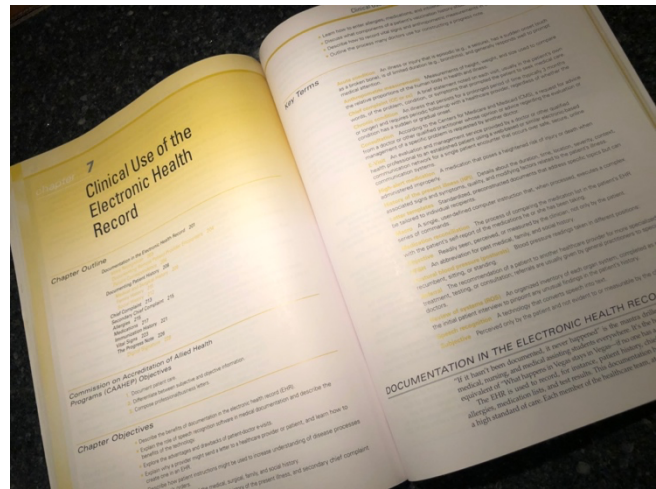


Elsevier (Saunders) asked me help Amy Devore, the subject-matter expert, flesh out her manuscript into a first-edition textbook. The publisher generously gave me title-page credit as Amy's co-author. Here are a few sample pages.



**Electronic health record (EHR)** A computerized patient health record that allows the electronic management of a patient's health information by multiple healthcare providers and stores the patient's contact information, legal documents, demographic data, and administrative information; the term can also refer more broadly to a system that manages such records.

**Electronic transcription** Data entry into the EHR using handwriting recognition, voice recognition, electronic sentence building, scanning, and other means.

**Interoperability** The ability of separate EHR systems to share information in compatible formats.

**Patient information form** A form used to gather data about the patient, including contact information, health history, current health status, and chief complaint.

**Patient statement** A billing and scheduling document that lists copayments made by the patient, reimbursement received from the patient's insurance company, outstanding amount owed, and appointment details.

**Practice management software** Software used in a medical office to accomplish administrative (nonclinical) tasks, including entry of patient demographics, record-keeping for insurance and other billing transactions, appointment scheduling, and advanced accounting functions.

**Practice Partner** A top-rated, CCHIT-certified, integrated system of EHR and practice management software published by McKesson Corp. Practice Partner is used with this textbook to illustrate the features and functionality of an EHR system.

**Third-party payer** A party other than the patient, spouse, parent, or guardian who is responsible for paying all or part of the patient's medical costs.

## WHAT IS A MEDICAL RECORD?

### History of Medical Records

Nearly as long as there have been doctors, there have been medical records. A patient medical record is simply a physical collection of an individual's healthcare information. Chunyu Yi, who was born in China in approximately 200 BCE, is one of the first doctors known to have kept records on the patients he treated. A hospital in Damascus, Syria, built in 706 AD, was perhaps among the first in history to adopt the widespread use of medical records.

Medical records and death ledgers were kept during the plagues that swept through Europe during the fourteenth and seventeenth centuries. In the United States during the Civil War era, soldiers' medical records documented "nervous disease" (later known as "shell shock" and now "post-traumatic stress disorder") and injuries suffered in combat and infectious diseases contracted in the crowded, unsanitary military camps. Between 1892 and 1954, medical records were created for most of the 12 million immigrants who passed through Ellis Island, eager to begin their new lives in America. The record served as proof that the person had been deemed able-bodied and free of communicable diseases, such as tuberculosis and smallpox, which would have prompted quarantine or deportation.

Of course, medical records haven't always been used in the service of good ends. Nazi doctors often kept meticulous records on each "patient" forced to participate in their gruesome, cruel experiments. Between 1932 and 1972, researchers documented the signs, symptoms, and complications of syphilis in the records of hundreds of African-American men during the infamous Tuskegee syphilis experiment. The men were denied proper care and allowed to suffer long after penicillin was found to be a highly effective treatment for syphilis.

