Health Information Technology Basics
Institute for Health & Socio-Economic Policy
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Part I
Introduction

Health information technology (HIT) is widely celebrated as a universal healthcare fix. Promoters say it will contain costs, improve quality, and modernize medical care. But such promises are the public relations messages of the HIT and healthcare industries. Is HIT really the panacea to cure our healthcare crisis, or are there consequences that aren’t being discussed? RNs have good reason to be wary.

Patient care processes in some hospitals have already been transformed by HIT, and many other hospitals will be adopting it in the next few years. Among other types, hospitals are adopting

- electronic medical records,
- clinical decision support systems,
- e-prescribing,
- medication dispensing,
- radio frequency identification and tracking,
- medical credit scoring,
- telemedicine, and
- robots.

Clinical decision support systems (CDSS) are one widespread technology that affects patient care directly. Of the 5,139 U.S. hospitals reporting (almost all hospitals not run by the federal government), 67.6% have adopted fully automated CDSS and 8% have either begun the installation process or have contracted to do so. A revolution is well underway. It will soon reach RNs and patients in every hospital.
Part II
Why Workplace Technologies Change

SECTION 1: Overview

As health professionals and patient advocates, direct-care RNs need to understand the changes in patient care that HIT can bring. Technological change in workplaces has always been driven by employers’ desire to control their employees and get them to produce more. HIT is no exception.

Private hospital administrators need to create profit (called “surplus revenue” for nonprofit hospitals) to keep their jobs, so profit is their top priority. Public hospital administrators learn management on the private model. In prioritizing profit, hospitals are like all other business employers, and they adopt new technologies for the same reasons.

SECTION 2: Conflicting Values

To serve the bottom line, employers constantly try to increase productivity and efficiency. Few people in the United States today question these business values, but they need to be questioned.
For hospital management, “productivity” refers to how quickly patients are processed. But processing patients quickly comes at a cost to patients and RNs.

Management’s concept of efficiency is very narrow. Management is only concerned with conserving company resources. This is just technical efficiency. It may not be in the best interests of others if it means

- wasting public resources,
- overburdening or displacing employees,
- undercompensating employees, or
- endangering patients.

Social efficiency, which includes the interests of patients, health professionals, and the public, is more important than technical efficiency.

Claims that a new technology increases efficiency or productivity shouldn’t end the conversation. Health professionals don’t have to accept management’s values.

Health professionals have different priorities. They care about their own quality of life and that of their families, so they’re concerned about their

- wages,
- working conditions,
- health, and
- retirement.

They may also be concerned about

- the natural environment and
- the greater social good.

Like other health professionals, direct-care RNs care about these things. But, by law and by calling, their top priority is patients.

For business employers—particularly large corporations—all these concerns are secondary at best. So the primary interests of hospital management and health professionals fundamentally conflict.

SECTION 3: Management Secrets

Because their interests conflict, hospital management is always searching for new ways to control health professionals. Workplace technologies are developed and adopted to increase employers’ control so they can maximize productivity. A technology that erodes the employer’s control won’t be adopted, even if it has benefits like increasing technical efficiency, making work safer, or protecting the environment. Hospital managers talk a lot about high-quality patient care, but for them, patient care is secondary to control.
Workplace technologies help hospital management control health professionals in five ways.

1. **SURVEILLANCE**

Your employer has to know what you’re doing in order to control you. Because managers can’t watch everything you do, hospitals adopt surveillance technologies.

Video cameras may be the first to come to mind, but hospitals use other surveillance technologies as well. For example, management can track an RN’s location electronically both in and outside of the hospital.

Surveillance is one of the primary functions of electronic medical records (EMRs), the computerized version of patients’ paper records. Computers keep track not only of data entered, but also of exactly when each entry is made. This allows management to monitor work processes closely, analyze them, and force RNs to change them and work faster.

Such technologies keep management informed. They also help to control RNs by making them believe they’re being watched all the time.

2. **DIVISION**

Employees are easily controlled when they see themselves as individuals distinct from other employees. They’re much stronger and harder to control when they feel solidarity with their coworkers and act collectively. Hospital management knows this and uses technologies to divide RNs.

