

**TWO POINTS** serve as a prelude to and justification for this report dealing with the “**normal (average)**” versus “**normal (physiologic)**” glucose tolerance test

In the first place, the evidence seems abundantly clear that the incidence and prevalence of maturity-onset diabetes mellitus or a hyperglycemic syndrome indistinguishable from this type of diabetes mellitus<sup>1</sup> in optometric patients has not been established

Second, it is also necessary to underscore the fact that, within **traditional diabetic** circles, there is little agreement as to what constitutes maturity-onset diabetes mellitus. In other words, diabetic specialists are not in agreement as to what constitutes a physiologic glucose tolerance test. Specifically, a survey of 20 diabetologists disclosed that they employed diagnostic criteria which differ widely. In some samples, including the general population of the United States, these disparities would result in major differences, in the rates of so-called diabetes mellitus. The evidence is clear<sup>2</sup> that some diabetologists classify as “**normal (meaning acceptable or healthy)**” more than half of the one and two-hour blood glucose values considered to be abnormal by other equally well-qualified diabetologists.

It is our thesis that part, possibly the major portion, of the disagreements stem from the fact that “**normal (average)**” and “**normal (physiologic)**” are viewed as one and the same. The failure to discriminate properly between these two interpretations is, in part, a semantic trap. Thus, when the word “**normal**” is employed, it means “**average**” to some people and “**physiologic, ideal or healthy**” to others. Since things equal to the same thing become equal to each other, it follows that “**average**” and “**healthy**” become synonymous. Thus, the assumption is that what most people have is acceptable. Parenthetical mention should be made that, although 95 percent of Americans suffer with tooth decay, this is clearly still a sign of illness!

**THERE HAS BEEN** a variety of published so-called health standards during the past several decades. These include a broad scope of parameters such as height and weight, blood pressure, serum cholesterol, and dietary recommendations. Without exception, these so-called “**health**” criteria stem from the assumption that the mean plus two standard deviations of the population is “**normal**”, meaning “**healthy**”. Thus, an examination of standard medical (and optometric) textbooks yields a “**normal**”, presumably “**healthy**”, total white cell count of 5,000 to 10,000 cells per cubic millimeter. Likewise, pursuing the same logic (or illogic) the Recommended Dietary Allowance (RDA) for vitamin A is recognized as 5,000 International Units.

For purposes of this report, an attempt will be made to answer the following three questions

1. What is the “**normal (average)**” classical glucose tolerance pattern in a group of presumably healthy doctors and their spouses?
2. What is the glucose tolerance pattern of this same group divided into two subgroups based upon the composition of their nonspecific clinical symptoms and signs?
3. From these observations, what can one con-

# “Normal (Average)” Versus “Normal (Healthy)” Glucose Tolerance Test: Its Optometric Implications

by

*E. Cheraskin, M.D., D.M.D.*

and

*W. M. Ringsdorf, Jr., D.M.D., M.S.  
University of Alabama in Birmingham*



Dr. Cheraskin



Dr. Ringsdorf

clude regarding the "normal (average)" versus "normal (physiologic)" glucose tolerance pattern in terms of its practical optometric implications?

Apropos of the first question, 124 presumably healthy (surely nondiabetic) doctors and their spouses were subjected to the classical three-hour glucose tolerance test utilizing the AutoAnalyzer method for determining blood glucose. Additionally, all subjects completed a questionnaire regarding their clinical state of health. The mean age with one standard deviation for this group was 37.5+5.9 years. The number of clinical symptoms and signs, including but not exclusively optometric, proved to be 15+12.

The fasting, one-hour, two-hour, and three-hour blood glucose values were 81+11, 129+44, 94+40, and 77+34 milligrams per cent (Figure One). According to the recommendations for standardization of the oral glucose tolerance test approved by both the Committee on Public Education and Detection and the Committee on Statistics of the American Diabetes Association<sup>3</sup>, this group of subjects may be viewed as nondiabetic.

**HENCE, WE HAVE** here the opportunity to note the "normal (average)" classical glucose tolerance pattern which is generally also regarded as the "normal (physiologic)" pattern. To respond properly to the second question, the 124 doctors and their spouses were divided into two equal subgroups in which the participants were age and sex paired in terms of their clinical symptoms and signs (Table). Thus, one group may be viewed as relatively asymptomatic, meaning that the average subject showed 7.5+5.9 clinical findings. The other group of 62 subjects demonstrated 21.5+12.3 symptoms and signs. These groups are here referred to as the relatively asymptomatic versus the relatively symptomatic group. The glucose tolerance patterns were evaluated for these two subgroups.

**FIVE POINTS** are worthy of mention (Table). First, there are slightly higher mean values in the symp-

tomatic versus the asymptomatic group and particularly at the one- and two-hour levels. Second, none of these mean values is statistically significant. Third, at every temporal point, the standard deviation is larger in the symptomatic versus the asymptomatic category (Figure Two). Fourth, in every instance, the variance is statistically significantly greater in the symptomatic group (Table). Finally, this suggests, in answer to the second question, that those with the greater number of nonspecific clinical symptoms and signs (which includes also optometric findings) tend to be more hyper- or hypo-glycemic. Or, in other words, more apt to be dysglycemic.