These researchers, fortunately, represent an exception to the generally high standards of conduct observed by members of the medical and scientific communities. Researchers studying HIV/AIDS, for example, have used retrospective (i.e., backward-looking) studies of medical records in several ways. First, they were able to confirm that HIV/AIDS was, in fact, a new infectious disease. Second, by studying who had contracted the disease (e.g., men who had sex with men, infants of infected mothers, and patients with hemophilia who had used contaminated blood products), they were able to determine how HIV is transmitted. Finally, they were able to track the spread of



## EASING THE TRANSITION 1-1

### Will e-Prescribing Solve the Problem of Medication Errors?

Doctors and bad handwriting go together like senators and lobbyists, cops and doughnuts, pop stars and rehab. But those uncrossed t's and scrawled numbers are more than just a cliché. Illegible handwriting is downright dangerous. An estimated 1.5 million medication errors occur each year, thousands of which can be attributed to sloppy script. Hesperan can be mistaken for Heparin, or Norcuron can look like Narcan. In fact, the manufacturer of the Alzheimer drug Reminyl changed the drug's name because two people died after being given the diabetes drug Amaryl.

The problem goes beyond drug names, though. Hurriedly written 2s can look like 7s, or 0s can resemble 6s, leading to dosage errors. Abbreviations are another source of peril. For example, the abbreviation "qhs" on a prescription, which means "taken at the hour of sleep (bedtime)," can look like "qhr," which means "taken every hour." Seven thousand deaths each year are attributable to these kinds of medication errors.

A number of solutions have been proposed for the problem. The Institute for Safe Medicine Practices (ISMP) publishes a continually updated list of sound-alike medications and a list of dangerous abbreviations, symbols, and dose designations, along with suggested alternatives. The ISMP recommends, for example, that "nightly" be substituted for "qhs." In addition, safety advocates urge prescribers to write a brief description of the diagnosis, such as "For Alzheimer," directly on the prescription as an additional cross-check for the pharmacist to confirm that he is dispensing the right medication. Patients, too, should take an active role in preventing errors by checking prescription labels, reading the leaflets or product inserts accompanying their prescriptions, and consulting with the pharmacist if the pills they're given are a different size, shape, or color from those previously dispensed for the same prescription.

But is e-prescribing (CPOE) the real solution to poor penmanship? The answer is a qualified yes. After all, typewritten drug names and dosages are always legible. The Veterans Administration, which has converted entirely to a system of EHRs, issues more than 230 million prescriptions a year and claims an accuracy rate of nearly 100%. The VA checks hospital patients' prescriptions against a bar code on their wristbands to make sure the drug being dispensed will not react adversely with the patient's other medications. Using built-in clinical decision support tools, the EHR system makes sure the drug is compatible with the patient's diagnosis. The system also produces automatic warnings if the dosage entered is beyond the range normally prescribed.

According to an annual survey on EHRs conducted by the American Academy of Family Practice, doctors are enthusiastic about e-prescribing, ranking it as one of the top five advantages of EHR systems. However, the e-prescribing function isn't foolproof. A recent study published in the *Journal of the American Medical Association (JAMA)* found that the use of EHRs actually facilitated 22 new kinds of prescribing errors unrelated to legibility. For instance, the prescriber can still click on the wrong medication when selecting from an alphabetical list, or he or she can choose, say, a tablet instead of the liquid formulation of a drug. Another kind of error occurred, the researchers found, when prescribers viewed a pharmacy inventory on the screen (indicating, for instance, that the 200 mg tablets of a given medication were in stock) and mistook it for prescribing guidelines that help doctors determine the customary dosage of a drug. Because it may take as many as 20 screens to view a single patient's medications, errors also occurred in failing to discontinue a previously prescribed drug when a replacement drug is ordered. A medication can even be prescribed to the wrong patient when one prescriber fails to log off the system at a shared computer terminal.

Nevertheless, the advantage of an electronic system over paper in reducing medication errors is undeniable. Even the aforementioned *JAMA* study concluded that EHR systems are less subject to error caused by sound-alike drug names and mistaken dosages. The report also concluded that the CPOE systems built in to EHRs are able to reduce underprescribing and overprescribing and can easily be linked to drug interaction warnings and clinical decision support systems that help ensure accuracy. Although we should be aware that e-prescribing is not a cure-all and has generated unexpected kinds of errors, we must acknowledge that it nevertheless represents a dramatic advance toward the goal of keeping patients safe.