Design and Implementation of an Inpatient Physician Documentation System Using Off-the-Shelf Components

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Abstract
We report the development and implementation of an electronic inpatient physician documentation system using off-the-shelf components, rapidly and at low cost. Within 9 months of deployment, over half of physician notes were electronic, and within 20 months, paper physician notes were eliminated. Our results suggest institutions can prioritize conversion to inpatient electronic physician documentation without waiting for development of sophisticated software packages or large capital investments.

Introduction
Electronic physician documentation systems are typically complex, motivated by an assumption that feature-rich user experiences will promote adoption. Their complexity leads to lengthy and expensive development efforts, unfamiliar user interfaces, and often requires extensive training and extended adoption periods. We tested the hypothesis that a physician documentation system developed with off-the-shelf components could provide a successful user experience to clinicians at low cost, and be rapidly deployed in a multi-site academic medical center.

Methods
The University of California, San Francisco Medical Center inpatient facilities consist of Moffitt/Long Hospital, Mt Zion Hospital, and UCSF Children’s Hospital. The local implementation of its vendor-supplied hospital information system provides limited functionality for physician documentation, consisting of a plain text editor and limited macro text entry. As nursing and ancillary documentation were converted to electronic entry, institutional leadership prioritized contemporaneous conversion to electronic physician documentation. To speed adoption, minimize training requirements, and control costs, we developed a physician documentation system from familiar commercially available components. We built two parallel network directory structures mirroring the organizational structure of the hospital’s clinical services. One set of directories is read-only and controlled by the clinical chiefs of service. The second is read-write, for collaborative use by the providers on that service. We developed Microsoft Word document templates encoding the major classes of physician documents (History & Physical, Progress Note, etc), and provided these starter sets to each clinical service chief. The service chiefs adapted these generic templates to their specialty’s clinical needs and organizational goals. The chiefs published their templates in the read-only directory hierarchy, and end-user providers select appropriate templates as the basis for their clinical documentation. Simple macros and a custom toolbar simplify transfer of content from the finished Word document to the hospital information system’s text editor. Providers may save the Word version in the read-writable directory for collaboration within the care team.

Results
The documentation system was developed without acquisition of new software. Service chiefs were successful in customizing templates without specialized instruction. Within 9 months, half of the inpatient physician notes at UCSFMC were electronic, and within 20 months, paper physician notes were eliminated (Figure 1).

Document completeness, as measured by professional CPT coding, was also improved.

Conclusion
A low-cost physician documentation system can be successfully deployed in a multi-site academic medical center with off-the-shelf components. Our results suggest institutions can prioritize conversion to inpatient electronic physician documentation without waiting for sophisticated software packages or large additional capital investments.