The El Camino Experiment: Twenty-Eight Years Later

Mountain View's El Camino Hospital continues to lead the way in direct physician use of hospital computer systems.

For almost two decades now, a parade of physicians, researchers and health care administrators from around the world has converged on El Camino Hospital in Mountain View to witness one of the most successful demonstrations of the advantages and challenges of direct physician use of hospital computer systems.

The system is so successful that it is largely taken for granted by its clinical staff. Nurses frequently wonder what the big fuss is when visitors watch physicians, under no compulsion whatsoever to use the system, entering their own orders into and retrieving results from the hospital's computer system.

The system, now called TDS Healthcare Systems, was begun back in 1965 as a collaboration with Lockheed Missiles and Space company as a way to explore ways to cut a chunk of the perceived inefficiencies out of the post-Medicare health system. Its design was premised on the assumption that computers had to be fast, available, easy to learn and require no great typing skill in order to tempt physicians and other clinicians to use them aggressively.

In 1970, four physicians began testing the system by doing physician orders in front of an "MIS terminal", a somewhat bulky terminal (by today's standards) which propelled a light pen used as a pointing and selecting device, pathways which tried to follow a clinician's mental model of what needed to be accomplished, and blindingly fast response time. Screens flew by with only subsecond delay between screen changes.

Today there are 150 terminals and 55 printers spread about the 468-bed community hospital. A typical nursing station has six terminals to minimize queuing. There are also a few terminals now in physician offices and the trend to extend the hospital's network to offices and elsewhere is very likely to accelerate.

The vast majority of physicians ("virtually 100 percent") according to Karen Graham, a management engineer at the hospital use the computer to sign in, retrieve their patient lists and do other routine housekeeping chores.

The majority of physicians routinely retrieve lab results and other clinical data. Since results can be retrieved from any available terminal, the need to hunt down the sometimes elusive paper chart is reduced.

A somewhat smaller group of physicians enter orders on-line without using the customary physician order sheet. A recent study showed that 49 percent of orders were entered by physicians directly at a computer terminal, 28 percent had been written conventionally, while the remaining 23 percent were phone and verbal orders. The advantages of physician-entered orders are numerous. The clerical savings are large; it is not uncommon that an order sheet processed manually may pass through

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several hands as it is transcribed, interpreted and finally communicated to the appropriate department(s). Each of these steps is hindered by transposition errors, legibility problems and costs inherent in each of these steps. Just as significantly, the physician can resolve any inconsistencies in the interpretation of the order while still at the terminal. Thus, if a medication is not currently in the formulary or if a certain radiological study is offered only in a panel, the physician can resolve these issues without playing telephone tag later.

The physicians who seem to benefit most are those in specialties which lend themselves to the creation of custom order sets. Lawrence Williams, M.D., an oncologist, has described how an elaborate chemotherapy order might take him 45 minutes or an hour to craft. Now it takes him less time to enter it as a personal order set, and takes “under three minutes” to reinstate the order set if that patient (or another patient) should require the same (or similar) treatment protocol.

As in most computer applications, the advantages of the computer are most pronounced in doing repetitive work. Thus surgeons, oncologists and other protocol-oriented specialties seem to have most to gain from this technology. Since an intern’s orders tend to be more variable, the savings for them are today less dramatic.

Bart C. Lally, M.D., a gastroenterologist, is chair of the Physician Committee which meets monthly to advise the hospital’s information services staff and to suggest long-term goals. He has been a long-time proponent of the system. Many believe it has been El Camino’s ability to solicit the support and encouragement of members of their medical staff, such as Dr. Lally, which has made it possible for El Camino to accomplish what even today has eluded most other hospitals.

Dr. Lally suggests that physicians “have to be willing to accept a change.” But in return for accepting that change, using the system “is going to improve your ability to practice medicine.”

Another long-time proponent of the system is Marilyn Davis, who was the head nurse on the first nursing station to install the system. She has been El Camino’s MIS coordinator since 1983. She believes that, besides the clinical benefits, the system has allowed the hospital to attract and retain nurses, even during the recent prolonged nursing shortage. Once nurses have worked at El Camino, where physicians are more self-sufficient in their ordering tasks, and where clinical information is more readily accessible on-line, nurses don’t tend to want to go back to the paper-bloated and delay-ridden systems of other hospitals—nothing against Stanford as a hospital—but the convenience is a big factor in me saying come here. It is just so much easier to take care of your patients.”

Administrators at the hospital, even in these times of constrained capital budgets, seem willing to continue to invest in these systems because they believe their system has allowed them to maintain their cost-competitive position relative to other comparable community hospitals.

Later this year, El Camino has plans to roll out the PPR (permanent patient record) which will allow clinicians access to a longitudinal or episodic patient record on-line. Since the cost of keeping these data around “forever” is plummeting, no longer will data have to be purged shortly after discharge. This should further increase the system’s value to the medical staff.

The hospital also has aggressive plans to move into graphics, optical archiving and to replace its well-used terminals with modern personal computer workstations using windowing and other techniques. It is sometimes hard to remember that El Camino’s grand experiment began long before the personal computer was invented or before Microsoft’s Bill Gates turned ten.

“It isn’t that other hospitals today aren’t doing what El Camino is doing. In some areas, other hospitals now lead. Some have slicker applications,” says Davis. Some today have larger physician participation (many teaching hospitals mandate usage). However, no hospital has had as much experience developing and promoting these systems to embrace the physician as an integral part of the computerization process.

Regarding physicians who choose not to use the system, Davis reflects, “There are times, when you look at it from a physician’s point of view, when they are in a hurry taking care of patients, that it is just too difficult or it takes longer, so they choose not to [enter their own orders or retrieve their own results]. There may always be those who choose not to do it. But when confronted with this situation, we ask ‘What can we do to make the system work better for you? How can it help to improve your practice of medicine?’ It is this kind of cooperative attitude which has made on record keeping a success.”

Once they have worked at El Camino, physicians and nurses don’t want to go back to the paper-bloated and delay-ridden systems of other hospitals.

by Dennis J. Streveler, Ph.D.