

The Health Appraisal Center (HAC) was another example of health services research, emphasizing task reassignment, innovative use of technology, and computer-controlled information-gathering rolled into one system. It is described in a series of reports on automated multiphasic health testing at Straub. As developed by Dr Gilbert's group in the mid-1960s with the aid of a \$150,000 NIH grant, the central idea was to improve the quality and efficiency while reducing the cost of periodic examinations of patients who were "apparently well" or had stable chronic diseases. They needed complete health reviews or updates, but their numbers were overwhelming clinicians.

HAC's elements were a computer-patient interactive branching history; physical measurements and blood drawing by aides in the unique "Hawaiian carrel"; ECGs by technicians who screen-read them; physical examinations including Pap tests, rectal examinations, and sigmoidoscopies by nurse practitioners; and review by physicians after data-gathering. At each juncture printouts of positive findings were spewed out from the imposing PDP-40 computer housed in a 12-cubic-foot air-conditioned room that did the same work as a little laptop does now. The time was one hour, the cost \$30.

The HAC functioned steadily at 25 to 35 patients daily for 11 years, but its value was not widely appreciated, partly because of a fee-for-service environment. It was complete, complementary, and timesaving to physicians who used it but directly competitive to those who didn't. Its rebirth as an integral part of ongoing patient care will most likely occur when managed care expands.

Health Exam Plans

Tomi Kaizawa Knaefler

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The Straub Clinic's revolutionary physical examination plan that will go into effect later next month was unveiled today, oddly enough, in Stockholm, Sweden.

The plan was presented before the Seventh International Conference on Medical and Biological Engineering by Dr Fred I. Gilbert, Jr, who co-authored the blueprint with Dr R.A. Nordyke.

The new plan, designed for the *apparently well individual*, is tailored to provide comprehensive examinations in a minimum of time, with a maximum of efficiency.

The cost, however, is expected to remain pretty much the same as under the existing system.

Eventually, Straub Clinic physicians believe the new plan will bring physical examination fees down, or additional tests will be added, enabling patients to get more for their money.

An average pre-employment physical today costs about \$15. The price for periodic physicals varies greatly—from a \$15 more-or-less quickie to a \$75 to \$100 executive royale.

Initially, the plan will be geared to meet the needs of persons needing pre-employment or

periodic physicals. Later, the program may be expanded to provide diagnostic procedures for the sick.

Under the plan, an apparently well individual will start by answering (multiple choice or yes-no) questions pertaining to general medical history on an automated reader.

Then, the patient will sit in a cubicle and undergo tests, including vision, hearing, respiratory function, thyroid, EKGs, blood pressure, chest x-rays, blood and urinalysis, conducted by diagnostic technicians. All that will be done within the cubicle area.

From there, the patient will walk a short way to an examining room, where a registered nurse specializing in diagnostic medicine will conduct an initial physical evaluation and summarize the test findings.

It is only at this point that the doctor will enter the examination and perform selective tests based on the findings and make recommendations.

Drs Nordyke and Gilbert point out that the plan will relieve physicians from doing many routine measures that they now perform and, theoretically, they'll be able to spend more time studying patients and talking over problems with them.

To accommodate the plan, the Straub Clinic is now renovating the entire second floor of the Palma Building, where the test procedures will be concentrated.

The new setup will enable a patient to be comprehensively examined in about an hour. Under the existing non-concentrated

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system, a patient has to spend well over a half-day for a thorough physical.

The doctors expect to examine about 50 patients a day by the end of the first year and double that number eventually.

In addition to increased efficiency and maximal utilization of staff, the Straub doctors point out that computers would be used for data processing.

This will enable doctors to retrieve individual information quickly and accurately and to compile various summary data for research purposes.

Drs Gilbert and Nordyke worked out of Straub Medical Research Institute for the project, which, they believe, will relieve today's paradoxical problem "of considerable magnitude" the hordes of apparently well individuals needing examinations.

They state that physicians now are bogged down with routine procedures and "frustratingly engaged in high-cost, low-yield diagnostic maneuvers."

The Straub doctors rejected the fully automated multi-test procedures now being tried in several areas because of high per patient cost factors and the absence of the non-programmed human element so essential in medicine.

Multiphasic Screening Cut Down to Size

Fred I. Gilbert, Jr, MD

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*Dr Fred I. Gilbert, Jr, and nurse Pat Summers
using his multiphasic health screening equipment.*

A group practice in Hawaii has demonstrated that it doesn't take a lot of elaborate apparatus and huge outlays of money to set up a semiautomated unit for screening apparently well patients. Such a facility, the group's director contends, is within the reach of many physicians.

"Doctors tend to view multiphasic health screening only in terms of expensive equipment requiring large numbers of highly trained personnel," says Dr Fred I. Gilbert, Jr, director of the

Straub Medical Research Institute in Honolulu. Such physicians usually think of the assembly-line type of operation used at big diagnostic clinics, where a patient goes through some 20 stations for a head-to-toe examination. "But there is another way."

At the Straub Clinic—a group-practice, fee-for-service clinic of 60 doctors that handles about 1,000 patients a day—the machines are, in effect, brought to the patients rather than the other way around. The six-foot-square room known as a carrel after the library term meaning a place for individual study—contains a photomicrograph for evaluating thyroid function, a Vitalor machine for measuring respiratory function, an ECG, an audiometer, a sphygmomanometer, calipers for measuring fat, and a sight scanner. The cost of setting up one such carrel, which can handle 25 patients a day: \$5,000.

Group practices involving even as few as four internists would find the system particularly useful, Dr Gilbert believes. Larger groups can simply increase the number of carrels used. In the Hawaii clinic they have four of the screening units. And if a group's doctors should decide to invest in a very expensive machine, they can have it serve several carrels by means of connecting cables.

The carrels at the Straub Clinic have proven to be economical in several ways, says Dr Gilbert. First is the saving in employees. Instead of marching the patient to a dozen or more people who each manipulate some testing device, a single diagnostic technician performs all the tests conducted in the carrel. One person can handle almost everything, Dr Gilbert notes, because the machines are relatively simple to operate and have built-in quality controls.

Second, the clinic physicians did not choose the most sophisticated hardware possible but only the machine that would suffice to do the job they want. "And if people can do the job better, faster, and for less money than machines, we use people," says the Honolulu internist. "For example, we find that interpretations of ECGs can be done more accurately by a diagnostic technician and electrocardiographer than by any existing machine."

Third, the multiphasic unit cuts costs by not tying the equipment directly into a computer for immediate recording. Instead, the screening unit feeds the test data twice a day into a computer used by the entire clinic.

Before a patient sees the diagnostic technician in the carrel at Straub Clinic, he fills out a medical history questionnaire and has his chest x-rayed. Later, an RN specially trained in diagnostic medicine examines the patient for gross physical abnormalities and such diseases as glaucoma. An internist then checks the findings of the nurse and the diagnostic technician and does any physical examinations he feels are warranted. At this point, he may call in another specialist. Meanwhile, a laboratory technician carries out biochemical tests on blood and urine samples in a minilab that is equipped with an AutoAnalyzer.

The entire procedure, from history questionnaire to examination by a specialist if indicated, takes about one hour for a person in his thirties. If he is over 40, it takes another half-hour because additional tests are done. The price to the patient varies from \$15 to \$50, depending on the extent of the examination.

The health-appraisal unit in the clinic is open to all 60 doctors in the group and to any other physician in the Honolulu area who wishes to refer his patients for the screening procedure. "Physician acceptance has been excellent," says Dr Gilbert. To help the referring doctor make the best use of the screening program, the clinic sends him a tentative diagnosis based on the test results