TABLE 1. INTERASSAY VARIATION OF T_3 RESIN-STRIP METHOD

Laboratory	No. of analysts	n	Mean (ng/dl)	Standard deviation	Coefficient of variation (%)
Manufacturer	?	4	120.6	2.8	2.3*
Burman et al	?	13	"Normal"	?	18.7
N. C. Baptist Hospital:					
Pool No. 2	5	12	103.3	9.9	9.6
Pool No. 1	5	77	104.1	10.1	9.7

* Calculated from mean and standard deviation as reported in package insert, RIA-MAT Circulating T3 I-125 Kit, Mallinckrodt, Inc., St. Louis, Mo.

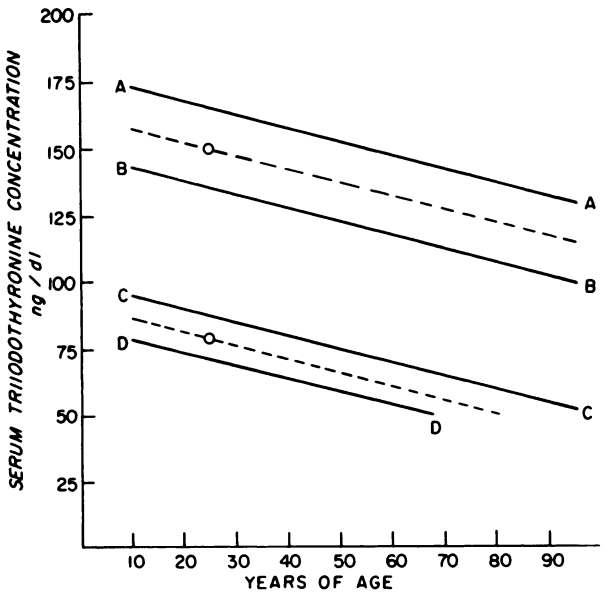

FIG. 1. Nomogram relating age to normal concentration of serum triiodothyronine. Normal range was determined for 20–30-year-old population, and line with slope —5 (ng/dl)/10 yr was extrapolated (dashed lines). When using nomogram to interpret serum triiodothyronine concentrations, values falling in area between lines A and B are considered borderline-elevated; between B and C, normal; between C and D, borderline-low. Values above line A are clearly hyperthyroid and values below line D indicate low values for subjects less than 65 years of age.

promised liver function will often have normal concentrations of T_4 and reduced T_3 levels. Such patients are usually not clinically hypothyroid and can be identified by the reduced concentrations of total serum proteins, albumin, or thyroxine-binding globulin (or elevated T_3 resin uptake).

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Reply

We thank Dr. Heise for her comments and we are gratified that her observations are consistent with ours. We agree that each laboratory must determine its own "normal range" and that these "normal ranges" should serve only as guidelines to suspected clinical illness and should not be interpreted strictly. Indeed, a given serum measurement may lie within the "normal range" and still be abnormal for an individual patient. Given these limitations of the "normal range," it is not surprising that serum T_3 measurements may be normal in clinically hypothyroid patients. Fortunately, other methods may be utilized to aid in the diagnosis of hypothyroidism, e.g., thyrotropin or thyroxine measurements and the patient's clinical state. We agree that T_3 levels decline with advancing age; this decrement may be related to decreased conversion of thyroxine to triiodothyronine (*1*). Besides the two groups of patients mentioned by Dr. Heise (the elderly and patients with liver disease), T_4-to-T_3 conversion may also be decreased in patients receiving glucocorticoids (*2*), lithium, or propylthiouracil (*3*); in fasting patients (*4*); and in newborn infants (*5*).

Conversely, serum T_3 levels may be increased in pregnancy or after ingestion of estrogens, heroin, or methadone, since these conditions involve elevated levels or capacities of thyroxine-binding globulin (TBG). A high TBG level may also have a hereditary basis. All these patients will tend to have normal free T_3 levels and to be clinically euthyroid. Alterations in total and free T_3 levels may also be found in euthyroid patients receiving anabolic steroids, in certain patients with various nonthyroidal diseases, and in patients with a hereditary decrease in TBG. That such alterations in binding produce changes in serum T_4 has been appreciated for several years. We must now apply the lessons learned so well

for T_4 to the newly available radioimmunoassays for T_3. A given serum T_3 concentration, like any other single serum measurement, must be interpreted in the context of the patient's clinical condition.

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