Management can use the information learned through technical surveillance to get RNs to compete against each other. Productivity standards are raised and individuals are blamed for falling behind. Those who are most productive or complain least are flattered or granted special privileges. They come to believe they don’t need the support of their colleagues, and their colleagues come to resent them. But it’s management that benefits most when RNs allow technology to divide them.

3. **ROUTINIZATION**

Hospital management wants to control health professionals so it can routinize work processes

- by simplifying them and fragmenting them into tasks, and
- by standardizing the tasks.

Management would like you to think that “standardizing” work processes means raising quality standards, but it doesn’t. “Standardizing” really means making work processes uniform, or forcing everyone to do them in exactly the same way. Making work processes simpler and more uniform allows
management to **speed up** and **intensify** work. This is how routinization increases technical efficiency.

So hospital management dictates “best practices,” the work processes it deems most efficient. To the extent that the safety of employees and patients affects a hospital’s bottom line, “best practices” may incorporate these concerns, but increasing technical efficiency is their primary purpose. One way to do this is to eliminate activities that don’t increase profit, including important aspects of patient care. From the point of view of health professionals and patients, routinized work processes are far from “best.”

Workplace machinery from the first assembly line to the latest information technology has been used to enforce conformity with “best practices” and compel employees to step up the pace.

Instituting “best practices” in a workplace means routinizing not only

- work processes, but also
- the worker, and
- the product.

In manufacturing and service industries, employers use machinery to make their products as uniform as possible. They consider variation a defect. And as employees adopt “best practices,” they themselves become more alike, interchangeable, like machine parts. In the same way, HIT threatens to homogenize health professionals and the patients in their care.

**4. DESKILLING**

**Skill and Judgment**

Routinization leads to the deskilling of work processes and health professionals. **Skill** is the ability, drawn from education and experience, to do something expertly. It can also be defined as the effective exercise of professional judgment in non-routine situations.

Following prescribed rules, as a machine would, makes an employee competent to perform tasks, but it doesn’t make the employee skilled. They can do their job as long as there are no surprises. But when something unexpected happens, the rules break down, and caring for patients means facing the unexpected every day. Only skilled health professionals can cope with the unexpected. To know what to do, they have to rely on their own judgment. The exercise of judgment is the essence of skill.
Highly skilled employees are harder to control than less-skilled employees. The most highly skilled employees are considered professionals. Professionals have significant responsibility and have conventionally had the freedom to design their own work processes in the ways that suit them best. They don’t need someone else to manage their time. A health professional’s judgment in deciding how to get work done should be respected by hospital management.

In general, the more highly skilled employees are, the greater their bargaining power in negotiating the terms of their employment. Because an 18th-century cobbler had special knowledge and skills, that cobbler’s livelihood was assured. But the job of someone working on an assembly line in a shoe factory can be learned quickly, so that worker can be easily replaced. Because assembly-line workers know this, if not highly organized, they’re easier to control than more highly skilled workers.

For this reason, a corporate employer will generally deprofessionalize its workforce as far as possible. Hospitals are no different. Hospital management believes that health professionals have too much power and targets them for deskilling through the redesign of work processes.
Automation

When work processes are sufficiently routinized, they can be automated. You can probably think of medical technologies that help health professionals do things they couldn't otherwise do. Such a technology benefits professionals and patients because it’s skill-enhancing. But technologies that automate work are usually deskilling or skill-degrading because they’re designed to serve management by tightening its control of employees.

Much health information technology is skill-degrading. As the work of health professionals becomes increasingly automated, they lose the ability to do their jobs without HIT. To make matters worse, they're expected to keep pace with machines. They serve the machines rather than doing the more gratifying work of patient care, and ultimately they’re compensated less well.

5. DISPLACEMENT

Employers would prefer not to have to control employees. It’s too much trouble. Machines are technically efficient, and they don’t join labor unions. From an employer’s point of view, the ideal workplace would be one where machines did all the work. Of course, in all industries, there are still many jobs performed by people rather than machines, but employers automate whatever processes they can. For health professionals, as for other employees, losing skills is a stage on the way to being replaced by machines.

Displacement is hard to spot because it’s unlikely to appear as a one-to-one correspondence; that is, you probably won’t find a robot sitting in your colleague’s chair tomorrow. It’s more likely to happen piecemeal, over an extended period, and through attrition.

