

THE HEALTH OF THE DENTIST AND HIS WIFE: A PREDICTIVE HEALTH PROGRAM

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INTRODUCTION

The literature is replete with documentation of exciting techniques designed to enhance the productivity of the dental practitioner. While high-speed instrumentation, four-handed dentistry and other technical, administrative, and philosophic armamentaria are effective tools, the central determinant for productivity is the never-mentioned health status of the dentist. Obviously, all innovations are worthless when the practitioner's health fails. Recognition of this fundamental fact led a group of dentists in Southern California to embark upon a periodic, predictive, multiphasic screening program.

In this, the first of two reports, an attempt will be made to outline the program's unique philosophy. A report to follow will relate some of the findings. Specifically, this discussion will concern itself with the answers to the following four questions:

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1. What is predictive medicine?
2. Why the need for a predictive multiphasic program?
3. What are the unique tools of predictive medicine which set it apart from traditional periodic health examinations?
4. What are the mechanics for a predictive multiphasic project?

WHAT IS PREDICTIVE MEDICINE?

For practical purposes and as an immediate working hypothesis, *predictive medicine* may be defined as the clinical discipline designed to *anticipate* disease. The intent, by such an approach, is to foretell illness before it erupts and thus institute *primary* prevention [prevention of occurrence]. This philosophy immediately sets *predictive medicine* apart from conventional medicine where the cardinal theme is the *identification* of disease with subsequent treatment and, at best, *secondary*

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prevention [prevention of recurrence].

Predictive medicine today is cloaked under terms such as *preventative, prognostic, anticipatory medicine, and propetology*. All of these labels are useful and valid. One might then question the need for this particular nomenclature of *predictive medicine*. Four reasons may be offered. First, *predictive medicine* is the most precise term etymologically, since the Latin derivative for prediction means to foretell. Second, unlike other terms such as *propetology*, it is simple. Third, *predictive medicine*, as a relatively new label, is not shrouded with historic misconception and overtones. For example, *preventative medicine* is largely concerned with the acute infectious diseases and embraces few prognostic connotations. Finally, *predictive medicine* is a unique discipline encompassing concepts and instrumentation from many existing disciplines [e.g. epidemiology, biostatistics, clinical pathology, ecology] but not presently utilized in packaged form in any other single specialty.

WHY THE NEED FOR A PREDICTIVE MULTIPHASIC PROGRAM?

Many multiple testing programs of presumably healthy persons have already appeared in the scientific literature. Table 1 is a summary of the result. Two points warrant special mention. First, it is clear that there is considerable variability in the frequency of disease in so-called healthy populations. The general statement can be made that the more parameters studied in a multiple testing program, the greater is the detection of disease. Additional factors which contribute to the wide range of illness in Table 1 are the age factor and the definitions of health and disease employed in different testing projects. For example, the older groups reveal more sickness than younger samples. Obviously, the definition of disease [e. g. diabetes mellitus] will influence the frequency of its recorded occurrence. Second, notwithstanding these interfering factors, the evidence in Table 1 suggests that only 8 to 51 per cent of sup-

Table 1
Per cent healthy and with newly discovered disease from health-maintenance examinations of presumably healthy people.

sample number	per cent healthy	per cent with significant newly discovered disease	investigators
500	48.0	40.6	Bolt et al.
500	10.6	32.6	Huth et al.
500	15.0	39.0	Elsom
14,965	13.6	37.5	Roberts
957	28.0	25.3	Borhani
3,994		19.4	Weinerman et al.
*14,132	36.3	29.7	Culbert and Jacobziner
707	50.5	35.3	Franco
600	7.7	59.9	Thompson and Staack
352	10.5		Wade
1,000	22.3	36.2	Collen and Linden
5,711		8.3	Carroll et al.
717	41.3	52.6	Franco et al.
1,513	28.0	40.0	Elsom et al.

*public school children

posedly healthy people are regarded as healthy! These staggering figures alone justify a system of medicine designed to *intercept* rather than to simply *identify* disease states.

The need for a predictive multiphasic screening program for the dental family is underlined by information derived from the dentist. A recent article, *The Grim Total*, in *Dental Management* [8: #1, 120, November 1968] contained the following citation:

More than 27 per cent of the dentists examined during the past three annual sessions of the American Dental Association were found to have abnormal or borderline electrocardiograms . . . Other findings disclosed during the examination include: 258, chest x-rays

with abnormal signs such as enlarged hearts, suspected tuberculosis lesions and tumors . . .

