High Tech Health Care:
Automation and Information Technology In the Health Care Workplace

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Pentagon Seeks To Develop 'Trauma Pod' for Battlefield Surgery; Kaiser EMR Could Serve as National Model; Detroit Medical Center Introduces Robotic Doctors; Georgia Launches Telemedicine Network; Idaho Hospital to Launch Telepharmacy Program; California County to Install Drug-Dispensing Robots in Jails; New Jersey Hospital Uses Robot To Aid Docs; High-Tech Hospital To Open in South Florida; U.S. Military Expands Telemedicine Use

These only a few samples of the Headlines from iHealthBeat, a daily electronic newsletter reporting on advances in information technology in health care, give an indication of the breadth and depth of technological change in the health care workplace.

In all sectors of the economy, management is responding to the pressures of competition by automating, restructuring, consolidating and outsourcing. Despite the perceived distinct mission of health care and the particular nature of this regulated sector that had long been dominated by non-profit institutions and by small practices and health care institutions, the pressures of competition are increasing and the responses mimic those taken in other industries. The increased role of for-profit hospitals, the demands of large customers for cost-cutting and “quality improvement” (it should be noted that customers are not patients, but rather the payors such as large employers, insurance companies, and the government), the increasingly aggressive role of the government and other large purchasers of health care services in pushing the use of advanced information technologies, the growing influx of technology vendors into the health care markets and the consequent availability of an increasing array of disruptive new
technologies are all factors in what is becoming a wide ranging and ongoing technological shift in health care.

The new Health and Human Services Secretary has placed the implementation of Electronic Medical Records at the top of his health care agenda as pointed out in an article in iHealthBeat titled “Leavitt To Focus on Electronic Records”:

HHS Secretary Mike Leavitt has said that creating an electronic health records system and reforming Medicaid and Medicare will be his main focus as head of the agency. [iHealthBeat 3/29/05 (AP/New York Times)]

Earlier, Leavitt had told a “…House appropriations committee that he ‘sees a day when every American can have access to an electronic health record.’ Leavitt said telemedicine and community health centers are critical to the nation's health and economy, and technology will facilitate health care delivery to rural communities.” [iHealthBeat, 3/4/05].

Dr. David Brailer, the Bush Administration’s lead man on health care technology, recently threatened industry leaders with government action if they didn’t get together and create standards for electronic medical records (the backbone of integrated information technology systems in health care) in order to facilitate the implementation of new technologies throughout the industry and that the industry must “…take steps soon to make it happen or the government will probably impose a solution.” [Lohr, 2004]

According to Dr. Brailer, who Business Week says may be the most important man in health care these days: “Health care is an inordinately complicated industry that really lacks the business model for productivity improvement because it’s so fragmented, and there hasn’t been a force that has been able to consolidate and integrate the industry in a better way.” [Business Week, 3/28/05] Technology will, it is hoped, provide the basis for the integration and consolidation that Brailer and others are seeking.

Congress is also getting into the act. Patrick Kennedy has joined with a Republican colleague to introduce the 21st Century Health Information Act of 2005. Senator Frist also has a bill that will
contribute to standards setting and “address regulatory issues that are inhibiting the full introduction and use of information technology.”

In addition to the federal government, private health care purchasers are calling for technological change to help cut the costs of health care. The LeapFrog Group is one example. www.leapfroggroup.org. The board of the LeapFrog Group includes representatives of 3M, General Motors, Boeing, and the National Business Coalition on Health.

Finally, organizations such as the Health Information and Management Systems Society, the National Alliance for Health Information Technology, the Center for Health Transformation and the American Health Information Management Association are in the forefront of pushing for the introduction of new technologies into health care, for technology standards and for government support. Arguments about patient safety are used to justify fundamental re-ordering of the system:

*Every day that the American healthcare system relies on paper health records, paper prescriptions and paper-centered medical learning, people will die unnecessarily. To transform the system into an electronically based system, all of us-- private and public entities, Democrats and Republicans-- need to unite to create a 21st Century Intelligent Health System that achieves more choices, of higher quality, at lower cost. The single greatest catalyst to achieving that system is the nationwide adoption of an interoperable health information infrastructure. [Newt Gingrich, July 21 2004 press release]*

The forces that are pushing technology into the health care sector are indeed powerful. The digital foundation is now being laid for changes that will define the health care landscape (for both patients and workers), for decades to come. The discussion of the future of health care takes place in a wide array of associations, consortia, societies, etc., all of which are engaged, directly or indirectly, in promoting standard-setting and social/technological transformation. In addition to government and private healthcare purchasers, drug companies, technology vendors, healthcare industry consultants, health care providers and others all have a great deal to gain from the technological revolution in health care.

