Preliminary Observations at DHMC

Impact of CodeNet on Accuracy of Code Documentation:

Prompts for key information such as ET tube size, confirmation of tube location, etc. increase the completeness of the code event record. End-of-code prompts for names of code participants proved invaluable in the case where a patient was later identified to have hepatitis C. All Code Team members were identified within a matter of minutes.

Impact of CodeNet on Quality of Code Documentation

Expectations of data to be documented during a code are consistent and clear. The documenter cannot close out of the program until the required data is entered. Electronic transfer of code records to reviewer happens within the same shift as the code. Consistent electronic format enables code events to be reviewed within a 5-15 minute timeframe, which results in quick follow-up to staff with critical feedback - often within a single shift. Quality issues are noted immediately so that involved staff on duty can be contacted to better understand the issue.

Impact of CodeNet on Patient Care

It may be desirable to review the patient's ECG data from the code so that best follow-up care can be ordered by the responsible physician in the upcoming hours. If the reviewer is contacted, the ECG data is immediately available for review and printing. This is especially helpful when the lethal dysrhythmia has been ventricular fibrillation or tachycardia (VT). If unsynchronized shocks are provided for VT, it can be clearly seen for counseling of the Code Team.

Impact of CodeNet on Documentation of Event Times

Accurate times for selected variables are needed in order to track quality of care and plan improvements such as:

- Time CPR Team was called
- Time CPR Team arrived at bedside
- Time to first defibrillation shock
- Time of first epinephrine dose

Historically, obtaining consistent times has been one of the greatest challenges for code documentation. The implementation of CodeNet allows for a single consistent timeline to be constructed. When a new ambulatory care building was opened at DHMC, it was realized that it took the CPR Team 3 minutes longer to reach the victim. Plans are now underway to revisit strategies for medical response teams in the larger facility.

Conclusion

The implementation of CodeNet has met the objectives at DHMC. The deployment process was straightforward, and the intuitive nature of the software made staff training very easy. Most importantly, improvements in the quality and accuracy of the code event record and labor efficiencies have been realized. CodeNet is a valuable tool to help our clinicians improve the quality of care and save patient lives.

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CodeNet Case Study #1

Deployment Considerations at Dartmouth-Hitchcock Medical Center

Dartmouth-Hitchcock Medical Center

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Introduction

ZOLL CodeNet™ is an integrated electronic system designed specifically for in-hospital resuscitation documentation. CodeNet consists of CodeNet Writer™, a PDA-based application that documents and automatically time stamps code events and downloads defibrillator data at the end of the code, and CodeNet Central™, a PC-based application to manage and store case-based and aggregate reports, and transmit code event data directly to The National Registry of Cardiopulmonary Resuscitation (NRCPR).

Dartmouth-Hitchcock Medical Center (DHMC), a 350-bed tertiary care center, implemented CodeNet housewide in May of 2004. DHMC's objectives in deploying the CodeNet system include improving reporting and analysis capabilities for resuscitation events, improving accuracy and completeness of code event records, and improving efficiencies in managing resuscitation event information and reporting to NRCPR. Initial results show:

- Accurate timelines related to CPR team page and all interventions
- Improved quality and accuracy of code records
- Increased quantity of information captured during a code
- Rapid feedback to Code Team–within 24 hours of event
- 20% reduction in time spent reviewing codes
- Data-driven modifications to equipment deployment and code process of care
- More timely follow-up of quality issues

This case study reviews initial preparations that should be considered for successful deployment of the ZOLL CodeNet system for code documentation.

Preparation for Deployment

Step 1: Build Internal Support

Successful change requires a champion! Implementation of a system such as CodeNet obviously begins with the approval of the CPR Committee, but successful deployment will also require much broader-based support. A project leader, or champion, can be the person who understands the whole system, coordinates initial deployment activities and serves as first line technical support after deployment. It is frequently helpful for the project coordinator to use CodeNet on a pilot basis during the initial preparations to gain experience for full deployment.

Internal communication is critical to prepare staff for the change in the code documentation process. The CodeNet Summary of Benefits can be helpful in educating hospital staff as well as generating enthusiasm. Specifically, deployment will typically require cooperation from the IT department (for computer access and support), CPR team members, nursing supervisors, educators, and nursing/physician leadership within intensive care units.

Step 2: Selection of Documenters

The ideal scenario is to have a designated code documenter as part of the code response team. This can be a nursing supervisor, a local floor nurse, or a member of the response team. The essential requirement is that someone is present who does not have additional responsibilities during the code and can remain afterwards to complete the documentation. A secondary consideration is defining a manageable pool of resources for training. Since DHMC is a teaching institution, they use third year Internal Medicine residents.

Step 3: Location of Hardware

Once the documenters have been identified, it is a relatively straightforward process to identify where to locate PDAs and PC workstations. Typically, one or two PDAs are carried by the appropriate members of the code response team. Additional PDAs are usually located in departments that may not call code teams - such as the Emergency Department, ICU/CCU, and OR. The PDA may also be carried by someone who will not document the code, but will hand off the PDA upon arrival. CodeNet Central should be loaded on PC workstations that are convenient to the documenter, and on selected administrative workstations.