More precise and relevant information is now available from the dental family. As of this date, data have been gathered from 341 dental practitioners and their wives. Specifically, there are now 108 dentists and wives in the Los Angeles area in a multiphasic screening program under the auspices of the Southern California Academy of Nutritional Research. This Los Angeles group has joined forces with 162 dentists and wives in Florida under the direction of the Southern Academy of Clinical Nutrition and 71 practitioners and wives in Columbus under the aegis of the Ohio Academy of Clinical Nutrition. The collec-

Table 2
percentage frequency of disease states

disease	Southern California Academy of Nutritional Research [n=108]	Southern Academy of Clinical Nutrition [n=153]	Ohio Academy of Clinical Nutrition [n=71]	totals [n=332]
hemorrhoids	37	39	42	39
overweight	23	21	39	26
major operation	37	18	20	25
hay fever	26	20	6	19
scarlet fever	22	12	10	15
rheumatic fever	15	11	13	13
varicose veins	14	11	17	13
tumor or cancer	19	7	10	12
kidney or bladder disease	10	14	9	12
hypertension	14	6	11	10
major injury	10	9	10	10
anemia	8	11	11	10
stomach ulcers	7	9	7	8
nervous breakdown	6	6	4	6
liver or gall bladder disease	5	5	10	6
malaria	5	6	1	5
heart disease	4	5	1	4
paralysis	5	3	0	3
mental hospitalization	3	4	3	3
underweight	2	5	1	3
tuberculosis	4	1	0	2
asthma	2	3	0	2
goiter	2	1	4	2
epilepsy	1	1	1	1
venereal disease	1	0	3	1
diabetes mellitus	0	2	0	1

tive disease patterns and the individual group listings are summarized in Table 2. It is interesting that, for the entire sample, four out of ten persons report hemorrhoids. Overweight ranks second and is reported in one-fourth of the group. Parenthetical mention should be made that the intergroup differences are largely explainable on the basis of variations in the age patterns. In brief, it is abundantly evident from Table 2 that a significant amount of disease already prevails in this socioeconomically-privileged, health-oriented group of dentists and their wives who are largely in the 40 to 45 year age category.

With illness rampant nationally and within the dental family, the cost in time, money, grief, and productivity makes it imperative to exploit immediately all avenues leading to the *anticipation* or primary prevention of disease. For too long, attention has been simply directed to the *identification* and treatment of these long-standing common killing and crippling disorders. Hence, there is a real and long-overdue need for a fresh approach to health. The singular features of *predictive medicine* provides a possible solution.

WHAT ARE THE SPECIAL TOOLS OF PREDICTIVE MEDICINE?

Predictive medicine is different from traditional medicine for five reasons. First, it recognizes the genesis of disease in an eco-system in which host resistance and susceptibility play a more dominant role than in conventional medicine. In the latter, for example, much more emphasis is accorded the environment such as the role of microbes in disease causation. In contrast, predictive medicine asks why microorganisms invade one and not another individual when the microbial exposure is the same.

Second, *predictive medicine* is mindful that disease is not strictly a binomial affair [e.g. diabetes mellitus or no diabetes mellitus]. Rather, it accepts the thesis of a spectrum characterized by a gradation series of gray with black and white as only convenient limiting poles. Hence, apropos to the earlier example, diabetes mellitus develops insidiously and can be recognized

long before it explodes in its classical form. By such *anticipation*, it becomes possible to institute measures which invite primary prevention.

Third, *predictive medicine* appreciates that the detection of the gray zone requires a new set of physiologic and biochemical standards. In traditional medicine, for example, physiologic weight or blood glucose standards are derived from the mean and two standard deviations of a presumably healthy population [which in fact is not healthy as shown in Table 1]. Thus, it is assumed that what 95 per cent of the population possesses is acceptable as healthy. The fallacy of this concept should be clear to the dentist. For if what 95 per cent has is physiologic, then dental caries and periodontal pathosis are expressions of health! Hence, all physiologic and biochemical parameters are judged for prognostic purposes on a more restricted scale than in present-day classical medicine. For example, fasting true blood glucose standards are usually considered to be 60 to 100 mg. per cent. In the predictive frame of reference, 70 to 90 mg. per cent proves to be more meaningful.

Predictive medicine also recognizes the importance of diet and nutrition in the etiology of so-called non-nutritional syndromes [infertility, obstetrical complication, congenital defects, mental retardation, psychologic state, cardiovascular disorders, and cancer]. Parenthetical mention should be made that this area has received no consideration in the classical multiphasic screening program.