Noticeably absent in most cases are the unions which representing the health care workforce. As the forces of change mount, as the federal government intervenes to support and promote technological
adoption, there is a need to look at the future being created in health care, to discuss the impacts of this future on the workforce and on the provision on health care, and to insert a union voice into the fray. This is a critical time for union input because the foundation for the new world of technological medicine is being laid. Voices absent now will be difficult to insert at a later date.

**Technological Change in Health Care**

The shifts in technology that are currently being implemented and that will increasingly characterize the world of health care in the future can generally be categorized into five key areas:

- **Electronic Data-Gathering and Record Keeping**
  
  Electronic Medical Records (EMR), combined with broadband networking capability, are the backbone of a system of information technologies that will allow and promote the digital capture, storage, analysis and retrieval of patient information. The Electronic Medical Record, combined with large scale distribution capability and analytical software, allows instant, geography-free access to health care information, statistical analysis, decision support, and performance monitoring. The EMR can be tied into systems that handle scheduling, billing and accounting, quality control, and personnel. It lays the basis for the introduction of distributed data-gathering devices such as CPOE (computerized physician order entry), bedside computer terminals, patient monitors, and wireless computer networks, and for the use of automated data-collection systems such as barcodes and RFID (Radio Frequency Identification).

  Kaiser Permanente, one of the largest health care organizations in the United States, has invested $3 billion to digitize the records of millions of patients nationwide, and is seen as a trend-setter and competitor that will pressure other health care systems to implement EMR’s. EMR’s are also laying the basis for regional collaboration among health care providers which will eventually allow “better” and more “efficient” allocation of resources and the elimination of regional redundancies. Estimates of the cost savings available from the use of electronic medical records are as high as $140 billion annually. Some predict even higher savings. [*Business Week – The Digital Hospital, 3/28/05*]
Telemedicine or distance medicine

Telemedicine is the combination of communication and computer technologies that allows medicine to be practiced from a distance geographically, de-coupling the service provider from the patient. The practitioner no longer needs to be at the bedside. Telemedicine applications include remote monitoring of blood pressure, heart rate and other vital signs and video conferencing with patients or among care providers. Telemedicine technologies can be used as a substitute for home care visits. They can mitigate the need for direct contact with specialists and are currently being used to offshore medical specialties such as radiology.

State governments are getting into the act as they struggle to deal with increasing health care costs and the difficulties of placing specialists in rural locations:

“Georgia on Tuesday launched its statewide telemedicine network, which eventually will link 36 rural hospitals and clinics, the Atlanta Journal-Constitution reports. The program, which will be the first to connect hospitals statewide through one system, will allow physicians at rural hospitals to consult with specialists at large urban hospitals and medical schools.”  
[iHealthBeat, 3/9/05]

The program is a public/private partnership between the state and Blue Cross/Blue Shield.

Telemedicine is growing rapidly and can be expected to grow even more as the broadband backbone necessary to an effective system is increasingly available. Telemedicine is described as a mechanism for providing more efficient care (eliminating travel time for home health care and thereby increasing the frequency of visits), increased access to specific specialties (particularly in rural or other underserved areas) and therefore a benefit for patients.

Again the federal government is playing a role in the research and development phase as the military works on telemedicine technologies which they see as a way to protect specialists while making them available on the battlefield:
“The U.S. military is expanding its use of telemedicine to help diagnose and treat soldiers in the field, the AP/Miami Herald reports. The technology has served as a "force multiplier," connecting specialists who can't be deployed with patients on the battlefield, said Army Col. Ron Poropatich, a critical-care doctor at Walter Reed Army Medical Center in Washington, D.C., and the telemedicine consultant for the U.S. Army Surgeon General” [iHealthBeat – 5/10/04]

The social, medical and technology basis for making telemedicine a regular part of medical service provision is being created as we speak. Once the disconnect between patient and provider is made, once the need for a doctor at the bedside is undercut, the possibilities are essentially limitless. We can see the social infrastructure for distance medicine developing in the form of medical tourism, offering cheaper alternatives for elective surgery ranging from cosmetic surgery to hip replacements. Countries from India to Malaysia are building advanced hospitals and offering their services to patients in Europe and the United States. The growth of medical tourism as a financially attractive alternative to local health care creates the capacity, the social acceptance, and a political/economic interest group for the transfer of medical services overseas.

