COMPARISON OF DOCUMENTATION MODELS USED BY EMERGENCY PHYSICIANS IN A COMMUNITY HOSPITAL SETTING

by

Guyla Corbett Evans

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Director of Dissertation: Donna Kain, PhD

Major Department: English

Physician notes are a unique genre within a larger genre ecology of a hospital's emergency care department. As such, they mediate activities of medical care and may also be appropriated for other uses such as billing and representing the patient's identity for patient-centered care. These additional uses may exert pressure upon the genre/genre ecology and contribute to its evolution. This study examines four documentation models used at different times over a twenty-year period at a community hospital and describes some of the changes to the genre of the physician's note along with the concurrent changes to the tools used to produce it. The study results demonstrate how the use of the genre for billing purposes has resulted in an increase in the number documented elements that pertain to billing and coding practices; it further demonstrates that there is considerable variability among the models in terms of how physician documentation reflects the elements of patient-centered care, which include patient needs, preferences, and values; coordination and integration of care; information, education, and communication needs; physical comfort; emotional support; and involving family and friends in care. The study findings suggest that there is an opportunity to improve patient-centeredness as represented within the genre of the physician's note. Tools within the genre ecology to which the physician's note belongs have the power to facilitate the conversations that both physicians and

patients believe are important, thereby increasing the degree of patient-centeredness within the activity system of patient care. Technical and professional communicators are uniquely equipped to contribute their knowledge of genre and genre ecologies when electronic medical record system design and configuration decisions are being made in order to help assure that the genres used in health care lead to actions that benefit patients and practitioners.

COMPARISON OF DOCUMENTATION MODELS USED BY EMERGENCY PHYSICIANS IN A COMMUNITY HOSPITAL SETTING

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by

Guyla Corbett Evans

APPROVED BY:

DIRECTOR OF
DISSERTATION: _____
Donna Kain, PhD

COMMITTEE MEMBER: _____
Michael Albers, PhD

COMMITTEE MEMBER: _____
Michelle Eble, PhD

COMMITTEE MEMBER: _____
Robert Kulesher, PhD

INTERIM CHAIR OF THE DEPARTMENT
OF ENGLISH: _____
Donald Palumbo, PhD

DEAN OF THE
GRADUATE SCHOOL: _____
Paul J. Gemperline, PhD

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CHAPTER 1: INTRODUCTION

Electronic medical record systems have been in use in some hospitals for over twenty years. During that time, these systems have been used to capture information for billing, as well as to house documentation and test results from physicians, nurses, and ancillary service providers. Electronic medical record systems have been touted as money savers due to the potential to improve efficiency and make patient care safer; a 2005 publication by the RAND Corporation's Health Information Technology (HIT) Project team estimated potential cost savings of $81 billion annually through adoption of electronic record technology (Hillestad, Bigelow, Bower, Girosi, & al., 2005) . Recent legislation has provided incentives for adoption of such technology, ensuring that even more providers (whether hospitals, integrated delivery networks, or physician practices) will implement them (EHR incentive programs, 2013). With passage of the American Recovery and Reinvestment Act (ARRA) of 2009, and its component known as Health Information Technology for Economic and Clinical Health (HITECH), approximately $36 billion (HIMSS, 2009) in financial incentives are available, allocated primarily for providers who implement and "meaningfully use" electronic medical record systems (US Department of Health and Human Services, n. d.).

Concurrent with the surge in technology utilization within medical records is a backlash against the dehumanization of "patienthood." In recent years, there has been a renewed interest in placing the patient at the center of care, as evidenced by the Institute of Medicine's (IOM) landmark publication *Crossing the Quality Chasm*. The IOM defines patient-centered care as "providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions" *(Crossing the quality chasm: A new health system for the 21st century*, 2001). Recent legislative activity also supports this

perspective. The Patient Protection and Affordable Care Act of 2010 (ACA) lays out a national strategy for improving health care by making health care more patient-centered, reliable, accessible and safe, with financial incentives and penalties tied to specific quality measures that support the strategy (Fact Sheets, n. d.). In addition, the ACA mandates that for hospitals receiving payment from Medicare, the patient's experience of care is to be measured by a standardized survey: the Hospital Consumer Assessment of Healthcare Providers & Systems, known popularly by the acronym "HCAHPS" (CAHPS Hospital Survey, n. d.). The HCAHPS survey is significant in that it asks questions about how the "patient" is treated as a "person"– how often the patient is listened to, treated with respect, and has questions answered–and even addresses how clean and quiet the hospital environment is. The survey has some legislative "teeth," in that hospitals' performance on the HCAHPS survey also directly affects a portion of the Medicare reimbursement that those hospitals will receive (The Official Web Site for the Medicare and Medicaid Electronic Health Records (EHR) Program, 2012).

Hence, two different, yet related, kinds of activities are at play. As influenced by two significant pieces of legislation–ARRA and ACA–health care providers are implementing electronic medical record systems in large numbers, and there is a new emphasis upon patients as individuals. These two activities, both important, create a tension. On one hand, there is the move to ever-increasing use of technology to mediate the activities of health care, including the contents of the medical record. On the other hand, there is a desire to value the patient's humanity within the practice of those same activities. While today's health care takes advantage of the plethora of available instruments, test modalities, and computer databases, taking care of patients is still an essentially human activity that requires empathy and communication in order to succeed. From both of these perspectives, documents within the medical record are important;

of the myriad documents used in the activities of health care, the documents that carry the greatest weight are those produced by the patient's physician. Orders for medications and diagnostic tests, lists of problems, and plans for improving the patient's health are all recorded by the attending and consulting physicians and used by numerous parties both within and outside the health care organization. Physician-created documents direct the actions of nurses, technologists, and therapists; their contents are codified and associated with billing items; outside the hospital, their information may be reviewed by office staff, third-party payers, other physicians, and even attorneys. Production of these documents is frequently mediated by technology, which both influences and is influenced by the document content. At the same time, these same documents serve to create identities, both for their creators and their subjects. Because physician-created texts support vital functions within the context of health care, it is important to study them, and the field of technical communication is uniquely positioned to provide the necessary tools for such study.

This research attempts to examine such physician-created texts in light of how they serve the dual activities of billing and patient-centered care, using texts produced within a community hospital setting over a period of twenty years. Since the early 1990's, Nash General Hospital, an acute care, not-for-profit county hospital located in rural eastern North Carolina, has utilized electronic medical records (EMR's) that include physician-created texts. While a number of physician-created texts have been digitized and added to the EMR over the years at this facility, one particular subset of physician documentation—the physician's note—represents the greatest variety in terms of the models used for text creation; the physicians producing these texts also comprised the earliest adopters of computerized tools for producing documentation electronically. The physicians to whom I refer are the doctors who staff the hospital's emergency

department. Since 1992, these physicians have contributed their notes to the EMR using four distinct models for document creation. In this research, I examine each of the four models, which include

- Model 1: a dictated and transcribed narrative note uploaded into an integrated electronic medical record system (1992 – 2001)
- Model 2: a template-driven paper-based note, with template selection dependent upon presenting complaint; digitized following patient discharge (2001 – 2004)
- Model 3: a computer-generated, template-driven note produced using a best-of-breed emergency department documentation application; the resulting note was interfaced to an integrated electronic medical record system (2004 – 2011)
- Model 4: a computer-generated, template-driven note produced using an integrated electronic medical record system that includes emergency department documentation tools (2011 – present).

In this study, I examine sample records from each of the four note types in order to answer two specific research questions.

- The first focuses on one particular aspect of hospital operations: use of the emergency physician's note to support billing for services provided; more particularly, "How do the four models compare in terms of documented items that are utilized for billing?"
- The second question is tied to the perspective on patient-centeredness and asks, "How are the elements essential to "patient-centered care" addressed within the text of each model?" Patient-centered care may be understood as encompassing "compassion, empathy, and responsiveness to the needs, values, and expressed

> preferences of the individual patient." (Crossing the quality chasm: A new health system for the 21st century, 2001)

The availability of these varied models affords an opportunity to study them in order to observe how each one supports the instrumental functions, such as hospital financial operations, as well as also supporting the "softer" elements of patient-centered care, which include recognizing and respecting the individual and his or her needs, preferences, and values. The field of technical and professional communication affords the tools for such an analysis through its theoretical underpinnings. I will discuss some of these theoretical foundations in chapter 2.

Study Background

My interest in medical records, and the electronic medical record in particular, began in 1991 while I was employed as a clinical laboratory supervisor at Nash General Hospital. During that time, the parent organization, Nash Health Care System, decided to implement a system-wide electronic medical record, and interested employees were encouraged to apply for a handful of clinical analyst positions. I had participated in the implementation of a laboratory information system at Nash that went "live" in 1984 and was fascinated by the technology; I applied for and received a slot on the implementation team. The original "install team" was conceptualized as a two-year, temporary assignment, after which the clinical team members would return to their original departments; however, it was quickly apparent that the clinical analysts would be needed on an ongoing basis to manage and maintain the system once it was fully installed. From this almost "accidental" beginning, I have now had a career in clinical information systems for over two decades, supporting a variety of clinical departments and diverse systems; consequently, I have the unique perspective of having been a part of the evolution of the electronic medical

record at the health care system from its beginnings up until my retirement in late 2014. Through this experience, I have been positioned to observe how emergency physician notes have evolved at Nash. In the following section, I provide background information on the history of the health care system and how its electronic medical record has evolved, as well as providing detailed information on each of the four documentation models that I examine in this research. I also provide a historical overview of how medical records as a whole developed over time in order to provide context and demonstrate some of the healthcare functions that the modern record supports.

Health care industry insiders recognize that in addition to the term "electronic medical record," or EMR, there is a second term now in use—"electronic health record," or EHR. Purists tend to use EMR to refer to medical record systems that are typically not interoperable; they exist in digital format, often created by imaging paper forms; and they do not lend themselves to sharing information outside of the walls of the institution where they are created. EHR's, in contrast, are designed to facilitate patient information moving with the patient from one venue of care to another. In this way, EHR's are characterized by their interoperability (Garrett & Seidman, 2011). Throughout this paper, I use the term "electronic medical record" for the sake of consistency; however the system used to produce the fourth documentation model is characterized as an EHR due to the types of data interchange it supports.

A Brief History of Nash Health Care Systems (NHCS)

The research in this dissertation was carried out using sample documents drawn from the electronic medical records of Nash Health Care Systems (NHCS), a county health care system comprised of three separate corporate entities: Nash Hospitals, Inc. (NHI), Nash Management

Services Organization (NMSO), and Nash Medical Development Authority (NMDA). Of these three entities, NHI is of primary interest. It is composed of four distinct hospitals on a single campus located in the city of Rocky Mount in Nash County. The flagship facility, Nash General Hospital, first opened its doors to patients in 1971. It essentially replaced the four smaller hospitals that previously existed in Rocky Mount, which included Memorial Hospital, Park View Hospital, Rocky Mount Sanitarium, and Seaboard Coastline Hospital. Nash General Hospital is a 282-bed acute care hospital. An outpatient surgery center (Nash Day Hospital) was added in 1984; a 50-bed inpatient psychiatric facility (Coastal Plain Hospital) joined the Nash family in 1996. Rounding out the group of four is a 23-bed inpatient rehabilitation hospital (Bryant T. Aldridge Rehabilitation Center), which admitted its first patients in 1999 (NHCS).

NMSO owns three physician practices; NMDA leases space to a long term acute care facility (property acquired in 1997) as well as leasing office space to physicians on both the NHCS main campus and two secondary campuses (NHCS). The health system's operating revenue for the final year of the current study, fiscal year 2012, was $219,897,003 (2012 Annual Report).

Currently, NHCS is one of the few hospitals in eastern North Carolina that has not been absorbed by a larger health care system, historically maintaining its autonomy on the strength of its financial position. In recent years, with the changing economic climate in the region and with increasing financial pressures from measures to contain health care costs, the system has sought partnerships with the neighboring systems in order to provide advanced services to patients locally. These partnerships allow the health system to provide cardiac care services, including on-site percutaneous coronary intervention (stents) for selected, carefully screened patients with off-site surgical backup; neonatal intensive care services; and cancer treatment services. In

addition to the partnerships for patient services, the health system has signed a management services agreement with UNC Hospitals, a large integrated delivery network. This arrangement became effective during the second quarter of 2014, with the intention of leveraging the resources and knowledge available from the UNC system in order to improve financial performance and quality of care.

The health system has recently expanded its emergency and cardiac care departments with new construction; a new emergency care center opened in 2014 and features a separate pediatric emergency department. The same year also saw the opening of a new heart center, which houses a chest pain observation unit, a cardiac intensive care unit, and a new state-of-the-art cardiac catheterization suite. Expansion of the campus central energy plant was undertaken concurrently with the other building projects in order to support the energy needs of the new buildings. A new Women's Center is slated for construction in a subsequent project.

Historically, the health system is known for many significant "firsts." When Nash General Hospital opened in 1971, it was the first all-private room hospital in the state; Nash Day Hospital was likewise one of the first free-standing ambulatory care centers to open (NHCS). The health system boasts the only parking deck in the county as well. Beyond its bricks-and-mortar innovations, the system also pioneered integrated electronic medical record (EMR) systems in the early 1990's. It is within this context of innovation and technological advancement that electronic medical record (EMR) development has taken place.

Evolution of an Electronic Medical Record

In order to understand how the four documentation models represented in this study came about, it is helpful to review the evolution of the electronic health record at NHCS. For most of NHCS's history, the health system was under the leadership of a single individual. Mr. Bryant

Aldridge's first role with the health system was overseeing the construction of the new county hospital building, which opened its doors in 1971. Upon opening, Aldridge became its first CEO, a position he retained until 1998. In 1990, Aldridge presented his strategic plan for information technology to the hospital's Board of Directors. At that time, the health system had computerization for order entry, patient accounting, and an interfaced laboratory information system – but little else. The visionary CEO had a bold plan for the organization – a fully integrated electronic medical record that would be used in every department and venue of care in the organization. A search committee was formed, requests for proposals were sent out and received, and the selection process was narrowed to three vendors – among whom the selection committee was equally deadlocked. Aldridge cast the deciding vote and selected the vendor. Implementation began in 1991 with a small interdisciplinary team of clinical and allied health professionals, who expected to be assigned to the project for a maximum of two years. The "install team," as they came to be known, worked side by side with analysts from the vendor to customize the software to NHCS's specifications. The vendor's implementation methodology at the time included little pre-configured content; all data entry screens, workflows, and documentation had to be customized to the health system's desires.

The two-year timeframe for system implementation proved to be naïve, but a year after the implementation began, the first modules of the system were brought "live." By 1999, most areas were using at least some features of the EMR, although there were shortcomings in what the product could offer within the Surgery and Emergency Care environments. While the system did afford the Emergency Department a large electronic tracking board (which replaced the handwritten grease boards used to keep up with patient locations prior to computerization), there were no specialized tools for emergency documentation. Physicians who saw patients in the

Emergency Department dictated their notes, which were subsequently transcribed and uploaded into the electronic record. The resulting entry was stored as a "text blob" rather than as specific data fields, which meant that data mining was impractical. The only significant additions to the product were a modernization of the user interface in 2003 (Evans, 2004) and a move toward increasingly computerizing the medication administration process, first through a computer-generated paper medication administration record (MAR) in 2006 (Evans, 2006) and an eventual transition to an electronic MAR (eMAR) in 2008 (Evans, 2008). During this relatively stagnant period, there was a philosophical shift away from the single system, fully integrated model that had been originally conceived. Fragmentation of the record began with adoption of a paper-based template system for use by Emergency physicians beginning in 2001 (Evans, 2004); within a few years, best-of-breed applications were brought on-line, starting with an Emergency Department (ED) niche system that went "live" in 2004 (Evans, 2004). While this application served the ED well, it required multiple interfaces to pass registration data, orders, and results back and forth between the primary EMR system and the ED application. Further complicating the landscape was an interface limitation. Crucial information such as medications and allergies could not be interfaced, leading to duplicate documentation and potential for error.

Imaging systems were the next major additions; in 2005, a PACS (Picture Archiving and Communication System) application was added to house digital diagnostic Radiology images, (Digital imaging at Nash Health Care Systems transforms traditional x-rays, 2005) and in 2008 a medical records imaging solution was also added (Evans, 2008). This completed the digitization of the patient record, as all remaining paper documents from the record would now be scanned and retained as images.

While adding these niche systems provided the health system with additional functionality, now patient data was spread across multiple repositories. In addition, the primary EMR vendor suffered a string of mergers and buyouts, leading to a chaotic development path for several years. By 2009, it was increasingly clear to both the leadership and the staff of NHCS that changes had to be made; a search for a new EMR vendor commenced. Following rounds of requests for proposals, sales presentations, and site visits, the hospital selected its new vendor. The winning system featured a fully integrated database that supported both images, text, and structured data, as well as including specialized modules for Surgery and the Emergency Department. An aggressive eighteen-month implementation commenced in January of 2010, (Evans, 2010) and in June of 2011 the health system transitioned to the new EMR platform; intraoperative anesthesia documentation followed in 2012. Figure 1.1 summarizes the implementation timetable as well as the "documentation model" in use, which I discuss in the following section.

Model 1	1992	• Patient Registration and Admit/Discharge/Transfer Information • Order Entry • Radiology Results Documentation & Charge Capture • Laboratory Results Documentation & Charge Capture • Pharmacy Charge Capture • Financial System Interface (patient accounting)
	1993	• Physician Dictation (all except progress notes) • Special Medicine Documentation & Charge Capture (Respiratory Therapy, EKG, Cardiovascular testing)
	1994	• Clinical Dietitian Documentation • Patient & Family Services Documentation • Rehabilitation Services Documentation & Charge Capture

	1995	• Nursing Assessments and Care Plans • Anatomic Pathology (including data conversion from legacy system) • AMSO Physician Office Laboratory Results
	1996	• Nursing Interventions (including Tubes & Drains)
	1997	• Speech & Hearing Services Documentation & Charge Capture
	1998	• Fetal Monitoring Application
	1999	• Inpatient Rehabilitation Documentation (Nursing & Therapies) & Charge Capture
Model 2	2001	• *Paper Template Documentation System implemented in Emergency Department; digitized following patient discharge*
	2003	• Upgrade to Graphical User Interface (replaced original menu-driven client application) • New Patient Accounting system installed; new financial interface
Model 3	2004	• Implementation of best-of-breed Emergency Department system; bidirectional interface to main hospital system
	2005	• Implementation of Picture Archiving and Communication System (PACS) for digital Radiology • Implementation of Physician Personal Digital Assistant application with interface to main hospital system
	2006	• Computer-generated Medication Administration Record (CG-MAR) implemented

	2008	• Electronic Medication Administration Record (E-MAR) implemented • Document Imaging System implemented with interface to main hospital system
	2009	• Decision made to replace legacy computerized electronic medical record system and interfaced departmental systems with single system solution
	2010	• Implementation process begins to replace all legacy application functionality
Model 4	2011	• New system implemented, including data conversion (full MPI; two years' worth of encounters, laboratory, radiology, and HIM imaging results; blood bank and mammography data from 1992 to cutover); Emergency Department, HIM Imaging, and Fetal Monitoring systems all replaced with the new vendor's integrated solution • Computerized Provider Order Entry (CPOE) implemented
	2012	• Anesthesia documentation implemented • Legacy EHR data converted to archive imaging application

Figure 1.1: Implementation Timetable

Four Documentation Models

The evolution of the electronic medical record at Nash resulted in four unique models for documentation by Emergency physicians which I briefly describe here. In Chapter 4, I discuss each type of record in more detail, provide examples and illustrations, and analyze the ways each model mediates health-care-related activities and functions as part of patient-centered practice.

In 1992 when the first electronic medical record system was implemented, narrative notes spoken by physicians into dictation systems represented the "state of the art." The recorded notes were subsequently typed into a computerized dictation system by transcriptionists and then

uploaded into the EMR by means of a foreign system interface. (This type of interface refers to the processes of data communication that allow information from one computer system to be transmitted to and stored in another.)

As patient volumes increased, the emergency physicians saw a need for greater efficiency in capturing the information needed to treat patients and also to support medical coding and billing. In 2001 they adopted a second documentation model—a paper-based template system (Evans, 2004). This commercially-developed system allowed the physicians to select from an assortment of forms, organized by presenting complaint. While the physicians in the Emergency Department liked the speed and efficiency of the templates, others viewed adoption of the paper template forms as a step backward. However, the popularity of the paper template system with the emergency physicians laid the groundwork for the next evolution in their recordkeeping. By this time, "niche" electronic medical record systems created specifically for emergency departments were starting to emerge, and the hospital adopted one of these systems in 2004 (Evans, 2004). This third model provided the emergency department with specific content as the preceding model had, but since it was electronic, it permitted the interchange of data with the hospital's other information systems.

The fourth and final model came about with a substantial change to the hospital's information landscape. In 2011, the hospital implemented a new electronic medical record application that offered new features and greater integration due to its single database that stored information from all of the application's various departmental modules. The ability to provide seamless integration between the emergency department and the rest of the hospital proved to be one of the deciding factors in the new system's selection.

Background of Medical Records

I have briefly described how electronic medical record systems evolved at the subject institution, and how the four note types under study developed through the years. However, in order to understand the role of the physician's note within the dual perspectives of health care financial operations and patient-centeredness, it is helpful to explore the history of the medical record. Through this exploration, I identify some of the purposes that the medical record has served, some of the ways in which it has evolved over time, and some of the external influences that have shaped its development. I show that the record has been shaped by a variety of audiences and writers with different, but convergent, agendas.

Medical records have a lengthy history, dating back at least to the ancient Egyptians. The practice of recording information about patients and treatments continued during the classical period, as Hippocrates and others recorded case histories. In the medieval period, Islamic physicians maintained records as well. The common thread uniting the records across the centuries was the purpose for which they were maintained–primarily for didactic, or teaching, purposes (Gillum, 2013).

By the early modern period in Europe, the medical record had expanded to encompass additional functions. Records served the accounting functions of documenting treatments provided and payments owed and received. Also during this time period, scientists were recording their observations of the natural world; the medical practitioners did the same. In the decades after 1750 or so, hospitals in England adopted the practice of keeping "case records" (History of medical record-keeping, 2011). Across the Atlantic, evolution of the medical record in the United States took a similar path. Looking at records kept by hospitals in the state of New

York gives us some insight into what was being recorded, and to what purposes those records served. For instance, in 1793, New York hospitals kept records of admissions and discharges so that reports could be made to the state legislature, at least in part to justify expenses. By the early 1800's, the concept of recording cases for the purpose of education had come back into favor. Throughout the nineteenth century, cases were recorded, but there were no commonly accepted standards for documentation so the contents could vary widely (Siegler, 2010). "Patient based" documentation schema were, however, beginning to emerge; Florence Nightingale was known to have had patient-based documentation at her disposal during the Crimean war (Slater, 2007). Efforts at standardization were evident by the turn of the century, with the adoption of forms for data capture (Siegler, 2010). In 1907, Dr. Henry Plummer, a physician at the Mayo Clinic, grew frustrated with the inability to locate information about patients' previous hospital care in the chronologically arranged logbooks. He obtained permission from Dr. William Mayo to develop a new method for storing records so that they would be readily accessible for the purposes of patient care and teaching. His system borrowed from the efficiency models popular with business and industry at the time. In Dr. Plummer's "dossier model," each patient who came to the clinic was assigned a number; all records were collated, indexed, and stored in an envelope identified by the number; and the envelopes were then stored in a central repository. This model became the foundation for how medical records are maintained today (Camp, 2008).

Just a few years later, in 1910, a Dr. Ernest Codman shared an idea he had with a colleague, Dr. Edward Martin. Dr. Codman's idea was to organize hospitals so that treatments could be evaluated for effectiveness, and so that ineffective treatments could be identified in order to prevent future failures. Dr. Martin saw the merit in Dr. Codman's idea, and at a surgeons' conference in 1912 submitted a proposal that ultimately led to the formation of the

American College of Surgeons (ACOS). The ACOS from its inception worked to improve hospital quality, and by 1919 had created a set of guidelines called the "Minimum Standard." The Minimum Standard addressed educational standards and governance for physicians practicing in hospitals, as well as requiring competent diagnostic laboratory and radiological services – all important components of high quality hospital care (Roberts, Coale, & Redman, 1987). Additionally, the Minimum Standard also delineated the elements to be captured in the medical record. Roberts, Coale, and Redman quote the following from the 1924 *Bulletin of the American College of Surgeons* (volume 8, number 4):

> That accurate and complete records be written for all patients and filed in an accessible manner in the hospital—a complete case record being one which includes identification data; complaint; personal and family history; history of present illness; physical examination; special examinations, such as consultations, clinical laboratory, X-ray and other examinations; provisional or working diagnosis; medical or surgical treatment; gross and microscopical pathological findings; progress notes; final diagnosis; condition on discharge; follow-up and, in case of death, autopsy findings. (Roberts, Coale, & Redman, 1987)

Participation in the "Hospital Standardization Program," as it came to be called, was voluntary, but hospitals quickly embraced the standards that ACOS set. By 1950, the accreditation program had become too large an endeavor for the ACOS to manage alone. In 1951, the ACOS joined forces with the American College of Physicians, the American Hospital Association, the American Medical Association, and the Canadian Medical Association to create a body that would oversee hospital standards, and the Joint Commission on Accreditation of Hospitals (JCAH) was born, although the Canadian Medical Association would leave in 1959 in order to participate in Canada's own hospital accreditation organization (Roberts, Coale, & Redman, 1987). JCAH changed its name in 1987 to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), reflecting its expanded scope of operations; it would rebrand itself

again in 2007, to be simply called “The Joint Commission” (TJC) (The joint commission history, 2013).

In 1965, Title XVIII of the Social Security Act was enacted, creating the government-sponsored health insurance program known as Medicare. Originally providing coverage for individuals aged 65 and over, the program was expanded in 1973 to include benefits for younger individuals with particular diagnoses (Hoffman, Klees, & Curtis, 2004). “Conditions of Participation” were enacted which mirrored the JCAH “Minimum Standard,” and hospitals accredited by JCAH were “deemed” to be in compliance (Lohr, 1990). With this action, the diverse roles of the record in mediating the care of the patient, contributing to high quality care, and satisfying requirements for billing began to converge.

While the Medicaid program (which provides healthcare benefits to low income persons) was signed into law at the same time as Medicare, it was administered separately until 1977. In that year, the Health Care Financing Administration was formed to manage both Medicare and Medicaid (Key Milestones in CMS Programs, n. d.); the name was changed to the Centers for Medicare and Medicaid Services (CMS) in 2001 (Program Memorandum, 2001).

As both CMS and TJC evolved over time, so did their standards. Currently, the CMS Conditions of Participation (CoP’s) are found in part 482 of Title 42 of the Code of Federal Regulations; section 24 is devoted entirely to the medical record. This section of the CoP’s addresses record administration, retention, and confidentiality as well as the content of the record itself. The full content of section 24 is reproduced in Appendix B (Electronic Code of Federal Regulations - 42CFR482.24, 2013).

Like CMS, TJC also includes standards regarding the content of the medical record. The TJC standards are relatively broad, with specific “elements of performance” provided for each

standard that further clarify the expectations for compliance. The Information Management standards address how the hospital plans for information management; how privacy of health information is protected; how patient information is captured, stored, and retrieved; how knowledge-based information is made available; and how the processes for maintaining the accuracy and integrity of the record are carried out. Sample standards and elements of performance are reproduced in Appendix C (The Joint Commission, 2011).

Over time, the medical record became increasingly important as a tool to support billing for physicians' services. CMS published guidelines in 1995, and again in 1997, that set forth the documentation requirements for levels of evaluation and management (E/M). These guidelines take the general content of medical records seen in the CoP's to a much greater level of detail, stipulating the components that must be present in the documentation in order to support billing at a particular service level. Patient histories and examinations are grouped into four categories: problem focused, expanded problem focused, detailed, or comprehensive. The patient history may include a chief complaint, history of present illness, review of systems, and past medical, family, and/or social histories; the number and complexity of these elements determines the category. Likewise, the examination may include a number of body systems, with multiple elements examined for each body system. As with the patient history, the number of body systems and elements examined determine the category. Evaluating the complexity of medical decision-making completes the documentation process. For a more detailed explanation along with examples, refer to the "1997 Documentation Guidelines for Evaluation and Management Services" found in Appendix D (Documentation Guidelines For Evaluation & Management Services, Center For Medicare and Medicaid Services, 2012).

Concurrent with the evolution of the medical record itself was the evolution of a professional organization concerned with ensuring its quality. I have already discussed the role of ACOS in the development of hospital standards; however, this body was also important to the development of standards for the medical record itself. ACOS created the Association of Record Librarians of North America (ARLNA) in 1928 (AHIMA), just nine years after creating the "Minimum Standard (Roberts, Coale, & Redman, 1987)." The organization's name would change several times over the decades, becoming the American Association of Medical Record Librarians (AAMRL) in 1938, the American Medical Record Association (AMRA) in 1970, and the American Health Information Management Association (AHIMA) in 1991—the name by which the organization is known today. This most recent name change recognizes the progression of the medical record beyond its paper beginnings and reflects the "expanded scope of clinical data beyond the single hospital medical record to health information comprising the entire continuum of care (AHIMA)."

Accreditation standards and billing are not the only concerns pertinent to the medical record. As seen in its early history, medical records were first created to serve the needs of physicians. While the regulatory agencies were influencing the content of the medical record, practicing physicians also had contributions to make; one particularly influential contributor is Dr. Lawrence Weed. In 1968, Dr. Weed published an article in the New England Journal of Medicine advocating a patient record that systematically addressed the patient's medical problems, as well as the use of flow sheets to represent changes in objective data over time (Weed, Medical Records that Guide and Teach, 1968). This approach would become known as the "problem-oriented medical record," or POMR (Weed, 1983). Dr. Weed theorized that a more systematic approach to recordkeeping would help to organize the physician's thoughts, assisting

him or her in drawing the proper conclusions, asking the proper questions of the patient, and making sure that any necessary screening tests were scheduled at an appropriate time (Slater, 2007). He also created a heuristic to help other physicians follow his proposed methodology–the "SOAP" note. "SOAP" is an acronym for "subjective," "objective," "assessment," and "plan" (Weed, 1983). Both the POMR and the SOAP note would become widely adopted (Slater, 2007). In a bold move that was far ahead of the technology of the day, Dr. Weed anticipated the possibility of using computerization to manage patient data, as well as for integrating data across the various health care disciplines (Weed, Medical Records that Guide and Teach (concluded), 1968). His vision is still in the process of being fully realized, as many modern medical records are a hybrid, with charts arranged in a combination of source-based and problem-based formats; however, physician documentation now seems to largely follow the format originally proposed by Dr. Weed.

Yet another role that medical records serve is that of capturing statistical information about diseases in populations. As the Black Death ravaged Europe in the seventeenth century, parish clerks began recording causes of death. Londoners in 1629 were able to purchase copies of the "Bills of Mortality" in order to learn which parts of the city had the greatest number of fatal cases. The Bills were ultimately organized into sixty categories of diseases, representing an early effort at statistical analysis. Over the next hundred and fifty years, new classification schemes were developed, moving from a focus on causes of death to diseases in general. By the mid-1800's, England had its first medical statistician. Dr. William Farr built on the classification work of others to standardize the approach and terminology, as well as adding additional information that he believed had a bearing on causes of death, such as a person's occupation. Dr. Farr is perhaps most famous for his association of cholera cases to the patients' source of

drinking water during a London cholera epidemic in 1866. Even before this groundbreaking event, Farr's work was recognized by the international community. The International Statistical Congress (ISC) requested that Farr develop a classification scheme for their consideration. He presented a scheme based on anatomical site that was first adopted in 1864. This original work had four subsequent revisions; after Farr's death in 1883, Farr's counterpart in Paris, Jacques Bertillon, took on the task of continuing the work Farr had begun. The "Bertillon Classification," as it became known, was adopted by the ISC in 1893, and by 1900, twenty-six countries (including the American Public Health Association) had placed it into use. The Bertillon Classification also experienced revisions over the next twenty years. After Bertillon died in 1922, there was a move to expand the classification scheme beyond causes of death (mortality) to include causes of illness (morbidity). In 1949, the World Health Organization (WHO) produced a coding system called the "Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death," abbreviated simply as "ICD." The ICD system has had ten revisions to date; starting with the eighth revision, the United States has customized the international version. The current version in use in the US is known as "ICD-9-CM," with CM standing for "clinical modification" (Aalseth, 2006). Expectations were that the latest version, ICD-10-CM, would be implemented in October of 2014; however, the "Protecting Access to Medicaid Act of 2014" has delayed implementation by a year (ICD-10, 2014). ICD-10-CM significantly increases the number of codes, and also expands the codes themselves from four-digit numeric values to alphanumeric values whose lengths range from four to six digits (Aalseth, 2006). The use of ICD-9-CM (and eventually, ICD-10-CM) is significant, as private insurers and government programs such as Medicare and Medicaid require information about a patient's diagnosis in order to process a claim for payment. Claims for which the care provided

does not correlate to the patient's diagnosis are rejected. These payers require that the diagnosis be provided in a standardized format; hence, the use of ICD-9-CM codes (Aalseth, 2006).

As the role of the medical record has evolved, so has its format. Records that were once kept on paper are now housed in electronic databases in a variety of forms – from discrete data elements to text documents to scanned images, as well as multimedia files that range from digital x-ray images, sound files, or even full-motion video captured by an endoscope during an invasive procedure; also incorporated into the record are codes used to support billing, such as ICD-9-CM.

Notes in Context

Today, physician documentation serves many needs for many audiences. From a medical standpoint, physician documentation currently follows a model that has not changed significantly from what was proposed by Dr. Lawrence Weed in the late 1960's. However, as I have noted, there are additional drivers for physician documentation. The texts that doctors and other licensed independent practitioners (such as physician assistants, nurse practitioners, and midwives) produce also support activities that are financial in nature; insurance companies and governmental payers require justification within the medical record for claims submitted for payment. Regulatory agencies also exert an influence, defining what sorts of information should be included in the medical record.