Lastly, *predictive medicine* appreciates the interdependence of the oral cavity and the rest of the organism in the total health concept. Once again, it is noteworthy that the mouth is not included in the usual multiple testing project.

WHAT ARE THE MECHANICS OF A PREDICTIVE MULTIPLE TESTING PROGRAM?

With the philosophic structure in mind, it is now fitting to describe the anatomy of a predictive multiphasic screening program. A lamellated sphere serves admirably as an experimental model for viewing

man in the predictive connotation. Layers of the sphere may be removed. In so doing one eventually approaches the core. In man, lamellae may be stripped off until the core is brought into view.

The outer, most peripheral, ring is readily inspected in the sphere and in man. In this category, one can observe obvious evidence of the ravages of diseases such as a limp, a skin eruption, a carious tooth. This most observable layer can be graded by physical examination and through history taking. In the present program, each participant completed a form [Cornell Medical Index Health Questionnaire] eliciting information about general health, a dental record [Oral Health Index Questionnaire], and an abbreviated psychologic test of the controlled association type [Cornell Word Form-2].

Beneath the outer layer is the zone of *symptoms*. These findings are not as readily discernible as *signs* and can only be derived through interrogation [the classical interview or questionnaire]. In this area would be, for example, the reporting of a headache or dry mouth. Since symptoms generally precede signs of disease, evidence obtained at this echelon may be regarded as prognostic. Such information was derived by means of the questionnaires which the dentists and their wives completed.

Stripping off this second layer unearths the world of *performance*. It is a fact that impairment in performance generally forewarns symptoms and signs of disease. Such information can be elicited from questionnaires, studies of motor activity, and various physiologic parameters. In this study of the dental family, performance was judged from the questionnaires [questioning relating to fatigability and frequency of illness] and the electrocardiogram. The uniqueness of the latter was the fact that the electrocardiographic measures were obtained under magnification. The intent here was to note small, yet predictive, electrocardiographic aberrations.

Removing the performance layer brings into view the *biochemical* pattern. Illustrations would include blood sugar and

serum cholesterol determinations. This lamella is predictive of the more peripheral zones since biochemical imbalance antedates disturbances in performance and the advent of symptoms and signs. Thus, chemical diabetes mellitus characterized by disturbances in blood glucose precedes the clinical diabetic syndrome by months and even years. A battery of biochemical tests was performed on each dentist and his wife. This series included blood glucose, cholesterol, triglycerides, protein, calcium, phosphorus, complete hematology, etc.

Dissecting off the biochemical layer brings into view the deeper *hormonal area*. It is here that measures of endocrine state [e.g. protein-bound iodine] are disclosed. Aberrations in hormonal state precede changes in biochemical homeostasis. For example, the hypothyroid patient frequently demonstrates hypercholesterolemia. Hence, the hormonal ring becomes predictive of the more peripheral layers. Several hormonal tests were performed on each dentist and his wife.

At the near-center of the core is the *enzyme* pattern. Many of the 2000 known enzymes can be measured. For example, serum glutamic oxalacetic transaminase [SGOT] is now utilized as a predictive tool of impending cardiovascular disease. There are many factors which enter into enzyme balance [e.g. genetics]. However, the most ignored is diet and nutrition. In this study, each of the dentists and wives completed two dietary surveys. Hence, it was possible to relate diet to all of the peripheral problems such as enzyme state, hormonal balance, biochemical patterns, performance, and clinical symptoms and signs. Thus, diet was employed as a prognosticator of impending illness.

SUMMARY

In the final analysis, the *productivity* of the dentist is a function of his state of health. The detailed national health surveys and the limited information available about the dental family indicate that disease, as judged peripherally, is rampant. While traditional medicine is performing a meritorious job of *identification* and *treatment* of existing diseases, there is an

urgent need for the *anticipation* and subsequent *prevention* of disease. *Predictive medicine* offers a possible solution.

The philosophy of a *predictive medicine* program is outlined in these pages. At the present time, 108 dentists and wives in the Los Angeles area are being followed in such a program under the auspices of the Southern California Academy of Nutri-

tional Research. This is part of a larger program involving 162 Floridian dental practitioners and wives in the Southern Academy of Clinical Nutrition and 71 dentists and wives in the Ohio Academy of Clinical Nutrition.

A report to follow will summarize some of the observations already obtained from these three groups.

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