The reassurances that health care jobs can’t be outsourced or offshored are seeming thin as the reality of telecommunications, telemedicine and electronic medical records places these jobs are at risk. The remaining barriers are regulatory and cultural rather than technological, and these are being chipped away.

Robotics:

*A study by Mckinsey and the confederation of Indian Industries has indicated that: “Medical tourism is capable of creating 40 million jobs in India.” And that “healthcare tourism can generate additional revenues of around $2 billion by 2012.”

India Business Insight, November 26, 2004*
Remote control/robots are increasingly being developed for and introduced into the health care workplace. Nursebot is a project of CMU funded by the NSF that is developing a “personal assistant robot” that can replace live nurses in the care of the elderly. The RP-6 is a fully mobile robot which has a screen that displays a picture of a physician who is in a remote location. Detroit Medical Center has 10 of these robots prowling its hallways and allowing work intensification and just-in-time doctoring:

The aim is twofold:
• To save lives by enabling immediate consultation with specialist doctors in critical situations.
• To save money by reducing the time patients lie in bed awaiting attention from doctors.

Think of a hospital as a manufacturing facility, Wang said (the inventor of the RP-6 robot), with sick patients coming and in and well patients going out. "If an emergency room case requires a consult with a specialist but the specialist can't get there for four or five hours -- versus 30 minutes if the robot and remote link -- the patient sits there, occupying space in the ER which then backlogs the whole system. [Walsh, 2005]

The inventor of the robot points out that the use of technology to separate the patient from the care provider reaps large economic benefits: "Care management," he said, "is optimized, both from a safety and from an economic point of view, if you can put the physician by the patient's bedside at the right time. If you can decouple the need to be physically at the patient's bedside in order to advance care, then you've greatly relieved and improved the efficiency of the system." [Walsh, 2005]

Benewah Community Hospital is using a combination of telemedicine and robotics in a telepharmacy program in Idaho. According to iHealthBeat, Pyxis drug-dispensing stations will be controlled by computer from Kootenai Medical Center. “The computer will then instruct the station, which features a fingerprint authorization system, to dispense certain drugs. Benewah’s pharmacy has cameras and interactive monitors to connect nurses to a pharmacist at Kootenai, who can watch the medicines being prepared and answer questions…” [iHealthBeat 2/15/05]
And while much of the current round of automation is aimed at the core of the health care delivery process, Helpmate is the robotic orderly that can deliver everything from meds to clean towels. The Helpmate website offers management the perfect worker to replace all the defective humans that they currently have to deal with:

“What employee never takes a vacation?
Never takes a break
And never calls in sick
Works 365 days a year, 24 hours a day
With more than 3 million hours of experience
Is qualified to work in Dietary, Central Supply, Pharmacy, Radiology, Medical Records, Lab”

➢ Advanced Diagnostic Equipment and Patient Monitoring Systems

Patient monitoring is increasingly being done by computerized equipment. Sensors are used to gather data which can then be fed into centralized computer systems. eICU, for example, is a combination of advanced monitoring equipment and telemedicine:

Inova implemented the system last fall to improve patient monitoring and to aid nurses, the Post reports (Smith, Washington Post, 1/30). The Visicu systems use digital cameras, software and microphones to monitor heart rates, blood pressure, respiratory rates and other information for intensive-care patients. Audio and video links will let the eICU staff see patients and talk to other providers (iHealthBeat, 9/20/2004).

