Not available	Free T3 Free T4 THE/THF ratio
	<p><b>Commentary:</b> Serum panels are standard for thyroid evaluation and have the most comprehensive panels. It is important to evaluate reverse T3 (rT3) as elevated levels can be indicative of underlying heavy metal toxicity, which may be contributing to thyroid dysfunction and symptoms. 24-hour urine Free T3 has excellent correlation with clinical symptoms of hypothyroidism.<sup>28</sup> The ratio of adrenal metabolites THE and THF is also highly correlated with thyroid function.<sup>29-30</sup></p>		

**Table 1.** This table outlines the testing options in all three methods for the hormones of interest. The commentary in each section provides the rationale for choosing a particular option.