

Nurses also are caught between a growing avalanche of paperwork and patient care. While the average nurse devotes 40 to 60 percent of her time to clerical work the number of nursing school graduates falls further and further behind the need. The computer, with its incredible memory capacity and processing speeds, offers the only hope for managing the flood of medical information now being generated. But only those with access to the computer will be able to use it and its communications growing in capability apace of the computer, which will extend the real benefits of the computer age to medicine as to others. These, I think, are two mighty tools, the computer and communications. Each reinforces the value of the other.

The marriage of the computer, with its ability to digest, manipulate, store, sort, and articulate mountains of data over any distance, and communications, with its ability to move these mountains of data over any distance at any speed in practically every form using the Nation's communications system, is a truly awesome union.

Throughout the Nation, a great effort is underway to harness the capability of the computer and communications to medical objectives. In my report I will describe several examples of how this is being accomplished.

In addition to computer data communications, I have selected examples of how voice, video, and simple data systems are also being used. In all, 12 actual systems will be described. These cases include the transmission of electrocardiograms and other medical data by telephone—

Senator NELSON. The purpose of this is to transfer an electrocardiogram that has been taken under the direction of a physician someplace to a cardiologist in some other part of the country for assistance and diagnosis? Is that the kind of thing you are talking about?

Mr. CALLAHAN. Yes, sir; exactly.

Senator NELSON. So, a doctor in some remote part of the country at his small hospital who may think he needs assistance or advice in diagnosing an electrocardiogram that he has taken, can instantly transmit it and get an answer back?

Mr. CALLAHAN. Yes, sir.

Senator NELSON. Where is the transmission equipment going to be?

Mr. CALLAHAN. Well, the transmission equipment may be in the doctor's own office. There is portable equipment which he may carry with him to use even in the patient's home and, of course, the receiving equipment would be located either in the cardiologist's office or in a medical center, where the services of a cardiologist or other heart specialist would be available to assist the local doctor.

Senator NELSON. There is small portable transmitting equipment that a physician might have?

Mr. CALLAHAN. Yes, sir, and we are going to demonstrate that equipment today, also.

In addition to discussing the transmission of electrocardiograms, we are going to explain and show an automatic hospital emergency alerting system, and to describe the use of telephone in operating rooms; we are going to describe a computerized cancer treatment planning system, an automated medical laboratory and medical record system,