

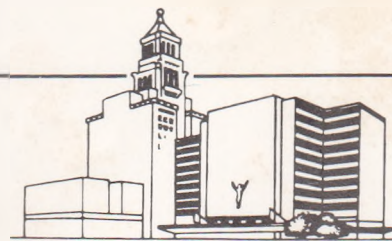
THE MAYO ALUMNUS



APRIL 1968

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THE COVER Traditional stethoscope in pocket, G. W. Morrow Jr. of the Mayo Medical Information Study team "writes" a medical history of a patient—in this case, Lockheed Missiles and Space Company computer programmer Ruth Short. For more on the MIS study, turn to page 17. Photos for this report are by E. W. Miller.

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COMPUTERS IN CLINICAL PRACTICE

progress report from Rochester

A Mayo Clinic study of computers as an aid to physicians in patient care is now well into its second year.

Late in 1966, after months of preliminary discussion, a one-year feasibility study was authorized by the governing boards. Results of the study (carried out by Mayo personnel, supported by an engineering team from Lockheed Missiles and Space Company) were encouraging. As a result, the 1968 phase of the project includes "limited application of computer technology to certain aspects of information processing. This year, emphasis is on continuing experimental work and systems analysis."

George W. Morrow Jr., staff internist and full-time senior member of the MIS (Medical Information Study) team is both realistic and sanguine about results and prospects. He notes

that broad application of machines to support clinical practice in Rochester must be weighed by the governing boards against other patient care-education-research needs. But Doctor Morrow states categorically that:

"Within five years, it would be both possible and feasible to have a basic system at the Mayo Clinic—one that would provide for automation of the data handling function for patient registration, scheduling of medical orders, and laboratory test reporting.

"This would apply initially only to the clinic, to outpatients. Extension to include the more complex problems of hospitalized patients could come later. And it should be noted that application of a basic system at the clinic—in addition to its own direct value in patient care—would allow for revisions so as to maximize

effectiveness and reliability of the system when extended to the hospitals."

Is it economically feasible?

Doctor Morrow and his associates estimate a development cost for the basic system of between \$5 and \$10 million. Once operational, it should prove to be economically self-supporting, but development costs probably would not be amortized by operational savings. Proponents see greatest benefits coming in such areas as improved patient registration, test scheduling, test reporting—all of them areas preliminary to meaningful coming-together of the patient and the doctor.

Many additions to the basic system would be possible. Among these: a terminal employing formatted display could allow physicians to enter medical orders, and nurses to enter responses to the orders; a "dialogue" between physicians and a computer with a virtually unlimited store of medical data; educational use for residents—or, should the still-unresolved question of a medical school in Rochester be decided affirmatively, for medical students.

Further, in the view of proponents, the potential uses of the computer in application to care of both outpatients and hospitalized patients go much further still. Included here: a fully automated medical record, computer-based and so more complete and legible than at present, that could be prepared, added to, called, filed, handled and stored, all by machine; entry of the history and physical examination data by the physician by use of a cathode ray tube display with light pen selection ("now under medical, technical and economic feasibility study here"); a taking over by machines of perhaps 75% of the detail of physician correspondence ("and our study shows that a Mayo consultant spends five hours every week

on correspondence"); universal access to medical records by authorized personnel.

Should all this come into being, Doctor Morrow notes: "We would have automated the major functions for the delivery of health care in the Mayo setting."

In a paralleling current study at Rochester, well over 2,000 patients have taken part in a "Computer Generated and Processed Multi-level Patient Questionnaire" project. Basically, this consists of an initial or first-level "mark sense" questionnaire which can be filled out in about 20 minutes, then processed by a computer which generates a second-level questionnaire composed of questions that inquire in greater depth into the positive responses indicated on the first.

Although only the first-level questionnaire has been administered to date, emerging findings from this indicate that it has been very well accepted by patients; the questionnaires have been well marked; the questioning picks up some 93% of patients' chief complaints. Consultants cooperating in this study will receive a print-out of positive responses prior to their first meeting with the given patient—a possible approach to shortening physician-time spent in coming to grips with the individual medical problem.

Whatever the final outcome, George Morrow and his colleagues (most active at this time, J. M. Kiely, J. L. Juergens, D. M. Witten, J. W. Linman, M. J. Martin, J. G. Mayne, R. G. Siekert and R. W. Harwood) emphasize that the purpose is in no way to find a way for machines to diagnose or to treat the sick. Rather, it is to free the physician from the clerical-routine tasks that now interfere seriously with the best and most satisfying use of his time in caring for patients. ■

Provenance Note:

This document was provided by Ms. Ruth Short, formerly Ruth Hall, a programmer for Lockheed and Technicon, who worked on Lockheed's Medical Information System (MIS) from 1967 until about 1979. Ms. Short is in the background of the cover.

Ms. Short identifies the terminal on the cover as a prototype Lockheed Video Matrix terminal (VMT) designed and built by Ralph Boyce and Paul Williams for Lockheed, in Williams' garage. She recalls the computer Lockheed used for the MIS prototype at the Mayo Clinic as a "mini-mainframe."

This cover image was taken in a separate room with one VMT for programming with several VMTs in an adjacent room used for hospital staff interaction. The equipment behind Ms. Short was part of the MIS prototype.

Other documents characterize the computer used at the Mayo Clinic as having 16 Kbytes of 12-bit, 1.75 μ sec core memory and included tape, drum and paper-tape drives as peripherals. A search of computers with such characteristics available in the middle 1960s identified the SDS-92 as the likely computer and as shown in the image below, a comparison of the SDS-92's control panel with the partially obscured object to the left of the doctor appears to confirm this.



Scanned in part and OCR'ed.

Provenance note updated,

T. Gardner August 2026