- The job of patient care will be redefined, privileging technical over clinical skills.
- The hospital will begin to hire more HIT specialists and fewer RNs.
- Functions performed in the past by health professionals will be fragmented and reallocated between machines and less-skilled employees.
- Increased technical efficiency will enable the hospital or HMO to expand without expanding its workforce.

In any business, increasing productivity—that is, getting more work out of each employee—means displacing employees. Farming machinery has displaced family farmers, robots have displaced autoworkers, ATMs have displaced bank tellers, and scanners have displaced grocery checkers. A trend toward displacement is clear in the changes in any industry viewed in historical perspective.

Because employers decide how company money is invested, these five functions have been selling points for countless workplace technologies for more than 200 years. They’re also built into health information technology.
Part III
Routinizing Patient Care

SECTION 1: Overview

Nursing is especially hard to routinize because every patient is different, but hospitals are working on it. In fact, they want to routinize

- the nursing process,
- RNs, and even
- patients.

From management’s point of view, machines make better RNs than people do. Machines usually do things in exactly the way management wants them done, and they don’t advocate for patients when management wants to cut corners on patient care. Machines would make better patients too. Because they’re simpler than people, they could be cared for by other machines. If only both RNs and patients could be replaced by machines, managers would finally be satisfied.

Of course, patients can’t be replaced by machines, so management wants to do the next best thing: treat them like machines. An information technology is itself just a complex machine made up of hardware and software. It can’t think. It can’t recognize differences among patients that weren’t programmed into it beforehand. It can only treat patients like machines, as if they always behaved as expected.
For HIT to provide high-quality patient care, two premises would have to be valid:

1. All patients are pretty much the same.
2. Any variation can be anticipated by software designers.

RNs know better. Every patient is unique. Because humans are infinitely complex and variable, each patient needs to be assessed and cared for by a thinking, skilled professional—that is, by a human being.

To defend your role in patient care against routinization, you first need to understand how each type of HIT prioritizes profit by

- controlling RNs and
- treating patients like machines.

SECTION 2: The Core Technologies

Three technologies make up the skeleton of HIT:

- electronic medical records and electronic health records,
- clinical decision support systems, and
- the health information exchange.

These technologies support and sometimes incorporate many others, and between them they manifest most HIT problems.

1. ELECTRONIC MEDICAL RECORDS (EMRS) AND ELECTRONIC HEALTH RECORDS (EHRS)

Orientation

Electronic records are the backbone of HIT. All other technologies rely on them directly or indirectly. EMRs are accessible only within a single institution, such as a hospital or HMO network. EHRs are accessible to multiple institutions. But the two terms are often used interchangeably. Here, “EMRs” refer to both types of electronic records.

The advantages of EMRs over paper charts are advertised loudly by HIT companies, hospitals, and politicians. They can be searched more easily and accessed from multiple locations, and they may reduce certain types of errors. But because hospital management controls the purse strings, EMRs are designed, above all, to increase hospital profits. For this reason, they threaten patient care.

EMRs increase management’s ability to control RNs through surveillance, division, routinization, deskilling, and displacement. They deprofessionalize RNs, preventing them from exercising their professional judgment to decide what’s best for their patients.
Managers often claim that HIT will free RNs to spend more time with their patients, but the opposite is true. EMRs enforce cumbersome documentation requirements that take time away from patient care, often without benefiting patients.

**Menu Hazards**

EMRs may or may not allow substantial narrative charting. Narrative charting is important because it allows an RN to describe a patient's condition and care precisely and efficiently. But even when EMRs allow narrative charting, they subordinate it to a long series of menu selections. Imposing menus on patient assessment and care gives management more control over nursing practice by routinizing it, with many negative consequences.