It follows logically that the combination of medical, financial, and regulatory influences affect physician-produced texts. Additionally, in recent years, the adequacy of the problem-oriented/financially driven record has been called into question. In 2001, the landmark publication *Crossing the Quality Chasm* was produced by the Institute of Medicine (IOM),

operating under the auspices of the National Academy of Sciences. In this follow-up to 1999's *To Err is Human,* the IOM set out to delineate ways that facilities could focus "more broadly on how the health care delivery system can be designed to innovate and improve care" (*Crossing the quality chasm: A new health system for the 21st century*, 2001). The IOM's recommendations state that patient care should meet six criteria. It should be safe, effective, patient-centered, timely, efficient, and equitable *(Crossing the quality chasm: A new health system for the 21st century*, 2001). For purposes of this study, I focus on item three: patient-centered care. Patient-centered care is defined as follows:

> This aim focuses on the patient's experience of illness and health care and on the systems that work or fail to work to meet individual patients' needs. Similar terms are person-centered, consumer-centered, personalize, and individualized. Like these terms, patient-centered encompasses qualities of compassion, empathy, and responsiveness to the needs, values, and expressed preferences of the individual patient. *(Crossing the quality chasm: A new health system for the 21st century*, 2001)

Dr. David Berwick, who was part of the IOM contingent that drafted *Crossing the Quality Chasm*, offers an even more detailed definition:

> The experience (to the extent the informed, individual patient desires it) of transparency, individualization, recognition, respect, dignity, and choice in all matters, without exception, related to one's person, circumstances, and relationships in health care. (Berwick, 2009)

Because of ARRA and ACA, health care providers are implementing electronic medical record systems in large numbers, and there is a new emphasis on patients as people rather than as "diseases," "cases," or "diagnoses." Hospitals have many commercially available electronic medical record systems from which to choose, designed to support the problem-oriented approach to medical care as well as the intricacies of medical billing. But are these record systems fulfilling their potential? And will they support the evolution of health care into

something that respects the patient as an individual? How might we examine our systems in order to know? And if our systems are weighed in the balance and found wanting, so to speak, how might we change them in the future so that they support the outcomes that we desire? These questions, and others like them, underscore the need for research. The two research questions addressed by this study attempt to provide at least some answers.

The field of technical communication provides a theoretical framework from which to begin analyzing physician notes within the context of the electronic medical record in a hospital setting. Health care within this venue is a complex collection of practitioners and their specialized tools. They perform coordinated actions to arrive at a proper diagnosis, devise an appropriate treatment plan, and execute that plan in order to restore patients to the best possible state of health and facilitate their exit from hospital care. Physicians with various specialties, nurses, allied health practitioners, and non-medical personnel (such as registration and billing staff, environmental services personnel, and staff in supporting departments like purchasing, food service, information systems, and plant maintenance) all interact in a variety of ways in order to provide patients with the services they need. Practitioners in these varied communities fall into at least two broad groups–those who engage in the discourse of medicine (individuals whose primary responsibilities involve some type of patient care), and those who engage in the discourse of business (individuals whose primary responsibilities include financial and operational concerns).

With this distinction in mind, I conceptualize the physician note as a boundary object between and among the discourses of medicine and business; by looking a bit deeper, I find that even within the general sphere of "medicine" there are varied discourse communities serving a variety of subspecialties (physicians, nurses, and ancillary practitioners of many kinds), all of

which also have boundaries to be set and crossed. In the next chapter of this work, I explore the literature within the discipline of technical and professional communication in order to see some of the ways that researchers within the discipline have considered medical records. In chapter three, I describe the methodology used for the current study, and present my results in chapter four. In the fifth and final chapter, I discuss the results in terms of what the data reveals, and how these findings may be used by technical and professional communicators and others.

CHAPTER 2: SITUATING LITERATURE

The field of technical and professional communication has considered medical records, and several researchers have examined them using a variety of viewpoints. Over the next few pages, I review some of the ways in which the discipline of technical and professional communication has approached the medical record and build a foundation for where my research fits within the existing literature.

Medical Records as Boundary Objects

Electronic medical records arguably open the door to a greater degree of boundary mediation than paper records because discrete data stored in a highly accessible database allow clinicians of all kinds access to information across disciplinary lines. EMR systems have the capability of adjusting filters and views to make certain types of data easier to locate and also possess the ability to use artificial intelligence to facilitate actions based on "rules" (Popham, 2005). An additional affordance of modern electronic medical record systems is that they not only allow access to information across disciplinary lines, but they often have the capacity to combine data in new ways in order to create interdisciplinary views for specific audiences that may not be possible or practical in the paper record environment.

Now, many healthcare organizations are expanding access to their records to the patients who are the subjects of those same records. This creates a situation in which the record performs a significant role as a boundary object between and among yet another line of discourse—that of social/interpersonal discourse with its attendant concept of patient-centeredness. As health care organizations move forward into compliance with ARRA's Meaningful Use requirements, many health care organizations are creating "patient portals," which give patients internet-based access

to selected portions of their own electronic medical records (Stage 2 Eligible Hospitals and Critical Access Hospitals (CAH) Meaningful Use Core and Menu Objectives, 2012). These secure websites provide patients with ready access to information that in the past has been sequestered within the walls of Health Information Management (HIM) departments. While patients have always had the right to view their records, exercising this right typically involved visiting the HIM department; acquiring a paper copy of the record (or relevant portions) generally had associated costs. Patient portals allow patients to create a user account and password and then access the available portal data at any time via the internet. Portal data often consists of laboratory and diagnostic imaging results, as well as encounter summaries for hospital visits. For many physicians, such unprecedented access to data by patients has opened up previously unheard-of concerns: that patients may get their test results before the attending physician (the physician caring for the patient) has a chance to review them, or that patients may misunderstand information presented. The impact of this new information availability may not be seen until patient portal utilization reaches a tipping point; however, one might surmise that portals certainly have the potential to affect the dynamic between patient and physician.

Medical Records, Power Relationships, and Identity Construction

The new focus on patient-centeredness is producing changes that also have the potential to alter power relationships within health care. As Segal (2005) notes, for the last two hundred years or so, power in health care has been situated squarely with the physician, with patients represented largely in terms of their disease process. However, patient portal technology equips patients with additional information about their own health conditions; instruments such as the

HCAHPS survey serve to give voice to patients who might otherwise be silenced by science and technology, and the ACA guarantees that their voices will be heard.

Electronic medical records also afford the opportunity to examine ways in which patient's identities are constructed, including how their needs, values, and preferences are represented within texts like the physician's note. Gee (2011) theorizes that human beings "build things" through the use of language, including the ways that we make particular concepts or items significant, cause specific practices to be enacted, create relationships, and distribute social goods, among others. These "building tasks" support the physician's construction of the patient as a person who has a variety of needs, some of which may be related to a disease process or medical problem, but may extend to the social realm as well; likewise, the patient has values and preferences that are sociocultural in nature which may be represented within the note (Gee, 2011).

Medical Records in Activity Systems

A hospital emergency department can be conceptualized as a complex activity system in which the physician's note influences behavior and is itself influenced by a number of factors. According to Engestrom (1999), in an activity system, the subject and object of activity influence and are influenced by mediating artifacts, the communities which participate in the activity, the rules which constrain the activity, and the ways by which labor is divided among the participants. All of these tensions affect the production of an outcome. In addition, the interactions that take place as part of the activity system are not necessarily linear; they may be subject to innovation, and even to failure (Engestrom, 1999). The interactions between the components of an activity system are represented graphically in Figure 2.1.

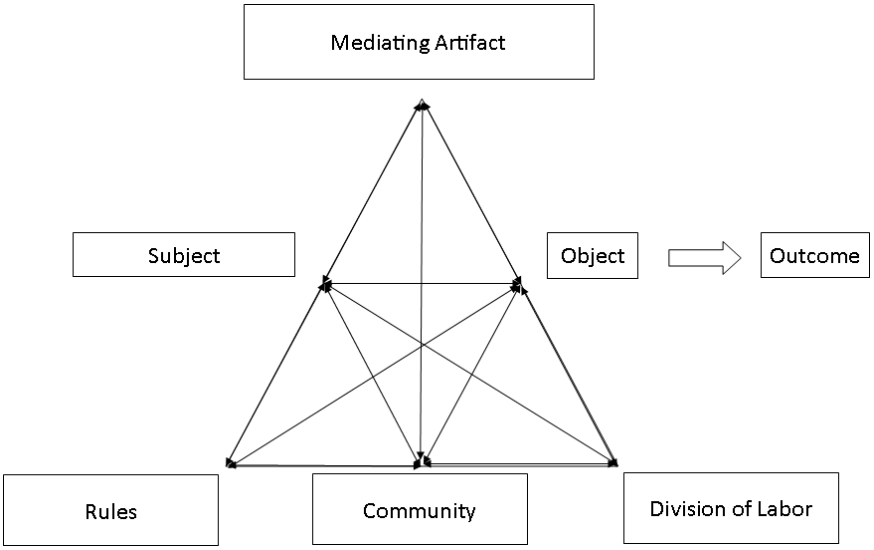


Figure 2.1: Components of an Activity System

One hallmark of the medical record is that it records actions – and the actions of the patient's physician are the primary force in causing other actions to be taken. With this concept in mind, we can begin thinking about a medical record and its component parts as a unit within an activity system. Using Engestrom's model of a complex activity system as a basis for representation, we might construct a system in which a physician is the "subject," a patient is the "object," and the change in status from illness to improved health is the "outcome." A physician's individual actions are connected to the collective activity of patient care, with the physician's note serving as a mediating artifact. The situation in which the note is produced is governed by numerous rules (billing requirements, best practice guidelines, accreditation standards, and the like); the actions take place in a particular community (which can be understood narrowly as the hospital at which the care activities are taking place) with a particular division of labor (role-based actions governed by the disciplines to which the various caregivers belong) (Engestrom, 1999). The resulting activity system is represented graphically in Figure 2.2.

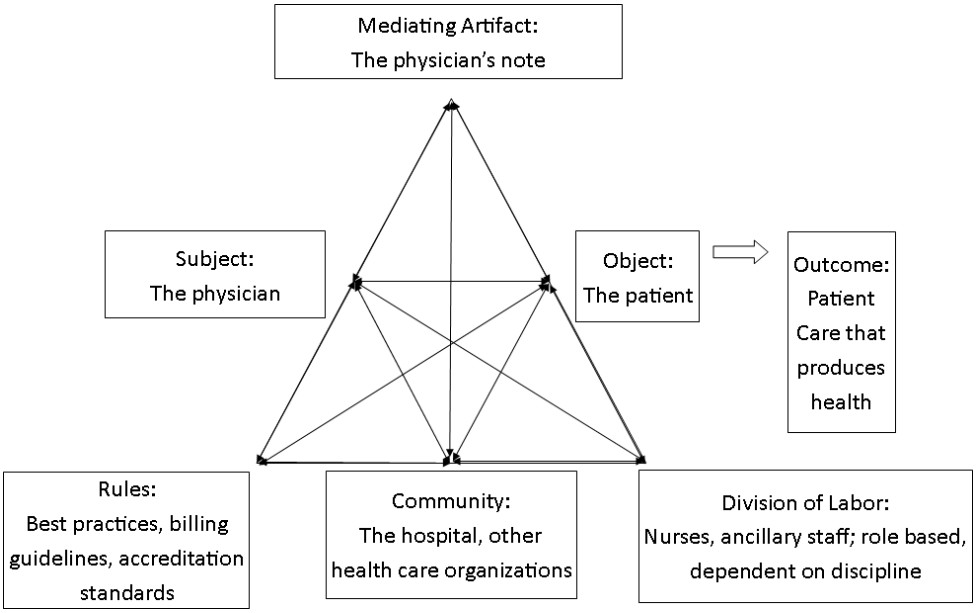


Figure 2.2: Activity System in Health Care

While Engestrom's model allows us to begin thinking about how a note within a medical record produces an action, it does not provide us with the tools for a more sophisticated analysis of how the physician's note serves our dual perspectives of supporting the "business" of healthcare while also facilitating "patient-centeredness."

Medical Record as Genre

The field of genre studies offers us a useful lens with which to examine the medical record. Carolyn Miller (1984) cites Harrell and Linkugel, who posit that rhetorical genres come from principles used to organize recurring situations that produce specific kinds of discourse. Miller goes on to theorize that a hallmark of genre is the action that it is intended to produce (Miller, 1984). With this idea in mind, we can begin to characterize the medical record as a genre—one that functions within the context of differing activity systems, such as the activity system of billing or the activity system of patient-centric representation.

Within the field of technical and professional communication, a number of scholars have examined medical records using a variety of approaches. Berkenkotter and Hanganu-Bresch (2011) cite the ability of physician documents to cause events to happen, based upon their study of involuntary commitment proceedings during the 1800s . Foundational to Berkenkotter and Hanganu-Bresch's work is that of Austin, who put forth the notion that utterances have "illocutionary force," which has to do with what the speaker intends to achieve through making a particular utterance (Austin, 1999). Berkenkotter and Hanganu-Bresch expand Austin's concept beyond the act of speaking and extend the idea to the written word, noting the power of the physician document to result in incarceration provided the letter of the law had been met and the proper signatures obtained (what Austin would term "felicity conditions"). When the appropriate conditions were met, the end result was that the subject's liberty was curtailed and he or she was remanded to the custody of a mental health treatment facility until being deemed able to return to society (Berkenkotter & Hanganu-Bresch, Occult Genres and the Certification of Madness in a 19th-Century Lunatic Asylum, 2011). In the current context of an electronically-mediated physician's note, the felicity conditions might include completion of required fields within an electronic form and authentication of the document through use of a private password in combination with a unique user identifier, hardware token, or radio frequency identification (RFID) device.

Within the context of health care, some documents carry considerable illocutionary force, as in the example of a physician's order; in such an instance, the physician's intention is clear and non-negotiable, and the document serves as proxy for the physician him/herself. Other documents, such as a therapist's recommendations for rehabilitation services, may be subject to more give-and-take, as therapeutic strategies may be negotiated between and among different

communities. For instance, the therapist may recommend outpatient therapy four times a week, but insurance will only pay for two; or the patient may request therapy at home, while the therapist recommends treatment at an outpatient center which has beneficial equipment.

Genre theorists have suggested that medical discourse may be subject to, and benefited by, rigorous evaluation. The problem-oriented medical record originally proposed by Dr. Weed has a counterpart within the field of veterinary medicine; an ethnographic study by Schryer (1993) demonstrated that within this context, use of the problem-oriented veterinary medical record as a documentation model promoted certain types of literacies and served to discourage others. The author's research led her to the conclusion that "We need to teach our students to refuse simply to acquiesce to genres. As communicators, they need to be able to take them apart and see how they work and what they are actually doing or not doing within various communicative contexts" (Schryer, 1993, p. 230).

Barton makes a similar observation in her study of the discourses privileged when health care workers were working directly with patients, compared to when the patient under discussion was not present (Barton, 2004). The concept of privileging or suppressing particular discourses is particularly important to technical communicators, as it is important to be mindful of potential pitfalls when designing forms, computer input screens, and other tools for creating texts. We have already considered the elements that are important in patient-centered care; the work of both Schryer and Barton underscores the importance of careful reflection on how effectively the texts we create, and perhaps the influence of the tools we use to create them, both support and fulfill our expectations for what those texts should accomplish. Barton echoes this theme in her work on "disciplined interdisciplinarity," in which she suggests that both the observational methods used in language studies and the objective, quantitative methods used in the sciences

can be used to inform practice (Barton, 2001). This approach seems particularly suited for the development of tools used in producing texts within the realm of health care.

The scholarly literature has addressed the physician note as genre in a variety of ways; we have already discussed the work of Berkenkotter and Hanganu-Bresch (2011) on involuntary commitment proceedings from the 1800's and drawn conclusions regarding illocutionary force. We can also consider Rundblad's (2007) work on passive voice and metonymy, in which she notes that the discourse of science and medicine privileges impersonalization and generalizability. Interestingly, it seems that the notion of "patient-centeredness" currently being put forth as desirable seeks to balance the scientific/medical discourse by privileging what we might refer to as "patient discourse."

Genre Systems and Ecologies

If we consider the hospital as the context in which the medical record operates, one can begin to conceptualize a genre system. Care within hospitals is directed by physicians, who create texts known as "notes." If we consider Kenneth Burke's (1945) characterization, the physician's note becomes the agent which causes a variety of events to be enacted, such as orders for tasks that are carried out by nursing personnel and a host of ancillary services. Billing for both the physician's own services as well as the hospital's myriad charges may be a product of the note. The note itself is about patients, but it also is instrumental in meeting the needs of other stakeholders as diverse as other caregivers (nurses, allied health professionals), patients' family members, third party payers such as Medicare and insurance companies, accrediting agencies, and even other health care organizations (clinics, other hospitals, skilled nursing facilities, etc.). Additionally, the note is part of a legal record, and is also subject to the legal

requirements of governmental actions. All of these things are true of the physician's note, whether it is written on paper or produced electronically; however, when migration to the electronic record takes place, additional layers become part of the genre system. The physician now interacts with a computer interface as he or she produces the note, giving rise to issues of usability both for the producers of the note and the consumers who use it. The presence of the computer system necessitates the presence of technology specialists with varying degrees of clinical knowledge who design, implement, and support the hardware, software, and network infrastructures required for the system to be operational. Recognizing this interplay between various technologies and users in the production of artifacts and the performance of work, Spinuzzi and Zachry propose moving beyond the concept of a genre system to what they term a "genre ecology." Three features of a genre ecology include its contingency, or adaptation by users for purposes beyond its original design; decentralization, or activities mediated by a combination of artifacts; and stability, or having relatively unchanging connections (Spinuzzi & Zachry, 2000). Its significance here is that the concept of a genre ecology leaves room to include both the product (the physician's note) as well as the medium used to produce it (which may involve a number of technologies, including dictation systems, paper forms, or computer systems with their attendant screen flows, prompts, and displays). The genre ecology is represented graphically in Figure 2.3.

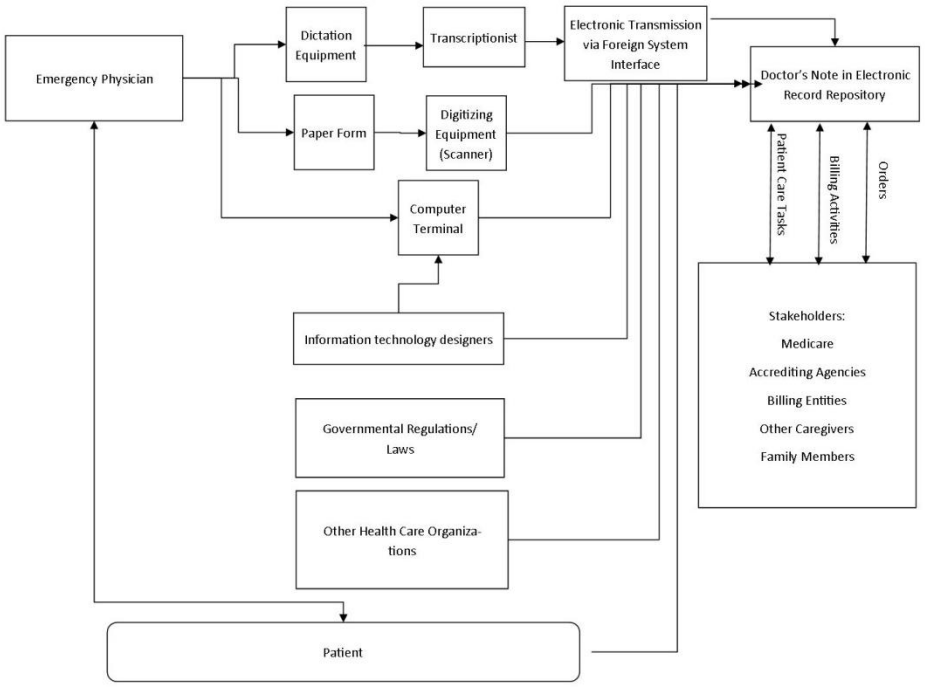


Figure 2.3: Genre Ecology—Hospital Emergency Department

By broadening my view of the medical record beyond a genre system in order to consider genre ecologies within medicine, I find that there is a gap. The current study responds to this gap by encompassing both the text of a particular component within the medical record and the tools used to produce it, comparing physician notes within the context of a hospital emergency department that were produced using four unique documentation models.

Evaluating a Genre Ecology

Recognizing the physician note as part of a genre ecology allows me to consider the tools by which I might analyze them, bearing in mind the dual purposes that I have previously identified: using technology to mediate the activities of health care (which include billing) within the framework of the medical record, and representing the patient in a way that underscores the patient's humanity by respecting his or her needs and values. Berkenkotter and

Huckin assert that academic writers must "know how to strategically use their understanding of genre" (Berkenkotter & Huckin, 1993, p. 477). I would argue that this observation may be generalized to physicians who create notes on patients, as they also "strategically use" the genre of the note in order to enact a variety of communicative actions leading to desired outcomes.

The work of genre theorists appears to support this view. Miller (1984) puts forth a theory of genre that asserts the importance of action rather than form. Drawing from the work of Burke, who emphasized human action, and Bitzer, whose focus was on human reaction, Miller stresses an ethnomethodological approach that privileges what she terms "social motive" (Miller, 1984). It is useful to review Burke's contribution here. As Miller indicates, the work of Kenneth Burke provides a method of examining the means by which the medical record as a genre produces action. In Burke's theory of dramatism, he describes what he terms a "dramatistic pentad." Using the metaphor of theatre, Burke's pentad has five vertices – scene, or the place where actions occur; act, or the event that has taken place; agent, or the one who has performed an act; agency, or by what means the action was carried out; and purpose, or why the action was done. Each vertex of the pentad influences and is influenced by the others – what Burke called "ratios" (in an unfortunate borrowing of the mathematical term) (Burke, 1945). Through the use of his "dramatistic pentad," we can understand the hospital setting as the "scene" in which various "agents" – physicians, nurses, ancillary professionals, and others – "act," or play their roles in the provision of care. In addition to the individual actors, the medical record itself can be understood as possessing "agency," in that it mediates the social motives described above. An alternate definition of agency is simply the capacity to exert power (Merriam-Webster Dictionary, 2011). Burke may not have intended to ascribe agency, or the power to act, to an

inanimate object; however, this seems to be a reasonable paradigm in our health care scenario. A graphical representation of Burke's pentad in the health care setting is presented in Figure 2.4.

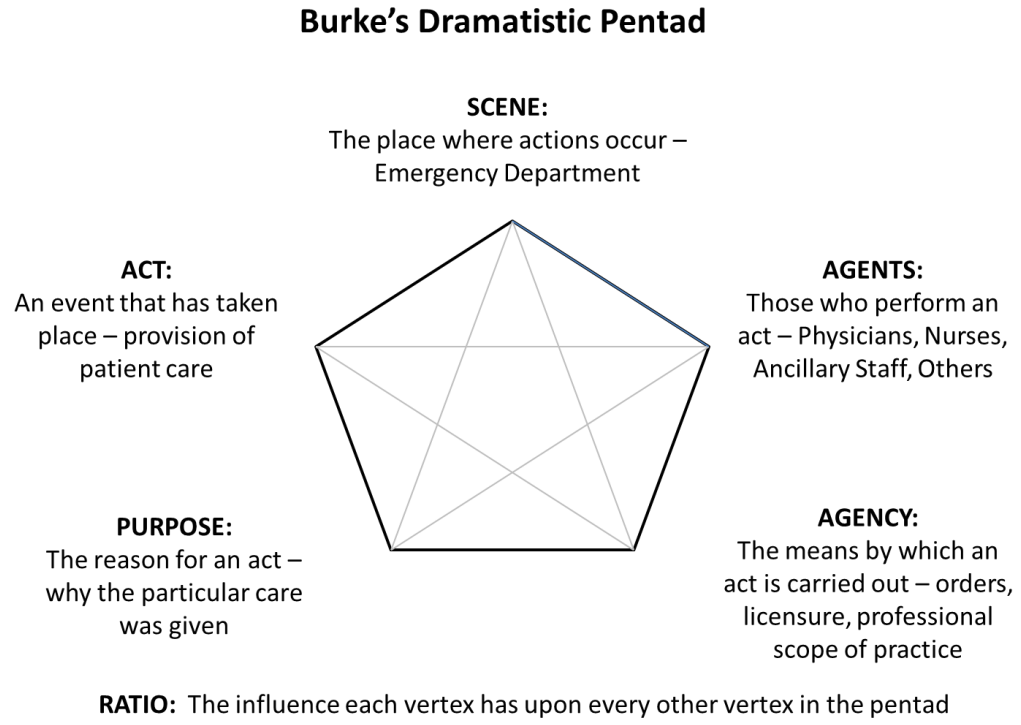


Figure 2.4: Burke's Dramatistic Pentad

Miller asserts that a hallmark of genre is its capacity for mediating social motives (Miller, 1984). The medical record, while it may itself be considered a genre using this definition, with a broad social motive of mediating health care, may also be considered a collection of many genres–with its many varied texts affecting a variety of social motives. For instance, the genre of "charge information" is used rather specifically for the purpose of facilitating billing so that payments for services may be received from payers such as private insurance, government-sponsored insurance (e.g., Medicare), or from the individual patient or other guarantor. The genre of "physician orders" is used to communicate requests for diagnostic tests, medications, and other necessities (such as meals appropriate to the patient's needs, special equipment such as canes or walkers, and so forth). The genre of "nursing notes" records the findings of assessments

made by the nurse concerning the patient's physical condition, psychosocial needs, and educational needs in order for those needs to be met. The genre of "diagnostic test results" communicates this category of information to the physician and other providers who will take actions based upon those results. All of these various genres serve a particular purpose, and are important in the process of providing care; however, one might argue that the most important genre is the physician note.

The physician note is particularly significant in that it summarizes the patient's current condition and lays out the plan for his or her ongoing care, taking into account the things that make the patient's experience unique. The note paints a picture for other caregivers who will be tasked with carrying out the plan devised by the physician. The note serves as evidence to support the billing activities of the health care organization, and is also part of a legal record. In the pre-electronic medical record age, the physician's note could be handwritten, dictated and transcribed, or created using forms with checkboxes, lists, drawings, and spaces for writing—underscoring the importance of tools within the context of a genre ecology. It is significant to note that with paper and/or dictation, the physician has complete control over the note in terms of what he or she wishes to comment on (although policies, procedures, and billing/legal requirements exert an influence). With the advent of the electronic medical records, an additional "layer" is placed between physicians and their notes; the computer system and its user interface may exert an influence and may even constrain the physician through the use of screen flows, selection lists, required elements, rules, and other "forcing functions" designed to insure that particular aspects of care are addressed within the note—again underscoring the importance of tools within the ecology.

Actor-network theory affords us another set of tools by which we can begin to understand how a physician note functions within the context of a healthcare organization. Spinuzzi and other proponents of actor-network theory would likely find a hospital to be an environment that fits this model comfortably. According to actor-network theory, networks are formed when individuals come together, forming and releasing alliances in order to accomplish particular tasks or generate specific outcomes. This "splicing together" of actants can occur with people, and can also take place with documents that serve as a proxy for an individual; in actor-network theory, inanimate objects such as texts are imbued with agency, just as people are. Spinuzzi describes texts being used in this capacity as "immutable mobiles" – documents that are regularized and unchanging that can move through a system in order to facilitate work (Spinuzzi, 2008).

Several types of documents within the hospital environment can function as such immutable mobiles. One example is a physician's order sheet. This text may be paper, but may also exist in electronic format as an entry in an electronic medical record system. Regardless of the format, the order sheet contains a number of pieces of information, including identifying data about a particular patient (name, medical record number, encounter billing number, date of birth, age, gender, nurse station/room/bed). It also includes interventions to be performed and by whom/which hospital department (a laboratory test for which blood must be drawn, a diagnostic imaging study which requires the patient to be transported to the CT scanner, and medications to be administered by the nurse after the pharmacy prepares them). The order sheet also identifies when each action is to be taken (blood test "stat," or immediately; CT scan tomorrow morning; medications three times daily at mealtime). The order sheet serves as a proxy for the physician, and allows him or her to communicate with several different hospital services, and for them to coordinate their activities.

Many hospitals also use a document (again, either paper or electronic) when performing what are known as "handoffs." In the case of our hypothetical patient leaving the nursing floor to have a CT scan, a document may be produced to accompany the patient to the Radiology department. That document would again contain identifiers, and might also include crucial information such as any food or medication allergies, the patient's "code status" (type of resuscitation efforts to be made in an acute event such as a heart attack), whether the patient requires the use of supplemental oxygen while being transported off the nursing unit, and so forth. In this instance, the handoff document ensures continuity of the most critical knowledge about the patient, even when the patient is passed from the nursing staff on a particular unit to a different type of professional staff housed in another part of the hospital.

My focus here, though, is on the physician's "note." One important way that the physician note functions within a hospital is at what technical and professional communicators might term "border crossings." Order sheets and handoff documents might be largely characterized as "instrumental" discourse–texts that are produced for the purpose of carrying out specific work (Killingsworth, 1992). However, physician notes serve in a variety of capacities. One capacity in which they serve is to represent patients and their needs, goals, and values to others – effectively bridging the gap between the physician's discourse community and the communities of other caregivers. Citing Leigh Star, Wenger writes that "boundary objects" are items that "serve to coordinate the perspectives of various constituencies for some purpose." Wenger goes on to say that such artifacts may be used in order to connect an individual to a "community of practice" to which he or she may not necessarily belong (Wenger, 1998). When a physician writes a note, especially a "history and physical" (H&P), he or she essentially introduces the patient to different communities of practice within a hospital: the rest of the

health care team. These various communities of practice use the note for different purposes. A coding specialist in the Medical Records department reads the physician's note in order to assign the proper codes to facilitate billing and payment for services provided – what we might consider an "instrumental" function of the note. A rehabilitation therapist might read the physician's H&P note to learn more about a patient's activity level prior to hospitalization; this would help the therapist in working with patients to define their rehab goals. For instance, a knee-replacement surgery patient whose hobbies included hiking and wilderness camping might have very different goals than a similar patient whose most strenuous activity was playing the piano. This sensitivity within the text to who the patient is as a person (as opposed to "the gall bladder in 427"), rather than serving a purely instrumental function, is used in a representational way. In our context, the note then serves to support an element of "patient-centered care." Patient-centered care has been described by Gerteis et al and incorporates elements including respecting individual patients' needs and values, as well as their informational and communicative needs; ensuring comfort and support; and involving family and friends as appropriate (Gerteis, Edgman-Levitan, Daley, & Delbanco, 1993).

Bazerman (1999) calls our attention to how texts represent individuals through his discussion of the relationship between "utterances" and "genre." He uses a well-known example: the US Individual Income Tax Return, popularly known as "Form 1040." He explains how the form represents identity, objects within the "discursive universe," and how translation functions, as well as how intertextuality functions within the context (through examples of other associated forms and data sets such as W-2 forms, Social Security Numbers, and so on). Bazerman provides us with a useful way of thinking about a particular text and how the concepts of identity, translation, intertextuality, accountability, and operations relate to it (Bazerman, 1999). It is a

relatively simple matter to extrapolate from Bazerman's example of the Form 1040 to a physician's note. Like the 1040, a physician's note constructs a particular identity for a person (the "patient"), as well as the writer's own (the "physician"). It likewise utilizes objects within the "discursive universe" of health care, and translates those objects into orders for tests, treatments, and lists of diagnoses, which are in turn represented by a plethora of coding schemes (such as billing codes for patient charges, diagnostic categorizations such as ICD-9-CM or SNOMED, descriptions of therapeutic interventions such as CPT codes, and the like). Intertextuality is noted, with data elements passing back and forth from hospital to insurance company or government program, or test results transmitted from a reference laboratory to a hospital and on to a regional health information exchange. Responsibilities for taking particular actions are assigned, and various operational activities that are needed to support the primary objective of improving the patient's well-being are enacted.

When considering the theoretical perspectives relevant to the notion of boundary objects and border crossings, we are drawn to the work of Popham (2005). She takes the "Foucaultian" position that disciplines experience tension between each other, citing the intersection (and occasional conflict) between medicine, science, and business. She cites numerous others in explaining that genres and genre systems serve a particular discourse community, but goes on to explore how a genre (such as the forms that are part of a medical record) might serve multiple communities. In this way, the genre mediates the interaction between various disciplines. The author's examples include a number of forms commonly used in a physician practice: an exam form, an encounter form, forms for diagnosis and insurance, and a billing claim form. She notes that these "boundary objects" share common vocabulary, knowledge, and methodology while remaining heteroglossic and flexible. She concludes that health care in particular is "ripe for

increasing examination" so that its communicative practices and the texts that mediate them can be better understood and adapted to meet the needs of practitioners and the public (Popham, 2005). Within health care, we certainly observe that texts produced by one discipline or community are used by another in order to mediate interaction between the various communities. The health care needs of patients are supported by the texts that are produced; sometimes those texts are influenced by billing needs (documentation that is required by payers to support the billing claim, or to indicate its medical necessity). In a facility that is heavily involved in research, texts might be utilized for research purposes or additional documentation might be requested in order to support the requirements of a particular study.

When thinking about the texts used to facilitate border crossings in health care, it is difficult to separate the text itself from the technology used to create it; paper forms, with checkboxes, lists, and spaces to write constrain the creator of the text to some degree – a large, empty block of space might encourage a lengthy, detailed account (at least, for a provider who was so inclined); a single line might mean only a few words would be used. Electronic medical record technology constrains the user even further. Required fields, lists that control whether single or multiple selections are possible, and rules-based processing that presents the user with additional screens for documentation (perhaps with more required fields) depending upon previously selected data all serve to influence how a text is constructed.

As a component of a genre ecology, a number of conclusions may be drawn regarding the physician's note: 1) it has illocutionary force (Berkenkotter & Hanganu-Bresch, Occult Genres and the Certification of Madness in a 19th-Century Lunatic Asylum, 2011); 2) it is often stylized to give privilege to a particular type of speech (Barton, 2004; Rundblad, 2007) ; 3) it can demonstrate the relationship between representations and genres with respect to identity,

translation, intertextuality, accountability, and operations (Bazerman, 1999); 4) it contributes to "border crossings" between various types of care providers (Spinuzzi, 2008; Popham, 2005); 5) it may be subjected to rigorous evaluation (Schryer, 1993; Schryer & Spoel, 2005); and 6) it can be shaped by an interdisciplinary approach to research into its characteristics (Barton, 2001).