DHMC has a total of 10 PDAs, 15 PC user workstations and 5 administrative workstations deployed as follows:

- PDAs are carried by the Internal Medicine house officer who serves as documenter (plus one always docked and charging); and also stationed in ICU, CCU, CTICU, OR and ED. Several additional PDAs are kept for training.
- CodeNet Central is available on "unrestricted" user computer workstations in 3 med/surg units, all intensive care units, the OR, Cath Lab, Radiology, Infusion Suite, house staff lounge, Internal Medicine house staff library, and the Learning Lab.
- Administrative workstations with CodeNet Central are those of the CPR Committee Co-chairs, the IT consultant, and the data entry staff in Clinical Quality Services.

Step 4: Deployment and Training

Final deployment and training for CodeNet is expected to take place over three days. During this time, ZOLL Medical Corporation brings in a dedicated resource to conduct actual software installations and training. Prior to bringing in the CodeNet deployment specialist, the hospital-based project coordinator should go through the pre-deployment checklist to ensure that all appropriate preparations have been completed.

Training for documenters should be conducted in very small groups, where each trainee has access to a PDA, a PC workstation and a defibrillator. Documentation with CodeNet is highly intuitive. The training process uses case scenarios to walk documenters through documentation during a mock code, downloading defibrillator data, and completing a code record on the PC. Additional training is conducted with the small group of users that will be responsible for reviewing code records and generating reports.

CodeNet Resuscitation Information System

Summary of Benefits

The summary of possible benefits listed below is intended to be a representative sample of what an institution might achieve with the implementation of CodeNet software to document and manage code event data within the hospital. The information is presented from two perspectives: 1) Generalized benefits of better resuscitation information to patients, families, clinicians and institutions; and 2) Potential clinical, quality and financial benefits associated with implementation of CodeNet.

GENERAL BENEFITS OF IMPROVED RESUSCITATION INFORMATION

Patient Benefits

- Faster access to information improves quality of care.
- Rapid case analysis and trend analysis improve efficiencies, and therefore cost of care for patient.
- Programs with "decision support" mechanisms improve safety of patient care.

Family Benefits

- New guidelines that support family presence during resuscitation create opportunity for increased level of questions from family.
- Improved documentation of actual events, in conjunction with better access to information, provides better information for families.

Clinician Benefits

- Clinicians desire quick, easy way of documenting events.
- Clinicians desire cues for decision support.
- Clinicians need improved tools to increase their efficiency. Staffing shortages make it even more important to decrease the amount of time spent on paperwork so more time is available for quality patient care.

Institution Benefits

- Institution desires continuous improvement in quality of patient care and patient outcomes. Improved quality of resuscitation information provides data to support process changes to improve patient care, as well as quantitative means for publicizing improvements if desired.
- Institution must be able to measure quality of resuscitation programs per JCAHO standards.
- Allocation of equipment and supplies can be maximized with better information.
- Staff development and training can be improved based on resuscitation data from realistic scenarios.
- Institution needs resuscitation data to answer risk management questions. Liability exposure related to resuscitation events is more often due to inadequate documentation rather than errors or omissions in intervention.

ZOLL CodeNet Clinical / Quality Benefits

- Staff responsible for documenting codes will enjoy using system.
- Accurate and complete documentation of events is facilitated, especially in locations where resuscitations may be an uncommon occurrence and thus more chaotic.
- Data entry is concurrent with the stream of events during a resuscitation, rather than being retrospective.
- More detailed information is available to determine the chronology of the event.
- Improved and safer patient care during resuscitations due to cues for medication doses and reminders for repeat doses of medications such as epinephrine.
- Improved accuracy of resuscitation data since there are fewer hand-offs by multiple persons and automatic population of data fields.
- Uniform and accurate timestamping of resuscitation events so that delays in the delivery of interventions will be better realized and benchmarking with other institutions will be meaningful.
- Ability to accurately track time from the call of the CPR Team to their arrival at the patient bedside will help the CPR Committee evaluate adequacy of the emergency staff resources.
- Ability to better correlate the drawing and results of blood gases with the administration of medications, patient response, and subsequent interventions.
- Electronic archival, printing, and retrieval of the CPR record and defibrillator ECG information for a more complete picture of the patient's treatment results in improved quality of care.
- Improved efficiency in the creation of quarterly and yearly CPR reports.
- Display of resuscitation data in meaningful ways for staff, previously unrealized due to lack of resources.
- Ready availability of data for use in resuscitation research and realistic CPR Team training.
- More effective compliance with the JCAHO requirements for monitoring of hospital-based resuscitations.
- Increased ability by Risk Management to knowledgeably defend questions related to resuscitations.
- Availability of data about medications and interventions used during resuscitations that will assist the CPR Committee to determine appropriate supplies on the arrest carts.
- Rapid notification to CPR Committee of quality assurance issues allows for more timely follow-up.

ZOLL CodeNet Logistical Benefits

- CPR event information can be managed in a single system, eliminating duplicate data entry and multiple systems and achieving personnel efficiencies.
- CPR information can be managed in a paperless system, making information more readily available to multiple users.
- Single system data management requires less IS support effort than multiple systems, increasing the operational efficiencies.
- Improved ability to present resuscitation information and emergency systems to internal staff and outside audiences.
- Ability to position hospital on the cutting edge of technology development in the field of resuscitation.
- Direct interface to the National Registry of Cardiopulmonary Resuscitation (NRCPR).