As a pioneer of paperless systems, Duke University Health System (DUHS) has been digitizing medical records since the late 1980s. Having come together through mergers, however, its hospitals—Duke University Hospital, Duke Raleigh Hospital, and Durham Regional Hospital—initially used different electronic medical record (EMR) systems and could not easily share information.

Duke Health Technology Solutions (DHTS), led by Associate Chief Information Officer for Application Development Boyd Carlson, solved this problem in 2003 by adapting Duke University Hospital’s clinical data repository (CDR) to the entire DUHS enterprise. Working with a team of clinical, technical, and business staff, DHTS created a database containing a unique identifier for every patient in the hospital system and then built that master patient index into the health system’s front-end patient registration application. The team then organized and moved historical data from each hospital’s health information system into the CDR using the Health Level 7 version 2.x standard.

The result was an electronic clinical data repository (eCDR) that supports a rich variety of integrative applications. Today, the eCDR is DUHS’s computerized legal medical record. It documents every encounter patients have when they visit a Duke hospital or clinic, and contains clinical laboratory test results, patient demographics, pharmacy information, radiology reports, pathology reports, hospital admission dates, discharge dates, transfer dates, discharge summaries, and progress notes.

“Most wired” hospital

With 1.2 million outpatient encounters, 32,000 inpatient hospitalizations, and 80,000 emergency room visits per year, DUHS relies on the eCDR to store massive amounts of information in a way that is encoded, secure, and yet readily retrievable by Duke clinicians.

It is interfaced with more than 100 systems, including the radiology, laboratory, and ECG systems, as well as the computerized physician order entry (CPOE) application. The latter is an award-winning system that allows Duke clinicians to communicate treatment instructions over a computer network to departments and staff responsible for implementing those instructions, thus decreasing delays in order completion, reducing errors related to handwriting or transcription, allowing order entry at the point of care, and providing a mechanism for checking duplicate or incorrect drug doses or medical tests.

Authorized users can access the eCDR via eBrowser, a Web application that integrates all inpatient and outpatient treatments so that clinicians can view a seamless picture of their patients’ overall health. For instance, they can see laboratory result trends at the click of a mouse, view clinical guideline alerts and research updates, and retrieve data from the picture archiving and communication system, which digitally stores x-rays and CT scans.

By 2006, Duke was already one of the most wired hospitals in the world, with awards from the American Hospital Association, the National Alliance for Health Information Technology, and several other organizations. It had eBrowser, a renowned CPOE system, digital imaging, and a
Duke clinicians can view their patients’ full medical records at more than 1,000 patient information network stations in Duke’s hospitals and clinics, on any computer in the Duke hospital network, or by using a Virtual Private Network.

Data repository containing approximately 50 million clinical results and documents on more than 1.3 million patients. At that point, its major challenge was to bring all of these systems together to create a comprehensive EMR not just for its inpatients, but for patients seen at any of Duke’s 116 outpatient clinics.

**Ambulatory electronic medical record**

To meet this challenge, DHTS partnered with McKesson Corporation to co-develop and deploy an ambulatory electronic medical record (AEMR). The AEMR gives Duke clinicians access to a list of their patients’ medications, allergic reactions, and other information they need to safely prescribe new medicines no matter where they are seeing those patients: at a primary care physician’s office in Chapel Hill, at a hospital-based outpatient clinic in Durham, or at a specialist’s office in Raleigh.

Today, all Duke clinicians can view their patients’ full medical records by logging on to eBrowser at any of more than 1,000 patient information network stations deployed across Duke’s hospitals and clinics, on any computer in the DUHS network, or on any computer outside the network using their Virtual Private Network account.

In 2007, DUHS took clinical integration a step further by giving its patients their own specialized portal to the eCDR (see page 10). With a username and password, Duke patients can now log on to HealthView Portal—which pulls data from the data repository—to view laboratory test results, radiology test results, dictated notes, allergies, and vital signs; to refill prescriptions; and to schedule appointments.