The concept of "interdisciplinarity" figures prominently in the literature; specifically, how the disciplines of medicine and discourse analysis can benefit each other. Barton (2001) presents the argument that students of the discourse of medicine should strive for an interdisciplinary approach to research that contributes both to language studies and to medicine itself. She notes the difficulty in marrying the observational, qualitative approaches to research in language studies with the quantitative/deductive approaches used in science and medicine that can be used to inform practice, but insists that careful prospective design that takes the methodological paradigms of both fields into consideration can likewise contribute to both (Barton, 2001). Schryer and Spoel also note the importance of interdisciplinarity within the research methodology, concluding that "professional groups are interested in reflecting on their own practices and will listen to critique" so long as that critique is delivered in a meaningful way (Schryer & Spoel, 2005, p. 273). Achieving this sort of interdisciplinarity is one of the aims of this research.

Orlikowsky and Yates recognize that members of a community use genres that evolve and change over time (Orlikowski & Yates, 1994). It is possible to observe this evolution to a degree within the history of the medical record genre ecology as a whole. In subsequent sections, this research will demonstrate some of the ways in which the genre of the physician's note within the context of hospital emergency care has changed in one particular hospital with regard to its

dual functions of supporting hospital operations and supporting patient-centeredness, as the tools mediating the production of the note have changed over time.

Activity Systems and Genre Ecologies in Combination

I have discussed the physician's note as part of an activity system, and also as a component of a genre ecology; these two theoretical constructs, while separate, can be related. The key components of an activity system—subject, object, artifacts, rules, community, and division of labor—are all present within the genre ecology previously represented graphically in Figure 2.3. Figure 2.5 displays how the elements from the genre ecology may be superimposed upon the activity system, demonstrating the relationship between the two.

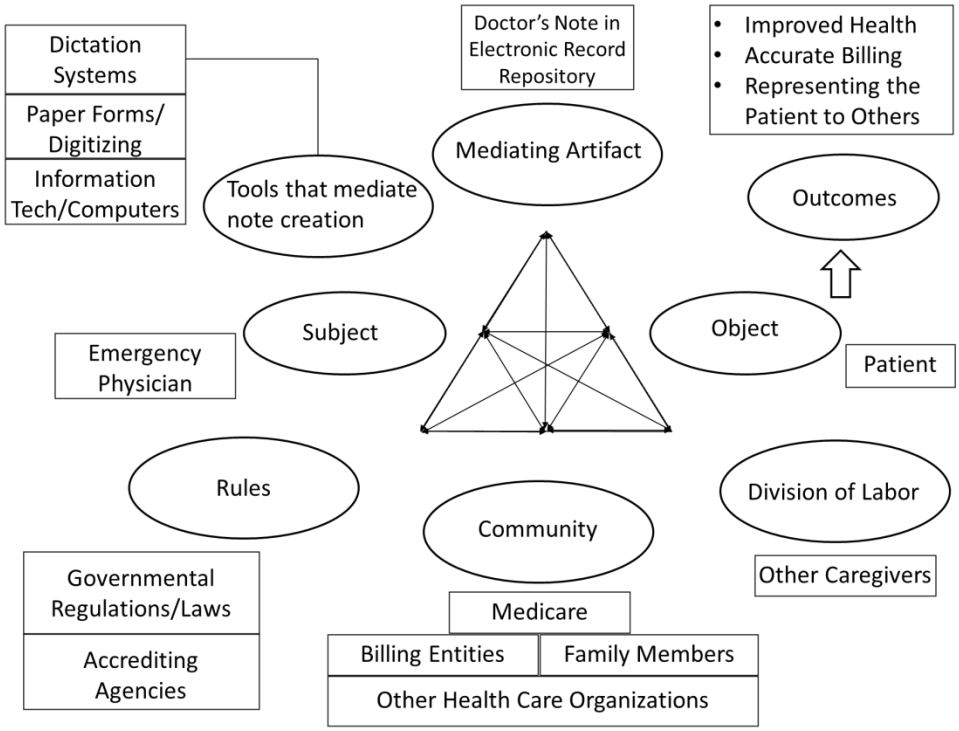


Figure 2.5: Combined Activity System/Genre Ecology

Here, we see the emergency physician represented as subject; the patient as object; and the outcome of improved health. This diagram also incorporates the additional outcomes of accurate billing and representation of the patient, reflecting the two lines of inquiry being

considered in this research. We see the interplay of regulatory action and standard-setting organizations exerting and influence, along with community groups outside the immediate hospital setting and other caregivers within. All of these entities exert and influence on, and may be influenced by, the mediating artifact—the emergency physician's note—which is itself influenced by (and may influence in some respects) the technologies used to produce it. These technologies, or tools, may take many forms. The spoken word, translated into a written document and then imported into an electronic repository is one form, constrained by the technology used to transform it. Paper forms represent another tool, with their own affordances and limitations of prompts, checkboxes, space constraints, and again the technology required to make the form part of an electronic record. Information technology is yet a third tool, with its own set of influences; system design choices and the supporting hardware, with their attendant qualities of usability and the affordances of prompts, reminders, rules, and constraints of data types, selection lists, and so on.

To summarize, physician notes can be characterized in a number of ways – as boundary objects, as indicators of power relationships, as constructors of identity, as part of an activity system, and as part of an evolving genre ecology (which is itself comprised of genre systems and individual genres, all of which can adapt and change with the needs of the communities which it serves). In this research, I explore how each of the four models of emergency physician documentation fulfill the instrumental function of supporting hospital billing and the patient-centric function of representing the patient's needs, preferences, and values, while demonstrating changes that have occurred in the genre of the note over time.

CHAPTER 3: METHODS/METHODOLOGY

In Chapter 2, I discussed that physician notes are part of the genre ecology known as the electronic medical record, and that the field of genre studies affords a lens with which to examine them. This study examines electronic medical records from a community hospital system located in rural eastern North Carolina that has used four distinct models for physician note creation over the past two decades. The study explores two distinct research questions. The first has to do with the "health care operations" perspective and focuses on one aspect of operations: use of the physician's note within the activity system of medical billing. Specifically, the first question asks, "How do the four models compare in terms of documented items that are used for billing?" The second relates to the perspective on patient-centeredness, and focuses on use of the physician's note within the activity system of patient-centered care. This question asks "How are the elements essential to patient-centered care addressed within the text of each model?" In order to answer these two research questions, a data audit of existing emergency physician notes from each of the four models was performed, with textual analysis employed as the means to evaluate them.

In this chapter, I discuss the means by which a corpus of texts was selected for analysis. I also describe how the analysis was performed for each of the two research questions. My findings appear in chapter 4.

Data Selection

Blythe (2007) provides a framework for analysis that begins with selection of sample texts. The sample may be chosen either through convenience, through criteria, or through randomization. I chose to use criteria-based sampling in order to obtain a relatively homogenous

corpus of texts to analyze, and selected patients who had a similar "chief complaint," or their reason for being seen in the Emergency Department. To further refine the sample, I selected patients who also had a similar "discharge disposition," or outcome upon leaving the department.

With the volume of patient records available, narrowing them down to a manageable subset was crucial. One way to begin limiting the data was to look at numbers of emergency visits over time. I reviewed the available historical data detailing encounter volumes for the emergency department for the past sixteen years in order to determine whether there was a particular "peak" month that consistently demonstrated the greatest number of encounters. The data revealed that the top month varied from year to year (only May was never represented as having the highest number of admissions). While there was no clear trend in terms of encounter volumes, there was a trend in terms of the average inpatient census. January emerged as a frequent "high census" month. Therefore, I selected January as the month to use for sampling.

Reasons for coming to the emergency room can vary widely; emergency departments see everything from sore throats and simple lacerations to motor vehicle crash victims suffering from multiple physical traumas. The type and amount of documentation needed varies as well. In order to compare "apples to apples," I elected to choose a single type of complaint as the focus for this study. Since heart disease is the leading cause of death in the United States and acute myocardial infarction ("heart attack") has been included in The Joint Commission's "core measures" for hospital care quality since 2001 (Core Measure Sets, n. d.), my study focused on patients who presented with a primary complaint of chest pain.

Cases were selected by first performing a data extract from the applications that house patient demographic information for the study period. Fields for the extract included encounter number, encounter date and time, encounter day of week, chief complaint, and gender. The

corpus of texts was selected from emergency department physician notes created between 1992 and 2012.

The extracts were restricted to the month of January for each included year and only included encounters resulting in an inpatient admission to the hospital for which the original encounter type was "Emergency." The resulting data sets were further narrowed by filtering the chief complaint field and only including "chest pain" and related descriptions (such as "rule out myocardial infarction," "angina," and commonly used abbreviations such as "CP"). Once the data set was reduced to chest pain-related complaints for patients presenting to the Emergency Department during the month of January during a study year, the list for inclusion was finalized by choosing one male and one female patient with an encounter time from each hour of the day, with dispersion of patients across days of the week so that no day of the week was represented with a frequency greater than four. This process resulted in potentially 192 total charts to evaluate – 24 male and 24 female for each documentation type. As stated earlier, this sampling method is known as "criterion sampling," since defined criteria were used in the selection process (Blythe, 2007). Ultimately 185 charts were pulled for use in the study. One chart from the second model was thrown out because the patient suffered a fatal cardiac arrest; the resulting note took the form of a "code blue" sheet that differed substantially from the form used for the other notes. The fourth model also had fewer qualifying charts; since this model had been in use for less than one year during the approved study period, there were not enough qualifying patients with a complaint of chest pain to permit selection of 24 males and 24 females. Consequently, the sample was reduced to 21 males and 21 females for this particular model. The sample quantities are presented in table form in Table 3.1. The data extracts were stored

electronically in a secure file share on the NHI network only long enough to select the records for inclusion and were not retained.

Model	# Male Charts	# Female Charts	Total
1	24	24	48
2	23	24	47
3	24	24	48
4	21	21	42
	Grand Total		**185**

Table 3.1: Charts by Model and Gender

For each selected chart, the emergency note was retrieved from its electronic repository and a single copy was printed; all personal identifiers considered to be "personal health identifiers," (PHI) under the Health Insurance Portability and Accountability Act (HIPAA) (including but not limited to patient name, medical record number, encounter number, admission date/time, social security number, and date of birth) were redacted from the printed copy before being made available to the study (Health Information Privacy, n. d.). No crosswalk of individual printouts back to the source records was retained. The research project was approved by the Institutional Review Board of East Carolina University as well as the Institutional Review Committee at Nash Hospitals, Inc.

Data Analysis

Once the sample texts were identified, units of analysis were determined and the texts were tagged for analysis. Tagging may entail what Blythe (2007) describes as either "manifest" (meaning directly observable) or latent (having to do with "the purpose to which language is put"

or alternatively, the way in which a reader responds). The two stated research questions required both types of tagging; a quantitative comparison of the presence of elements required for payment utilized directly observable phenomena with little need for subjective interpretation. Exploring issues of patient-centeredness, however, required tagging for latent content. Blythe counsels his reader on the need for reflexivity when dealing with latent content and suggests detailed note-taking or journaling in order to capture the thought process behind the decisions that are made. For the purpose of this study, the sample charts were reviewed several times, paying attention to how elements of patient-centeredness were recorded and then deciding how the data would be tagged.

Blythe provides useful guidance on the nuts and bolts of tagging textual data – the "how" of analysis–but to analyze the data successfully, we must also focus on the "what." Textual analysis provides a framework for comparing the ways in which the elements essential to "patient-centered" care are addressed in each documentation model. These elements are especially well-articulated in Gerteis, Edgman-Levitan, Daley, and Delbanco's (1993) thought-provoking work, *Through the Patient's Eyes*. The authors identify several characteristics that embody patient-centeredness:

- Respecting the individual patient's values, preferences, and needs
- Coordinating and integrating care
- Meeting the information, education, and communicative needs of the patient
- Providing physical comfort
- Providing emotional support
- Involving the patient's family and friends in his or her care

These six elements were used as a framework for analyzing the four documentation models in order to see how the patient is constructed by the texts, and how the texts might mediate the care of the patient and thereby bring about care that addresses each of these elements.

Analysis for Using Physician Notes in the Activity of Billing

The first research question seeks to ascertain how successfully each record format complies with requirements for documentation in order for hospitals and physicians to bill for their services. The 1997 Medicare Conditions of Participation (Documentation Guidelines For Evaluation & Management Services, Center For Medicare and Medicaid Services, 2012) provides the most current listing of required components for physician documentation for participating hospitals, including what elements must be present and for those elements, the number of items that must be addressed in order to meet requirements for the levels of complexity that drive reimbursement for services provided.

I created a simple checklist to use in quantifying the number of items for each major category based on the 1997 documentation guidelines. The checklist is presented in Table 3.2.

Chief Complaint		
History of Present Illness		
	location	
	quality	
	severity	
	duration	
	timing	
	context	
	modifying factors	
	associated signs/symptoms	
Review of Systems		
	constitutional (such as fever, wt loss)	
	eyes	
	ears/nose/mouth/throat	
	cardiovascular	
	respiratory	
	gastrointestinal	
	musculoskeletal	
	integumentary (skin/breast)	
	neurological	
	psychiatric	
	endocrine	

	hematologic/lymphatic	
	allergic/immunologic	
Patient/Family/Social History		
	past medical history	
	family history	
	social history	
Physical Examination		
	constitutional	
	eyes	
	ears/nose/mouth/throat	
	neck	
	respiratory	
	cardiovascular	
	chest/breast	
	gastrointestinal	
	genitourinary	
	lymphatic	
	musculoskeletal	
	skin	
	neurological	
	psychiatric	
Medical Decisionmaking		
	number of diagnoses/management options	
	amount/complexity of data to review	
	risk of significant complications	

Table 3.2—Billing Item checklist

While my checklist is based upon the elements used in medical coding, this study was not intended as an attempt to replicate the action of medical coders, who go into even more detail regarding the numbers of items addressed in the various elements of the note; the checklist was simply used as a standard framework for enumerating the elements across the four models for purposes of this study.

Analysis for Using Physician Notes in the Activity of Patient-Centered Care

The second research question seeks to address the question of how "patient-centeredness" is mediated within the genre of the emergency physician note. I created a second checklist to guide the data collection for this dimension of the study; it provides a simple six-item framework for interrogating the documents based upon the key factors in providing patient-centered care as identified by Gerteis et al (1993). The checklist is presented in Table 3.3.

Respect for patient's values, preferences, needs	
Coordination/Integration of care	
Information/communication/education	
Physical comfort	
Emotional support	
Involvement of family/friends	

Table 3.3—Patient-centered Item Checklist

The items referenced in this checklist guided the review and coding of the sample texts, using what Blythe terms an "editing" approach (Blythe, 2007) for presence of the Gerteis et al. key factors. After a preliminary review of the documents, the key factor of "providing physical comfort" was further refined; I found that pain at admission was carefully documented in virtually every case; however, differences emerged among the models as to how pain was documented at the end of the patient's emergency room stay. Therefore, I elected to examine pain documentation at the time the patient was ready to leave the emergency department as the measure for "providing physical comfort."

For both research questions, once the documents were tagged, the identified elements or themes were counted so that similarities and differences between the four models could be identified. In addition to comparing the numbers of elements observed, I also qualitatively

evaluate the models and describe the format, inclusions, language, and accessibility of the physician's note for each. The results of my analysis are presented in the next chapter; in it, I demonstrate the differences that I observed between the four models with respect to the various elements of billing support and patient-centeredness. I show some of the ways by which the genre ecology at the specific health system has evolved over the years in concert with changes in the technological landscape.

CHAPTER 4: RESULTS

One of the features of a genre ecology is its contingency, or the means by which end users may appropriate a text for use beyond its original intent; this is evident in the use of the physician note for billing functions. Quantifying and comparing the four documentation models in terms of the presence of components needed for the activity of billing is one line of inquiry in the current research. The second line of inquiry, or quantifying and comparing the four documentation models in terms of the presence of terms related to the six aspects of patient-centered care, ties back to the text's function as a boundary object, representing the patient and bridging various communities of practice. These communities may include physicians, nurses, allied health providers, and others; they may be found both inside and outside of the hospital. In each line of inquiry, there exists a subtle interplay between the text itself and the medium used to create it – whether the medium takes the form of human speech, a paper form, or a computer system with prompts and required elements–with the format influencing what is included or excluded from the final product created within the genre ecology.

In this chapter, I first describe each of the four models qualitatively, highlighting some of the affordances and limitations inherent in the tools used to produce them. Then I present the quantitative differences that I observed when evaluating the models against the identified elements used for billing and for patient-centered care.

Electronic Medical Record at Nash

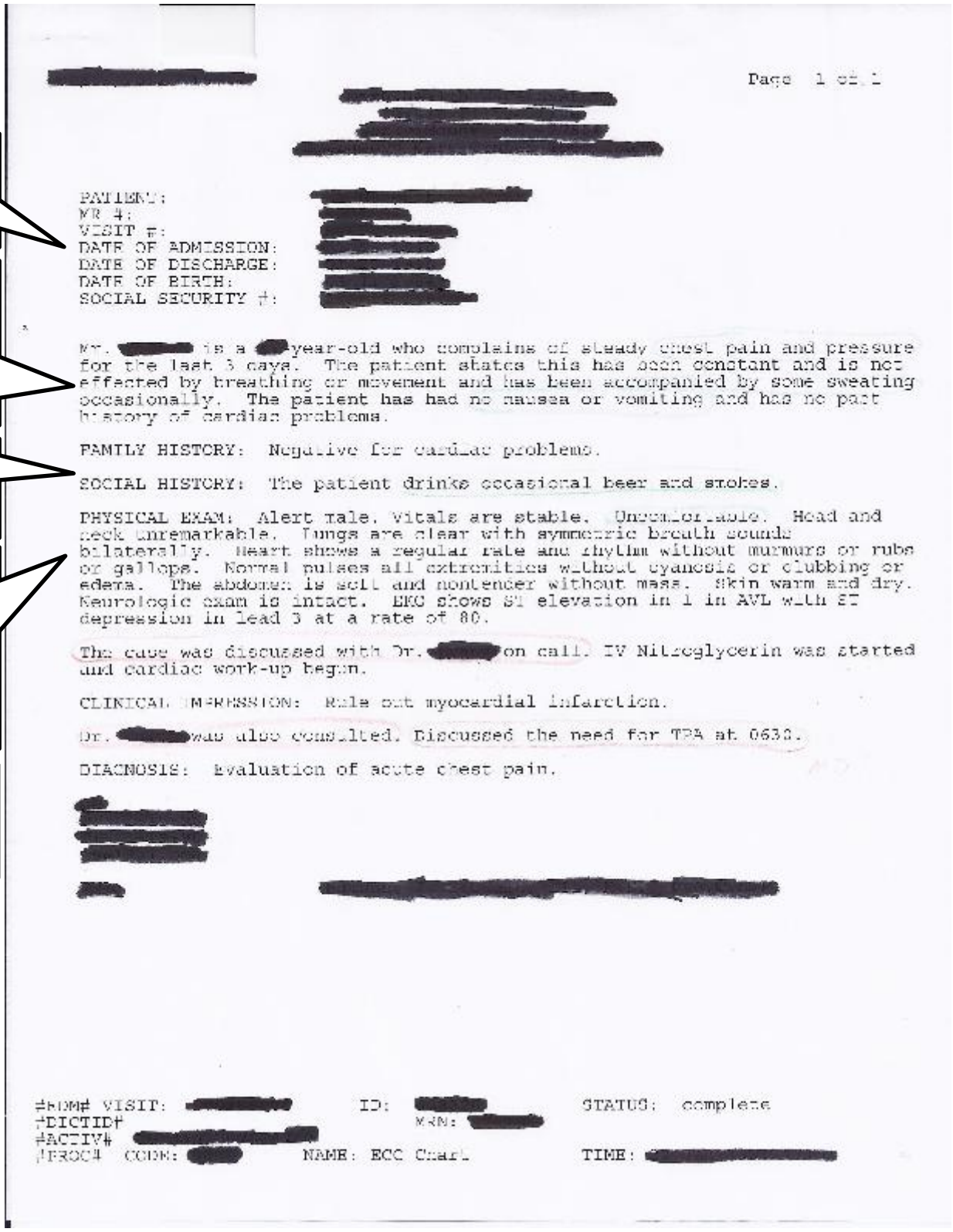
Drawing on the theoretical foundations presented in Chapter 2, I view the electronic medical record as a genre ecology composed of many unique genres that include test results, orders, medication administration records, coding summaries, and various types of notes created

by diverse practitioners such as the physician's note that is the focus of this study. Each of these genres is created to serve the needs of a particular group, but other groups may appropriate a particular genre in order to serve its own needs, as is often the case in the health care environment. These genres then function within a number of different activity systems, mediating the activities required for health care. Additionally, genres are not static; they evolve to meet the needs of the activity systems they support. In this chapter, I highlight some of the changes that have occurred within the genre of the physician's note at Nash Health Care.

Model 1

As briefly described in Chapter 1, the electronic medical record at Nash has included four unique models for physician's note creation by doctors in the Emergency department. In the first model, narrative notes were spoken into a dictation system, transcribed, and uploaded into the EMR. The notes were stored in the EMR as a "text blob," meaning that the entire text of the note was stored as a single entry within the patient's record. A sample document appears in Figure 4.1. (Patient and physician identifiers have been redacted in all study materials.) As shown in the figure, the text begins with a header containing basic demographic information—identifiers such as patient name, medical record and encounter numbers, birth date, social security number, and admission and discharge dates. The narrative portion begins with a description of the patient's current complaint, and describes the nature of his pain and any related symptoms. A brief statement relative to the family history relevant to the current problem appears, as does a brief social history that addresses alcohol and tobacco use. The physical examination section lists a number of findings related to several body systems. The body of the note mentions the other physicians with whom the case was discussed, and presents a clinical impression of "rule out myocardial infarction" and a diagnosis of "evaluation of acute chest pain." This type of note is

essentially a blank slate for the physician, who is free to include as much or as little information as he or she chooses. (The page footer contains information that was used during data migration from the original EMR system to the current one.)



Page 1 of 1

PATIENT:
MR #:
VISIT #:
DATE OF ADMISSION:
DATE OF DISCHARGE:
DATE OF BIRTH:
SOCIAL SECURITY #:

Mr. [redacted] is a [redacted] year-old who complains of steady chest pain and pressure for the last 3 days. The patient states this has been constant and is not effected by breathing or movement and has been accompanied by some sweating occasionally. The patient has had no nausea or vomiting and has no past history of cardiac problems.

FAMILY HISTORY: Negative for cardiac problems.

SOCIAL HISTORY: The patient drinks occasional beer and smokes.

PHYSICAL EXAM: Alert male. Vitals are stable. Uncomfortable. Head and neck unremarkable. Lungs are clear with symmetric breath sounds bilaterally. Heart shows a regular rate and rhythm without murmurs or rubs or gallops. Normal pulses all extremities without cyanosis or clubbing or edema. The abdomen is soft and nontender without mass. Skin warm and dry. Neurologic exam is intact. EKG shows ST elevation in I in AVL with ST depression in lead 3 at a rate of 80.

The case was discussed with Dr. [redacted] on call. IV Nitroglycerin was started and cardiac work-up begun.

CLINICAL IMPRESSION: Rule out myocardial infarction.

Dr. [redacted] was also consulted. Discussed the need for TPA at 0630.

DIAGNOSIS: Evaluation of acute chest pain.

[redacted]

#ROOM# VISIT: [redacted] ID: [redacted] STATUS: complete
†DICTID† MRN: [redacted]
#ACTIV# [redacted]
†PROC# CODE: [redacted] NAME: ECG Chart TIME: [redacted]

Demographics

History of Present Illness (paragraph form, full sentences)

Patient/Family /Social History (brief)

Physical Examination (paragraph form; body systems not specified)

No Review of Systems in this example

Figure 4.1: Sample Report, Model 1

The data in the dictation report was not parsed into unique data fields and therefore could not be searched, or "mined," using the available technology at that time. The EMR system only supported reporting against discrete, field-based data; the architecture did not support searching through large blocks of text. However, this limitation was balanced by a significant new advantage. Prior to the implementation of the EMR system, all of the patient's clinical information was housed in a paper chart—a single binder containing sections for the various text genres (for instance, laboratory results, x-ray reports, nursing notes, physician notes, and so on). The physical chart could only be used by one person at a time, and could only be in one place at a time—problematic if the patient was in the Radiology department for a test and the chart was still at the nursing station, or if a physician took the chart with him to the dictation room and failed to return it to its usual storage location. With the advent of the EMR, physicians and other caregivers were no longer limited by the constraints of a single chart binder that could only be accessed by one physician at a time in a single physical location. Instead, any of its contents, including the emergency physician's note, could be viewed simultaneously by any providers with appropriate system access, creating an improvement in how the record was used to mediate care (provided, of course, that the note was dictated and transcribed promptly). If we consider this notion within the context of the activity system presented in Figure 2.2, we see that Model 1 facilitates Division of Labor by making a mediating artifact (the genre of the physician's note) more accessible to other caregivers. In similar fashion, the physician's note is also readily available to those users within the genre ecology who are using the contents of the note for billing purposes—what can be termed a Community usage.

Model 2

By 2001, increasing patient volumes were driving the need for greater efficiency in the Emergency Department. This push for efficiency included increasing the speed by which the physicians could see patients and document their care, as well as ensuring that the documentation supported the requirements for billing. The department's management team explored possible options and identified a paper-based template system that promised to meet those needs, leading to the adoption of a second documentation model.

Model 2 was implemented in 2001, and consisted of paper forms that were customized by the patient's presenting problem. The forms include sections for the most common/important pieces of information needed for managing patients with a given problem, and allow rapid notations to be made using anatomic diagrams, checklists, frequently-used diagnostic tests, and so on. A blank sample template form for the presenting complaint of "chest pain" is illustrated in Figures 4.2 and 4.3. This form has the potential to capture more information than a dictated note, which relies on the physician's memory for the items to include. Note the "HPI" section on the left side of page 1 (Figure 4.2). The form prompts the physician to note the many items that are needed for a fully-documented History of Present Illness, as described in the coding guidelines. The anatomic drawing allows quick, accurate notation of where the patient's pain is located. The column on the right side of the page prompts the physician to address several body systems within the "ROS," or Review of Systems. The Past History section facilitates rapid notation of relevant previous medical problems. Current medications and allergies are addressed next, followed by the Social History section which prompts the physician to address alcohol, tobacco, and drug use. The final section on the page reminds the physician to address any relevant family history.

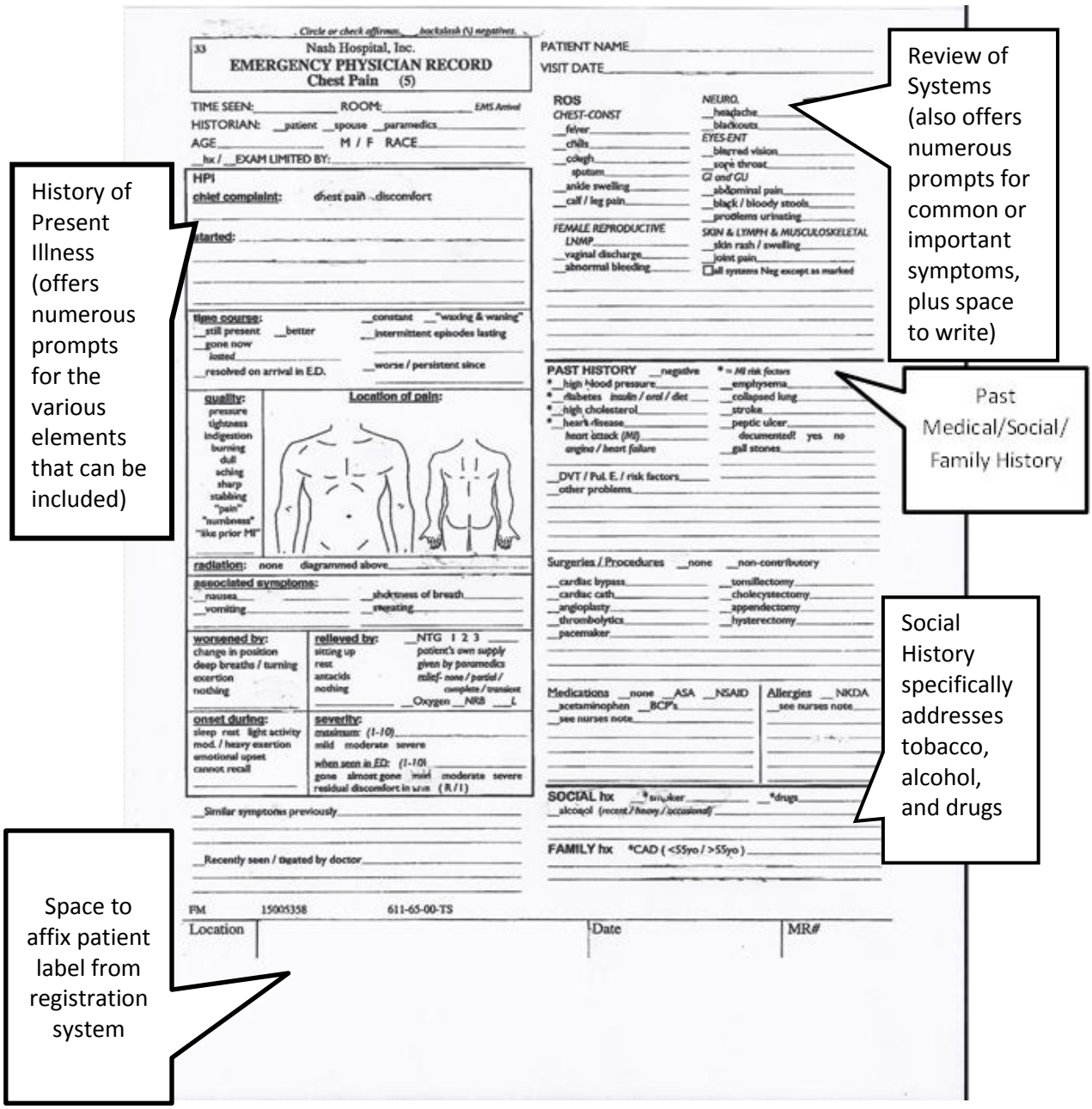


Figure.4.2: Sample Form (page 1), Model 2

The second page of the template form allows the physician to continue the clinical documentation, with the Physical Examination findings placed on the left side of the page. On the right side we find space to record significant diagnostic test results, followed by a summary

line allowing the physician to note any change to the patient's condition. This is followed by a few blank lines where the physician may choose to write a brief narrative. Consultation with other physicians follows, and there is also a space within which to record whether any counseling or education was provided to the patient or family. The final portions of the template provide space for the physician to note a clinical impression, as well as the patient's "disposition," or destination following treatment in the Emergency Department.

The paper template system provided useful prompts to the physician in terms of creating a complete note that supported items needed for billing. However, a major problem with this system was that attending physicians outside of the emergency department had become accustomed to viewing information on-line. Having to locate the emergency physician's note as a paper form in a chart binder was a barrier in terms of the accessibility of the documents, representing a discontinuity within the activity system between the mediating artifact (the note) and both the community and other caregivers (division of labor). There was no process for entering the information from the paper template into the electronic chart, and the electronic medical record system in place at the time did not support importing the paper templates electronically (as a digitized image) in near real time. It would be several years before the hospital's imaging capabilities would permit such digitization to occur. Eventually, however, these documents would eventually be incorporated into an imaging system that could be accessed from the EMR (Evans, Infobytes, 2008).

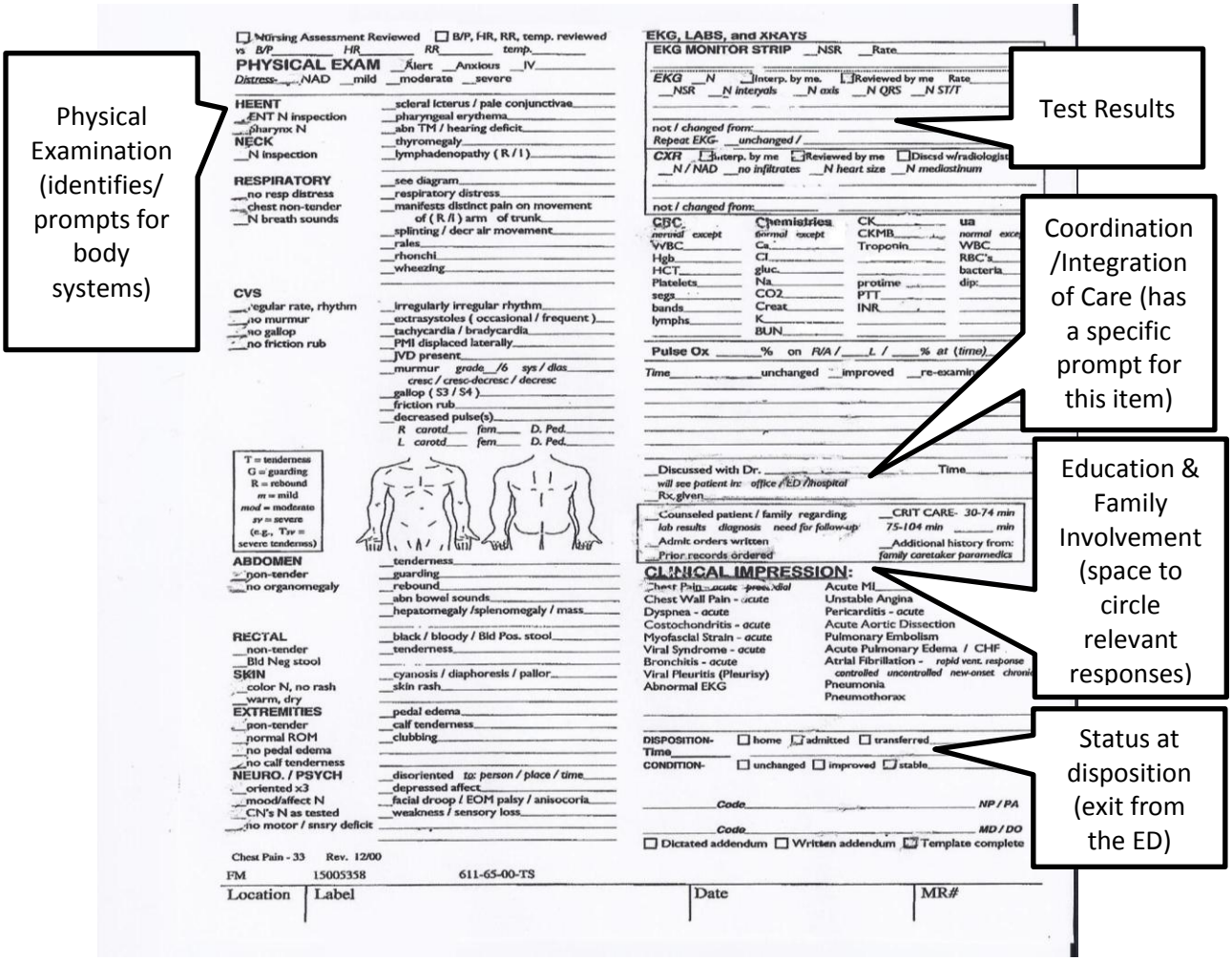


Figure. 4.3: Sample Form (page 2), Model 2

Model 3

By 2004, the hospital recognized the need for a return to electronic documentation in the emergency department and had secured approval for purchasing a "niche" electronic system designed specifically for use in emergency care, thus resulting in the third model of documentation for the emergency physicians. Like the paper-based system that preceded it, the niche system could serve to standardize care, prompting the physician for particular pieces of information based on criteria. Checklists and drop-down boxes made data entry efficient, and the system's rules allowed accurate billing and coding information to be produced as a by-product of documentation. The system also interfaced to the hospital EMR. Because this system has been decommissioned and is no longer available, I cannot provide actual screen shots of the user interface. However, three screen shots from the vendor's marketing materials are provided below which give a sense of the overall "look and feel" of the application. Figure 4.4 demonstrates the "home" screen. This screen gives the providers a snapshot of all patients in the Emergency Department in real time. Patient acuity is color coded by bed location; for instance, in Figure 4.4, medium acuity is indicated in yellow, while high acuity is indicated in orange. Moving from left to right across the screen, we see the patient name, age, chief complaint, and a space for disposition (once it is determined); the responsible caregivers assigned to the patient are indicated in the next columns. Note that for the physician section, attending, resident, and extenders such as physician assistants and nurse practitioners can all be indicated. The Nurse column also allows a primary nurse and an extender such as a nursing assistant or emergency technician to be noted. Orders and test results are indicated in the next section, and an "LOS," or Length of Stay, column tracks how long the patient has been in the department. The display columns are customizable, so HIPAA identifiers such as patient name may be removed from the display for computer terminals in public areas. Prior to implementing this application, the

Emergency Department had a pair of large monitors suspended near the ceiling above the nurse station, which provided a listing of occupied beds along with limited demographic information. The data came from the primary EMR application, and consisted of a report that executed to the screens and updated every minute or so. While this represented the state of the art in 1992, by 2004 this technology was dated. The system used for Model 3 was capable of providing more information on the large tracking boards because more data was being captured within the system. This same data plus even more could be displayed on individual user workstations.