- Reviewing the menus and making selections often takes so long that little time is left for patient care, let alone narrative charting.
- Like other aspects of HIT, imposition of menus depersonalizes the relationship between RN and patient.
- Crucial information in a record can go unnoticed because it's buried in a lot of irrelevant information.
- Menus suggest charting by exception. If a symptom listed in a menu isn't selected, someone reviewing the record later is likely to assume that the patient was normal in that respect, when this may not be the case.
- It's easier to make an incorrect selection with a single mouse click than to write something incorrectly. Errors are easily overlooked because EMRs are more extensive than paper charts, include irrelevant information, and appear orderly and official. Errors also can have a wider impact because they proliferate electronically, appearing everywhere records are accessed and impacting other HIT programs.
- Too much reliance on electronic menus in patient assessment and care deskills RNs. Over time, knowledge of how to use EMRs supplants knowledge of patient care. RN professionals are, in effect, displaced by technicians when EMRs usurp their power to make choices based on their professional judgment.
- The assumption underlying menus is that all patients are more or less the same, so their needs are routine and predictable. But because every patient is different, a patient's condition or care may not be accurately reflected in any of the choices included in a menu. In this situation, the RN is often forced to make a selection, misrepresenting the patient's circumstances, in order to advance to the next screen. Menus obscure the individuality of every patient, and thus his or her humanity.

Although making documentation more burdensome may seem inefficient, EMRs promise to increase technical efficiency as the hospital or HMO grows, in part by increasing management's control of RNs. Employers expect long-term financial benefits from increased control.

**Surveillance**

Electronic medical records are a powerful surveillance technology, a rich data
resource for employers in their quest for control. They help management take surveillance to a new depth. The time of every entry into an EMR is recorded, and deletions are recoverable. Based on analyses of how and when EMRs are used, management can redesign nursing practice and other work processes to increase technical efficiency and productivity. Electronic documentation requirements serve these objectives.

RNs end up between a rock and a hard place. You’re more vulnerable to scapegoating if the hospital is sued, so you have to be more vigilant in your documentation. At the same time, management uses EMRs to intensify your work. With a heavier workload, you can only document as expected at the expense of patient care. It’s a terrible choice.

Management can also tap EMR data to compare RNs in efficiency and compliance with “best practices.” It can use the information to divide them and discipline those who resist routinization of their practice. Because younger RNs often lack experience nursing without HIT, they’re less likely to resist it, and management exploits this generational difference. By favoring younger RNs, managers can upset RNs’ natural informal authority structure based on experience and divide them generationally.

**Revenue Capture**

Employers also adopt EMRs as a “revenue capture” technology. They help ensure that everything that can be billed will be billed, so hospitals can extract greater profit from

- public health insurance programs,
- insurance companies,
- employers who provide insurance, and
- patients.

**Documentation Over Care**

Because EMRs are designed in the interest of hospitals rather than patients, they prioritize documentation over patient care and threaten RNs’ exercise of professional judgment. Of course, documentation is important for patients as well as hospitals, but is it ever more important than skilled nursing care?

### 2. CLINICAL DECISION SUPPORT SYSTEMS (CDSS)

**Orientation**

Evidence-based medicine (EBM) aspires to synthesize the latest research on each medical issue into guidelines for patient treatment and care. Based on the patient data entered, clinical decision support systems implement EBM by generating

- diagnoses,
- prognoses, or outcome predictions, and
• treatment protocols, or “critical care paths” (adapted from “critical path analysis” in manufacturing), recommending a particular course of treatment or care.

The CDSS is an “expert system”—that is, one designed to perform the functions of professionals—adapted for use by RNs and doctors from systems used in manufacturing. It’s generally interoperable (that is, it can communicate) with or is incorporated into EMRs.

Evidence-based medicine is promoted by hospitals and some health professionals as the medical gold standard. A current, complete medical library accessible from the bedside would be an advantage for RNs and doctors, who can evaluate the quality and relevance of research. But EBM guidelines delivered by CDSS are not unfiltered research findings, and they can potentially harm patients.

What’s Wrong with Support?

CDSS are designed to serve the institution before the patient, putting profit above patient care.

• CDSS don’t produce a neutral description of the patient’s condition. Diagnostics are tailored to restrict patient admissions, speed up “patient cycle time,” and favor higher reimbursement.

• Protocols remind doctors to think of cost at every turn. In the HMO context, they restrict treatment and care. CDSS prescribe formulary drugs and erect electronic hurdles for doctors to clear before they can order tests and treatment. In the fee-for-service context, doctors are prompted to provide more expensive treatment than they think necessary.