Intensive care units are equipped with digital cameras, microphones and software that link to a team of specialists, who conduct "virtual rounds" by monitoring patients' vital signs, the Post reports. Patients are notified when the camera is being turned on, and information is transmitted over a secure wireless connection. The specialists can use the system to notify nurses if there is a problem, and they also can guide resident physicians through difficult procedures (Washington Post, 1/30). [iHealthBeat, 1/31/05]

➢ Employee Monitoring Systems
As a part of the digitalization of medicine, workforce tracking systems including infrared badges (lovingly referred to as Nurse LoJack by nurses at one hospital we visited), barcode readers, key or swipe cards, and other forms of integrated data gathering are increasingly being implemented.

Everywhere that digital technology is used, there is an opportunity for monitoring the workforce - gathering information that can be analyzed and applied to “optimizing” (read: squeezing out “extra” workers) and controlling the work process. Pyxis patient-stations, for example, dispense medicines and track the workforce at the same time, many with biometric sensors that rely on fingerprints or handprints for employee identification.

The bottom line of all of the above is that health care technologies, in particular information technologies, are increasingly being developed and deployed and are increasingly forming part of an integrated network. We can expect this trend to continue and in fact to accelerate.

**Impacts on the Workforce**

The impacts of these technologies on the workforce need further and particular analysis. That being said, it is clear that these new technologies will, among other things, result in job loss, work intensification and increases in workload, skill shifts, stress, job disruption and overall insecurity.

A key goal of automation/computerization is cutting costs through the elimination of workers or the transfer of work to lower wage areas. Once the digital infrastructure has been created through the combination of broadband communication channels and Electronic Medical Records, it will be even easier to add new levels of automation and to transfer work to other areas and other countries. We have often been told that health care work has to stay put, but we know from looking at the recent outsourcing of professional work that these promises should not give us much comfort. The geographical decoupling that was discussed earlier, while initially a local phenomenon, is essentially limitless.

It is also clear that the monitoring and speedup that grow from the new technologies will lead to increased workload and stress on the job. Reassurances that the monitoring capabilities of the new technology will not be used to monitor employees ring hollow in the face of management efforts to
increasingly control the staff in hospitals. In one hospital system in Northern Minnesota, management put a proposal on the table at negotiations to put ankle bracelets on the Maintenance staff so they could be electronically tracked. Although this proposal was rejected, the EMR system and the new time and attendance system being implemented will accomplish much of the same results for the rest of the workforce.

Electronic Medical Records and wireless transportable computers are advertised a means for reducing paperwork for nurses – giving them more time with patients or less forced overtime. While in the short run EMR’s and bedside computers may provide some relief to direct care personnel, in the long run, it seems highly unlikely that opportunities to have fewer nurses and more patients per nurse will be ignored by management.

The impact of technology on skills has been a subject of intense debate. Many of the technologies are touted as returning human beings to what they do best, working with patients and providing care. But the reality is that increasing use of digital rather than human care givers is designed to decrease the reliance on skilled humans. So-called evidence-based medicine combined with computerized expert systems are paving the way to medicine based on complex algorithms.

A key impact of new technologies that deserves more study is the diminishment of social interaction among workers. As work is intensified and downtime becomes rare, as workplace communication is moved to controlled digital channels, as workers in downsized and computerized workplaces are increasingly working alone and as monitoring makes informal conversation difficult, social interaction among workers is lost. Social interaction/social support has been shown to be a significant factor in increasing job satisfaction and decreasing stress on the job.

**Impacts on Unions/Collective Voice**

In some ways, more important than the impact of technological change on individual members is the impact on the union and on the viability of collective voice.
Key sources of internal leverage with management are embedded in the specific nature of the work process, the relationship between the workforce and the work process, and the organic solidarity that grows out of workplace interaction and shared oppression. It is therefore critical that we look at the impacts of shifts in technology on leverage and the possibilities of collective voice.

There are three key organic sources of collective voice/union leverage that are heavily impacted by the new technologies that are currently being implemented in the health care sector. These include:

- a work process that is dependent on a large contingent of skilled workers (particularly nurses and technicians),
- the geographic limitations on the work process (the work has not been easily transferable), and
- the collective nature of the work (large numbers of people working in close proximity in a work process that is in fact dependent on social interaction).