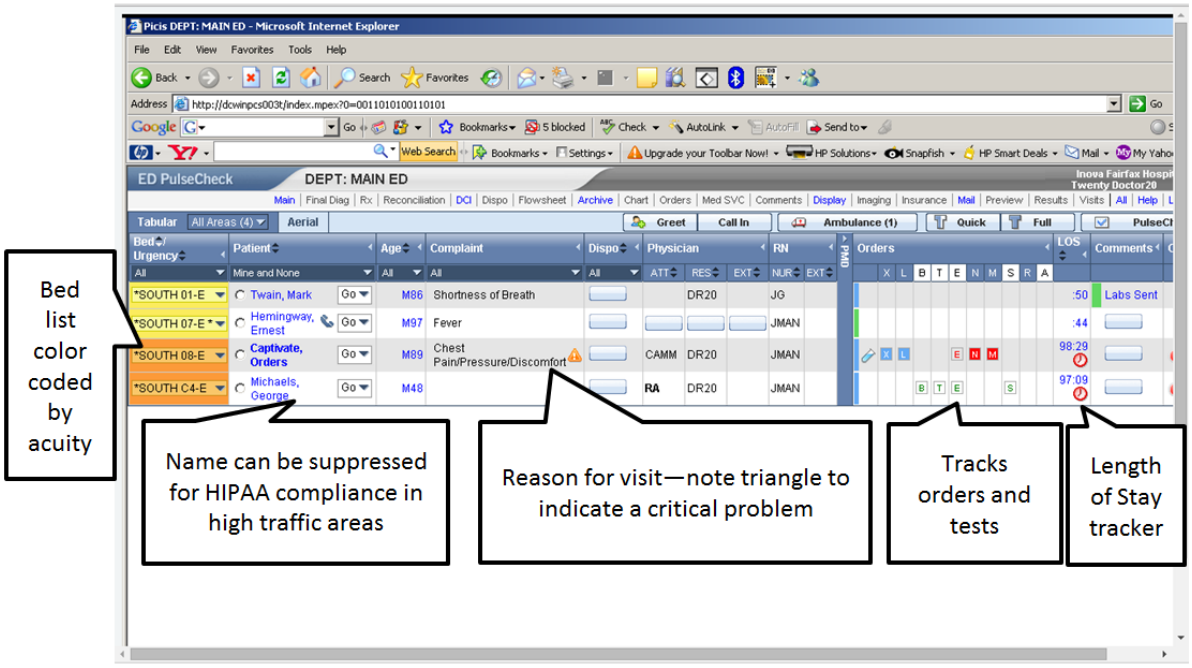


Figure 4.4: Main "whiteboard" display, Model 3

Figure 4.5 demonstrates what a typical charting screen looks like. There is a demographics bar across the top of the screen that contains patient identifiers and significant results such as vital signs and a pain scale; abnormal results are highlighted in red. Looking at the split screen below the demographics bar, the right-hand pane includes a section for charting the "HPI," or History of Present Illness; the screen contains a pick list of common complaints, as well as a search box that can be used to search for terms not on the initial pick list.

The pane on the left side of the screen includes several categories of documentation, used by a variety of providers. This represents a change within the genre/genre ecology. In Models 1 and 2, the tools to produce the notes are used exclusively by the physician; likewise, the resulting note is created by the physician without any input into the content from practitioners from other communities of practice. However, in Model 3, we see a shift. Nurses within the Emergency Department are using the computer system, and they enter information that may subsequently be incorporated into the physician's note. For instance, the "Triage" or "Vital Signs" options are used by nursing staff, options such as the "Past Medical History," "ROS" (Review of Systems), and "Physical Exam" options would be used by the physician.

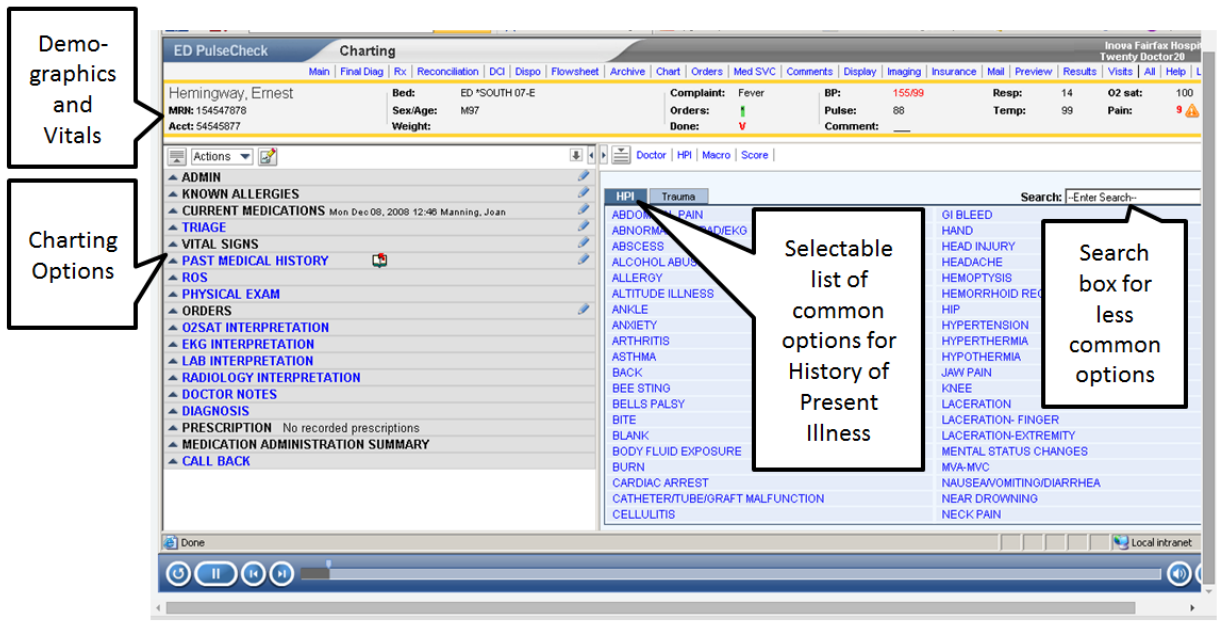


Figure 4.5: Charting screen, Model 3

Figure 4.6 provides an example of the charting screen that opens up when an option is selected from the HPI pick list. For this example, once "fever" is selected, a group of new fields become available for selection. Clicking the blue bar for a particular field opens up a list of

choices for selection; in Figure 4.6, the "Chief Complaint" and "Associated With" options have been opened.

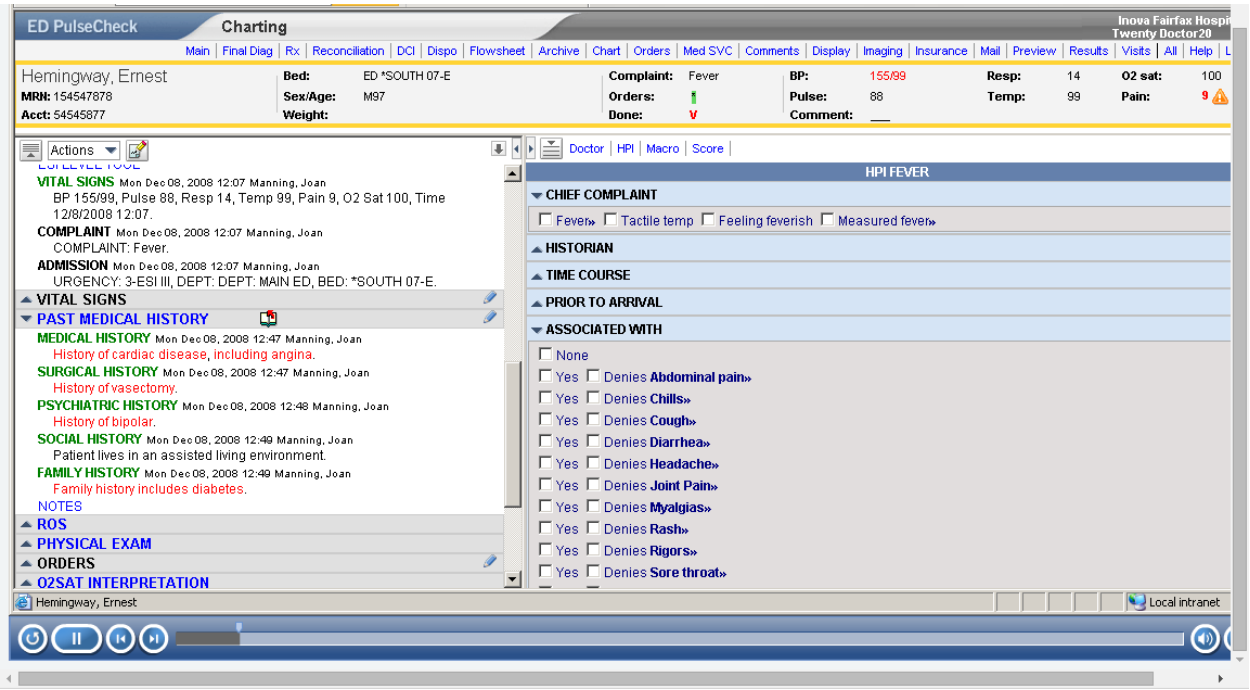
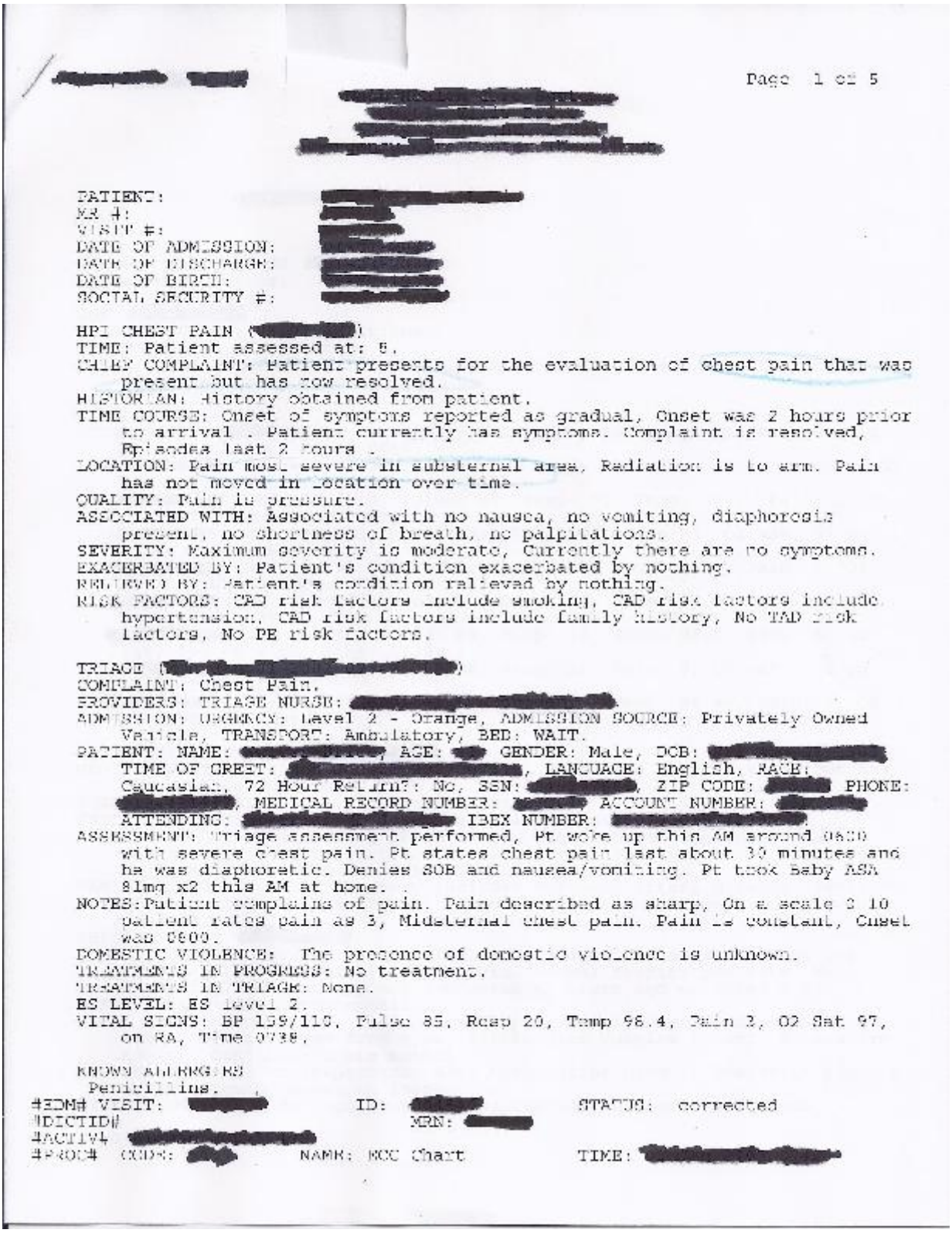


Figure 4.6: Additional HPI fields, Model 3

As the various sections within the charting screens are selected and completed, the system creates a narrative note from the selected data. Figure 4.7 shows the first page from an actual note; to view additional pages, refer to Appendix D. While grammarians might shudder, the resulting document does have a sentence-like structure and reads somewhat like the narrative note produced in Model 1. This is an interesting choice from a system design perspective; Model 2, which consisted of pick lists and checkboxes, was doubtless considered an acceptable documentation format, popular with physician users because of its speed and efficiency. Model 3, which takes advantage of the affordances provided by a complex database system, including prompts, reminders, and required data elements, results in a note that generally contains more bits of information than either of its predecessors. However, when the data is presented to end

users, it is processed by the system to take the time-honored format of the narrative note, similar in appearance to the original model.



[redacted] [redacted] Page 1 of 5

[redacted]

PATIENT: [redacted]
MR #: [redacted]
VISIT #: [redacted]
DATE OF ADMISSION: [redacted]
DATE OF DISCHARGE: [redacted]
DATE OF BIRTH: [redacted]
SOCIAL SECURITY #: [redacted]

HPI CHEST PAIN ([redacted])
TIME: Patient assessed at: 5.
CHIEF COMPLAINT: Patient presents for the evaluation of chest pain that was present but has now resolved.
HISTORIAN: History obtained from patient.
TIME COURSE: Onset of symptoms reported as gradual, Onset was 2 hours prior to arrival . Patient currently has symptoms. Complaint is resolved, Episodes last 2 hours .
LOCATION: Pain most severe in substernal area, Radiation is to arm. Pain has not moved in location over time.
QUALITY: Pain is pressure.
ASSOCIATED WITH: Associated with no nausea, no vomiting, diaphoresis present, no shortness of breath, no palpitations.
SEVERITY: Maximum severity is moderate, Currently there are no symptoms.
EXACERBATED BY: Patient's condition exacerbated by nothing.
RELIEVED BY: Patient's condition relieved by nothing.
RISK FACTORS: CAD risk factors include smoking, CAD risk factors include hypertension, CAD risk factors include family history, No TAD risk factors, No PE risk factors.

TRIAGE ([redacted])
COMPLAINT: Chest Pain.
PROVIDERS: TRIAGE NURSE: [redacted]
ADMISSION: URGENCY: Level 2 - Orange, ADMISSION SOURCE: Privately Owned Vehicle, TRANSPORT: Ambulatory, BED: WAIT.
PATIENT: NAME: [redacted], AGE: [redacted] GENDER: Male, DOB: [redacted]
TIME OF GREET: [redacted], LANGUAGE: English, RACE: Caucasian, 72 Hour Return?: No, SSN: [redacted], ZIP CODE: [redacted] PHONE: [redacted], MEDICAL RECORD NUMBER: [redacted] ACCOUNT NUMBER: [redacted]
ATTENDING: [redacted] IDEX NUMBER: [redacted]
ASSESSMENT: Triage assessment performed, Pt woke up this AM around 0430 with severe chest pain. Pt states chest pain last about 30 minutes and he was diaphoretic. Denies SOB and nausea/vomiting. Pt took baby ASA 81mg x2 this AM at home. .
NOTES:Patient complains of pain. Pain described as sharp, On a scale 0 10 patient rates pain as 3, Midsternal chest pain. Pain is constant, Onset was 0600.
DOMESTIC VIOLENCE: The presence of domestic violence is unknown.
TREATMENTS IN PROGRESS: No treatment.
TREATMENTS IN TRIAGE: None.
ES LEVEL: ES level 2.
VITAL SIGNS: BP 159/110, Pulse 85, Resp 20, Temp 98.4, Pain 3, O2 Sat 97, on RA, Time 0738.

KNOWN ALLERGIES
Penicillins.

#EDN# VISIT: [redacted] ID: [redacted] STATUS: corrected
#DICTID# MRN: [redacted]
#ACTIVA [redacted]
#PROC# CODE: [redacted] NAME: ECG Chart TIME: [redacted]

Figure 4.7: Formatted output (page 1), Model 3

In this third model, registration and encounter information passed electronically from the EMR to the emergency system; diagnostic test orders and results were communicated back-and-forth between systems; and upon completion of the emergency care, the emergency system record was transmitted electronically to the EMR system as a narrative document (again, storing the document as a "text blob," as in the first documentation model). The interface between the emergency department system and the EMR had some limitations; for instance, allergies and medications could not be interfaced between the two systems, requiring duplication of effort when patients moved between the two venues of care. However, physicians providing inpatient care and other providers outside of the emergency department again had ready access to the emergency record. In addition, though the narrative document stored in the primary EMR was not accessible for data mining, information that was input into the niche system was "structured," or composed of discrete fields within data tables. This structure allowed detailed reporting within the niche system, which was a source of useful information across groups of patients–not just for a single patient.

The fact that a single text within a genre could function differently depending upon the tool used to access it highlights a unique circumstance within the genre ecology. While the information contained in the physician's note appears the same, whether viewed in the EMR application or within the emergency system, there are different affordances. Both provide the user with the same patient information, but within the emergency system, the "building blocks" of structured data used to create the physician's note are still available discretely, supporting data mining functions that can be used for statistical analysis, quality assessment, and so on.

Model 4

The newest clinical information system, from which model 4 is produced, was implemented in 2011. This system can be considered a true "electronic health record," or EHR, in that it possesses the ability to export and import data using standard formats that may be received and sent by other health care organizations. Like the niche system for the Emergency Department that preceded it, this information system incorporates specialized tools for the emergency department, and continues to provide standardized content for documentation—but the more problematic interfaces of the past are gone. Because the new system stores all patient information in a common database, medications, allergies, and all documentation occurring in the Emergency Department are now fully integrated into the patient record. Like the niche system that preceded it, emergency care documentation is now mostly structured and useful for data mining and reporting. In addition, the new EMR system also offers limited semantic search capabilities, allowing search-engine-like features that provide some capacity for locating specific data within textual documents. Screen shots demonstrating how a user might move from screen to screen are provided in Appendix E; a sample screen is shown in Figure 4.8.

We see some of the system navigation tools in Figure 4.8. This screen shot demonstrates a demographics bar running horizontally across the screen, showing the patient's name and a snapshot of commonly-used information such as birthdate, age, gender, and identifiers such as medical record number and encounter number. The vertical navigation bar on the left side of the screen provides a menu of items for selection; the "PowerNote" item has been selected, which opens the pane on the right side of the screen. Within the PowerNote pane, a template of "abdominal pain" has been selected. We see a list of familiar components including Chief Complaint, History of Present Illness, Review of Systems, and Physical Examination among others in the area of the screen highlighted in light blue. These items correspond to the pick lists

on the right side of the pane that appear when "show structure" is chosen. The physician can quickly build a note by clicking on the desired responses; clicking "OTHER" allows him or her to enter a free-text comment.

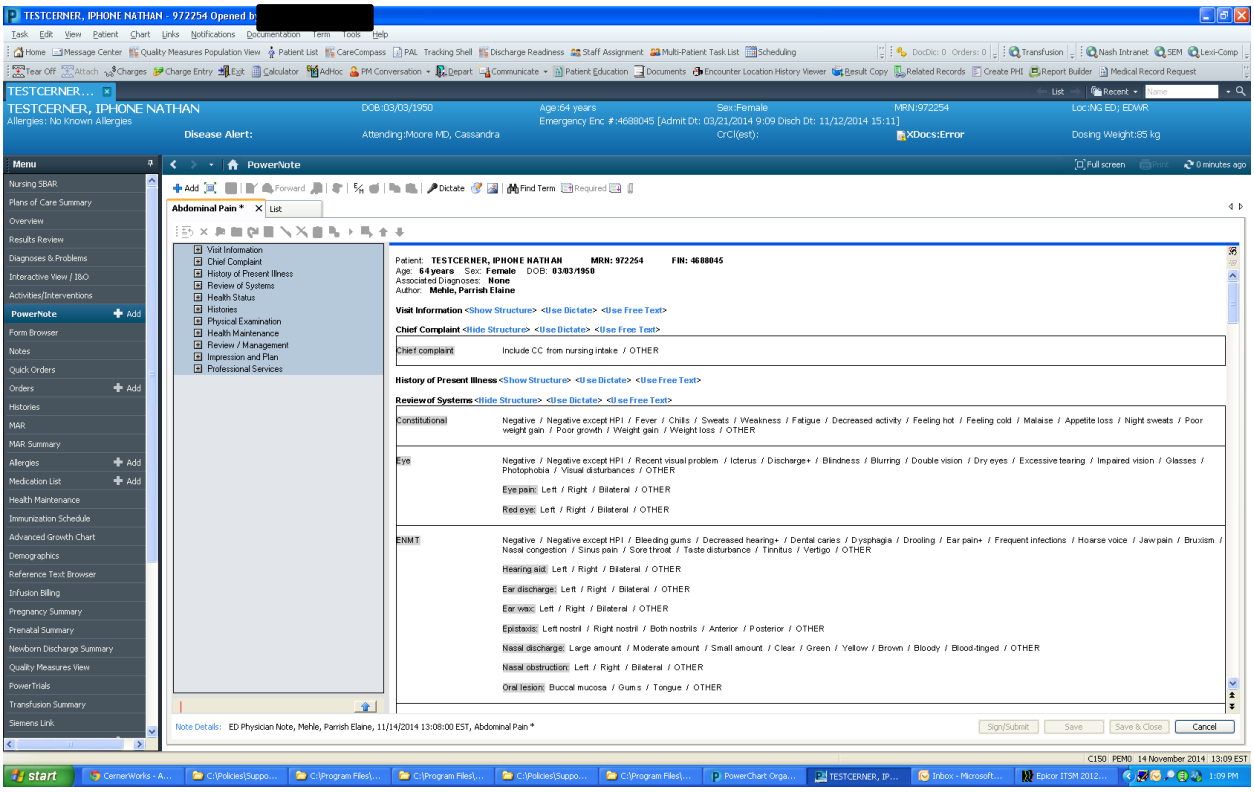


Figure 4.8: Charting screen, Model 4

In Figure 4.9, we see an additional system tool—an automated coding review. Selecting this tool allows the end user to see which billing level (CPT code) is supported by the number and type of documented items. Tools are an important part of a genre ecology. Beyond the "tool" of the documentation system itself, we see an additional system feature that supports a very specific aspect of the activity system of providing care. This particular feature interacts very specifically with the community activity of billing, as well as supporting the division of labor for

individuals whose role is to perform medical coding.

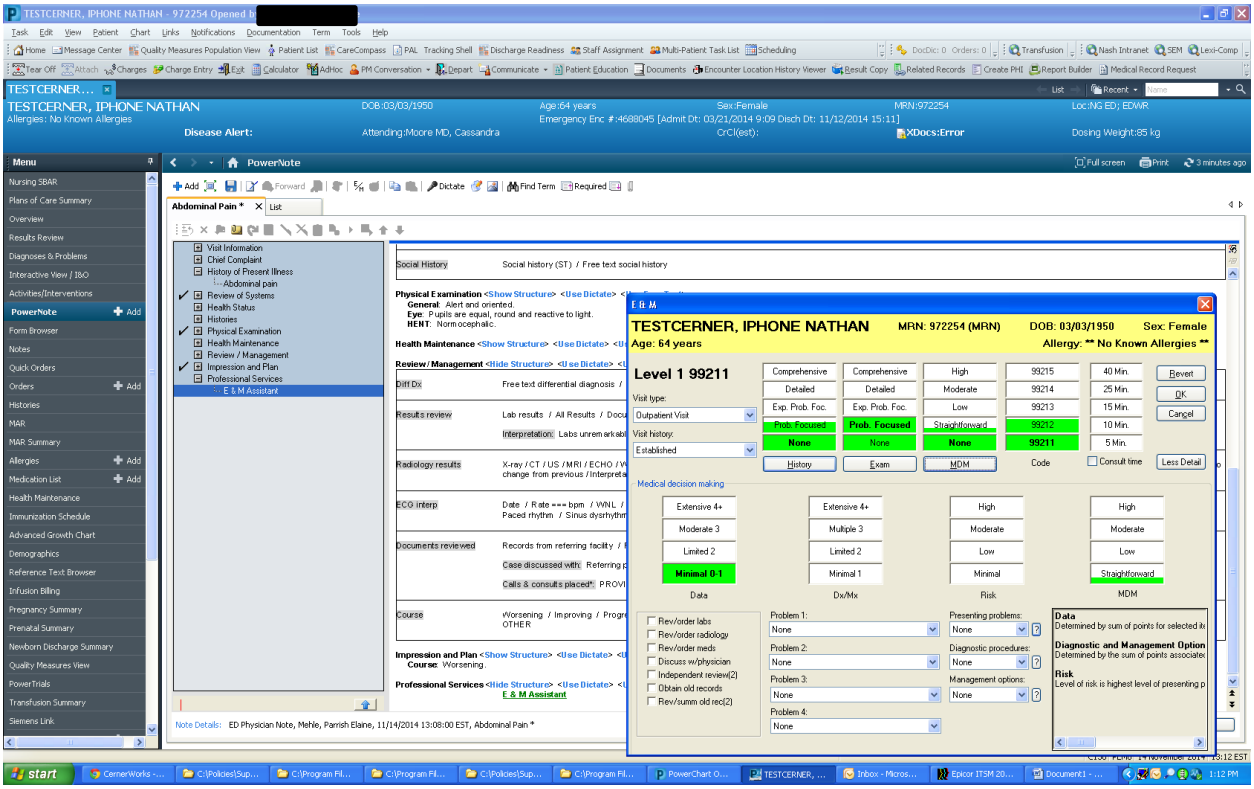


Figure 4.9: Coding Assistant tool, Model 4

Figure 4.10 demonstrates the first page of output from the physician's selections in the charting screens. Similar to Model 3, Model 4 also automatically converts the selections into narrative note format. Also similar to Model 3, Model 4 also permits data entered into the medical record by other caregivers to be included in the physician's note. In Model 3, the contributors are essentially limited to users of the niche application. However, the note produced in Model 4 is comes from a system that is in use hospital-wide. Because all of the information in the system is stored in a common database, the potential exists to integrate information produced by many different communities of practice into system documents, depending on the requirements placed on the genre in order to effectively mediate patient care activities. A sample note from Model 4 is provided in its entirety in Appendix F.

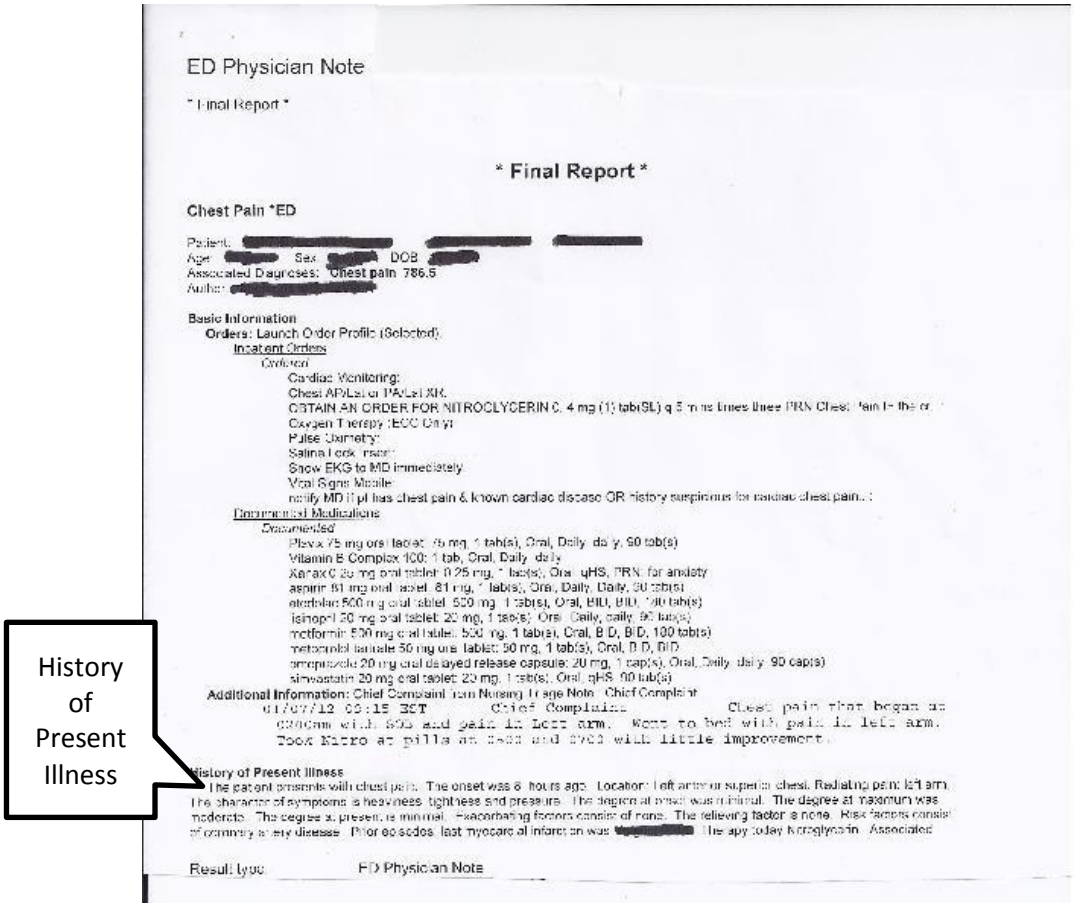


Figure 4.10: Formatted output (page 1), Model 4

With Model 4, we see some simplification in terms of the patient care activity system. Because some layers of technology (separate systems, data interfaces, etc.) have been eliminated, some potential sources of discontinuity have been removed. All of the data that contributes to the physician note is housed in the same repository as all other types of patient clinical data and is available in real time, supporting the activities of other caregivers within the division of labor. Information from the patient's encounter is also available to the patient himself via the hospital's "patient portal," a secure website to which patients may subscribe in order to access portions of their own records. This brings the patient into the activity system as a participant and user of the genre, not simply the "object" of the activity system to which interventions are provided and for

whom a favorable outcome is desired. Because the system producing the genre is interoperable, an increased level of community participation is also possible. Information from the encounter, including portions from the physician's note, can be transmitted electronically to other health care organizations. From the internal perspective of the hospital, much of the data that forms the physician's note is now discrete and structured, facilitating data review for a single patient as well as supporting data mining across large numbers of patients. As also observed with Model 3, the narrative note produced in Model 4 also includes contributions from other practitioners, demonstrating another means by which the artifact supports the aspect of division of labor within the activity system of providing patient care.

I have now described each of the four models for documenting physician notes, and highlighted what I consider to be important changes to the genre of the note and to the genre ecology that includes the tools used to create them. As the genre/genre ecology has evolved, the ability of the physician's note to mediate the actions of health care has increased through its improved ability to support usage by other practitioners within the health care setting, other users in the community, and even patients themselves. Models 2, 3, and 4, in addition to other affordances already described, also exert pressures and constraints in the form of prompts and reminders (and in the case of models 3 and 4, forcing functions) that can lead to increased regulatory compliance by helping to ensure that the notes include all of the features required by the regulatory bodies. The note, by virtue of the systems used to create it, also exerts an influence on the subjects of our activity system—the physicians—shaping the way that they approach their documentation.

