Open School

Case Study: (AHRQ) Code Blue- Where To?

(http://www.ihi.org/offerings/ihiopenschool/resources/Pages/CaseStudies/AHRQCaseStudyCodeBlue.aspx)

Case Study from [AHRQ WebM&M](#)

Learning Objectives

At the end of this activity, you will be able to:

- List several ways to improve the effectiveness of code teams.

Description

A code blue is called on an elderly man with a history of coronary artery disease, hypertension, and schizophrenia hospitalized on the inpatient psychiatry service. House staff covering the code team do not know where the service is located, and when the team arrives, they find their equipment to be incompatible with the leads on the patient.

Related IHI Open School Online Courses

- [PFC 103: Having the Conversation: Basic Skills for Conversations about End-of-Life Care](#)
- [PS 103: Teamwork and Communication](#)
- [PS 104: Root Cause and Systems Analysis](#)

Key Topics

Care coordination and transitions, engage patients and families in care, environmental design, hospital operations: rapid response teams, patient- and family-centered care, communication, satisfaction: patient and family, teamwork.

The Case

An 80-year-old man with a history of coronary artery disease, hypertension, and schizophrenia was admitted to an inpatient psychiatry service for hallucinations and anxiety. On hospital day 2, he had sudden onset of confusion, bradycardia, and hypotension. He lost consciousness, and a "code blue" was called.

The inpatient psychiatry facility is adjacent to a major academic medical center. Thus, the "code team" (comprising a senior medical resident, medical intern, anesthesia resident, anesthesia attending, and critical care nurse) within the main hospital was activated. The message blared through the overhead speaker system, "Code blue, fourth floor psychiatry. Code blue, fourth floor psychiatry."

The senior resident and intern had never been to the psychiatry facility. "How do we get to psych?" the senior resident asked a few other residents in a panic. "I don't know how to get there except to go outside and through the front door," a colleague answered. So the senior resident and intern ran down numerous flights of stairs, outside the front of the hospital, down the block, into the psychiatry facility, and up four flights of stairs (the two buildings are actually connected on the fourth floor).

Upon arrival minutes later, they found the patient apneic and pulseless. The nurses on the inpatient psychiatry ward had placed an oxygen mask on the patient, but the patient was not receiving ventilatory support or chest compressions. The resident and intern began basic life support (CPR with chest compressions) with the bag-valve-mask. When the critical care nurse and the rest of the code team arrived, they attempted to hook the patient up to their portable monitor. Unfortunately, the leads on the monitor were incompatible with the stickers on the patient, which were from the psychiatry floor (the stickers were more than 10 years old). The team did not have appropriate leads to connect the monitor and sent a nurse back to the main hospital to obtain compatible stickers. In the meantime, the patient remained pulseless with an uncertain rhythm. Moreover, despite ventilation with the bag-valve-mask, the patient's saturations remained less than 80%. After minutes of trying to determine the cause, it was discovered that the mask had been attached to the oxygen nozzle on the wall, but the oxygen had not initially been turned on by the nursing staff. The oxygen was turned on, the patient's saturations started to rise, and the anesthesiologist prepared to intubate the patient. Chest compressions continued.

At this point, a staff nurse on the psychiatry floor came into the room, recognized the patient, and shouted, "Stop! Stop! He's a no code!" Confusion ensued—some team members stopped while others continued the resuscitation. Although a review of the chart showed no documentation of a "Do Not Resuscitate" order, the resuscitation continued. The intern on the team called the patient's son, who confirmed the patient's desire to not be resuscitated. The efforts were stopped, and the patient died moments later.

The Commentary

Bruce D. Adams, MD, COL, MC, US Army, Chief, Department of Clinical Investigation, William Beaumont Army Medical Center

Although it was ultimately discovered that this patient did not want resuscitation, many things went awry in this case, including a significant delay in possible defibrillation. In any cardiac arrest, time to defibrillation (Tdefib) is the single most important variable associated with survival, as mortality increases up to 10% for each additional minute of delay in defibrillation.[1] Great strides in improving the "chain of survival" have been achieved for both in-hospital and out-of-hospital cardiac arrest, from early access to emergency services to early CPR to early defibrillation.[2] In this case, there were delays in locating the patient, problems with the equipment, and inadequate CPR training of the psychiatry staff. Some of these errors can (and do) occur in cardiac arrests on medical wards and other inpatient care areas. Yet the location of this arrest—outside the main hospital—doubtless led to the poor technique, inadequately trained personnel, and malfunctioning equipment that we observed here. Hospital cardiac arrest teams ("code blue" teams) are accustomed and trained to manage just that—"code blues" on admitted inpatients within the usual confines of the hospital walls. Once code blue teams are forced to leave those familiar borders, they are literally "out of their comfort zone." The environment now is as medically austere as that an ambulance paramedic experiences when he resuscitates a patient 4 miles away from the hospital.