• The prognostic, or risk-assessment, function of clinical decision support systems may be their most disturbing. Prognostics make the likelihood of patient mortality a self-fulfilling prophecy. When advised by the CDSS that patients are unlikely to benefit from treatment, physicians are more likely to withhold it. But a patient to whom CDSS attributes a 95% chance of dying regardless of treatment isn’t the same as a patient whom treatment can’t help. CDSS can’t determine whether a statistical model has any relevance for an individual patient. That patient is unknown to the statistical model because that patient is absolutely unique. Only practitioners, using their professional judgment, can determine whether a patient is sufficiently similar (in ways that matter) to the patients on whom the model was based. If CDSS have their way in such a situation, patients who might be helped by treatment will not get it. CDSS threaten to make the withdrawal of treatment a purely economic decision rather than a medical one.

CDSS enable the surveillance, routinization, and deskillling of the work of skilled practitioners. Their name is deceptive; they don’t “support” the professional judgment of RNs and doctors, but pressure them to give it up.

• When practitioners want to deviate from protocol, they have to document their reasons, making themselves legally vulnerable.
Will management’s machine ever challenge management’s values?

They’re aware that their compliance statistics are automatically reported to management—another reason to think twice before rejecting the recommended path.

Practitioners are, in effect, absorbed into the clinical decision support machine. Little by little, knowledge of the technology supplants knowledge of patient care.

By deskilling health professionals, CDSS threaten to displace them. Only skilled professionals empowered to use their independent judgment can advocate in the exclusive interest of patients. Because CDSS are designed to put profit above patients, independent professionals who understand patient needs—not merely how to use CDSS—are essential.

CDSS can never be adequately tested. They constantly incorporate new research findings without being retested.

The process by which CDSS arrive at their recommendations is mysterious and unchallengeable.

- HIT can only be fully understood by computer scientists.
- Many of its operations are trade secrets protected from disclosure by law.

Practitioners can’t know how the decisions recommended by CDSS were arrived at, so they can’t evaluate that process.

CDSS hide the limitations of clinical studies. Formal medical research isn’t complete or disinterested.

- Historically, clinical studies have systematically excluded women and minority populations.
- Patients with multimorbidity are usually disqualified.
- Most pharmaceutical research is funded by drug companies with an interest in promoting their products. As a result, studies are designed to exaggerate the effectiveness of treatment, minimize its risks, and ignore alternatives.

In medical journals, research limitations are generally explained. But EBM guidelines that synthesize research from multiple sources strip findings of their political and economic contexts. Consequently, practitioners can’t evaluate the quality of research or its relevance to their particular patients.
Knowledge gained from clinical practice is wrongly represented as unscientific in comparison to evidence-based medicine. The findings of formal clinical studies don’t constitute the sum total of all possible knowledge about a topic. Both formal research and clinical practice produce medical knowledge. Because each type of knowledge has advantages and disadvantages, both are necessary.

- The findings of well-planned research are more reliable. Researchers can design blind studies to eliminate the placebo effect and the influence of observer bias, and findings can be confirmed or disproved in further studies. But formal studies are extremely slow to answer questions and only answer the few questions researchers pose.

- Individual practitioners fill in the gaps with knowledge they gain through clinical experience. The fact that this information didn’t come from formal research doesn’t necessarily make it wrong. In fact, clinical practice points the way for future research. For example, doctors prescribe medications for off-label uses identified in practice rather than in clinical trials. Trials can be designed to test these uses. EBM doesn’t devalue individual clinical practice experience because it’s unreliable, but because it makes independent healthcare professionals indispensable, which hurts the bottom line.

Computers can’t think. They can’t reason or make split-second judgments in crisis situations. HIT companies advertise their CDSS by comparing them to human thought. But a computer is only a machine; it understands medicine no better than a calculator understands math. It can only store data and manipulate it as instructed. Data is only meaningful when synthesized and interpreted by a health professional. Regardless of what CDSS promoters would like us to believe, data isn’t knowledge, and computers can’t know anything.

What variables matter in assessing a patient can’t be determined in advance. No individual patient can be assessed before they walk through the hospital doors. Yet designers of CDSS imagine they can anticipate every significant variable in every possible case. Their ambition is hubris. Individual patient assessment requires the judgment of skilled health professionals.