As stated at the beginning of this chapter, one feature of a genre ecology is its contingency—in other words, the way that users appropriate a genre for their own purposes.

While physician notes are intended first and foremost for the use of physicians, they have been appropriated for use in hospital billing. Physician notes are used as evidence to support claims to insurers, using clearly-defined requirements. This appropriation results in pressure on the genre to support an additional function—meeting billing requirements.

Physician notes also frequently introduce a patient to other health care providers, both within and outside the organization in which the note is produced. In this way, they serve a representational function, creating an identity for the patient. This concept of identity is at the heart of the concept of patient-centered care, which is concerned with the needs, values, and preferences of individual patients *(Crossing the quality chasm: A new health system for the 21st century*, 2001). In order to support patient-centeredness, the way patients are represented within the genre of the physician's must be considered. This potentially provides an additional, different sort of pressure on the genre—to support a philosophy of care, in addition to its other functions within the activity system of providing that care.

These considerations lead us back to my original research questions. The first research question that I asked was "How do the four models compare in terms of documented items that are used for billing?" The second was "How are the elements essential to "patient-centered care" addressed within the text of each model?" In order to answer each of these questions, I evaluated each of the four models using a quantitative approach. In the remaining pages of this chapter, I will discuss my analysis and findings, demonstrating the changes with respect to the elements of both usages throughout the evolution of the genre.

Analysis of the Physicians' Notes

Physician notes were reviewed and tagged for elements used for billing and for elements that reflect patient-centeredness. As I mentioned in Chapter 1, the CMS published guidelines in 1995 and 1997 describing the documentation required to support billing for evaluation and management of patients. These guidelines stipulate the quantity of documentation needed in each of five different categories in order to support the use of a particular Current Procedural Terminology (CPT) code for billing at a given level of service. The five categories include History of Present Illness (HPI), Review of Systems (ROS), Patient/Family/Social History (PFSH), Physical Examination (PE), and Medical Decisionmaking (MD). Within each of the five categories, the CMS guidelines also list specific elements and the number of each that are required in order to support billing at a given level.

In order to evaluate the notes in light of the elements used for billing, I created a checklist based upon the 1997 CMS guidelines. I reviewed each note and recorded the presence or absence of the elements for each category. For each category, I determined the total number of elements charted. The checklist originally included a section for "Medical Decisionmaking;" however, in three of the four models evaluated there were no explicit data elements that could be readily assessed; therefore, I opted to eliminate this element.

Once the data was recorded for each model, I determined the median number of elements recorded for each category. I chose to use the median as a basis for comparison because it is less susceptible to the influence of outliers than the mean (Measures of Central Tendency).

A similar approach was used for the patient-centered elements. However, these elements were less well-defined than the billing items, so reviewing for latent content and making decisions on how to code the data was required. For the category of "Patient's Values,

Preferences, and Needs," three clear-cut elements were found: tobacco use, alcohol use, and drug abuse. Any additional items were grouped together as "other preferences/needs." The category of "Patient Comfort" likewise required review and a determination as to how this aspect of care would be evaluated. Reviewing the charts revealed that for all four models, pain at admission was well defined and extensively captured within the History of Present Illness. Pain is frequently referred to in hospitals as the "fifth vital sign" (after temperature, pulse, respiration, and blood pressure), and HCAHPS focuses on the treatment of patients' pain as well. Since pain at admission was being consistently documented, I chose to focus on pain documentation at the time the patient was exiting the emergency department for my Patient Comfort measure. For the remaining categories (Coordinating/Integrating Care, Information/Education/Communicative Needs, Emotional Support, and Involvement of Family/Friends), any mention within the note relative to a given category was counted as a positive response. For example, a phone call between the emergency physician and a consulting cardiologist was counted under "Coordinating/Integrating Care;" a note that a patient was hard of hearing was included under "Information/Education/Communicative Needs." When enumerating the patient-centered elements, I recorded whether the element was present in the note or not and then calculated the percentage of notes for which the element was present for each model. In the following paragraphs, I present the results of my analysis.

Billing Data Elements

A summary of my findings from my analysis of the billing data elements is presented in Table 4.1, which lists the median number of defined elements for each category in each of the four models. The median absolute deviation (MAD), a measure of dispersion around the median,

appears in parentheses next to each median value. In the following paragraphs, I discuss each category in detail.

	Model 1	Model 2	Model 3	Model 4
HPI	4 (1)	6 (1)	7 (0)	6 (1)
ROS	2 (2)	7 (1)	10 (3.5)	10 (1)
PFSH	3 (0)	3 (0)	3 (0)	3 (0)
PE	9 (1)	11 (0)	12 (1)	12 (1)
TOTAL	**18**	**27**	**32**	**31**

Table 4.1: Billing Elements by Model

History of Present Illness

There are eight possible elements within the History of Present Illness section that are used for describing the patient's current symptoms. They are:

Location (where in the body is the pain/symptom?)
Quality (a description of the pain/discomfort; e.g., burning, crushing, stabbing)
Severity (mild, moderate, severe, or a pain scale such as ranking from one to ten with one being the absence of pain and ten being the worst pain imaginable)
Duration (how long have the symptoms been going on?)
Timing (when do the symptoms occur?)
Context (what was the patient doing/what activity triggers the symptoms?)
Modifying factors (does anything make the symptoms better/worse?)
Associated signs/symptoms (what other symptoms are present? For instance, patients experiencing chest pain may also experience nausea and vomiting.)

In Model 1, the History of Present Illness is a narrative, completely at the physician's discretion. The following example is fairly typical of this model:

> ____ has approximately a one week history of intermittent and substernal chest pain that is pressure in nature. There is no radiation. Positive mild shortness of breath. No paroxysmal nocturnal dyspnea or orthopnea noted. He denies any relationship to eating, activities, or walking. He does not seem to have a whole lot of pain during the day. He has had increasing amounts of chest pain every night this week.

We see some of the elements reflected in the model; for instance, we quickly note the location (substernal chest pain), quality (pressure), duration (one week), context (denies any relationship to eating, activities, or walking), and associated signs/symptoms (positive mild shortness of breath).

In Model 2, the physician is given the opportunity to document any or all of the eight elements. The HPI section of the form includes a human torso diagram upon which the location of the pain may be quickly marked; the element "quality" has a list of words that can be quickly circled. Other portions of the HPI section prompt the physician for the remaining elements, also with lists of responses that can be readily marked by circling (for positive responses) or via strikethrough (for negative responses).

Model 3 provides the physician with a field for each element, as well as a pick list for frequently-used choices. Model 4 offers a similar list of fields and pick lists, but has one significant difference: for HPI, the physician also has an option of using free text, either in addition to or in lieu of the fields and pick lists.

For this category, I reviewed each of the notes and recorded for each of the eight elements whether it was addressed in the record or not. I determined the median number for each model, as well noting the minimum and maximum values, identifying the 25% and 75% quartiles, and calculating the interquartile range. The median value for Model 1 was 4, with a range of 1 to 8; Models 2 and 4 were higher, each with a median value of 6; Model 3 had a median value of 7. The ranges for Models 2, 3, and 4 were similar, with a minimum of 2 for

Model 2 and 1 for Models 3 and 4; the maximum for each was 7. The interquartile ranges were similar across the models, with Model 3 demonstrating the smallest interquartile range of 1. This information is presented in table form in Table 4.2. It is displayed graphically in Figure 4.11. Note that for the graph, the median value is identified with a black diamond. The range of data is shown by a gray vertical line, and the interquartile range is indicated by a gray box. These conventions will be used in presenting the data for each category.

	Model 1	Model 2	Model 3	Model 4
Upper Quartile (75%)	6	7	7	6
Maximum	8	7	7	7
Minimum	1	2	1	1
Median	4	6	7	6
Lower Quartile (25%)	4	5	6	4.25
Interquartile Range	2	2	1	1.75

Table 4.2: Data, History of Present Illness

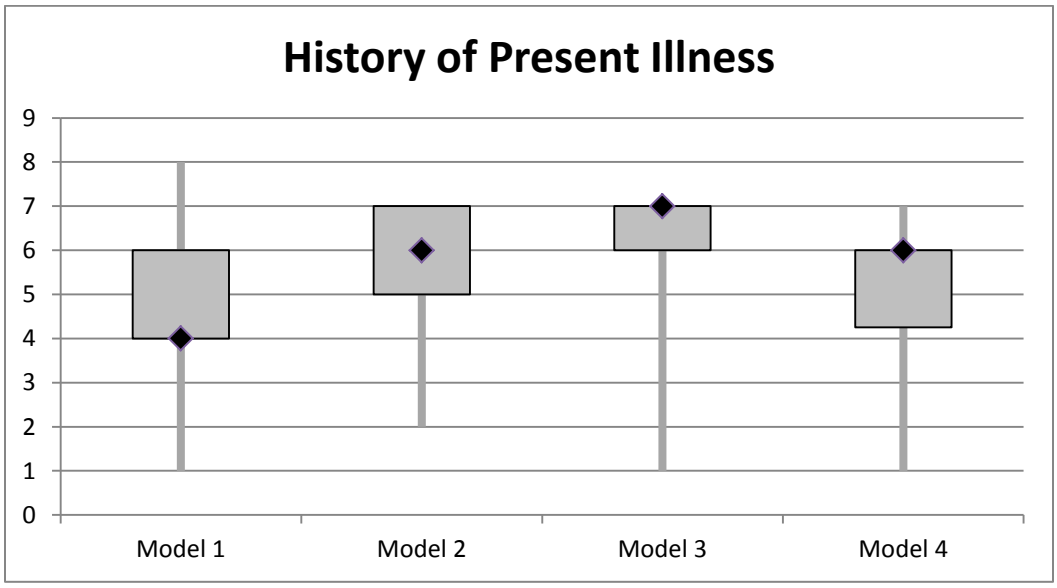


Figure 4.11: Elements charted for History of Present Illness

Review of Systems

The second category within the Billing Elements is the Review of Systems. There are fourteen possible elements included in this category:

Constitutional (such as fever, weight loss)	Gastrointestinal	Psychiatric
Eyes	Genitourinary	Endocrine
Ears/Nose/Mouth/Throat	Musculoskeletal	Hematologic/Lymphatic
Cardiovascular	Integumentary	Allergic/Immunologic
Respiratory	Neurological	

For the Review of Systems, Models 2, 3, and 4 present the physician with prompts regarding the various body systems about which to inquire, such as whether the patient is experiencing fever or chills, has a cough, has blurred vision, or has headaches. As described in the previous section, I reviewed each note for the presence of documentation relevant to the specific elements and again determined the median for each model. There was a dramatic difference observed between Model 1 and the subsequent models for this category. In Model 1, the median value was 2, despite the range extending from 0 to 14. The Model 2 median was much higher, at 7; the range is tighter, with a minimum of 0 and maximum of 9; the interquartile range is the smallest of the four models, at 1. Models 3 and 4 demonstrated an increase over the preceding models, each with a median value of 10. The ranges are different, with Model 3 exhibiting the same spread seen with Model 1; the interquartile range is quite large compared to the other models, with a value of 10. The data is presented in tabular form in Table 4.3 and graphically in Figure 4.12.

	Model 1	Model 2	Model 3	Model 4
Upper Quartile (75%)	5.25	7	12	12
Maximum	14	9	14	14
Minimum	0	0	0	9
Median	2	7	10	10
Lower Quartile (25%)	0	6	2	10
Interquartile Range	5.25	1	10	2

Table 4.3: Data, Review of Systems

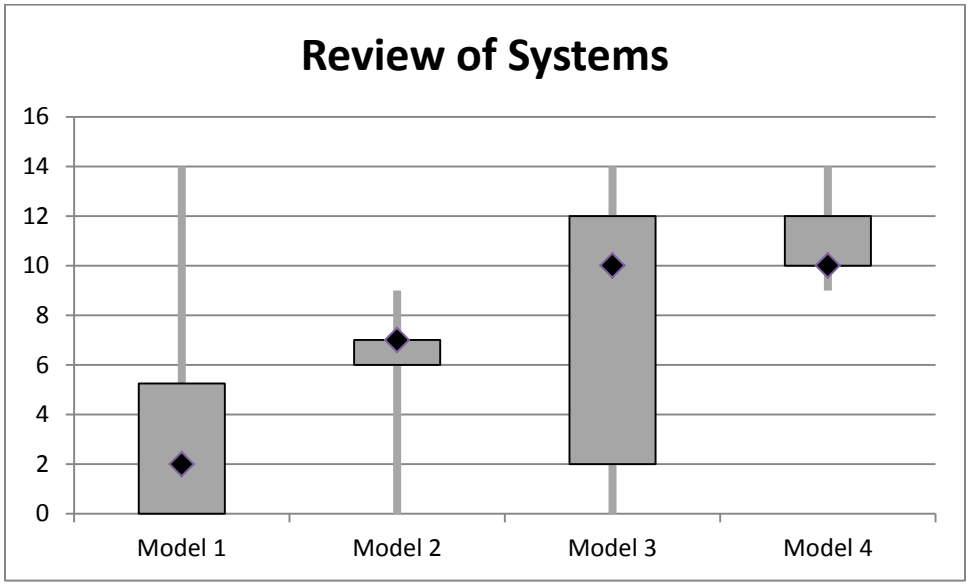


Figure 4.12: Elements Charted for Review of Systems

Patient/Family/Social History

The third category within the Billing Element dataset is identified as Patient/Family/Social History. There are only three items within this category:

- Past medical history (patient's own relevant medical history)
- Family history (typically, family history of illnesses pertinent to the patient symptoms)
- Social history (typically, tobacco, alcohol, and/or drug use, as well as the living situation – alone, with family, with others, etc.)

This element demonstrated the greatest consistency across the four models. The median value for all four models was 3; Model 1 exhibited the widest range, from 0 to 3; Model 2 had the smallest, from 2 to 3. Model 3 had the smallest interquartile range, at 0. The data is presented in table format in Table 4.4. A graph of the data is found in Figure 4.13.

	Model 1	Model 2	Model 3	Model 4
Upper Quartile (75%)	3	3	3	3
Maximum	3	3	3	3
Minimum	0	2	1	1
Median	3	3	3	3
Lower Quartile (25%)	2	2	3	2
Interquartile Range	1	1	0	1

Table 4.4: Data, Patient/Family/Social History

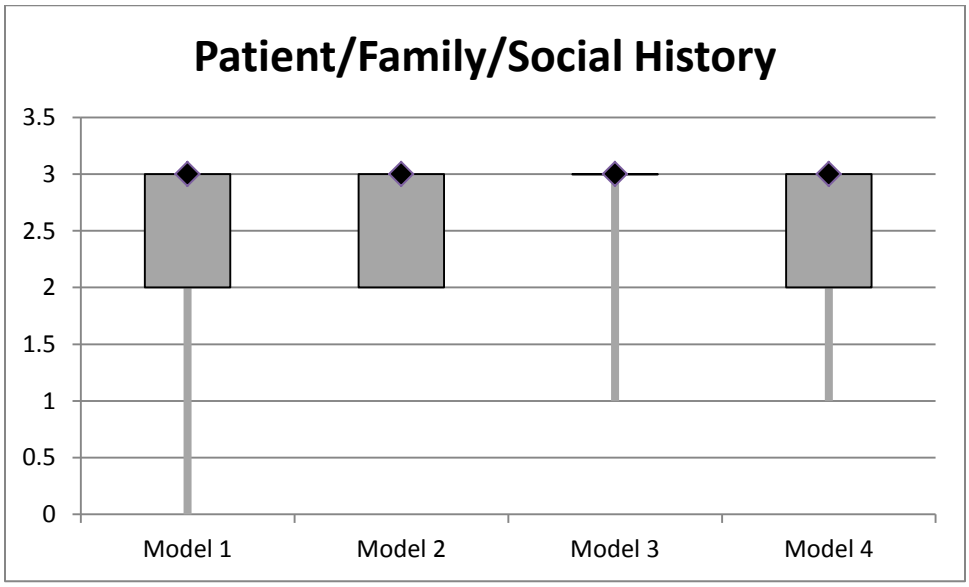


Figure 4.13: Elements Charted for Patient/Family/Social History

Physical Examination

The Physical Examination section of the physician's note closely mirrors the Review of Systems, including many of the same items. While the two categories appear to address the same information, in reality these sections are used for different things. In the Review of Systems, the physician is typically interviewing the patient, asking questions about the various body systems. The Physical Examination section is where the physician records observations and physical findings from the examination performed. Depending upon the patient's individual situation, the components of the Physical Examination can vary; I chose to use the list of elements described in

the 1997 Documentation Guidelines for a "General Multi-System Evaluation" when I created my evaluation checklist. The elements are as follows:

Constitutional	Cardiovascular	Musculoskeletal
Eyes	Chest/breast	Skin
Ears/Nose/Mouth/Throat	Gastrointestinal	Neurological
Neck	Genitourinary	Psychiatric
Respiratory	Lymphatic	

In Model 1, the median value was 9 with a range of 0 to 12; the interquartile range was 3.25, with 50% of values falling between 6.75 and 10. Model 2 exhibited a slightly higher median value of 11, with a range of 5 to 11; the interquartile range was smallest for this model with a value of 1. Models 3 and 4 each had a median value of 12; Model 3 had the greatest range across all models, from 0 to 14, and Model 4 had the tightest, at 9 to 13. The interquartile ranges for Models 3 and 4 were identical at 2, spanning from 11 to 13. This would suggest that the screen flows or forcing functions for Model 4 resulted in greater consistency of data capture than Model 3. These results are presented in tabular form in Table 4.5, and in graphical form in Figure 4.14. My focus was on evaluating each note for the presence or absence of each element, and determining overall totals for the number of elements documented. However, it was possible through the course of reviewing the notes to observe some differences. For instance, taking the element of "Eyes" as an example, in Model 1 physicians frequently combined assessment of the eyes with the head, ears, nose, mouth, and throat, using the abbreviation HEENT to represent them. Blanket statements such as "HEENT: within normal limits" or "no acute change" were seen. Model 2 presents the user with a very brief list of items that can be checked; essentially, the physician can select "N inspection" (N for normal), or check and/or circle "___ scleral icterus / pale conjunctivae." Any additional comments must be recorded on the single line provided at the end of the section. In contrast, examination of the eyes in Model 3 frequently resulted in far

more documentation, which was seen across many of the sample notes. A typical entry reads "Eyes are normal to inspection, Pupils equal, round, and reactive to light, No discharge from eyes, Extraocular muscles intact, Sclera are normal, Conjunctiva are normal." Capitalization here is as it appears within the note, and is the result of the system concatenating strings chosen from a pick list in order to create a note with more of a narrative flavor. Model 4 is similar; a typical entry reads "Eyes are normal to inspection, No discharge from eyes, Extraocular muscles intact, Sclera are normal, Conjunctiva are normal." Interestingly, the wording is very similar to Model 3. While this may represent standard language, it is also possible that when the pick lists were created for Model 4, many of the items from the previous model may have been replicated in the new system. From a system implementation perspective, this makes sense. First, there is ready-made content which is available to the implementation team; second, providing end users with content that they are already familiar with helps them to transition from their old system (Model 3) to the new one (Model 4).

	Model 1	Model 2	Model 3	Model 4
Upper Quartile (75%)	10	11	13	13
Maximum	12	11	14	13
Minimum	0	5	0	9
Median	9	11	12	12
Lower Quartile (25%)	6.75	10	11	11
Interquartile Range	3.25	1	2	2

Table 4.5: Data, Physical Examination

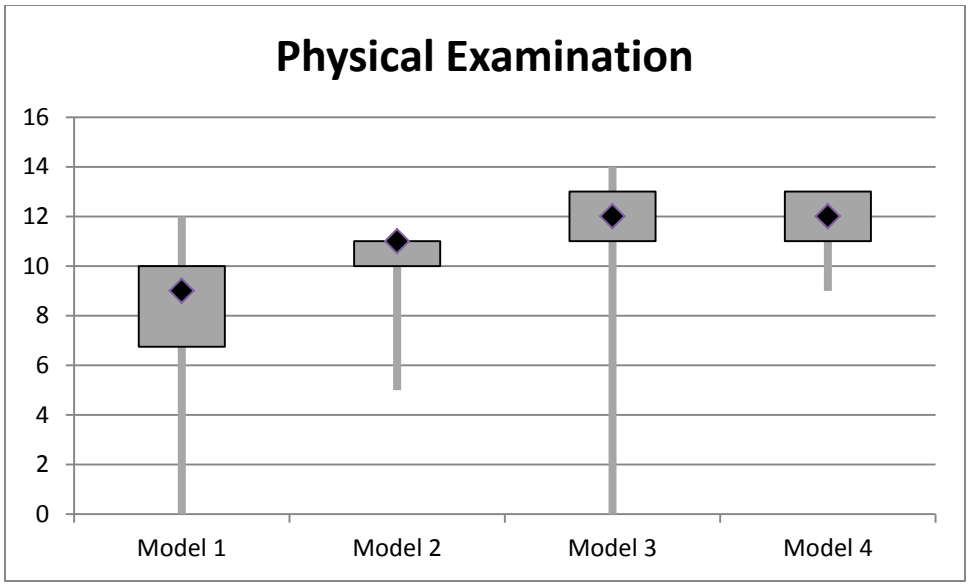


Figure 4.14: Elements Charted for Physical Examination

Patient-Centered Care Data Elements

The elements of patient-centered care were less explicit than the elements used for billing, and therefore required review with an eye to latent content. When the notes were read and tagged for the elements identified as supporting patient-centered care, the first category of patient needs, values, and preferences yielded four subcategories of data. The models were found to capture information regarding tobacco use, alcohol use, drug use, and a broad subset of other information that included such items as the patient's living situation or specific hobbies or interests. A table listing each of the patient-centered elements and the percentages of notes for which the element was documented across the models is presented in Table 4.6.

Element	Model 1	Model 2	Model 3	Model 4
Patient Needs/Values/Preferences				
Tobacco	77.08	97.87	89.58	52.38

Alcohol	60.42	82.98	89.58	54.76
Drug Abuse	0	44.68	81.25	47.62
Other	29.17	4.26	58.33	45.24
Coordination/Integration of Care	87.50	74.47	87.50	100
Information/Communication Needs	2.92	46.81	27.08	59.52
Pain at Handoff	62.50	48.94	93.75	52.38
Emotional Support	18.75	25.53	18.75	14.29
Involvement of Family/Friends	54.17	25.53	14.58	54.76

Table 4.6: Patient-Centered Elements, Percentage Present by Model

Patient Needs/Values/Preferences

Examining the text revealed differences in how each of the models dealt with the subject matter of patient needs, values, and preferences. This category overlaps somewhat with what is termed "Social History" when looking at the Billing elements. Model 1 provided some variability, as each dictating physician was free to choose what to include and what to leave out. Interestingly, while 37 of the 48 sample charts address alcohol and/or tobacco usage, none of the sample charts from this model address whether the patient uses/abuses drugs. In three charts, we see comments that address patients' desires specifically regarding their medical treatment and willingness to undergo invasive testing. One physician made a note that the patient "refused cardiac catheterization;" another wrote that the patient "has at this point steadfastly refused to have any invasive studies done;" a third noted that the patient "refused the 3rd recommended angiogram."

Other comments related to physical disabilities for which special accommodations might be needed. One note included a comment that the patient "walks with a walker" and requires "soft vegetables" in order to eat them. Another note mentions that "hearing is diminished."

A few other charts include information of a more personal nature. Two charts mention that the patient lives alone. In another chart, the physician notes that the patient participates in horseback riding. Another chart includes extensive comments from the physician, stating that the patient is a "married housewife" whose spouse has Alzheimer's disease and can no longer care for himself; the couple also has an adult son who is mentally handicapped and difficult to manage, and there is also an adult daughter who has breast cancer.

Model 2 demonstrates fewer variations in responses, since the alcohol, tobacco, and drug responses can be valued positively or negatively with a checkmark or strikethrough. In seven of the charts, the physician did make an additional comment either with respect to the quantity of alcohol or tobacco routinely used, or that the patient had quit using tobacco or alcohol.

In two of the Model 2 charts, an additional comment not relative to alcohol, tobacco, or drugs was handwritten into the record. In each case, the physician noted that these patients did not wish to have artificial resuscitation should their hearts stop.

We see the impact of having "pick lists" for selection in Model 3, which is the "niche" system designed specifically for use in the emergency setting. This model resulted in consistent statements: "denies alcohol abuse," "denies tobacco abuse," "denies drug abuse." Twenty-six charts also included the patient's living situation. The most frequent response was "lives with others," but three of these indicated that the patient resided in some type of long term care facility and one indicated that the patient lived alone at home. Two of the charts contained a note indicating that the patient was able to read and write. Two other charts contained references to

disability; one contained a general reference to the patient being "disabled," while the other specifically noted that the patient was blind and had a below-the-knee amputation.

Model 4 has similarities to Model 3, in that the narrative note is also generated from "pick list" elements. However, there is also the ability to enter free-text information, which is reflected in the diversity of comments. While the usual elements of alcohol, tobacco, and/or drug use are present in twenty-seven of the charts, a number of additional pieces of information can be found in this model. In four of the charts, the physician entered information relative to health issues in addition to the presenting complaint, such as the need for dialysis or a diagnosis of advanced cancer. Employment status is mentioned in five charts, with notes stating the patient is "retired," "unemployed," or "unemployed and seeking disability." In one chart, the physician noted that he or she wished to transfer the patient to another hospital, but that the "family refuses this."

Because the coding for the patient-centered items was essentially either "present" or "absent," one way to understand and visualize the data is to simply compare the percentages for each model. (Percentage is preferable to count since the sample sizes are unequal.) When considering the four subcategories identified under the umbrella of patient needs/values/preferences, we find that tobacco use was documented 77.08% of the time in Model 1. Model 2 captured information on tobacco use at the highest frequency, at 97.87%, followed by Model 3 at 89.58. Model 4, which is the most recent model, came in at a distant 52.38%. This information is represented graphically in Figure 4.15.

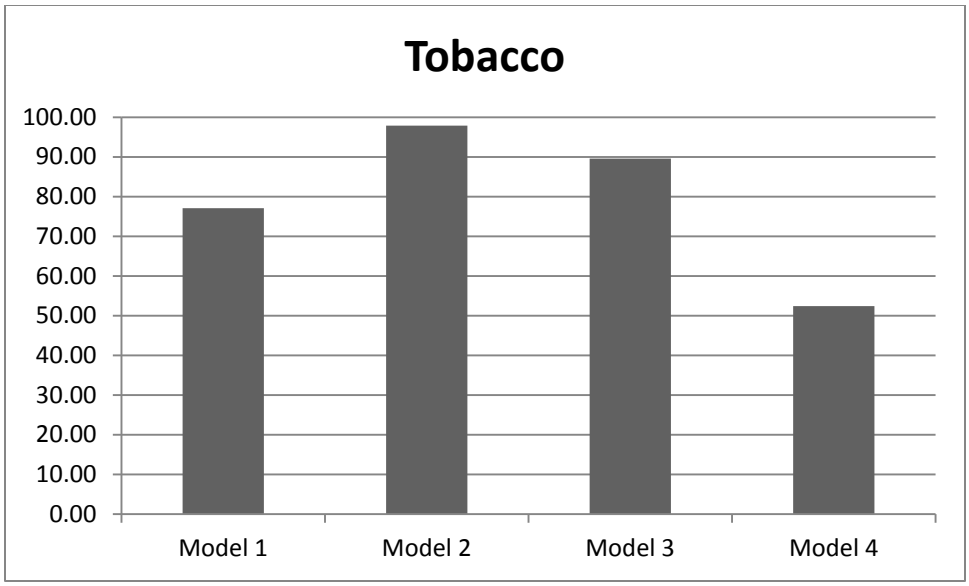


Figure 4.15: Percentage of notes for which tobacco use is addressed

Alcohol use was addressed less frequently than tobacco in Models 1 and 2, with 60.42 and 82.98 % respectively; the percentages for Models 3 and 4 were much closer to the findings for tobacco, at 89.58% (the same frequency as tobacco) for Model 3 and 54.76% for Model 4. The findings are represented graphically in Figure 4.16.

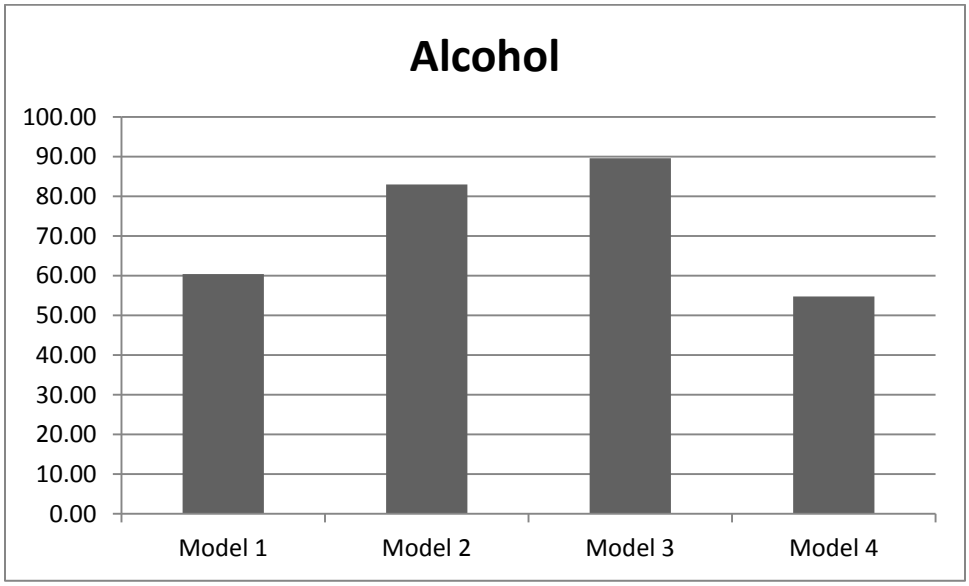


Figure 4.16: Percentage of notes for which alcohol use is addressed

Drug use was mentioned less frequently across all four models. Drug use for Model 1 was not documented in a single note from the sample corpus. It was addressed only 44.68% of the time in Model 2 (about half as often as tobacco and alcohol). The frequency was higher in Model 3, which captured an assessment of drug use 81.25% of the time. Model 4 was similar to Model 2, with a percentage of 47.62. A graph of the data is presented in Figure 4.17.

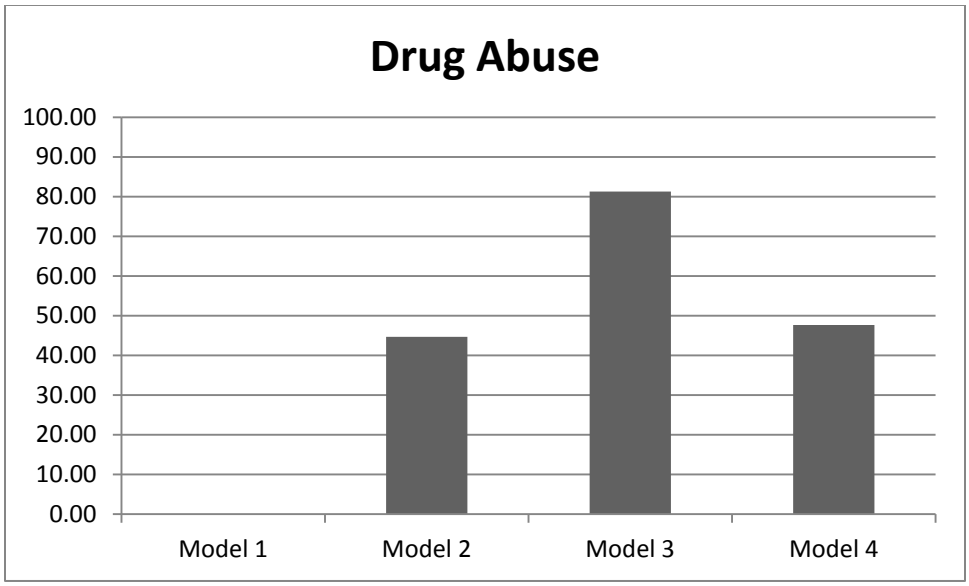


Figure 4.17: Percentage of notes for which drug abuse is addressed

The "other preferences/needs" category was addressed with the least frequency in each model. In Model 1, other preferences were mentioned in only 29.17% of charts. Model 2 had the lowest frequency at 4.26%. Model 3 had the highest frequency, at 58.33% of charts, and Model 4 was the second highest, at 45.24%. This information is shown graphically in Figure 4.18.

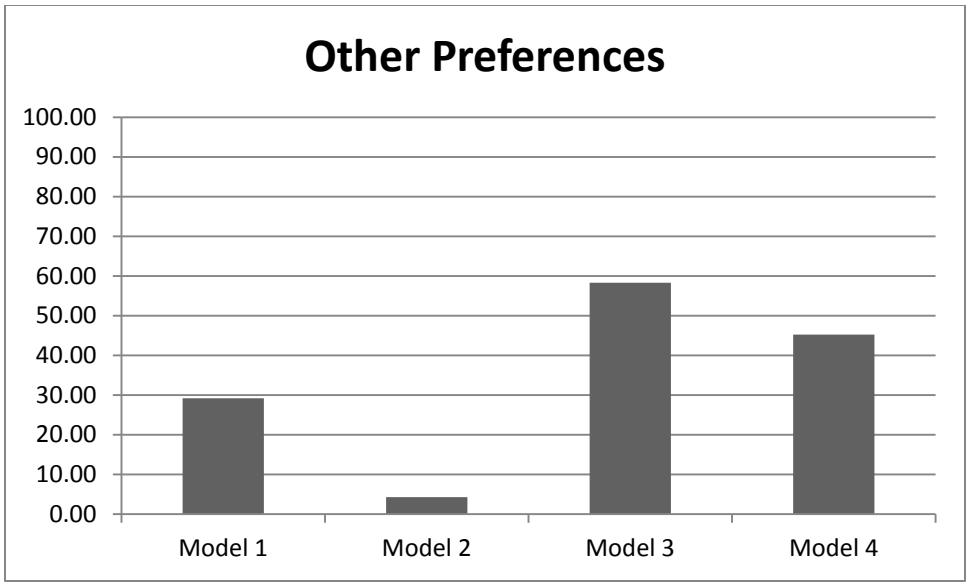


Figure 4.18: Percentage of notes for which other preferences are addressed

Coordination/Integration of Care

Documentation of activity regarding coordination and integration of care was consistently high across all four models. It was consistently noted that the written documentation pertained to physician-to-physician communication; little mention was made of coordination with other members of the healthcare team. Nonetheless, the documentation did reflect the emergency physicians' coordination of treatment with the admitting physician who would be receiving the patient for inpatient care. Models 1 and 3 each had a percentage of 87.50%; Model 2 was slightly lower at 74.47%; Model 4 had a "perfect score" of 100%, suggesting a system forcing function or required field. A graph of the data is presented in Figure 4.19. The actual language used is consistent with the affordances provided with each set of tools. For Model 1, the physician's own spoken sentence structure was present, but there was consistency in language, with phrases such as "I spoke with Dr. ___" or "Consultation was made with Dr. ___" appearing with some regularity.

