

**EDUCATION GRAM™**  
**Hypothyroidism In Adults**

Vol. 13 No. 02 | February 2015

**Hypothyroidism Symptoms:** Fatigue, Cold intolerance, weight gain, cognitive dysfunction, constipation, growth failure, dry skin

Spectrum of Hypothyroidism	Characteristic
Primary Hypothyroidism	TSH > 5 mIU/L with Free-T4 < 0.8 ng/dL
Subclinical Hypothyroidism	TSH > 5 mIU/L with Normal Free-T4
Secondary (Central) Hypothyroidism	TSH low to normal (TSH <0.5 or 0.5-5 mIU/L) with Free-T4 < 0.8 ng/dL

**Treatment Plan for Hypothyroidism:**

Treating hypothyroidism is life-long, consisting of thyroid hormone replacement, synthetic thyroxine (T4) not T3 because it has a longer half life and it is the main circulating hormone. T4 has an extra iodine which can interact with cells and once it enters it becomes T3 by losing the iodine. Then the T3 conveys metabolic messages to the other cells. Patients who are treated with T4 usually begin to improve within two weeks, but complete recovery can take several months in those with severe hypothyroidism.

**Levothyroxine Dosing Guidelines for Hypothyroidism in Adults**

POPULATION	DOSING	FOOD/DRUG INTERACTION
Non-pregnant patients	<ul style="list-style-type: none"> <li>1.6 mcg/kg/day initial dosage</li> <li>Evaluate initially every 6-8 weeks until TSH normal- evaluate in 2-3 months after dose adjustments</li> </ul>	<ul style="list-style-type: none"> <li>Educate patients to take early in the morning before food, since food affects its absorption</li> <li>Space Levothyroxine 4 hours apart from Cholestyramine, Ferrous Sulfate, Sucralfate, and Aluminum Hydroxide</li> </ul>
Elderly, patients with known or suspected cardiac disease	<ul style="list-style-type: none"> <li>25 or 50 mcg daily (&lt;1 mcg/kg/day)</li> <li>Increase by 25 mcg every 3-4 weeks until replacement dosage reached</li> </ul>	
Pregnant patients	<ul style="list-style-type: none"> <li>Increase to 9 doses weekly at earliest knowledge of pregnancy</li> </ul>	
Patients with subclinical hypothyroidism	<ul style="list-style-type: none"> <li>TSH &lt; 10 mIU/L: 50 mcg daily</li> <li>Increase by 25 mcg daily every 6 weeks until TSH=0.35- 5.5 mIU/L</li> <li>TSH &gt; 10mIU/L: 1.6 mcg/kg</li> </ul>	

Foot Note: Anticonvulsants (Phenytoin, Carbamazepine) and Rifampin may require higher Levothyroxine doses (since it increased metabolism of Levothyroxine)

# PRO PHARMA

PHARMACEUTICAL CONSULTANTS, INC.

## Suggested Treatment Plan for Hypothyroidism

Medication	T4/T3 Ratio	Source	Adult Comparative Daily Dosage (=65mg Thyroid Equivalent)	AWP Cost per tablet
Nature Thyroid USP (Armour Thyroid, Thyrar) Used Rarely – Last Resort	T4/T3	Desiccated animal thyroid glands	65 mg QD	G: \$ 0.21-0.79 B: \$ 0.35-1.20
Levothyroxine (Synthroid, Levoxyl, Levothroid)	T4	Synthetic	100 mcg QD (~65 mg Thyroid)	G: \$ 0.36-1.09 Synthroid \$ 1.11-1.35 Levoxyl \$0.46-0.86
Liothyronine Sodium (Cytomel, Triostat)	T3	Synthetic	25 mcg QD	G:\$ 0.80-1.62 B:\$ 1.78-2.72
Liotrix (Levothyroxine+ Liothyronine) (Thyrolar)	4:1	Synthetic	50-12.5 mcg QD	(no generic) B: \$ 0.61-1.09

According to the UCSF study, there is no clinical significant difference between brand and generic Levothyroxine products. In addition the study concluded that they are bioequivalent and interchangeable. The orange book has approved both brand and generic being bioequivalent as well. On the other hand, the Forest Manufacturer for Synthroid has still argued that there is a difference since the onset of Synthroid is faster, making it a significant difference compared to generic products.

Reference:

1. Garber, J., Cobin R, Gharib H. et al. "Clinical Practice Guidelines for Hypothyroidism in Adults: Cosponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association." ATA/AACE Guidelines. December 2002. Vol 18 No. 6 <https://www.aace.com/files/final-file-hypo-guidelines.pdf>
2. Dong BJ, Hauck WW, Bambertoglio JG, et al. Bioequivalence of generic and brand-name levothyroxine products in the treatment of hypothyroidism. *JAMA*. 1997; 277:1205-1213.
3. Orange Book. Synthroid. U.S. Department of Health & Human Services FDA. Accessed May 6, 2015. <http://www.accessdata.fda.gov/scripts/cder/ob/docs/temptn.cfm>