Humans are far too complex to be represented adequately in the binary language of computers. Management sees in EBM the potential to make care more technically efficient by digitizing the patient, reducing the patient to computer data. But digital computer language is simplistic because it is binary, made up entirely of zeros and ones. Human experience isn’t reducible in every respect to either this or that. Ambiguity isn’t a bug to be fixed, but a condition of being human. Practitioners confront the limitations of computer language, for example, in addressing multimorbidity. The clinical decision support system is dumbfounded when presented with a patient with multiple medical conditions. Protocols conflict. Only professional judgment is equipped to cope with such ambiguity.
The question embodied by the individual patient doesn’t have a statistical answer. Evidence-based protocols are derived from statistical syntheses of research findings about general populations. Medical research produces generalizations, then EBM generalizes about those generalizations. Even if a statistical probability is accurate for the relevant population, it tells a practitioner nothing about the patient in front of them. A protocol directs the practitioner to do what works most of the time, regardless of its appropriateness in a particular case. In this way, CDSS substitute knowledge of statistical norms for knowledge of the individual patient. But statistics can only say, “Look here first”; they can’t answer the question presented by any particular patient.

EBM isn’t medical science but merely a dubious statistical synthesis of research findings. Science addresses the causal questions “Why?” and “How?” EMB doesn’t even attempt to explain causation, but only shows statistical correlation—“If this, then that.” Unlike statistics, medicine is a human science, constituted by human choices and full of ambiguity. Human judgment is necessary at every step along the way.

• Researchers exercise judgment in deciding what questions to ask, how to generate relevant data, and how to interpret that data.
• Practitioners exercise judgment in choosing their tools (both material and conceptual) and deciding when and how to use them.

Progress has never been made in any scientific field by following protocols. Without judgment, there can be no science. Evidence-based medicine eliminates science from clinical practice, replacing it with obedience.

In summary, EBM confuses what’s most easily measured with what’s most worth knowing. Not everything can be measured. You can’t reduce a human patient to a collection of zeros and ones, and you can’t put human thought in a bottle and sell it.

3. THE HEALTH INFORMATION EXCHANGE (HIE) AND THE CORE TECHNOLOGY LOOP

Orientation

A health information exchange is the Internet-based communication of electronic data among nonaffiliated organizations. The HIE isn’t fully developed, but the expectations of promoters are ambitious. It will begin as a repository of research data from which clinical decision support systems draw evidence-based protocols. Eventually the HIE will also collect and analyze patient data from electronic medical records and continually redesign CDSS protocols to assimilate this raw data. Thus the core technologies will feed each other in an electronic loop with troubling implications.
The Loop

As explained above, EMRs and CDSS standardize assessment, treatment, and care choices, treating patients as if they were all the same. Health information technology is normative: designers create an imaginary “normal” patient, then build the system around that norm. The menu options are created based on the assumption that every patient will fit the norm. Exceptions can only be documented in narrative, if at all.

Unlike data entered in menus, narrative charting isn’t quantifiable, so it will be disregarded by the HIE. As a result, outliers—the patients who most needed and may have received individualized care—are erased. It’s as if they never existed. In this way, the apparent validity of the protocols is protected from challenge by the existence of exceptions. The normative model on which the technology is based is self-affirming.

This loop can most directly endanger patients by affecting prognostics, which predict patient outcomes. If CDSS advise a doctor to withhold treatment because the patient is unlikely to survive and the doctor does so, the patient will be even less likely to survive. The patient’s death will confirm the prognosis, and one more negative outcome collected by the HIE will make the next patient’s prognosis worse. The withholding of treatment in similar cases becomes increasingly more likely with each cycle. In effect, the loop alters the population in question to fit the statistical model.

In the core technology loop, the role of the caregiver is simply to follow protocols—that is, to care for the statistical algorithm that generates the protocols rather than for the patient. Obedience to the statistical model is substituted for the independent professional judgment on which the fate of the patient depends.
SECTION 3: Supplemental Technologies

Orientation

The core technologies support others that can be grouped in three categories based on already familiar functions. Like the core technologies, these are designed to serve the hospital’s bottom line at the expense of patients and employees. They help managers control RNs through surveillance, division, routinization, deskilling, and displacement. They also help the hospital or HMO cut corners on patient care and collect higher fees. Any benefit to patients is incidental to these primary functions.