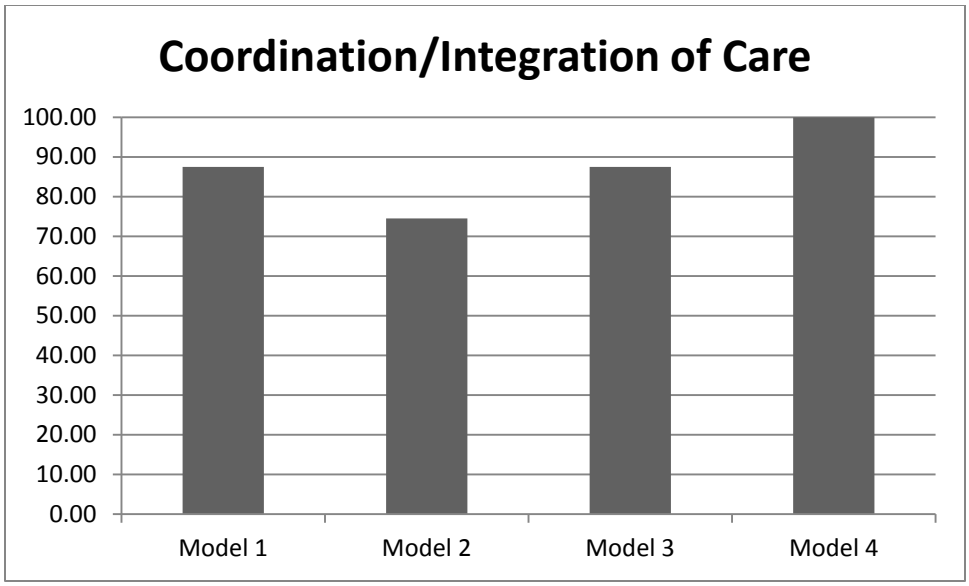


Figure 4.19: Percentage of notes for which coordination/integration of care is addressed

For Model 2, the paper form has two preprinted lines: "___Discussed with Dr. ____ Time ____" followed by "will see patient in office/ED/hospital" (completed by circling the appropriate response). The form also has blank lines above the preprinted item, in which the physician could also make a handwritten note. There were 35 responses to this item; in four of them, the physician wrote in additional information. Two of the four were additional clarification regarding consulting physicians; one noted that he/she had reviewed the data collected on the patient by the ambulance personnel. The final comment was a simple note that the physician with whom the emergency physician had spoken "will be in as soon as he can."

For model 3, the percentage of charts for which coordination/integration of care is documented is the same as model 1. Interestingly, despite coming from a computerized application, the actual verbiage for this element demonstrates considerable variability, suggesting that the physicians used a blend of "canned" data elements and free text in order to accurately reflect events. Most charts have a simple comment of "Discussed with ___," with the appropriate physician's name or hospital service and any other pertinent comments inserted. In one chart,

there is an extensive free-text note regarding the emergency physician's discussion with consultants at a large teaching hospital. In another, the physician specifically references a discussion with the radiologist regarding the patient's diagnostic images.

One difference between model 3 and the others is that there is an explicit mention of the physician having reviewed the data entered into the system by the nurse. In 24 of the charts, there is a note stating "Nursing records reviewed." The language is consistent from chart to chart, suggesting that the phrase was chosen from a pick list. Out of those 24 charts, nine also indicate that the physician "agrees" with the information entered by the nurse.

Model 4 also suggests a combination of pick lists and free text. There are a variety of responses, ranging from a simple "Intent to admit ___," with a note as to who the admitting physician or service will be, to a more complex statement such as "This case was discussed with Dr. ____, informed of exam, entire diagnostic workup, diagnosis, treatment plan, and desire to admit. Admitting physician will assume care of the patient." Some responses were in between, such as "This case was discussed with Dr. ____, Admitting physician will assume care of the patient." As noted in the previous discussion regarding the billing elements, statements such as these allow us to see the "building blocks" provided by the electronic system such as short, canned statements that may allow additional text processing; these statements are then combined by the system in order to provide a complete message without requiring the physician to type a long paragraph. This model is the only one for which 100% compliance is achieved, suggesting that system reminders/forcing functions are in use.

Information/Communication/Education Needs

Documentation of patients' information, communicative, or educational needs was less consistent. Model 1 had the lowest score, with these needs mentioned 22.92% of the time. In

three of the charts, hearing difficulties were noted; in two of these, the physician additionally commented on the difficulty of getting an accurate history given the patient's disability. Four other charts mention the physician discussing the risks and benefits of a proposed course of treatment. In two more charts, the specific need for smoking cessation education was charted.

Results for Model 3 followed closely behind Model 1, with information needs addressed in 27.08% of charts. The most frequently noted comments (six charts) reflected the patient's literacy, as in "patient can read, patient can write." The comment "risks and benefits discussed with ___" appear in two charts. Two additional charts mention "records reviewed with patient."

Models 2 and 4 fared somewhat better, with documentation relative to patients' educational needs present 46.81% and 59.52% of the time, respectively. Model 2 has a text block stating "Counseled patient / family regarding lab results diagnosis need for follow-up;" the physician circles the pertinent selections. Model 4, while using electronic pick lists instead of paper, demonstrates similar language. Twenty of the charts included variations on "Counseled patient regarding ___," with insertion of relevant choices from a pick lists that includes "diagnosis, diagnostic results, treatment plan, prescriptions." Twenty-one charts also included a statement indicating that the patient understood the information provided. A graph showing the percentage data is found in Figure 4.20.

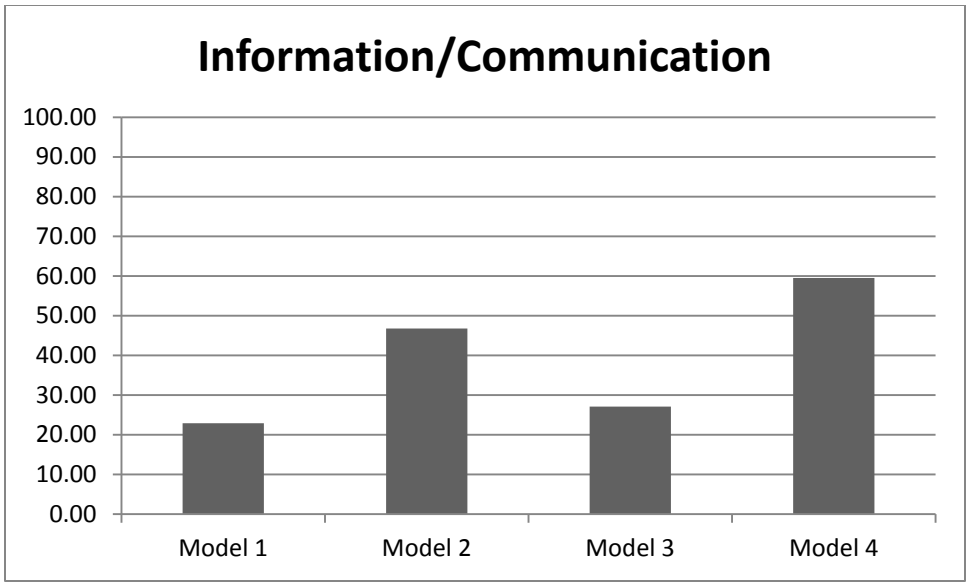


Figure 4.20: Percentage of notes for which information, communication, and/or educational needs are addressed

Pain at Handoff

"Pain at handoff" was selected as the measure for patient's comfort needs for purposes of this study, since pain at admission was generally well documented across all models. The charts were read for documentation regarding the patient's level of pain at the time he or she was ready to be handed off to the admitting physician for inpatient treatment. Model 3 demonstrated the greatest consistency of documentation, with 93.75% of charts containing an assessment of the patient's pain at this point in the encounter. The majority of charts included generic statements such as "condition stable," "patient has improved," or "patient has stabilized." Seven of the charts appear to have free text comments, typically used to expand upon the generic statements. Model 1 had the next highest percentage, which was only 62.50% of charts. As expected from the use of physician dictation, there was great variety in the actual language used; in eighteen charts, the physician specifically referenced the treatment given as well as the patient's response

to the treatment. Model 4 was next, with 52.38% of charts; the majority of those include statements selected from a pick list, singly or in combination. Eighteen of these charts included canned comments which were similar to those found in Model 3; "condition: improved," "condition: stable" or combinations of the two. Three charts included a comment of "no further pain after ACS medications."

Model 2 had the lowest percentage, at just under half (48.94%). The paper form had a "Condition" line with three checkboxes: "unchanged," "improved," and "stable," but the checkbox was marked in only two of the sample charts (one "improved," the other "unchanged"). In the remaining 21 charts in which pain at disposition was addressed, the physician made a handwritten entry; two of these referenced the specific treatment given. The remainder included brief comments, such as "patient feels better," or "no chest pain now." Three handwritten comments were completely illegible and were not counted as a positive response since the content of the comment could not be determined – demonstrating one of the drawbacks of this particular model. Percentage data is presented in Figure 4.21.

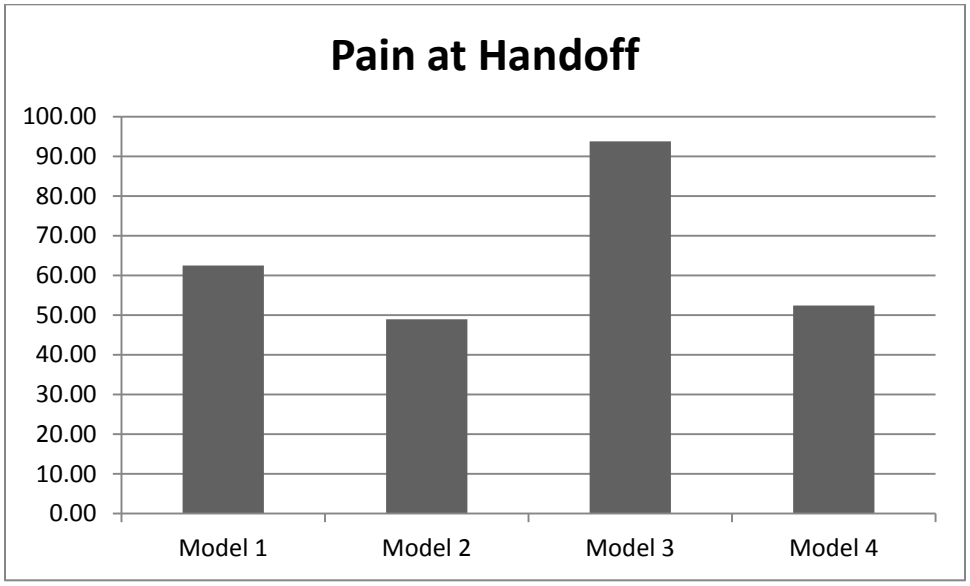


Figure 4.21: Percentage of notes for which pain at handoff is addressed

Emotional Support

The scores for documentation of emotional support for patients were relatively low across all four of the models. Model 2 yielded the highest percentage at 25.53%; Models 1 and 3 were tied at 18.75%; and Model 4 had the lowest frequency, at 14.29%. Of note, regardless of the model being considered, any documentation regarding patients' emotional states tended to be a simple statement such as "patient appears anxious," or a comment regarding a past history of depression. A graph showing the percentages appears in Figure 4.22.

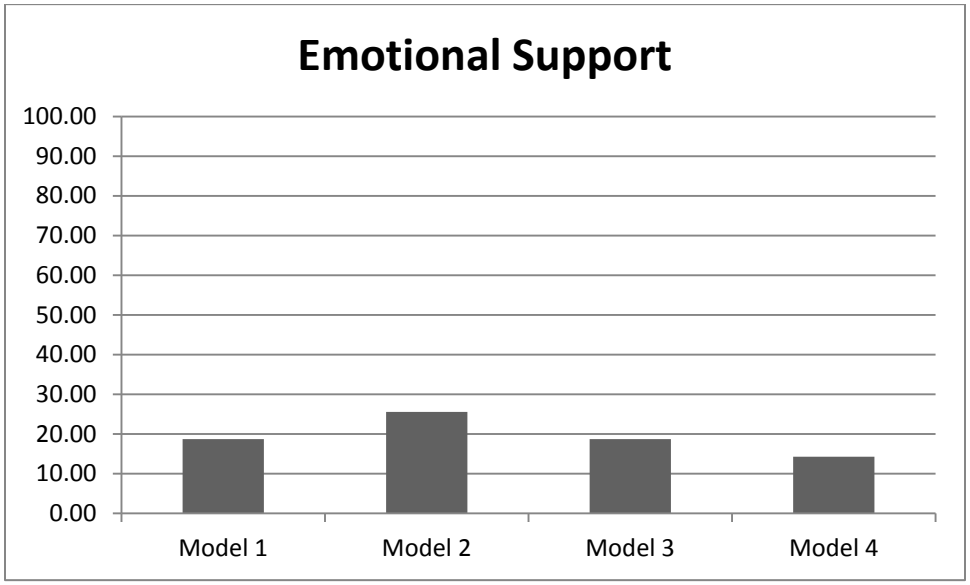


Figure 4.22: Percentage of notes for which emotional support is addressed

Involvement of Family/Friends

When I evaluated the data regarding the involvement of family and/or friends in the patient's care, I found that Models 1 and 4 made mention of the presence of patient family members or friends just over half the time, at 54.17% and 54.76% respectively. In contrast, Models 2 and 3 mentioned the presence of family or friends less often (25.53% and 14.58% respectively). A positive result for this element was simply the mention that family or friends

were present; in some instances, there was explicit documentation that treatment options were discussed with the patient's family as well as with the patient. These more extensive discussions were particularly noted when a higher-risk therapy such as TPA (tissue plasminogen activator, a clot-dissolving drug with potential bleeding risks) was proposed. Note that particularly for models 2 and 4, there is some overlap with responses identified in the section on information, educational, and communicative needs.

As has been noted elsewhere regarding Model 1, there is considerable variability in the comments made in the record. References to family are often conversational in tone, as in "One brother has cancer, rest are alive and well." At times the comments seem poignantly relevant to the patient's current condition: "Widowed. Husband died six years ago yesterday."

While the percentages in Model 4 are similar to Model 1, there is considerable contrast to the content. Many of the positive responses in Model 4 consisted of the same canned statement that was noted in the section on the patients' information, educational, and communicative needs: "Counseled patient, family regarding _____." This statement appeared in thirteen charts, either alone or in conjunction with additional statements. There are a few free text statements, such as "plan discussed with patient and his significant other," "lives with girlfriend," or "family is unaware of metastatic sites."

As with Model 4, we have already described the text block for Model 2 in the section on patients' information, educational, and communicative needs. This block, which includes the statement "Counseled patient / family regarding …" also includes an additional statement: "Additional history from: family / caretaker / paramedics," giving the physician one additional place to indicate that he spoke with the patient's family. Mention of interaction with family in either place was counted as a positive response.

Model 3 mentioned family most infrequently of the four models; when present, the most common response (three charts) was "History obtained from _____," with the appropriate reference inserted. Two charts indicated with whom the patient lived; one chart contained the note "patient and family agree with plan." One additional chart (given the benefit of the doubt) contained the comment "instructed patient and/or family member on follow-up care." A graph showing the percentage values for this category is presented in Figure 4.23.

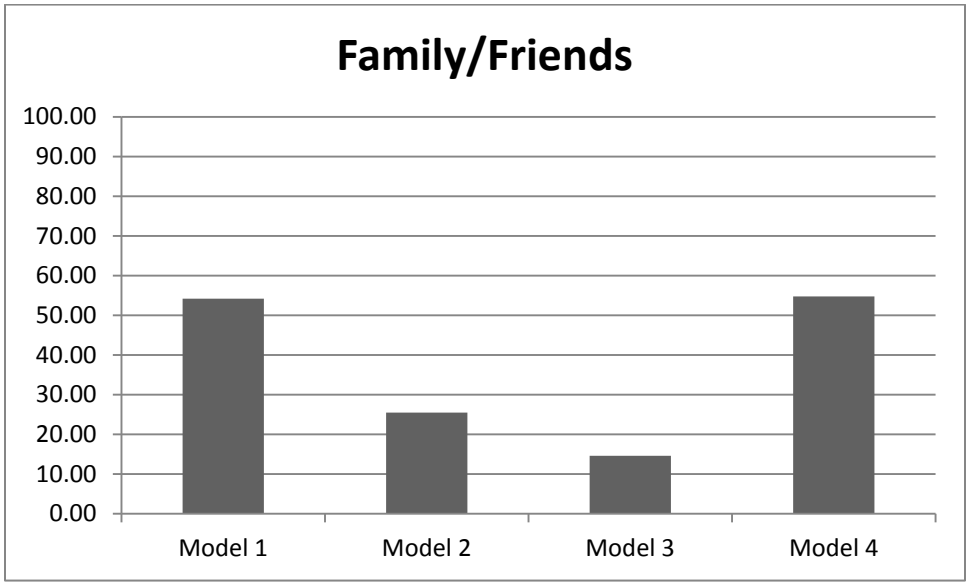


Figure 4.23: Percentage of notes for which inclusion of family or friends is addressed

Understanding the Data

In considering the genre of the physician's note and the presence of elements required for billing activity, I described each of the models in detail, determining the changes to the median number of elements addressed for each category of documented information. If the median scores for each model are added to obtain a total (shown in Table 4.1), the results are not surprising—Model 1 has the lowest total number of elements at 18, and Model 2 shows a 50% increase over Model 1 with a total of 27. These gains are observed simply by providing the physician with a paper form that prompts for responses. Of course, when Model 2 was adopted,

educational opportunities were no doubt provided as well, so the physicians were likely to have gained additional knowledge regarding the importance of recording the information they were capturing during patient encounters. Nonetheless, there was a measurable increase in the number of documented elements. Overall gains were made as well when moving from Model 2 to Model 3, with the total median number rising to 32. With a total of 31, Model 4 is essentially on a par with Model 3, demonstrating the same median number of elements for three of the four categories. Only the History of Present Illness is different, with a median value of 6 whereas Model 3 had a median value of 7. Interestingly, in Model 4 the History of Present Illness is a category in which the pick list may be bypassed in favor of free text; this may be a contributing factor to the slightly lower median value. The increases observed across Models 2 and 3 (and with the exception of HPI, Model 4) are likely due to pressure on the genre to improve the capture of documentation that supports billing. It is reasonable to consider the affordances offered by each of these two models and the likely effect of those affordances on the documentation; Model 2, the paper form, provides the physician with a visual "prompt" to address the various elements within the note categories, and the format lends itself to quickly checking or striking through an element to document that the element was considered in the course of the patient's care. Model 3, the niche system designed specifically for use in the Emergency Department, additionally adds the ability to 'force' the user to respond, through required fields that cannot be bypassed by the user and other rule-driven features.

Model 4, the emergency department module within the context of a larger, hospital-wide integrated system, is nearly identical to Model 3 in terms of the median numbers of charted items. One might assume that since Model 4 is the most recent model, it might have undergone the greatest pressure to optimize capture of documentation for billing purposes. However,

because this system must support the hospital as a whole, not just the emergency department, there may be other influences due to the possibility that some data elements may be shared among hospital departments. Another possible factor is the length of time that Model 4 had been in use relative to the study period. Model 4 was implemented in mid-2011, and the sample notes for the study were therefore only drawn from January 2012. The results may be due in part to a lack of maturity of the implementation, in which system configuration and use of forcing functions or rules may not be optimal (for instance, allowing the user to free text the entire HPI as opposed to forcing the user through the system fields and pick lists, allowing free text only for additional comments). Additionally, the relative inexperience of the users as compared to the other models may also be a factor.

In terms of how the genre of the physician's note supports the elements of patient-centered care, the data shows mixed performance across the models. This suggests that the genre has not been subject to the same type of evolutionary pressures with regard to this function, at least during the study period. With respect to patient-centered care, one way that the genre of the physician's note functions is as a boundary object between different groups. Interestingly, one aspect of patient-centered care which was consistently documented across all four models was the category of "coordinating and integrating care." However, the coordination/integration functions that were being documented typically involved a verbal exchange between the emergency physician and the inpatient admitting physician—not an interchange immediately mediated by the note (although it is likely that the admitting physician would refer to the emergency physician's documentation at some point during the inpatient course of treatment).

In Chapter 5, I provide additional discussion of the results and what they tell us, as well as drawing conclusions about how the genre of the physician's note and its genre ecology function within the activity system of patient care.

CHAPTER 5: DISCUSSION

In the previous chapters, I discussed some of the ways in which the field of technical and professional communication has considered medical records. Medical records have been examined as boundary objects (Wenger, 1998), as instruments that construct identities for patients (Bazerman, 1999), and as mediating artifacts within complex activity systems (Engestrom, 1999). Within the context of the medical record, the genre of the physician's note functions within a larger genre ecology, demonstrating its adaptation by users for purposes other than those for which its creators imagined it. For example, the genre of the physician's note is created initially to serve the needs of the physician creator. However, it is appropriated by billing personnel in order to support assignment of the proper level of CPT code so that revenues may be collected. Furthermore, the genre of the physician's note serves to mediate activities between and among components within the ecology. The note is used by additional communities of practice beyond that of the emergency physician; it mediates the activity of nurses, admitting and attending physicians in the inpatient setting, and other members of the healthcare team throughout a hospital; its use extends to other external settings such as physician offices and other healthcare organizations, where it further mediates activities; and may facilitate communication with patients themselves through the use of patient portals. These characteristics of the genre persist, maintaining connection between the various components of the genre ecology even as the genre itself evolves in form. In this chapter, I discuss the results of my study in light of these considerations.

If we reconsider Burke's dramatistic pentad, referenced in Figure 2.4, we can begin to picture the physician's note and the ways that it mediates and interacts with the various elements that compose the pentad. The note is intimately associated with the scene (the Emergency

Department), although it can also be used outside of it, in different scenes. It fulfills multiple purposes that include medical, historical, legal, financial, and representational, and recognizes agency on the part of many different actors (physicians, nurses, ancillary staff, patients, family members, and others). A hallmark of Burke's pentad is what he terms "ratios," or the relationship between each vertex of the pentad with every other one. The note mediates these relationships by connecting agents with acts for various purposes within the scene. For example, the emergency physician creates the note which includes information about the patient. The physician creates the note in order to record the medical facts surrounding that patient's care (an agent, who acts with a specific purpose in mind). A billing clerk within the emergency department (a different agent, with a different purpose within the same scene) then reads the note and associates the proper financial codes to the patient's account, based upon the content created by the physician. Both agents use the same mediating artifact—the note—but their purposes are different and may even be at odds. My findings demonstrate that the genre of the note has evolved in response to the requirement of accurate billing to include increased numbers of documented elements, but it is beyond the scope of the current research to evaluate whether the increased quantity of documentation contributes positively to the physician-agent's original purpose, which is to provide appropriate patient care.

As Actor-Network Theory (ANT) suggests, the note may in and of itself possess agency, serving as proxy for the physician and causing events to occur on the patient's behalf. The physician's note summarizes the patient's condition at the time the note was created and also projects the plan for his or her future care, considering aspects that make the individual patient's experience unique. In this way, the note mediates the formation of networks, connecting

practitioners who come together and provide patient care, and then separate once the care has been delivered.

We have imagined the health care environment as a complex activity system, in which physicians (subjects) act upon patients (objects), and interact with various communities that contribute to the division of labor within the system, constrained by rules. These various interactions, when successful, give rise to a specific outcome—the improved health of a patient. The interactions are mediated by the physician's note. As depicted in Figure 5.1, the note moves through the activity system with the patient, traveling from location to location (Emergency Department to inpatient unit; inpatient unit to discharge, with follow-up care in an ambulatory location). The note becomes a permanent part of the medical record for the given episode of care, and as such, may be put to a number of additional uses. As already indicated, the note is used to support the activity of billing; the content of the note may also be used for regulatory reporting, as a legal document, as part of the patient's full history, for research, or for other components

that comprise the genre ecology.

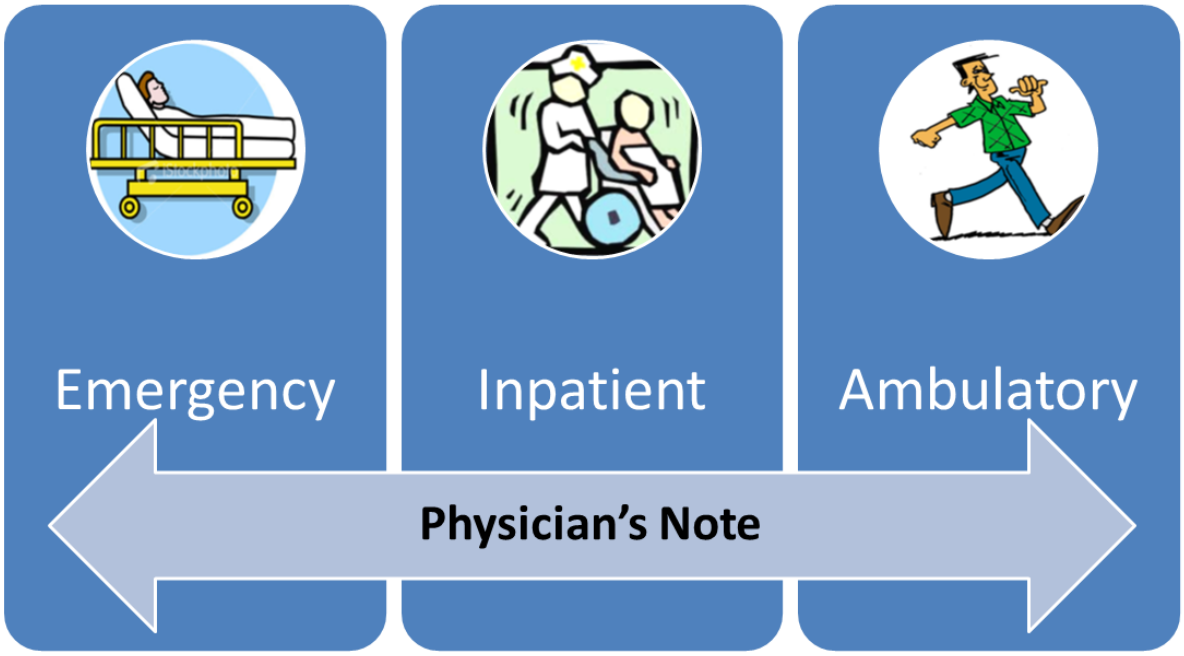


Figure 5.1: Physician Note in Activity System

Whenever a new venue of care or community of practice is introduced, the note serves as a boundary object that connects one practitioner to another and bridges the gap between the various communities of practice. We understand that in this way, the genre of the physician's note serves multiple communities and multiple functions. With the concepts of genre, activity, and genre ecologies in mind, we can consider the findings of this study.

Throughout the remainder of this chapter, I discuss my findings, as well as some implications for the genre/genre ecology under study. I also examine study limitations, opportunities for future research, and the role of technical and professional communication in the continued evolution of the genre of the physician's note and the genre ecology within which it functions.

Study Results

Orlikowsky and Yates (1994) observed that genres change over time; I believe that this concept may be extended to encompass genre ecologies as well. As I discuss the differences in the physician notes from each of the four models, I also consider the evolution of the tools within the genre ecology used to produce them.

Billing

In 2013, the Center for Public Integrity (CPI) published a report entitled "Cracking the Codes," which revealed that over the previous decade, physicians have increased their utilization of higher-level billing codes for Medicare patients, costing an estimated additional eleven billion dollars between 2001 and 2010. Although this shift in billing may be beneficial for individual physicians, consumers and others concerned with rising health care costs find this alarming. However, there are other factors to consider. CPI notes that physician groups argue that today's Medicare patients require more time to treat and coordinate care, because of chronic health problems and the increased use of electronic medical record systems, which typically require more data entry time than paper forms. They also argue that in past years, physicians were under-charging for the work that they actually performed.

CPI notes that electronic medical record systems are likely to facilitate higher levels of coding as well, due to the ease of documenting with a few keystrokes or mouse clicks, or through forcing functions that require the physician to address specific data fields. Because the systems facilitate capturing more bits of data, coders are able to assign billing codes that represent higher complexity, and therefore higher billing amounts. A review of the CPI's interactive map demonstrated that in 2008, Nash County, NC, where the study hospital is located, was among the hospitals whose emergency departments billed over half of their encounters at the two highest code levels; in 2001, the percentage was 25% or less. These findings are reasonably aligned with

the national trend, where the use of the two highest code levels rose from 25% to 45% between 2001 and 2008 (Cracking the Codes, 2013).

This study corroborates the CPI findings and demonstrates that for documentation elements related to physician billing, there has been an increase in the number of elements charted over time at the study hospital. When the median values are added together, the total number of billing elements observed for Model 1 was 18; Model 2 had a 50% increase over Model 1, at 27. Models 3 and 4 demonstrated increases as well, with totals at 32 and 31, respectively. These results are significant, because the number of documented elements are directly related to the assignment of Current Procedural Terminology (CPT) codes, which drive the billing process.

It is important to note the impact of the tools from the genre ecology here. In Model 1, where the median number of billing items documented was lowest, the physician was required to remember and articulate each of the items from the various data categories. The workflow additionally required the physician to locate an available dictation station, typically located in a secluded area away from the noise and commotion of patient care, from which the note could be recorded. This workflow resulted in a discontinuity within the activity system between the subject (physician) and creation of the mediating artifact (the note). This discontinuity had the potential to affect what was ultimately captured in the note, which in turn created its own discontinuities between the note and the various members of the division of labor as well as the community. Lack of detail in the note could conceivably affect the patient care provided by others, as well as directly affecting the level of billing that could be justified by the financial community.

Model 2 represented a change in that writing on a paper form at the bedside brought an immediacy to the documentation that was not present in Model 1. While the note was not immediately available to other caregivers within the activity system, an affordance of the Model 2 tool was that physicians could create their notes in real time, as they spoke with and examined the patient. The ability to capture both patient responses and their own observations as they occurred may have contributed to the sharp increase in captured elements, and by extension, higher level billing. The form also prompts the physician for responses, negating discontinuities caused by intervening distractions or forgetting.

Models 3 and 4 brought new affordances through the use of technology within the genre ecology. In each of these models, data could be entered at or near the bedside using fixed terminals and mobile devices (laptop and tablet computers). The computerized documentation allowed screen flows that could walk the user through the various data categories, with prompts for the available elements. Additionally, each element could present the user with a number of possible choices, facilitating more detailed documentation through a point-and-click user interface. With each of these two models, the influence of these lists was evident as multiple list items were often selected when responding to a given element.

The field of technical and professional communication should carefully consider the result of the affordances opened up in Models 3 and 4. This study demonstrates that there is a quantitative impact, but it is outside the scope of this research to determine whether impact equals improvement. The billing needs of the hospital are undoubtedly being served, but what about the physician's intent in creating the note for the purpose of caring for the patient? This study cannot answer whether the additional documentation is beneficial to the overall process of patient care, or whether patients who have more pick list items selected have superior outcomes

to patients with fewer. Practitioners of technical and professional communication should seize the opportunity to work with physicians, as well as with consumers of the information they provide, to tease out what their needs are, and how to structure the electronic systems for optimal capture of the information that is truly important.

Patient-Centered Care

Although there has been a demonstrable increase in the number of billing elements captured across the four billing models, trends that support the elements of patient-centeredness are less clear when considering the presence of documentation. For the category of patient preferences and needs, the study demonstrates that tobacco, alcohol, and drug use, as well as whether the patient lives with others or not, are assessed; however, very little information about actual patients' lives was found to be present in the notes. These elements, along with the demographic information captured for each patient, are the major features of patient identity created by the physician's note. However, the identities created by these few items result in a portrait that lacks dimension. Little can be determined about what patients really want and need from their medical care.

In contrast, coordination of care scored consistently well; for each of the four models, the documentation indicated that emergency and admitting physicians were communicating with each other regarding the patient's plan of care in the majority of cases. Interestingly, the documentation rarely reflected other kinds of communication, such as with nursing staff or ancillary personnel. From the standpoint of the genre mediating information flow between communities of practice within the activity system, this is an apparent discontinuity. Perhaps verbal/face-to-face communication between the physician and other members of the health care team is simply assumed, and its presence in the written record is considered superfluous.

However, if the desired outcome is a team-based model in which care coordination is an expectation, this is an avenue for technical and professional communicators to consider how our screen flows and documents, functioning within the genre ecology of the emergency department, might be designed to support and facilitate this interdisciplinary communication. One affordance of electronic medical record systems is their ability to combine data across various disciplines in screen displays and documents, allowing the creation of a comprehensive document that contains data collected from multiple sources, by multiple practitioners. Another affordance is the ability to apply processing rules as data is contributed to the EMR. Current EMR systems typically support rules-based messaging and clinical alerts, features that when used judiciously, can facilitate communication and coordination of care.

There was variability in terms of how the patients' information, communication, and education needs were addressed; the highest-scoring model captured this information only about 60% of the time. Even in the top-performing model (Model 4), the documentation most often took the form of a canned statement indicating that the physician had provided education to the patient and/or family. There was little personalization of the individual patient's exact needs by the emergency physician, whose documentation is the focus of this study. It seems that one of the aims of patient-centered care is to increase the patient's own agency; failing to provide patients with the knowledge resources they need to effectively manage their illnesses interferes with agency. It should be noted that all of the patients in this study were admitted for inpatient care, providing numerous additional opportunities to assess and educate patients outside the hectic environment of a busy emergency department. In addition, this study only considered physician documentation; nurses frequently assess patients' communicative and educational needs and include these items in their documentation, and nurses typically provide patient education prior

to discharge. However, if patients' information, communication, and educational needs are important components of their care, we should consider how the tools of documentation might be better designed to facilitate physicians' identifying and meeting those needs—a role for which technical and professional communicators are well suited.

