

tional method of taking and recording medical histories and the calculation of test reports involves considerable time for the physician.

As an example, a physician investigating the symptoms of allergy may have to ask the patient several hundred questions and devote several hours of his time. A computer technique now under development at the University of Wisconsin Medical School collects medical history information directly from the patient. It is so simple in operation that it can be used by the patients themselves.

A teletypewriter keyboard provides direct input to the computer. As used at Wisconsin in the investigation of symptoms of allergy, the computer questionnaire has been designed to imitate the normal physician-patient relationship as closely as possible. Simple questions are presented to the patient either on a cathode ray tube similar to a TV screen or a teletypewriter.

A typical question would be, "Have you ever had an allergic reaction to penicillin?" to which the patient replies "Yes," "No," "I do not know," or "I do not understand the question," by simply pressing one of four appropriate keys. The choice of questions presented and the order of their presentation is controlled by the patient's response.

A "Yes" response to a general question is followed by a series of specific qualifying questions. A "No" response results in the skipping of such qualifying questions and the presentation of another general question.

When the answers to questions are not known or not understood, these questions are clarified and explained with varying and simplified technology. The minimum number of questions to be answered by a patient who has no allergy and has taken none of the potentially allergenic drugs included in the program is 29. The maximum number of questions that can be answered by any patient is 320, but there are more than 500 questions in the program.

A printed summary is generated by the computer in each case and the response to every question is recorded on tape and stored in the computer.

At this point, with the assistance of my associate, Mr. Murray, we will call the computer and set it up for a demonstration which will take 2 or 3 minutes.

Senator NELSON. I understand, then, that the computer bank, for example, contains a series of questions on allergies. A patient can sit down in front of this machine and the computer can ask the questions without the necessity of the doctor's presence. The computer will, in a very comprehensive fashion, explore this particular patient relationship to any allergy problem that has been programed and the doctor can then use this information in place of an extensive consultation interview with the patient. Is that correct?

Mr. CALLAHAN. Yes, sir, and after the demonstration Dr. Meyer, who is here with us from the University of Wisconsin, will also discuss in some detail more about the medical aspects of this.

Actually, the best way to get an appreciation of the relationship that is established between patient and computer is for someone with no previous experience to play the role of the patient.