Automating Technologies

- **Computerized provider/physician order entry (CPOE)** is used by medical practitioners to communicate diagnostic orders, prescriptions, and instructions for treatment over a computer network to the staff members or departments responsible for filling the orders.
- **Medication dispensing devices** store medications, dispense them in a controlled fashion, and track their dispensing. (This is both an automating and a tracking technology.)
- **An electronic medication administration record (EMAR)** is a bar coding system used to match patients with their medication and check the dosage, the time of administration, and drug allergies and interactions.
- **An interactive patient system**, installed at the bedside, allows two-way communication between the patient and staff, including menu customization and other patient requests, and delivers patient education videos and quizzes, patient satisfaction surveys, entertainment, and Internet service.
- **Robots** are mobile, self-propelled machines that travel through the hospital as couriers transporting supplies and food and do other routine tasks such as administering medication. Some can be operated by an RN or doctor in a remote location, allowing them to visit patients virtually instead of in person and ultimately even perform some surgeries at home.

Tracking Technologies

- **Bar coding** can be used to identify patients, staff, equipment, and supplies.
- **Radio frequency identification (RFID)** uses radio waves to identify people and objects.
- **A real-time locating system (RTLS)** uses wireless communications to track the physical location of patients, staff, and equipment, allowing administrators to analyze work processes and make them more technically efficient, in part by increasing the speed at which they’re performed.
• **Patient tracking technologies** track each patient’s service and procedure progress from admission to discharge and allow administrators to analyze patient flow and increase the speed at which patients are processed in order to maximize the hospital’s capacity.

• **Patient monitoring technologies** allow staff to monitor a patient’s appearance and vital signs from a remote location.

### Revenue Capture Technologies

• **Electronic patient registration** transmits to an electronic record the information collected from the patient on admission, including insurance and credit card information.

• **Medical credit scoring (MCS)** allows the hospital to screen patients for ability to pay for care at the point of service (even in emergency situations) using address verification, full credit reports, and automated screening for charity and government programs.

• **Revenue cycle management (RCM)** is designed for managing a hospital’s cash flow. It facilitates revenue capture, billing, and collection.

In what ways can credit information be used by administrators devoted to the bottom line?
Use of any hospital technology must be consistent with safe, therapeutic, and effective patient care. Health information technology is a complete unknown in this regard. It’s an enormous social experiment designed by computer scientists and implemented by hospital administrators. HIT hasn’t grown organically from the needs of patients but has been imported from other industries. Known as enterprise resource planning, it’s adapted from similar technology designed to manage business operations on a massive scale and already being used to run the world’s largest corporations.

Caring for patients isn’t business. It requires compassion, judgment, and advocacy. Because RNs have the moral right and legal duty to advocate for patients, they have to be able to override the automated decision-making of HIT designed to serve business interests.

RNs have to work collectively to control health information technology rather than trying to fix it. It’s important to recognize that tinkering can’t fix HIT because its primary purpose is to mechanize, or routinize, patient care. It’s designed to quantify the unquantifiable, to replace the patient with an imaginary statistical norm. High-quality healthcare can’t be mechanized because it depends on people—on patients and caregivers—and people are infinitely more complex and capable than computers can ever be.

Can HIT be fixed so it helps patients instead of harming them?
How far does patient advocacy go?

Hospitals spend billions on HIT. In what other ways could that money be used to help patients?

Direct-care RNs know that patients aren’t just another product, and that traditional nursing values of compassion and individualized patient care honor the humanity of patients. It’s these values that impel and inspire RNs to advocate, both individually and collectively, for patients

• at the bedside,
• at the bargaining table, and
• in the political arena.

RNs advocate for patients everywhere hospitals and HIT companies try to use their economic power to reduce patients to assembly-line widgets.

The question confronting RNs today is whether nursing will be transformed by HIT into something altogether different. Gains in technical efficiency are paid for with ruthless routinization and trivialization of nursing practice. Patients who vary from a statistical norm are rendered invisible, and inhuman conformity and unthinking obedience are exacted from RNs. RNs who care for patients are in danger of being replaced by technicians who serve HIT.

Despite technological restructuring, nursing must continue to be defined in terms of human qualities. Management’s machines can’t think or care. They will never put the interests of patients above profit. That’s what it has always meant to be an RN, and what it must continue to mean in the brave new high-tech hospital.
Glossary of Acronyms

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