Responding to Cardiac Arrest in Outlying Areas of the Hospital Complex

For hospitals in the United States, The Joint Commission states that "Resuscitation services [must be] available throughout the hospital."[3] The statement "throughout the hospital" is crucial. It implies that equipment, supplies, oxygen, and medical personnel must all be present and ready to respond to cardiac arrest—not just in emergency departments (EDs), intensive care units, and wards but also in the "soft" areas, such as this inpatient psychiatry facility. Given this standard, it is likely that this case would represent a sentinel event in the Joint Commission's eyes.

Joint Commission standards are not the only regulations governing the requirement to competently manage cardiopulmonary arrests throughout health care institutions. The Emergency Medical Treatment and Active Labor Act (EMTALA), a federal statute best known for governing the transfer of patients between hospitals, also specifically outlines the responsibilities of hospitals to provide emergency medical services. According to EMTALA, hospitals are required to provide emergency medical services to all patients "within the hospital."[4]

EMTALA specifically obligates the hospital when the emergency presents outside of the main hospital, as in this case, under two of its provisions:

- Even when not physically located in the main hospital building, hospitals must provide screening and emergency stabilization for any medical condition in nearby psychiatric units. The relevant language is: "EMTALA requires that a hospital's dedicated emergency department would not only encompass what is generally thought of as a hospital's emergency room, but would also include other departments of hospitals, such as labor and delivery departments and psychiatric units of hospitals."[4] So the law actually considers the psychiatric unit legally (if not medically) to be on par with a full trauma center ED. This

requirement underscores that psychiatric units must have robust training, equipment, and activation protocols for life-threatening conditions.

- An actual request by or on behalf of the individual wherever a prudent layperson would believe, based on the individual's appearance or behavior, that the individual needs emergency medical examination or treatment.(4,5) While the actual care required is not dictated, the government does expect the hospital to either immediately arrange transport of the stricken individual to the ED or to "send out a crash team of physicians and nurses to the individual on site."(4)

The Hospital Campus

In 2000, Centers for Medicare & Medicaid Services (CMS) expanded the responsibility of the hospital to respond to any emergency presentation on the hospital campus or at any provider-based off-campus facility of the hospital. What is known as the "250-yard rule" arose from the definition of campus found in the Code of Federal Regulations section 413.65:

> Campus means the physical area immediately adjacent to the provider's main buildings, other areas and structures that are not strictly contiguous to the main buildings, but are located within 250 yards of the main buildings, and any of the other areas determined on an individual case basis by the CMS regional office, to be part of the provider's campus.(6)

In 2003, CMS clarified and narrowed the hospital's responsibility to respond to emergencies outside of the main hospital. The current legal state is dynamic, but the 250-yard zone continues to apply when defining the hospital campus. Note, however, that CMS is the ultimate judge of where that zone ends.

Hospitals should err on the side of caution by developing with legal assistance appropriate policies to cover emergencies throughout the hospital campus.

Managing Cardiopulmonary Arrests in Public (Non-Patient-Care) Areas of the Hospital

About 1% of all in-hospital cardiac arrests will occur to visitors or staff either within its non-core clinical areas (clinics, psychiatric units, rehabilitation facilities, etc.) or within the building's public areas such as gift shops, lobbies, or food courts.(7) Unfortunately, the code blue team typically arrives to these locations well past the recommended Tdefib benchmark of 3 minutes.(1) This translates into lost lives. Ironically, casinos or airports, with their robust public access defibrillator systems, may be safer for visitors than most hospitals!(7,8) The causes and solutions of delays are multifactorial:

- ***Automated External Defibrillators (AEDs) vs. Crash-Carts.*** Traditionally, code teams must roll cumbersome defibrillation equipment from distant clinical areas and locate and then assess the victim—all before defibrillation. Pre-positioning lightweight public access AEDs throughout a hospital's public areas and then utilizing available bystanders as first responders significantly shortens Tdefib for these situations.(9,10)

- ***Team Personnel.*** Code blue team members should be familiar with the geographic layout of their areas of responsibility as well as clinical staff that they may encounter. A map will help clarify these responsibilities and speed response times. Mock codes will help reveal these deficiencies while improving code team leadership skills.(11) Large hospitals may need more

than one cardiac arrest response team. For example, in our hospital, the ED staff explicitly cover the first two floors and the parking lot while medical residents cover all else.

- *Equipment.* Simple things like oxygen connectors or defibrillator pads can prove to be most uncooperative under stress, but standardized and ergonomically designed resuscitation equipment saves valuable time.(12) Hospitals must institute measures to ensure daily inspection of crash-carts, including those in areas that rarely have cardiac arrests. "We are just a psychiatry unit" is no excuse, especially given the risks of physical and chemical restraints often used in inpatient psychiatry units. A free video is available (entitled "Shock, Shock, Shock: Are You Ready for a Cardiac Arrest?" [requires registration to view]) that demonstrates how to "check the checker" and ensure that defibrillators are actually inspected.(13)

- *Activation.* Continually train all hospital employees and volunteers how to "activate the emergency response system."(2) The activation system should be both simple and redundant (e.g., simultaneous activation with both digital pager and overhead public address systems).