To answer the third and final question, the "average" is not "healthy." It follows that, therefore, the "physiologic" glucose tolerance pattern is characterized by a much more narrow range than traditionally held in both medical and optometric circles. Accordingly, it is fair to conclude that the pre-

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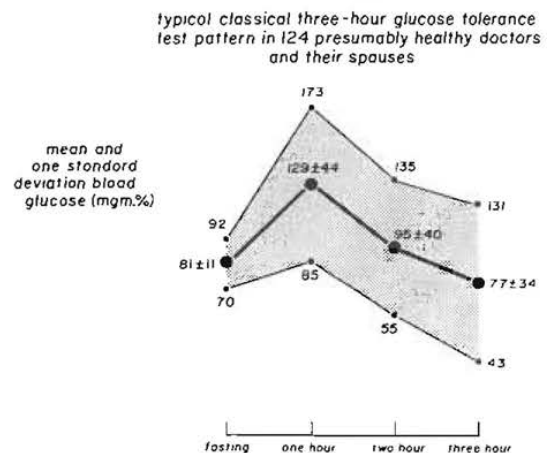


Fig. 1

## TABLE

Statistical significance of the variables in two groups of presumably healthy doctors and spouses

	asymptomatic group [n=62]	symptomatic group [n=62]	significance of the differences of the			
			means		variances	
age	37.5±5.9	37.5±5.9	t=0.0000	P > 0.5000	t=1.0000	P < 0.5000
number of symptoms and signs	7.5±5.9	21.5±12.3	t=9.4890	P > 0.0010*	t=0.2260	P < 0.0005*
blood glucose						
fasting	81±9	81±13	t=0.2339	P > 0.5000	t=0.4420	P < 0.0010*
1 hour	128±38	130±49	t=0.1738	P > 0.5000	t=0.5880	P < 0.0250*
2 hours	94±32	97±47	t=0.4359	P > 0.5000	t=0.4722	P < 0.0005*
3 hours	77±21	78±43	t=0.2408	P > 0.5000	t=0.2321	P < 0.0005*

\*statistically significant differences

### NORMAL (continued from page 17)

valance of maturity-onset diabetes mellitus in optometric subjects is probably greater than is generally cited.

#### References

- <sup>1</sup>Personal communication from Jerome Sherman, O.D. State College of Optometry, State University of New York.
- <sup>2</sup>Wesi, K. M. *Substantial differences in the diagnostic criteria used by diabetes experts*. Diabetes 24 #7: 641-644, July 1975.
- <sup>3</sup>American Diabetes Association. *Detection and diagnosis of diabetes plasma glucose procedures*. 1975.

### BIOGRAPHY

Dr. Cheraskin is a professor emeritus of the University of Alabama in Birmingham and is trained in both medicine and dentistry.

Dr. Ringsdorf is an associate professor in the Department of Oral Diagnosis at UAB.

The two doctors have published some 500 technical articles and thirteen books. The last text, *Psychodietetics*, the story of food and mood written for the public, made the best sellers list.

*typical classical three-hour glucose tolerance test in 62 age and sex paired doctors and spouses with relatively few (7.5 ± 5.9) versus many (21.5 ± 12.3) total clinical symptoms and signs*

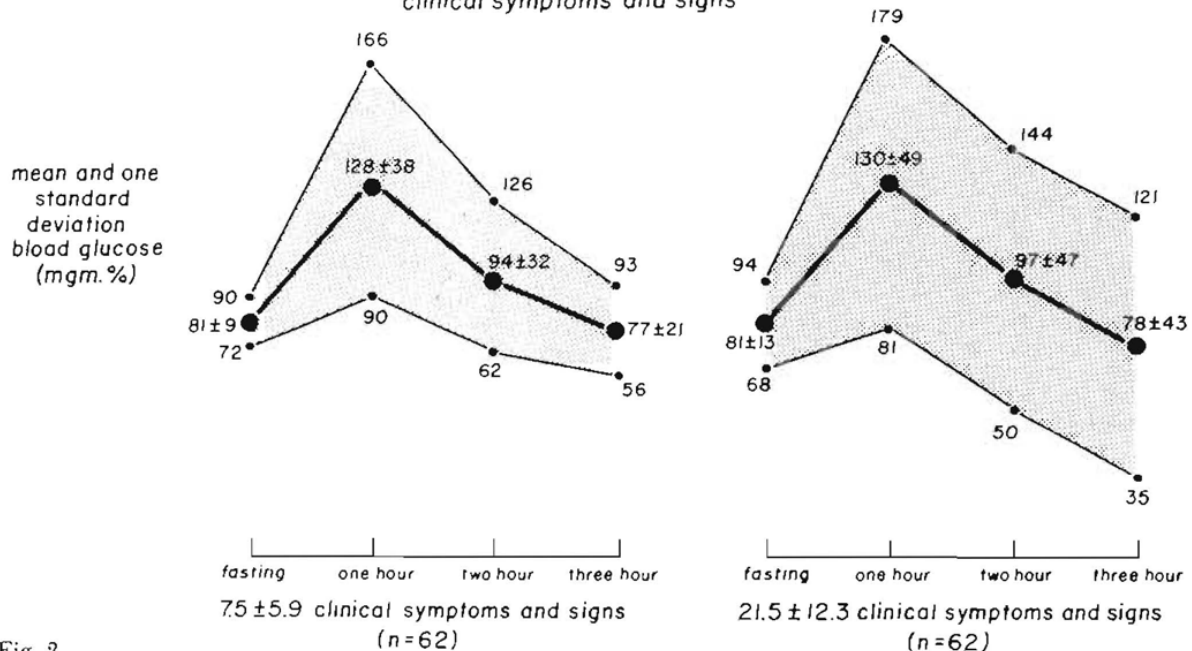


Fig. 2