Only one model performed consistently well in terms of capturing patients' pain at handoff. In the niche application (Model 3), this was charted almost 94% of the time, while each of the other models only did so about half the time (49 – 62%). This is a fairly striking difference; it would have been useful to determine whether there were specific prompts within this particular application that assisted in providing this level of compliance. Unfortunately, the niche system was decommissioned and the servers recycled, so it was not possible to go back and review the screens and system configuration in use at Nash to ascertain the role that the technology might have played within this particular genre ecology. Because of the large gap between this model and the others, it seems likely that the technology was a contributing factor. The poorer performance by Models 1, 2, and 4 demonstrate an apparent discontinuity within the activity system when those models were in use; the mediating artifact fails to connect the physician's (subject's) action to the patient's (object's) condition and outcome.

Another area that appears ripe for improvement is attention to the patient's emotional needs. Model 2 had the highest score in this area, but even the "high score" was only 25.5%. In the majority of cases, the documentation either consisted of a note that the patient seemed "anxious," or that there was a history of depression. Again, if we accept that the patient's emotional needs within the context of the medical encounter are important, there is an opportunity to improve documentation; to provide an assessment of first, the patient's emotional state, and second, how the provider responded to the patient's emotional needs. As with the

informational/communicative needs discussed earlier, this supports the patient's agency within the hospital scene.

Interestingly, Models 1 and 4—representing the oldest and newest—scored best for involvement of family and friends in the patient's care, with scores in the 54% range, while the other two models scored much lower, at 26% or less. The dictated notes from Model 1 tended to mention whether friends or family members were present, reflecting the community within the activity system; similarly, such a comment was seen with equal regularity in the integrated model (Model 4). As noted in the preceding chapter, pick list items relative to the presence of friends or family were present in this model. The study hospital has adopted a patient-centric model of nursing care, and has a task force devoted to increasing the focus on elements of patient-centered care, especially with regards to involving the patient and family in the overall care process. It is possible that this emphasis influenced decisions that were made during the design and implementation of the emergency care documentation (including items to include on the pick lists) that led to the increased capture of this type of information.

Study Implications

Architects have a maxim: form follows function. This is true of electronic medical record systems also. Through this study, we can begin to draw some conclusions regarding the kinds of discourse that are privileged within these physician-produced texts, and observe some of the changes that have occurred in response to the perceived needs of the activity system that the genre of the physician's note supports. We certainly see the privileging of financial requirements as evidenced by the increase in the number of billing elements captured as the subject health system moved from one documentation model to another. Interestingly, examining the billing elements provides us with another possible insight into physicians' thinking and what they

consider important. Of all the categories of billing elements that were evaluated in this study, the Review of Systems has arguably undergone the greatest change in terms of increased data capture. As noted, there is a great deal of overlap between the nomenclature for Review of Systems and for Physical Examination. Although there was a modest increase in the number of elements charted for Physical Examination from Model 1 (median value of 9) to Model 4 (median value of 12), the jump in the median value for Review of Systems went from just 2 in Model 1 up to 10 in Model 4. In Model 1, we might make the argument that physicians privilege what they can observe, using all of the skills of a modern, science-based medical education (the Physical Examination), over what the patient tells them (the Review of Systems). Indeed, the category demonstrating the highest median scores across all models was that of the Physical Examination. However, the increase in median scores for Review of Systems suggests that the tools matter; the prompts and reminders in the genre ecology through the evolution of models have likely influenced the quantity of documentation.

This study presumes that the pressure on the genre, as mediated by the tools within the genre ecology, which resulted in the net increase in documentation for Review of Systems, was financially motivated through the billing requirements for CPT coding; however, a possible consequence might be an increased privileging of the patient's own responses within the medical record. In addition to recording the patient's "complaint," in which there is generally an attempt to capture in patients' own words their reasons for seeking medical care, the Review of Systems captures the patient's responses to the physician's queries, providing another opportunity for the patient's voice to be heard within the context of the physician's note. At the same time, while publications like *Crossing the Quality Chasm* tout the importance of patient-centered care, we

observe that elements explicitly understood to underpin patient-centeredness are largely absent from these same physician-generated texts.

The results of this study answer the two original research questions regarding how the genre of the physician's note captures billing information and supports patient-centered care, but they also say something else: tools matter. The impact of the prompts in Models 2, 3, and 4 can clearly be seen through the increased quantities of documentation with regard to the billing elements. In addition, we see in Models 3 and 4 that having appropriate lists from which to select results in notation that is more explicit and extensive. Instead of a simple statement of "normal," as we saw in Models 1 and 2, Models 3 and 4 provide specific data as to the ways in which a given body system is normal (or not), or to which aspects of the body system the physician paid particular attention. In this way, the tools actually shape what physicians say as they create their texts. Also, the presence of forcing functions means that physicians will consistently address particular data elements or aspects of care, also influencing the creation of the text—in a way the creator may not even be aware of, or pay attention to.

These aspects underscore the importance of careful design when creating tools for physician documentation, and by extension, documentation by other clinicians. The design phase needs to be undertaken with an awareness of genre, but must extend to the entire genre ecology, considering what tools will be used to create the genre (or genres), what affordances and constraints are offered by the tools, and how the resulting texts will be used—by which audiences, for what purposes, and in what places. System designers are accustomed to acquiescing to stakeholder requirements, as evidenced by the growth in documentation which supports billing functions. However, designers tend to collect requirements from only one group of stakeholders—those who will input the specific documentation and thereby create the text.

Practitioners of technical and professional communication who are working with system designers should consider expanding their list of stakeholders—not just to the creators of texts, who represent a single node on the network of users, but to the users who form other nodes, connected by the texts that mediate their mutually beneficial activities. Using a genre ecology framework allows the participants in the network to view the activity system more holistically, rather than through just their own lenses.

Limitations and Opportunities

This study, though covering a relatively long time period of two decades, is limited in its approach. Many possible avenues for further research exist. The current study focused only on a single presenting complaint–chest pain–and included only patients whose emergency care visit resulted in an inpatient admission. Future studies could certainly cast a much wider net; for instance, sampling across all emergency visits. The current study also was not large enough to evaluate whether there were differences in documentation across gender, age, or other demographics or factors.

Another possible future avenue for research is to perform a similar analysis for the inpatient population. At the subject hospital, the dictation model continued to be used by physicians for inpatient documentation (history and physicals, operative records, and discharge summaries) until the implementation of the fully-integrated electronic medical record application in 2011; when that system went "live," physicians began utilizing system tools for creation of their documentation. The same methodology used for the emergency physician charts could readily be applied to inpatient charts. In addition, the methodology for this study could readily be applied to other hospitals, or to other venues of care such as physician offices or skilled nursing facilities. Also, this research focused solely on physician documentation. It would be relatively

easy to use a similar approach, particularly when considering the aspects of patient-centered care, in order to examine the documentation of nursing and allied health personnel.

As stated in the initial chapter of this work, since the implementation of the HCAHPS surveys, patients are being formally surveyed relative to items that relate to patient-centeredness, such as feeling listened to and receiving adequate pain management. The results of the HCAHPS surveys are beginning to affect a portion of hospitals' reimbursement; feedback from patients through the surveys is being shared with hospitals. This circumstance is exerting pressure on hospitals to become more patient-centric in their approaches to care. An additional research opportunity might be to perform a similar analysis of patient-centered documentation elements in the future in order to determine if this indirect pressure has effected change on the genre of the physician's note, and if new accommodations have been made to the tools within the genre ecology that serve to support such a change.

Another opportunity for future research has to do with the impact of patient portals. The availability of these portals opens up access to patient medical records in a way that was not widely used before their creation. Now patients can easily view the contents of their records via the internet, and also have the opportunity of challenging information they believe to be inaccurate or even contributing information to the record themselves. The idea of patient as "co-creator" of the record is a novel one; future research can explore how frequently patients are contributing to the content of the record, and in what ways.

Audit capabilities in current EMR systems also allow opportunities for new kinds of research. One affordance present in Model 4 that was not available in the earlier documentation models is a detailed auditing tool. The electronic repositories that housed the notes from the first three models permitted auditing access to medical records at the level of an individual patient's

chart; however, the audits were limited to the dates and times that records were viewed, and by whom. The system used to produce the notes in Model 4 offers a more sophisticated auditing tool, which allows audits at a much deeper level. These more detailed audits potentially allow researchers to determine what individual record components, such as a physician's note, have been viewed by classes of individuals. A frequently-heard complaint by electronic medical record users, whether physicians, nurses, or allied health staff, is the amount of data they are required to enter and the time that the data entry sometimes requires. As we have seen in the genre ecology, there are numerous influences on the genres it includes, such as regulatory and accrediting agencies, whose requirements can affect documentation practices. Detailed audit data as described can reveal what types of documentation various communities of practice actually use in the day-to-day activities of providing care to patients and carrying out hospital operations, as well as potentially revealing documentation that adds less value and thereby providing a catalyst for change.

The Role of Professional Communication

In her fascinating book, *How Doctors Think*, Kathryn Montgomery (2006) argues that medicine is not a science, but in fact is what Aristotle would term a "phronesis," or a kind of practical reasoning. She defends her argument with a reminder that the care of patients cannot be reduced to acts of logic, nor to the scientific experiment. Patient care is in fact contingent; it is dependent upon the reasoning of the practitioner to consider many factors in determining the "best" action to take for a given patient at a given time, under a given set of circumstances. This seems to me to be the essence of what patient-centered care strives to achieve. Within the health care activity system, it is possible to combine the six "patient-centeredness" factors with the physician actions that are recognized as essential, either through their explicit medical value or

by virtue of their inclusion in the criteria for their financial compensation. The genre ecology becomes the framework by which our tools are used to mediate the interactions within the health care activity system that make patient-centered care possible.

Hence, as professional communicators, we have a challenge and an opportunity. If the patient's needs and preferences are truly important, then the documentation models should facilitate these conversations and provide a means of capturing this information so that it can readily be viewed and considered during the patient's care—an area in which the field of technical and professional communication can contribute to electronic record system development. While the documentation needed for billing is driven by regulatory and financial requirements, creating documentation that privileges our sensitivity to the needs of our patients is largely up to us. Medical records have evolved in order to help physicians take better care of patients medically; now there is a desire to move beyond the disease-oriented model to one that sees patients holistically.

There are opportunities to build upon the findings presented here by applying the same sort of analysis to new kinds of samples—to a broader range of diagnoses, to different venues of care, or to different kinds of patients (a particular gender, age group, or other characteristic). The study could also be extended beyond the boundaries of the organization from which its samples were drawn, perhaps looking at similar patients from other facilities using the same documentation models (or different ones). There are myriad ways to gain more data and to perform more analysis.

What is ultimately important, however, is how we use what we learn. For example, the similarities of the billing data between Models 3 and 4 might suggest that, at least in the subject facility, data capture for billing has reached its maximum in terms of what is ethical and practical

within the emergency care setting. However, it seems that within the current model (Model 4), there is an opportunity to improve patient-centeredness (at least as it is reflected within the clinical documentation) in nearly every arena. Coordination and integration of care was consistently recorded in all of the Model 4 notes. However, most of the remaining elements were only recorded about half the time, and the measure for emotional support was only documented around 14% of the time. This suggests that we have an opportunity when designing systems for physicians to use for clinical documentation.

Designing systems is not simply a matter of adding one more field to a screen or creating additional items for a pick list. One feature of modern electronic medical record systems is that making these types of modifications is relatively easy. However, the easy path is not necessarily best. Our tools need to facilitate the conversations that both physicians and patients believe are important. Just as the presence of prompts and reminders increased physician awareness and led to a behavioral change that increased the number of documented elements for billing, appropriate prompts can also serve to cue physicians to talk with patients about their identities—their values, their need for understanding of their conditions, their physical comfort, the involvement of their families or friends in their care, and their emotional needs—and then to act on what they have learned. These changes within the genre ecology have the potential to modify the genre of the physician's note, and in so doing, to bring about positive change to the outcomes of the activity system of patient care. Technical and professional communicators are uniquely equipped to contribute their knowledge of genre and genre ecologies when electronic medical record system design and configuration decisions are being made in order to help assure that the genres used in health care lead to actions that benefit patients and practitioners.

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APPENDIX A: IRB LETTER

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · **www.ecu.edu/irb**

Notification of Initial Approval: Expedited

From: Biomedical IRB
To: Guyla Evans
CC: Donna Kain
Date: 5/30/2014
Re: UMCIRB 12-000598
_Protocol - Sun Mar 18 15:50:43 EDT 2012

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 5/29/2014 to 5/28/2015. The research study is eligible for review under expedited category #5. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
Potential questions.docx	Interview/Focus Group Scripts/Questions
Prospectus - Guyla Evans	Study Protocol or Grant Application

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX B: IRC LETTER

Nash Cancer Treatment Center
2460 Curtis Ellis Dr., Rocky Mount, NC 27804 • 252 962-8947 • Fax 252 962-8672

Monday, May 12, 2014

Dear Ms Evans,

Thank you for your recent submission to the Nash Institutional Review Committee for your study, *Comparison of Documentation Models used by Emergency Physicians in a Community Hospital Setting.* While this proposal was initially approved on May 16, 2012, I am happy to report that it has been approved by a second review of all applicable parties. If you have any further questions related to this, please feel free to contact me at the Nash Cancer Treatment Center, 252-962-8978 or by email at clwood@nhcs.org.

Thank you for your interest in research at Nash Health Care and I wish you great success in your future endeavors.

Respectfully,

Chris Wood
Director, Nash Comprehensive Cancer Program
Nash Health Care IRC Committee Coordinator

APPENDIX C: 1997 DOCUMENTATION GUIDELINES FOR EVALUATION AND MANAGEMENT (PAGES 1-18) (Documentation Guidelines For Evaluation & Management Services, Center For Medicare and Medicaid Services, 2012)

1997 DOCUMENTATION GUIDELINES FOR EVALUATION AND MANAGEMENT SERVICES

TABLE OF CONTENTS

I. INTRODUCTION

WHAT IS DOCUMENTATION AND WHY IS IT IMPORTANT?

Medical record documentation is required to record pertinent facts, findings, and observations about an individual's health history including past and present illnesses, examinations, tests, treatments, and outcomes. The medical record chronologically documents the care of the patient and is an important element contributing to high quality care. The medical record facilitates:

- **the ability of the physician and other healthcare professionals to evaluate and plan the patient's immediate treatment, and to monitor his/her healthcare over time.**
- **communication and continuity of care among physicians and other healthcare professionals involved in the patient's care;**
- **accurate and timely claims review and payment;**
- **appropriate utilization review and quality of care evaluations; and**
- **collection of data that may be useful for research and education.**

An appropriately documented medical record can reduce many of the hassles associated with claims processing and may serve as a legal document to verify the care provided, if necessary.

WHAT DO PAYERS WANT AND WHY?

Because payers have a contractual obligation to enrollees, they may require reasonable documentation that services are consistent with the insurance coverage provided. They may request information to validate:

- **the site of service;**
- **the medical necessity and appropriateness of the diagnostic and/or therapeutic services provided; and/or**
- **that services provided have been accurately reported.**

II. GENERAL PRINCIPLES OF MEDICAL RECORD DOCUMENTATION

The principles of documentation listed below are applicable to all types of medical and surgical services in all settings. For Evaluation and Management (E/M) services, the nature and amount of physician work and documentation varies by type of service, place of service and the patient's status. The general principles listed below may be modified to account for these variable circumstances in providing E/M services.

1. **The medical record should be complete and legible.**

2. **The documentation of each patient encounter should include:**

   - **reason for encounter and relevant history, physical examination findings, and prior diagnostic test results;**

   - **assessment, clinical impression, or diagnosis;**

   - **plan for care; and**

   - **date and legible identity of the observer.**

3. **If not documented, the rationale for ordering diagnostic and other ancillary services should be easily inferred.**

4. **Past and present diagnoses should be accessible to the treating and/or consulting physician.**

5. **Appropriate health risk factors should be identified.**

6. **The patient's progress, response to and changes in treatment, and revision of diagnosis should be documented.**

7. **The CPT and ICD-9-CM codes reported on the health insurance claim form should be supported by the documentation in the medical record.**

III. DOCUMENTATION OF E/M SERVICES

This publication provides definitions and documentation guidelines for the three key components of E/M services and for visits which consist predominately of counseling or coordination of care. The three *key* components--history, examination, and medical decision making--appear in the descriptors for office and other outpatient services, hospital observation services, hospital inpatient services, consultations, emergency department services, nursing facility services, domiciliary care services, and home services. While some of the text of CPT has been repeated in this publication, the reader should refer to CPT for the complete descriptors for E/M services and instructions for selecting a level of service. Documentation guidelines are identified by the symbol • DG.

The descriptors for the levels of E/M services recognize seven components which are used in defining the levels of E/M services. These components are:

- **history;**
- **examination;**
- **medical decision making;**
- **counseling;**
- **coordination of care;**
- **nature of presenting problem; and**
- **time.**

The first three of these components (i.e., history, examination and medical decision making) are the key components in selecting the level of E/M services. In the case of visits which consist predominantly of counseling or coordination of care, time is the key or controlling factor to qualify for a particular level of E/M service.

Because the level of E/M service is dependent on two or three key components, performance and documentation of one component (eg, examination) at the highest level does not necessarily mean that the encounter in its entirety qualifies for the highest level of E/M service.

These Documentation Guidelines for E/M services reflect the needs of the typical adult population. For certain groups of patients, the recorded information may vary slightly from that described here. Specifically, the medical records of infants,

children, adolescents and pregnant women may have additional or modified information recorded in each history and examination area.

As an example, newborn records may include under history of the present illness (HPI) the details of mother's pregnancy and the infant's status at birth; social history will focus on family structure; family history will focus on congenital anomalies and hereditary disorders in the family. In addition, the content of a pediatric examination will vary with the age and development of the child. Although not specifically defined in these documentation guidelines, these patient group variations on history and examination are appropriate.

A. DOCUMENTATION OF HISTORY

The levels of E/M services are based on four levels of history (Problem Focused, Expanded Problem Focused, Detailed, and Comprehensive). Each type of history includes some or all of the following elements:

- **Chief complaint (CC)**
- **History of present illness (HPI)**
- **Review of systems (ROS) and**
- **Past, family, and/or social history (PFSH).**

The extent of the history of present illness, review of systems, and past, family and/or social history that is obtained and documented is dependent upon clinical judgment and the nature of the presenting problem(s).

The chart below shows the progression of the elements required for each type of history. To qualify for a given type of history all three elements in the table must be met. (A chief complaint is indicated at all levels.)

History of Present Illness (HPI)	Review of Systems (ROS)	Past, Family, and/or Social History (PFSH)	Type of History
Brief	N/A	N/A	*Problem Focused*
Brief Problem	Problem Pertinent	N/A	*Focused Expanded Problem*
Extended	Extended	Pertinent	*Detailed*
Extended	Complete	Complete	*Comprehensive*

- ***DG: The CC, ROS and PFSH may be listed as separate elements of history, or they may be included in the description of the history of the present illness.***

- ***DG: A ROS and/or a PFSH obtained during an earlier encounter does not need to be re-recorded if there is evidence that the physician reviewed and updated the previous information. This may occur when a physician updates his/her own record or in an institutional setting or group practice where many physicians use a common record. The review and update may be documented by:***

    - ***describing any new ROS and/or PFSH information or noting there has been no change in the information; and***

    - ***noting the date and location of the earlier ROS and/or PFSH.***

- ***DG: The ROS and/or PFSH may be recorded by ancillary staff or on a form completed by the patient. To document that the physician reviewed the information, there must be a notation supplementing or confirming the information recorded by others.***

- ***DG: If the physician is unable to obtain a history from the patient or other source, the record should describe the patient's condition or other circumstance that precludes obtaining a history.***

Definitions and specific documentation guidelines for each of the elements of history are listed below.

<u>CHIEF COMPLAINT (CC)</u>
The CC is a concise statement describing the symptom, problem, condition, diagnosis, physician recommended return, or other factor that is the reason for the encounter, usually stated in the patient's own words.

- ***DG: The medical record should clearly reflect the chief complaint.***

HISTORY OF PRESENT ILLNESS (HPI)

The HPI is a chronological description of the development of the patient's present illness from the first sign and/or symptom or from the previous encounter to the present. It includes the following elements:

- **location ,**
- **quality ,**
- **severity,**
- **duration,**
- **timing,**
- **context ,**
- **modifying factors, and**
- **associated signs and symptoms.**

***Brief* and *extended* HPIs are distinguished by the amount of detail needed to accurately characterize the clinical problem(s).**

A *brief* HPI consists of one to three elements of the HPI.

- ***DG: The medical record should describe one to three elements of the present illness (HPI).***

An *extended* HPI consists of at least four elements of the HPI or the status of at least three chronic or inactive conditions.

- ***DG: The medical record should describe at least four elements of the present illness (HPI), or the status of at least three chronic or inactive conditions*.**

REVIEW OF SYSTEMS (ROS)

A ROS is an inventory of body systems obtained through a series of questions seeking to identify signs and/or symptoms that the patient may be experiencing or has experienced.

For purposes of ROS, the following systems are recognized:

- **Constitutional Symptoms (eg, fever, weight loss)**
- **Eyes**
- **Ears, Nose, Mouth, and Throat**
- **Cardiovascular**
- **Respiratory**
- **Gastrointestinal**
- **Genitourinary**
- **Musculoskeletal**
- **Integumentary (skin and/or breast)**
- **Neurological**
- **Psychiatric**
- **Endocrine**
- **Hematologic/Lymphatic**
- **Allergic/Immunologic**

A *problem pertinent* ROS inquires about the system directly related to the problem(s) identified in the HPI.

- ***DG: The patient's positive responses and pertinent negatives for the system related to the problem should be documented.***

An *extended* ROS inquires about the system directly related to the problem(s) identified in the HPI and a limited number of additional systems.

- ***DG: The patient's positive responses and pertinent negatives for two to nine systems should be documented.***

A *complete* ROS inquires about the system(s) directly related to the problem(s) identified in the HPI, *plus* all additional body systems.

- ***DG: At least ten organ systems must be reviewed. Those systems with positive or pertinent negative responses must be individually documented. For the remaining systems, a notation indicating all other systems are negative is permissible. In the absence of such a notation, at least ten systems must be individually documented.***

8

PAST, FAMILY, AND/OR SOCIAL HISTORY (PFSH)

The PFSH consists of a review of three areas:

- **past history (the patient's past experiences with illnesses, operations, injuries and treatments);**
- **family history (a review of medical events in the patient's family, including diseases which maybe hereditary or place the patient at risk); and**
- **social history (an age appropriate review of past and current activities).**

For certain categories of E/M services that include only an interval history, it is not necessary to record information about the PFSH. Those categories are subsequent hospital care, follow-up inpatient consultations and subsequent nursing facility care.

A *pertinent* PFSH is a review of the history area(s) directly related to the problem(s) identified in the HPI.

- ***DG: At least one specific item from any of the three history areas must be documented for a pertinent PFSH.***

A *complete* PFSH is a review of two or all three of the PFSH history areas, depending on the category of the E/M service. A review of all three history areas is required for services that by their nature include a comprehensive assessment or reassessment of the patient. A review of two of the three history areas is sufficient for other services.

- ***DG: At least one specific item from two of the three history areas must be documented for a complete PFSH for the following categories of E/M services: office or other outpatient services, established patient; emergency department; domiciliary care, established patient; and home care, established patient.***

- ***DG: At least one specific item from each of the three history areas must be documented for a complete PFSH for the following categories of E/M services: office or other outpatient services, new patient; hospital observation services; hospital inpatient services, initial care; consultations; comprehensive nursing facility assessments; domiciliary care, new patient; home care, new patient.***

B. DOCUMENTATION OF EXAMINATION

The levels of E/M services are based on four types of examination:

- ***Problem Focused* – a limited examination of the affected body area or organ system.**

- ***Expanded Problem Focused* – a limited examination of the affected body area or organ system and any other symptomatic or related body area(s) or organ system(s).**

- ***Detailed* – an extended examination of the affected body area(s) or organ system(s) and any other symptomatic or related body area(s) or organ system(s).**

- ***Comprehensive* – a general multi-system examination, or complete examination of a single organ system and other symptomatic or related body area(s) or organ system(s).**

These types of examinations have been defined for general multi-system and the following single organ systems:

- **Cardiovascular**
- **Ears, Nose, Mouth, and Throat**
- **Eyes**
- **Genitourinary (Female)**
- **Genitourinary (Male)**
- **Hematologic/Lymphatic/Immunologic**
- **Musculoskeletal**
- **Neurological**
- **Psychiatric**
- **Respiratory**
- **Skin**

A general multi-system examination or a single organ system examination may be performed by any physician, regardless of specialty. The type (general multi-system or single organ system) and content of examination are selected by the examining physician and are based upon clinical judgment, the patient's history, and the nature of the presenting problem(s).

The content and documentation requirements for each type and level of examination are summarized below and described in detail in tables beginning on page 13. In the tables, organ systems and body areas recognized by CPT for purposes of describing examinations are shown in the left column. The content, or individual elements, of the examination pertaining to that body area or organ system are identified by bullets (•) in the right column.

Parenthetical examples "(eg,…)", have been used for clarification and to provide guidance regarding documentation. Documentation for each element must satisfy any numeric requirements (such as "Measurement of *any three of the following seven*...") included in the description of the element. Elements with multiple components but with no specific numeric requirement (such as "Examination of *liver* and *spleen*") require documentation of at least one component. It is possible for a given examination to be expanded beyond what is defined here. When that occurs, findings related to the additional systems and/or areas should be documented.

- ***DG: Specific abnormal and relevant negative findings of the examination of the affected or symptomatic body area(s) or organ system(s) should be documented. A notation of "abnormal" without elaboration is insufficient.***

- ***DG: Abnormal or unexpected findings of the examination of any asymptomatic body area(s) or organ system(s) should be described.***

- ***DG: A brief statement or notation indicating "negative" or "normal" is sufficient to document normal findings related to unaffected area(s) or asymptomatic organ system(s).***

GENERAL MULTI-SYSTEM EXAMINATIONS

General multi-system examinations are described in detail beginning on page 13. To qualify for a given level of multi-system examination, the following content and documentation requirements should be met:

- ***Problem Focused Examination*** **– should include performance and documentation of one to five elements identified by a bullet (•) in one or more organ system(s) or body area(s).**
- ***Expanded Problem Focused Examination*** **– should include performance and documentation of at least six elements identified by a bullet (•) in one or more organ system(s) or body area(s).**
- ***Detailed Examination*** **– should include at least six organ systems or body areas. For each system/area selected, performance and documentation of at least two elements identified by a bullet (•) is expected. Alternatively, a detailed examination may include performance and documentation of at least twelve elements identified by a bullet (•) in two or more organ systems or body areas.**
- ***Comprehensive Examination*** **– should include at least nine organ systems or body areas. For each system/area selected, all elements of the examination identified by a bullet (•) should be performed, unless specific directions limit the content of the examination. For each area/system, documentation of at least two elements identified by a bullet is expected.**

SINGLE ORGAN SYSTEM EXAMINATIONS

The single organ system examinations recognized by CPT are described in detail beginning on page 18. Variations among these examinations in the organ systems and body areas identified in the left columns and in the elements of the examinations described in the right columns reflect differing emphases among specialties. To qualify for a given level of single organ system examination, the following content and documentation requirements should be met:

- ***Problem Focused Examination*** **– should include performance and documentation of one to five elements identified by a bullet (•), whether in a box with a shaded or unshaded border.**
- ***Expanded Problem Focused Examination*** **– should include performance and documentation of at least six elements identified by a bullet (•), whether in a box with a shaded or unshaded border.**
- ***Detailed Examination*** **– examinations other than the eye and psychiatric examinations should include performance and documentation of at least twelve elements identified by a bullet (•), whether in a box with a shaded or unshaded border.**

  Eye and psychiatric examinations should include the performance and documentation of at least nine elements identified by a bullet (•), whether in a box with a shaded or unshaded border.

- ***Comprehensive Examination* – should include performance of all elements identified by a bullet (•), whether in a shaded or unshaded box. Documentation of every element in each box with a shaded border and at least one element in a box with an unshaded border is expected**.

CONTENT AND DOCUMENTATION REQUIREMENTS

General Multi-System Examination

System/Body Area	Elements of Examination
Constitutional	• Measurement of **any three of the following seven** vital signs: 1) sitting or standing blood pressure, 2) supine blood pressure, 3) pulse rate and regularity, 4) respiration, 5) temperature, 6) height, 7) weight (May be measured and recorded by ancillary staff) • General appearance of patient (eg, development, nutrition, body habitus, deformities, attention to grooming)
Eyes	• Inspection of conjunctivae and lids • Examination of pupils and irises (eg, reaction to light and accommodation, size and symmetry) • Ophthalmoscopic examination of optic discs (eg, size, C/D ratio, appearance) and posterior segments (eg, vessel changes, exudates, hemorrhages)
Ears, Nose, Mouth and Throat	• External inspection of ears and nose (eg, overall appearance, scars, lesions, masses) • Otoscopic examination of external auditory canals and tympanic membranes • Assessment of hearing (eg, whispered voice, finger rub, tuning fork) • Inspection of nasal mucosa, septum and turbinates • Inspection of lips, teeth and gums • Examination of oropharynx: oral mucosa, salivary glands, hard and soft palates, tongue, tonsils and posterior pharynx
Neck	• Examination of neck (eg, masses, overall appearance, symmetry, tracheal position, crepitus) • Examination of thyroid (eg, enlargement, tenderness, mass)

System/Body Area	Elements of Examination
Respiratory	• Assessment of respiratory effort (eg, intercostal retractions, use of accessory muscles, diaphragmatic movement) • Percussion of chest (eg, dullness, flatness, hyperresonance) • Palpation of chest (eg, tactile fremitus) • Auscultation of lungs (eg, breath sounds, adventitious sounds, rubs)
Cardiovascular	• Palpation of heart (eg, location, size, thrills) • Auscultation of heart with notation of abnormal sounds and murmurs Examination of: • carotid arteries (eg, pulse amplitude, bruits) • abdominal aorta (eg, size, bruits) • femoral arteries (eg, pulse amplitude, bruits) • pedal pulses (eg, pulse amplitude) • extremities for edema and/or varicosities
Chest (Breasts)	• Inspection of breasts (eg, symmetry, nipple discharge) • Palpation of breasts and axillae (eg, masses or lumps, tenderness)
Gastrointestinal (Abdomen)	• Examination of abdomen with notation of presence of masses or tenderness • Examination of liver and spleen • Examination for presence or absence of hernia • Examination (when indicated) of anus, perineum and rectum, including sphincter tone, presence of hemorrhoids, rectal masses • Obtain stool sample for occult blood test when indicated

System/Body Area	Elements of Examination
Genitourinary	**MALE:** • Examination of the scrotal contents (eg, hydrocele, spermatocele, tenderness of cord, testicular mass) • Examination of the penis • Digital rectal examination of prostate gland (eg, size, symmetry, nodularity, tenderness) **FEMALE:** Pelvic examination (with or without specimen collection for smears and cultures), including • Examination of external genitalia (eg, general appearance, hair distribution, lesions) and vagina (eg, general appearance, estrogen effect, discharge, lesions, pelvic support, cystocele, rectocele) • Examination of urethra (eg, masses, tenderness, scarring) • Examination of bladder (eg, fullness, masses, tenderness) • Cervix (eg, general appearance, lesions, discharge) • Uterus (eg, size, contour, position, mobility, tenderness, consistency, descent or support) • Adnexa/parametria (eg, masses, tenderness, organomegaly, nodularity)
Lymphatic	Palpation of lymph nodes in **two or more** areas: • Neck • Axillae • Groin • Other

15

System/Body Area	Elements of Examination
Musculoskeletal	• Examination of gait and station • Inspection and/or palpation of digits and nails (eg, clubbing, cyanosis, inflammatory conditions, petechiae, ischemia, infections, nodes) Examination of joints, bones and muscles of **one or more of the following six** areas: 1) head and neck; 2) spine, ribs and pelvis; 3) right upper extremity; 4) left upper extremity; 5) right lower extremity; and 6) left lower extremity. The examination of a given area includes: • Inspection and/or palpation with notation of presence of any misalignment, asymmetry, crepitation, defects, tenderness, masses, effusions • Assessment of range of motion with notation of any pain, crepitation or contracture • Assessment of stability with notation of any dislocation (luxation), subluxation or laxity • Assessment of muscle strength and tone (eg, flaccid, cog wheel, spastic) with notation of any atrophy or abnormal movements
Skin	• Inspection of skin and subcutaneous tissue (eg, rashes, lesions, ulcers) • Palpation of skin and subcutaneous tissue (eg, induration, subcutaneous nodules, tightening)
Neurologic	• Test cranial nerves with notation of any deficits • Examination of deep tendon reflexes with notation of pathological reflexes (eg, Babinski) • Examination of sensation (eg, by touch, pin, vibration, proprioception)
Psychiatric	• Description of patient's judgment and insight Brief assessment of mental status including: • orientation to time, place and person • recent and remote memory • mood and affect (eg, depression, anxiety, agitation)

Content and Documentation Requirements

Level of Exam	Perform and Document:
Problem Focused	**One to five** elements identified by a bullet.
Expanded Problem Focused	**At least six** elements identified by a bullet.
Detailed	**At least two** elements identified by a bullet **from each of six areas/systems** OR **at least twelve** elements identified by a bullet **in two or more areas/systems**.
Comprehensive	Perform **all elements** identified by a bullet in **at least nine** organ systems or body areas and document **at least two** elements identified by a bullet **from each of nine areas/systems.**

APPENDIX D: MODEL 3 NOTE—FULL TEXT

PATIENT:
MR #:
VISIT #:
DATE OF ADMISSION:
DATE OF DISCHARGE:
DATE OF BIRTH:
SOCIAL SECURITY #:

HPI CHEST PAIN ( )
TIME: Patient assessed at: 5.
CHIEF COMPLAINT: Patient presents for the evaluation of chest pain that was present but has now resolved.
HISTORIAN: History obtained from patient.
TIME COURSE: Onset of symptoms reported as gradual, Onset was 2 hours prior to arrival . Patient currently has symptoms. Complaint is resolved, Episodes last 2 hours .
LOCATION: Pain most severe in substernal area. Radiation is to arm. Pain has not moved in location over time.
QUALITY: Pain is pressure.
ASSOCIATED WITH: Associated with no nausea, no vomiting, diaphoresis present, no shortness of breath, no palpitations.
SEVERITY: Maximum severity is moderate, Currently there are no symptoms.
EXACERBATED BY: Patient's condition exacerbated by nothing.
RELIEVED BY: Patient's condition relieved by nothing.
RISK FACTORS: CAD risk factors include smoking, CAD risk factors include hypertension, CAD risk factors include family history, No TAD risk factors, No PE risk factors.