- *Response Systems.* The Table shows several potential models for responding to these public areas. While "best" strategy depends ultimately on the hospital's resources, we think the best solution is properly resourced code blue teams throughout the hospital campus. Large facilities may require more than one team to cover the entire area. The hospital CPR committee should be responsible for assigning team members and conducting at least semiannual practice mock codes. The hospital leadership through its CPR committee must also establish standards for BLS (for all hospital employees) and ACLS (for professional clinical staff) training.

Take-Home Points

- Hospitals have a moral and legal obligation to respond appropriately to cardiac arrests throughout the hospital campus.

- According to Joint Commission and federal EMTALA regulations, the hospital campus can be defined as any type of medical facility located within 250 yards of the main hospital building plus any other area as determined by CMS.

- A rapid and robust response requires prior planning, training, and equipping of these outlying areas.

- CPR training should be performed on a regular basis for even these low-risk areas.

- Standardize equipment throughout the hospital to prevent ergonomic issues as seen in this case.

References

1. American Heart Association and the International Liaison Committee on Resuscitation. Guidelines 2000 for cardiopulmonary resuscitation and emergency cardiovascular care, IX: the automated

external defibrillator: key link in the chain of survival. Circulation. 2000;102(suppl 8):I60-I76. [go to PubMed]

2. American Heart Association and the International Liaison Committee on Resuscitation. Guidelines 2000 for cardiopulmonary resuscitation and emergency cardiovascular care, XII: From science to survival: strengthening the chain of survival in every community. Circulation. 2000;102(suppl 8):I358-I370. [go to PubMed]

3. Joint Commission of Accreditation of Healthcare Organizations: accreditation manual for hospitals. Oakbrook Terrace, IL: Joint Commission Resources; 2006:155-216.

4. US Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clarifying policies related to the responsibilities of Medicare participating hospitals in treating individuals with emergency medical conditions. Federal Register. 2003;68:53248-53250.

5. Stiller JA. A first look at the 2003 EMTALA regulations. Health Lawyers Wkly. September 5, 2003.

6. US Department of Health and Human Services, Centers for Medicare and Medicaid Services. CMS Manual System: Pub. 100-02 Medicare Benefit Policy. Washington, DC: US Dept of Health and Human Services, Centers for Medicare and Medicaid Services; 2004.

7. Adams BD. Cardiac arrest of nonpatients within hospital public areas. Am J Cardiol. 2005;95:1370-1371. [go to PubMed]

8. Faster care in a casino? Nursing. September 2005;35:33.

9. Adams BD, Anderson PI, Stuffel E. "Code Blue" in the hospital lobby: cardiac arrest teams vs. public access defibrillation. Int J Cardiol. 2006;110:401-402. [go to PubMed]

10. Warwick JP, Mackie K, Spencer I. Towards early defibrillation — a nurse training programme in the use of automated external defibrillators. Resuscitation. 1995;30:231-235. [go to PubMed]

11. Kaye W, Mancini ME. Use of the Mega Code to evaluate team leader performance during advanced cardiac life support. Critical Care Medicine. 1986;14:99-104. [go to PubMed]

12. Adams BD, Easty DM, Stuffel E, et al. Decreasing the time to defibrillation: A comparative study of defibrillator electrode designs. Resuscitation. 2005;66:171-174. [go to PubMed]

13. Adams BD. Shock, Shock, Shock: Are You Ready for a Cardiac Arrest [videotape]? Asheville, NC: Quality America; 2007.

Table

Table 1. Potential Models for Responding to Cardiac Arrests in Public Areas

Approach	Features	Advantages	Disadvantages
Ad hoc	Example is this case	None	Confusion and delays
Immediate transport to ED by clinic staff	"Scoop and run" without treatment	Relatively fast transport to ED	Delayed defibrillation; need transport equipment
AED emplacement	Bystanders begin resuscitation	Very easy to use. Follow American Heart Association (AHA) Public Access Defibrillation (PAD) program policies	Expensive to outfit entire hospital
Use of community EMS system	Call 911	EMS teams familiar with "field response"	Delays. May not relieve EMTALA obligation
Code Blue Team	Standard hospital "crash team"	Experienced highly skilled team	Unfamiliar surroundings = delayed arrival

Discussion Questions

Submitted by Kathy Meinbresse, BSN Student, University of Tennessee Health Science Center, Memphis, Tennessee, USA

1. What parts of this scenario really caught your attention?

2. Describe an emergency code you have witnessed. What went smoothly and what needed improvement?

   o Is there a code/medical response team where you work?

- o What are the steps to activating the code team?
- o What emergency equipment is available to you?

3. Brainstorm ways to educate hospital staff about how to activate code teams.

4. You are selected for an improvement team in response to this event. What recommendations would you make? Consider:

    - o Standardization of equipment
    - o BLS/CPR for the First Responder training
    - o Assessing the environment and all equipment upon entering the scene

5. Where is communication likely to break down at the code site?

    - o Who should be notified in the event of a patient code?
    - o How can you make Do Not Resuscitate orders available and effective?

5. The commentary mentions improving the "chain of survival." Consider your own clinical environment. What changes would you suggest to shorten the time before access to emergency services, CPR and possible defibrillation?