New technologies provide support for an ongoing effort in health care to transfer work from nurses and other licensed personnel to technicians with less training. Computers aid in this process as they gather the information and knowledge necessary to the provision of health care and support the oversight necessary in a work process that has been de-skilled and broken down into component parts. At the same time, electronic information systems and standardized processes make it easier to integrate new workers into the work process. The increasing use of contingent workers (agency nurses for example) in health care is indicative of management success in this arena. This in turn diminishes the social cohesion of the workforce, making solidarity an elusive goal.

Electronic medical records and telemedicine technologies allow increased remote integration of work processes, and facilitate the transfer of work from one location to another. The x-ray reader, for example, no longer has to be in the same location as, or anywhere near, the patient, because digital x-rays can be instantaneously transported across the world. In fact, radiological services in remote locations (including overseas) are being marketed not only on cost, but also on improved quality. X-ray readers, they say, will not be distracted by the patients and constant activity of the health care setting when they are sitting in an isolated cubicle across the street or across the world. This trend can be expected to increase and the distances between patient and health care provider will most certainly grow.
Once the separation of patient and care giver is created, the destination becomes less relevant. While the first degree of separation may be to a building next door, the next will most certainly be larger and more significant.

The damage to collectivity and social interaction has received little attention in the literature but may be one of the most significant outcomes of technological change. For workers in the digital hospital, isolation is increasing (and will continue to increase) as communication is moved into the computer and into carefully defined channels with strictly limited content. Human interaction is necessarily simplified to fit the digital format.

As technology is applied in ways that increase social isolation, achieving solidaristic action becomes more difficult:

- By sourcing service provision around the world, technology makes the construction of solidarity among the critical players in a production process more difficult (they aren’t in the same place, they may speak different languages and they come from different cultures). Language and cultural barriers to solidarity that are hard enough to deal with when people are in the same workplace are multiplied many fold when people are scattered throughout the globe.

- By changing the nature of interaction in the workplace, limiting direct human-to-human interaction, monitoring interaction and intensifying work so that interaction is more difficult and stressed, management is successfully undercutting the opportunities for solidarity development. One simple example: robots are being developed to handle food delivery, mail distribution and other simple tasks. These technological advances replace jobs that included mobility throughout the workplace and therefore provided a source of interconnectivity among different sections of the workforce.

- By facilitating “flexible” scheduling, technology helps to break down the regular schedules which help people develop social bonds in the workplace that are such an important basis for solidaristic action.
Unions are also suffering from a loss of members, a loss of potential dues and an increase in service demands. Ultimately, failure on the part of unions to take action on the technological changes that are occurring will further undercut union strength as the workforce loses faith in the union and in its capacity for bargaining over the future. Workers end up in jobs that are disempowered, they learn disempowerment and they give up on collective success.

**Conclusion**

There are powerful forces that are pushing the development and dissemination of health care technologies. We can therefore expect that the use of information technology in health care will only increase, as will the rate of implementation. These forces include large health care employers, the government, the technology vendors, the large insurance companies and the large employers who are paying for health care insurance for their employees – none of whom are watching out for the interests of the health care workforce.

Decisions being made now will have impacts on the future of health care, health care delivery and the health care workforce. The fact that unions are not part of the major decision making bodies is a significant problem.

The technological changes being introduced into health care are fundamentally shifting the power dynamics in the industry, undercutting key sources of collective workforce leverage. They are also significantly changing conditions for health care workers.

The impacts of these changes require a more effective effort on the part of the labor movement to control and shape the processes of technological change and work restructuring. Without such a response, and as unions fail to struggle over the work process and over technology, the relations of power that are built into the work process will continue to be de-constructed.

The surrender of the work process and the shop floor teaches non-struggle and defeatism to working people on a daily basis. Workers learn through experience that there is little they can do to control their lives at work - as they are monitored, analyzed and robotized. The danger exists that they will then take
this lesson of disempowerment – identified as apathy – with them as they decline to engage in the larger struggles to define the future of society and instead seek individual solutions to their problems (new jobs, jobs in management, individual educational opportunities, drugs, etc.). A downward spiral for collective voice is created, with its beginnings firmly rooted in the surrender of the shop floor and the core work process and with its end in a loss of faith in the union.

The prescriptions for action are clear: first, unions need to notice that the technological changes are happening; second, they need to understand how important these changes are for the future of the members and the union; and third, they should never surrender to management the right to determine the future of the workplace or of the work process and to introduce new technologies without dealing first with the union.

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