TRIAGE ( )
COMPLAINT: Chest Pain.
PROVIDERS: TRIAGE NURSE:
ADMISSION: URGENCY: Level 2 - Orange, ADMISSION SOURCE: Privately Owned Vehicle, TRANSPORT: Ambulatory, BED: WAIT.
PATIENT: NAME: , AGE: GENDER: Male, DOB:
TIME OF GREET: , LANGUAGE: English, RACE: Caucasian, 72 Hour Return?: No, SEN: , ZIP CODE: PHONE: , MEDICAL RECORD NUMBER: ACCOUNT NUMBER:
ATTENDING: IDEX NUMBER:
ASSESSMENT: Triage assessment performed, Pt woke up this AM around 0430 with severe chest pain. Pt states chest pain last about 30 minutes and he was diaphoretic. Denies SOB and nausea/vomiting. Pt took Baby ASA 81mg x2 this AM at home.
NOTES:Patient complains of pain. Pain described as sharp, On a scale 0-10 patient rates pain as 3, Midsternal chest pain. Pain is constant, Onset was 0600.
DOMESTIC VIOLENCE: The presence of domestic violence is unknown.
TREATMENTS IN PROGRESS: No treatment.
TREATMENTS IN TRIAGE: None.
ES LEVEL: ES Level 2.
VITAL SIGNS: BP 159/110, Pulse 85, Resp 20, Temp 98.4, Pain 3, O2 Sat 97, on RA, Time 0738.

KNOWN ALLERGIES:
Penicillins.

#EDN# VISIT: ID: STATUS: corrected
#DICTID# MRN:
#ACTIVE
#PROC# (OOD): NAME: MDC Chart TIME:

[redacted]

Nash Health Care Systems
Curtis Ellis Drive
Rocky Mount, NC 27804
Emergency Care Center Ibex Chart

Patient: [redacted]

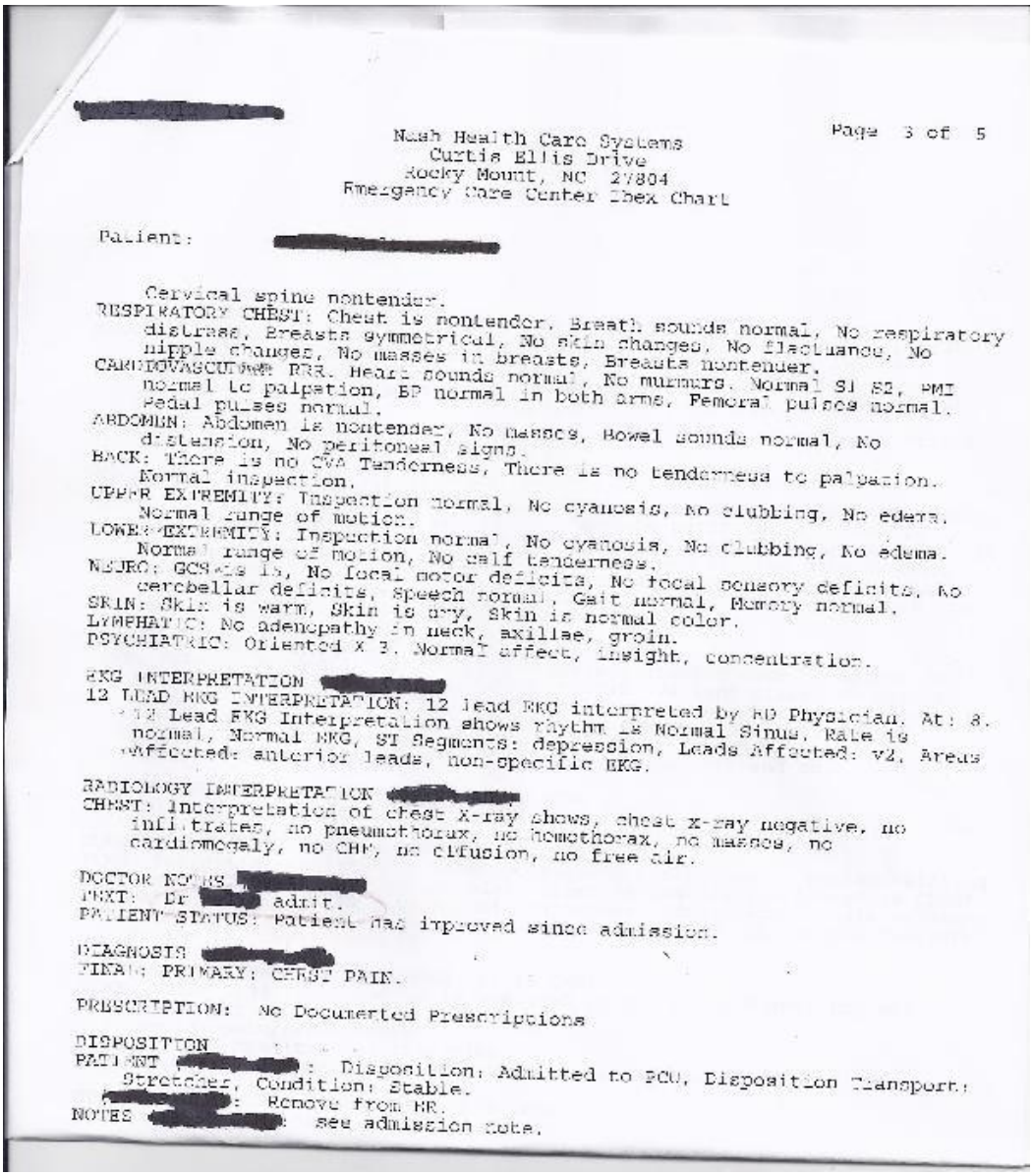
CURRENT MEDICATIONS [redacted]
Denies Medications:

ROS [redacted]
CARDIOVASCULAR: No palpitations.
GI: No nausea. No vomiting.
ALL SYSTEMS NEGATIVE: All systems were reviewed and are negative except as described above.

VITAL SIGNS
VITAL SIGNS [redacted]: BP: 148, / 95, Pulse: 90, Resp: 18, Pain: 3, O2 sat: 100, 2lit, Time: 0955.
([redacted]): BP: 137, / 96, Pulse: 88, Resp: 18, Temp: 98.0, Pain: 3, O2 sat: 100, 2lit, Time: 1035.
([redacted]): BP: 159/110, Pulse: 85, Resp: 20, Temp: 98.4, Pain: 3, O2 sat: 97 on RA, Time: 0739.
([redacted]): BP: 167/108, Pulse: 74, Resp: 18, Pain: 3, O2 sat: 97 on 2lit, Time: 0840.
([redacted]): BP: 149/98, Pulse: 80, Resp: 18, Temp: 98.0, Pain: 3, O2 Sat: 98 on ra, Time: 0915.
([redacted]): BP: 148/95, Pulse: 90, Resp: 18, Pain: 3, O2 sat: 100 on 2lit, Time: 0955.
([redacted]): BP: 137/96, Pulse: 88, Resp: 18, Temp: 98.0, Pain: 3, O2 sat: 100 on 2lit, Time: 1035.
([redacted]): BP: 142/96, Pulse: 84, Resp: 18, Pain: 0, O2 sat: 100 on 2lit, Time: 1130.
([redacted]): BP: 135/80, Pulse: 78, Resp: 20, Temp: 98.4, Pain: 0, O2 Sat: 98% on 2lnc.

PAST MEDICAL HISTORY [redacted]
MEDICAL HISTORY: History of hypertension, which has been treated, but has not been taking med.
SURGICAL HISTORY: left shoulder surgery.
PSYCHIATRIC HISTORY: No previous psychiatric history.
SOCIAL HISTORY: Denies drug abuse. Lives with others. Patient smokes tobacco, at 1, packs per day for 25, years; equating to 25, pack years of smoking. Patient consumes alcohol socially.
FAMILY HISTORY: Family history includes coronary artery disease. Family history includes CVA. Family history includes hypertension.

PHYSICAL EXAM [redacted]
CONSTITUTIONAL: Patient is afebrile, Vital Signs Reviewed. Patient has normal pulse, normal blood pressure, normal respiratory rate, Well appearing. Patient appears comfortable, Alert and oriented X 3.
HEAD: Atraumatic, Normocephalic.
EYES: Eyes are normal to inspection, Pupils equal, round and reactive to light, No discharge from eyes, Extraocular muscles intact. Sclera are normal. Conjunctiva are normal.
ENT: Ears normal to inspection, Nose examination normal, Posterior pharynx normal, Mouth normal on inspection.
NECK: Normal ROM, No jugular venous distention, No meningeal signs,



[redacted]

Nash Health Care Systems
Curtis Ellis Drive
Rocky Mount, NC 27804
Emergency Care Center Chex Chart

Patient: [redacted]

Cervical spine nontender.
RESPIRATORY CHEST: Chest is nontender. Breath sounds normal, No respiratory distress, Breasts symmetrical, No skin changes, No fluctuance, No nipple changes, No masses in breasts, Breasts nontender.
CARDIOVASCULAR RRR. Heart sounds normal, No murmurs. Normal S1 S2, PMI normal to palpation, BP normal in both arms, Femoral pulses normal. Pedal pulses normal.
ABDOMEN: Abdomen is nontender, No masses, Bowel sounds normal, No distension, No peritoneal signs.
BACK: There is no CVA Tenderness, There is no tenderness to palpation. Normal inspection.
UPPER EXTREMITY: Inspection normal, No cyanosis, No clubbing, No edema. Normal range of motion.
LOWER EXTREMITY: Inspection normal, No cyanosis, No clubbing, No edema. Normal range of motion, No calf tenderness.
NEURO: GCS is 15, No focal motor deficits, No focal sensory deficits, No cerebellar deficits, Speech normal, Gait normal, Memory normal.
SKIN: Skin is warm, Skin is dry, Skin is normal color.
LYMPHATIC: No adenopathy in neck, axillae, groin.
PSYCHIATRIC: Oriented X 3. Normal affect, insight, concentration.

EKG INTERPRETATION [redacted]
12 LEAD EKG INTERPRETATION: 12 lead EKG interpreted by ED Physician. At: 8. 12 Lead EKG Interpretation shows rhythm is Normal Sinus, Rate is normal, Normal EKG, ST Segments: depression, Leads Affected: V2, Areas Affected: anterior leads, non-specific EKG.

RADIOLOGY INTERPRETATION [redacted]
CHEST: Interpretation of chest X-ray shows, chest x-ray negative, no infiltrates, no pneumothorax, no hemothorax, no masses, no cardiomegaly, no CHF, no effusion, no free air.

DOCTOR NOTES [redacted]
NEXT: Dr [redacted] admit.
PATIENT STATUS: Patient has improved since admission.

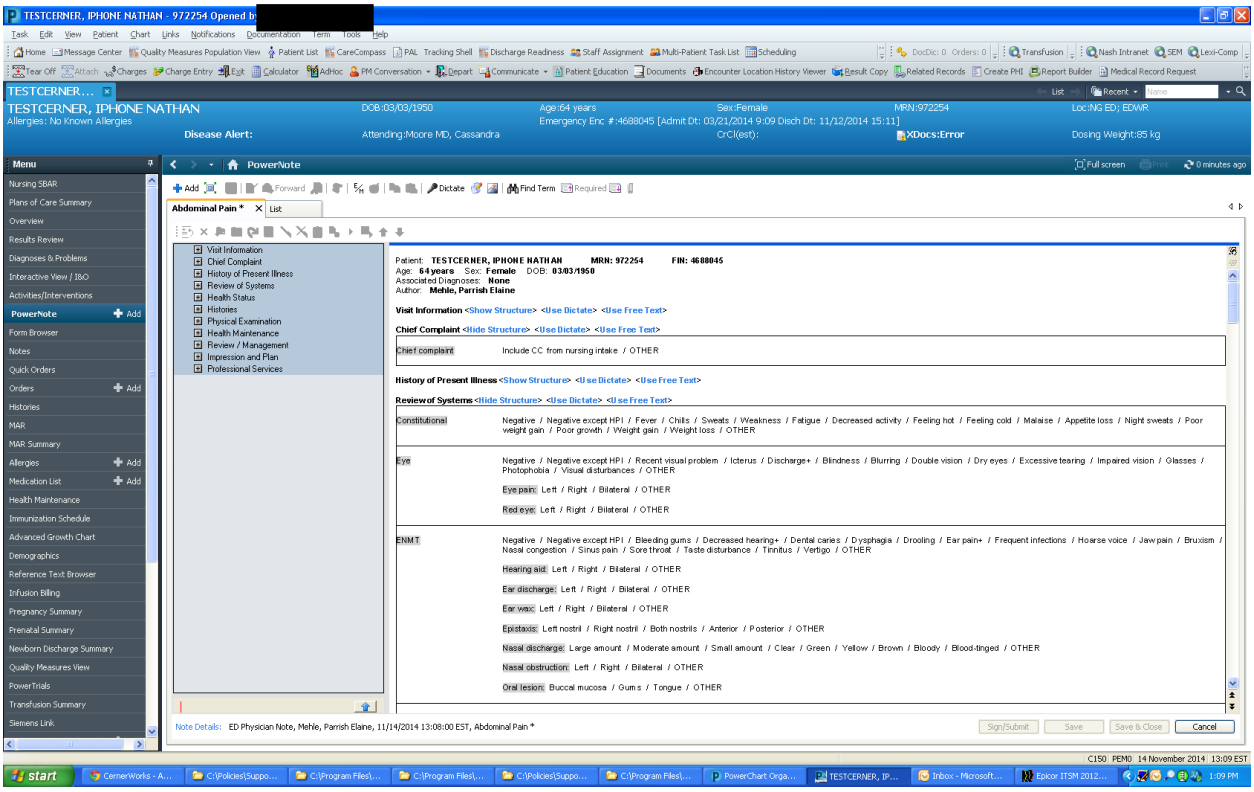
DIAGNOSIS [redacted]
FINAL: PRIMARY: CHEST PAIN.

PRESCRIPTION: No Documented Prescriptions

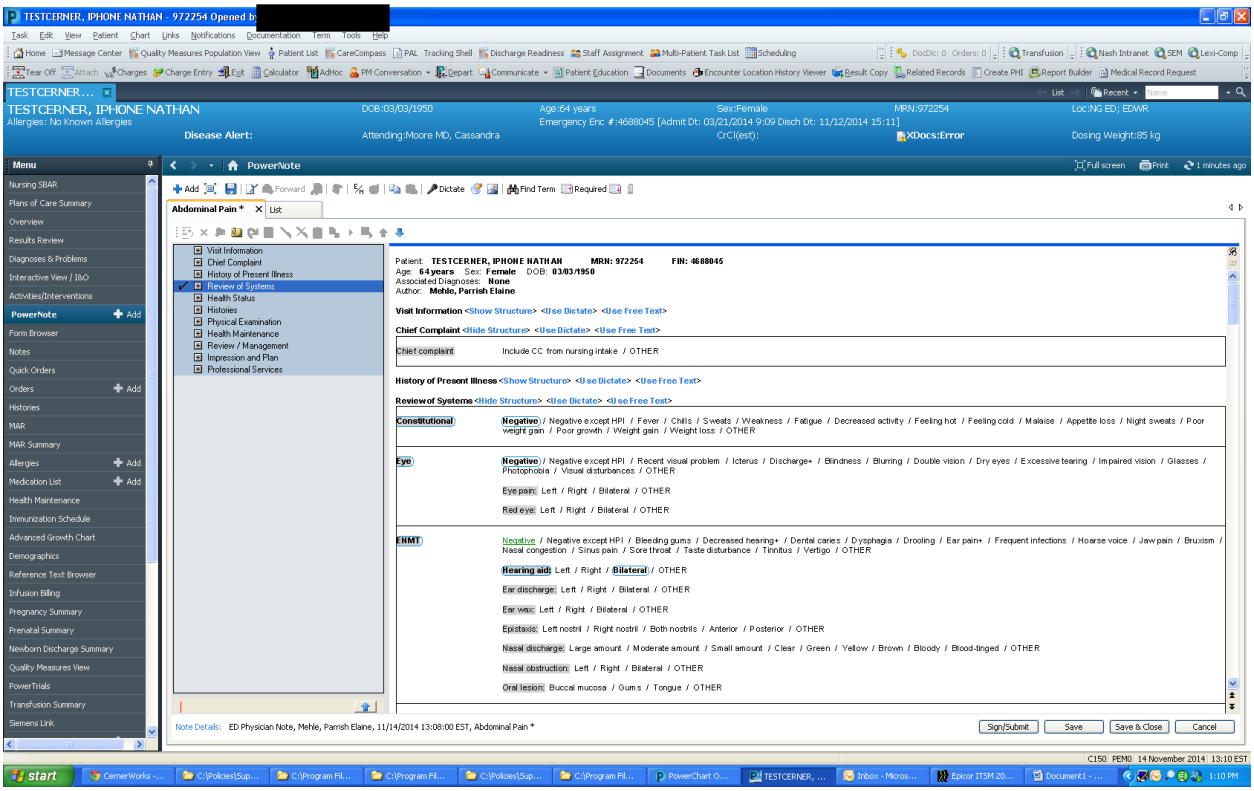
DISPOSITION
PATIENT [redacted]: Disposition: Admitted to PCU, Disposition Transport: Stretcher, Condition: Stable.
[redacted]: Remove from ER.
NOTES [redacted]: see admission note.

Note: there are additional pages included in this note. The data comes from nursing documentation and is therefore omitted.

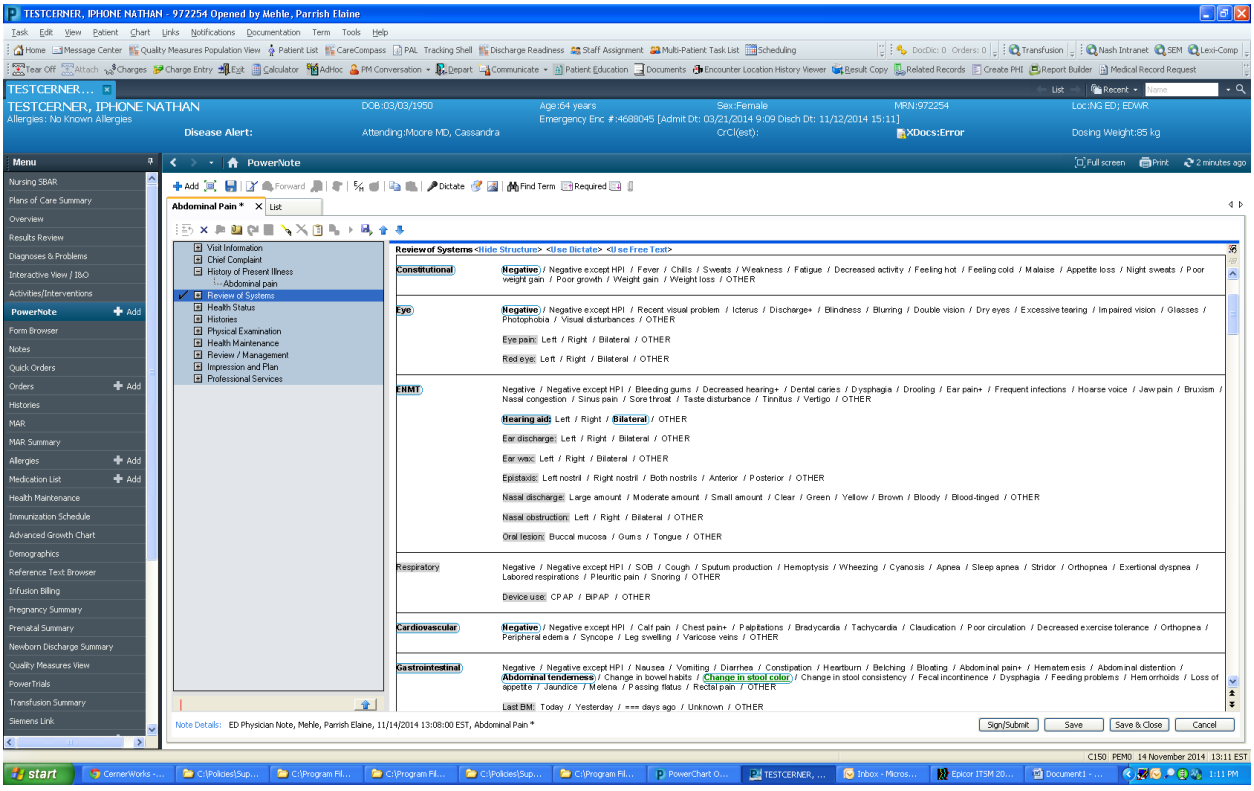
APPENDIX E: MODEL 4 SCREEN SHOTS



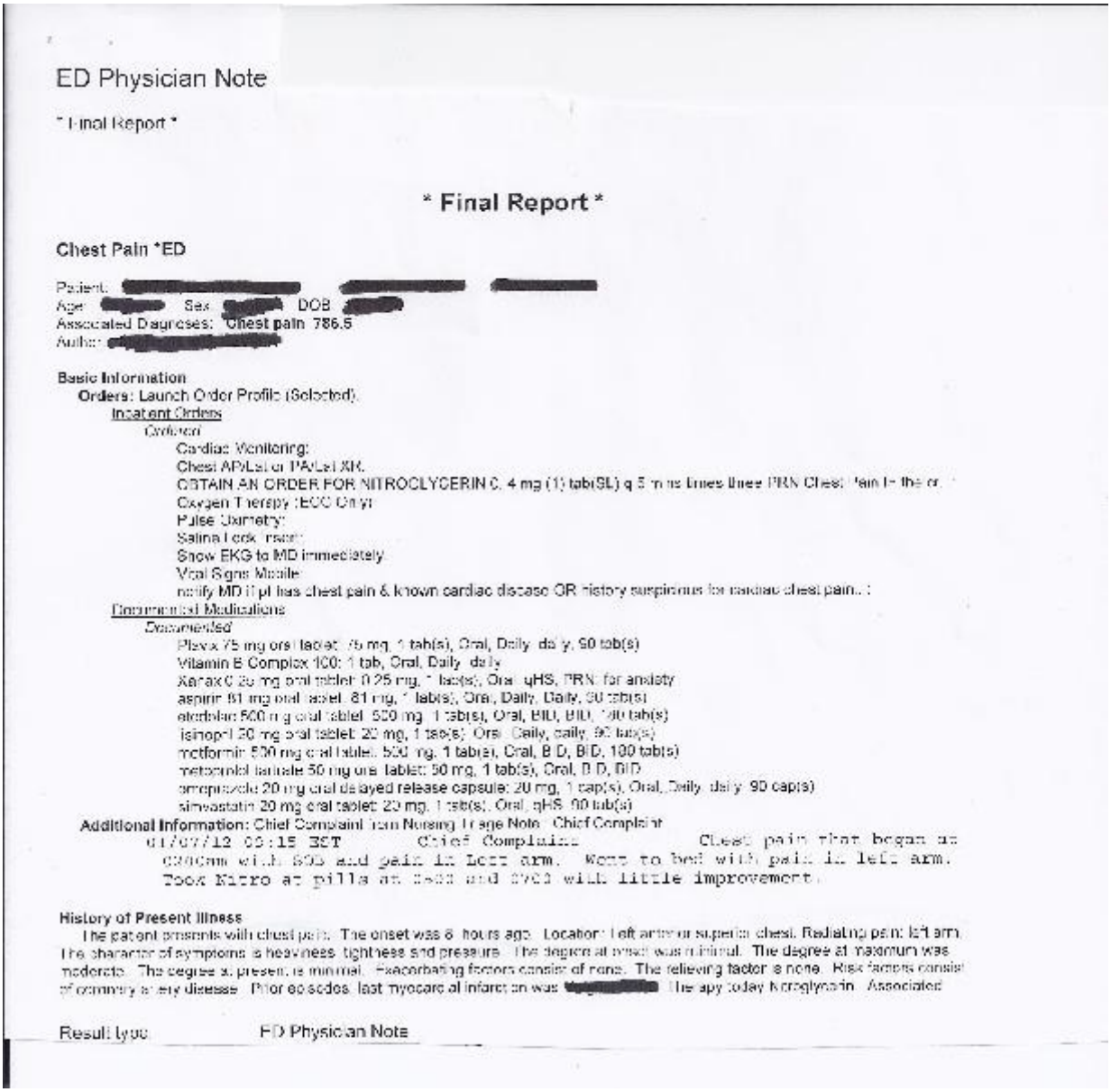
The next screen shot demonstrates what the screen looks like when selections have been made; in this case, the physician has charted in the Review of Systems section.



Scrolling down reveals additional data elements for selection:



APPENDIX F: MODEL 4 NOTE—FULL TEXT



ED Physician Note

* Final Report *

* Final Report *

Chest Pain *ED

Patient: [redacted]
Age: [redacted] Sex: [redacted] DOB: [redacted]
Associated Diagnoses: Chest pain 786.5
Author: [redacted]

Basic Information
Orders: Launch Order Profile (Selected)
Inpatient Orders
Ordered
Cardiac Monitoring:
Chest AP/Lat or PA/Lat XR.
OBTAIN AN ORDER FOR NITROGLYCERIN 0.4 mg (1) tab(SL) q 5 mins times three PRN Chest Pain if the pt
Oxygen Therapy (ECG Only)
Pulse Oximetry:
Saline Lock insert
Show EKG to MD immediately
Vital Signs Mobile
notify MD if pt has chest pain & known cardiac disease OR history suspicious for cardiac chest pain. :
Documented Medications
Documented
Plavix 75 mg oral tablet: 75 mg, 1 tab(s), Oral, Daily, daily, 90 tab(s)
Vitamin B Complex 100: 1 tab, Oral, Daily, daily
Xanax 0.25 mg oral tablet: 0.25 mg, 1 tab(s), Oral, qHS, PRN: for anxiety
aspirin 81 mg oral tablet: 81 mg, 1 tab(s), Oral, Daily, Daily, 90 tab(s)
atenolol 500 mg oral tablet: 500 mg, 1 tab(s), Oral, BID, BID, 180 tab(s)
lisinopril 20 mg oral tablet: 20 mg, 1 tab(s), Oral, Daily, daily, 90 tab(s)
metformin 500 mg oral tablet: 500 mg, 1 tab(s), Oral, B.D, BID, 100 tab(s)
metoprolol tartrate 50 mg oral tablet: 50 mg, 1 tab(s), Oral, B.D, BID
omeprazole 20 mg oral delayed release capsule: 20 mg, 1 cap(s), Oral, Daily, daily, 90 cap(s)
simvastatin 20 mg oral tablet: 20 mg, 1 tab(s), Oral, qHS, 90 tab(s)
Additional Information: Chief Complaint from Nursing Triage Note: Chief Complaint
07/07/12 09:15 EST Chief Complaint: Chest pain that began at
0200hrs with SOB and pain in left arm. Went to bed with pain in left arm.
Took Nitro at pills at 0400 and 0700 with little improvement.

History of Present Illness
The patient presents with chest pain. The onset was 6 hours ago. Location: left anterior superior chest. Radiating pain: left arm. The character of symptoms is heaviness, tightness and pressure. The degree at onset was minimal. The degree at maximum was moderate. The degree at present is minimal. Exacerbating factors consist of none. The relieving factor is none. Risk factors consist of coronary artery disease. Prior episodes: last myocardial infarction was [redacted]. Therapy today: Nitroglycerin. Associated

Result type: ED Physician Note

ED Physician Note

* Final Report *

symptoms: shortness of breath.

Review of Systems

Constitutional symptoms: Negative except as documented in HPI.
Skin symptoms: Negative except as documented in HPI.
Eye symptoms: Negative except as documented in HPI.
ENMT symptoms: Negative except as documented in HPI.
Respiratory symptoms: Negative except as documented in HPI.
Cardiovascular symptoms: Negative except as documented in HPI.
Gastrointestinal symptoms: Negative except as documented in HPI.
Genitourinary symptoms: Negative except as documented in HPI.
Musculoskeletal symptoms: Negative except as documented in HPI.
Neurologic symptoms: Negative except as documented in HPI.
Psychiatric symptoms: Negative except as documented in HPI.
Endocrine symptoms: Negative except as documented in HPI.
Hematologic/Lymphatic symptoms: Negative except as documented in HPI.
Allergy/immunologic symptoms: Negative except as documented in HPI.
Additional review of systems information: All other systems reviewed and otherwise negative.

Health Status

Allergies: .

Allergic Reactions (Selected)

Severity not Documented

Dilaudid- No reactions were documented.
Flagyl- No reactions were documented.

Past Medical/ Family/ Social History

Medical history: Medical history.

Resolved

HYPERTENSION (997.91): Resolved.
Hyperlipidemia (92826017): Resolved.
MI (75323015): Resolved.
Stroke (345636015): Resolved.
Reflux (78795015): Resolved.
Stented coronary artery (1480321017): Resolved.
Angina (299755016): Resolved.
DIABETES MELLITUS (250): Resolved.
IBS - Irritable bowel syndrome (1219342015): Resolved.

Family history: Family history.

Hypertension
Parent - Father
Parent - Mother
Stroke
Parent - Mother
Metastatic cancer

Result type: ED Physician Note

ED Physician Note

* Final Report *

Sister
Brother
CAD - Coronary artery disease
Parent - Father

Physical Examination

Vital Signs
Vital Signs.

[redacted]

Heart Rate Monitored	71 bpm	
Systolic Blood Pressure	**142 mmHg**	**HI**
Diastolic Blood Pressure	74 mmHg	
Mean Arterial Pressure, Cuff		97 mmHg

[redacted]

Temperature Oral	36.5 DegC	
Peripheral Pulse Rate	84 bpm	
Respiratory Rate	22 br/min	
Systolic Blood Pressure	**159 mmHg**	**HI**
Diastolic Blood Pressure	87 mmHg	
Vital Signs Assessed	Yes	

Measurements.

[redacted]

Height/Length Dosing	151.00 cm
Weight Dosing	71.200 kg
Weight Source	Measured
Height/Length Source	Measured

Basic Oxygen Information.

[redacted]

SpO2	96 %
Oxygen Therapy	Room air
SpO2	96 %

General: Alert, no acute distress.
Skin: Warm, dry, pink, intact.
Head: Normocephalic, atraumatic.
Neck: Supple, trachea midline, no tenderness, no JVD.
Eye: Pupils are equal, round and reactive to light, intact accommodation, extraocular movements are intact, normal conjunctiva.
Ears, nose, mouth and throat: Oral mucosa moist, no pharyngeal erythema or exudate.
Cardiovascular: Regular rate and rhythm, No murmur, Normal peripheral perfusion, No edema.
Respiratory: Lungs are clear to auscultation, respirations are non-labored, breath sounds are equal, Symmetrical chest wall expansion.
Chest wall: No tenderness, No deformity.
Back: Nontender, Normal range of motion, Normal alignment.
Musculoskeletal: Normal ROM, normal strength, no tenderness, no swelling.
Gastrointestinal: Soft, Nontender, Non distended, Normal bowel sounds, No organomegaly.

Result type: ED Physician Note

ED Physician Note

* Final Report *

Neurological: Alert and oriented to person, place, time, and situation, No focal neurological deficit observed, CN II-XII intact, normal sensory observed, normal motor observed.
Lymphatics: No lymphadenopathy.
Psychiatric: Cooperative, appropriate mood & affect, normal judgment, non-suicidal.

Medical Decision Making
Orders Launch Order Profile (Selected).
Inpatient Orders
Ordered
Cardiac Monitoring:
Chest AP/Lat or PA/Lat XR:
OBTAIN AN ORDER FOR NITROGLYCERIN 0. 4 mg (1) tab(SL) q 5 mins times three PRN Chest Pain IF the cr...:
Oxygen Therapy (ECC Only):
Pulse Oximetry:
Saline Lock Insert:
Show EKG to MD immediately:
Vital Signs Mobile:
notify MD if pt has chest pain & known cardiac disease OR history suspicious for cardiac chest pain...:
Documented Medications
Documented
Plavix 75 mg oral tablet: 75 mg, 1 tab(s), Oral, Daily, daily, 90 tab(s)
Vitamin B Complex 100: 1 tab, Oral, Daily, daily
Xanax 0.25 mg oral tablet: 0.25 mg, 1 tab(s), Oral, qHS, PRN: for anxiety
aspirin 81 mg oral tablet: 81 mg, 1 tab(s), Oral, Daily, Daily, 90 tab(s)
etodolac 500 mg oral tablet: 500 mg, 1 tab(s), Oral, BID, BID, 180 tab(s)
lisinopril 20 mg oral tablet: 20 mg, 1 tab(s), Oral, Daily, daily, 90 tab(s)
metformin 500 mg oral tablet: 500 mg, 1 tab(s), Oral, BID, BID, 180 tab(s)
metoprolol tartrate 50 mg oral tablet: 50 mg, 1 tab(s), Oral, BID, BID
omeprazole 20 mg oral delayed release capsule: 20 mg, 1 cap(s), Oral, Daily, daily, 90 cap(s)
simvastatin 20 mg oral tablet: 20 mg, 1 tab(s), Oral, qHS, 90 tab(s)
Electrocardiogram: Time [redacted] rate 78, normal sinus rhythm, no ectopy, STT segments 2 mm depression in lead(s):, II, , III, , AVF, , V4, , V5, , V6, QRS interval Right bundle branch block, Interpretation by Emergency Physician Ischemic changes.
Pt with ischemic changes to EKG and history concerning for ACS. Admit for rule out.

Results review: Interpretation Labs unremarkable.
Chest X-Ray: WNL, no acute disease process, interpretation by Emergency Physician.

Impression and Plan
Diagnosis
Chest pain 786.5 (ICD9 786.50, Discharge, Emergency Medicine, Medical)
Plan
Condition: Improved.
Disposition: Admit:

Result type: ED Physician Note

ED Physician Note

* Final Report *

Admit/Transfer/Discharge:
Intent to Admit (Ordered): [redacted]

Completed Action List:
* Perform by [redacted]
* Modify by [redacted]
* Sign by [redacted]
* VERIFY by [redacted]

Result type: ED Physician Note