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Considerations in Planning Code Call Implementation in Health Care Facilities

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Introduction

Code calls (a.k.a. Code Blue, Code Pink, emergency resuscitation, or Code Call in general) are considered to be the highest priority nurse call alarm events in a health care facility. They are initiated when a patient is in urgent and immediate need of specialized care and are associated with emergencies such as a patient’s heart stopping, a patient not breathing, the occurrence of severe bleeding, and more. For these types of emergencies, response time is critical and of absolute priority. State-of-the-art Nurse Call systems (a.k.a. Code Call systems) have a variety of ways to support Code Blue protocol.

This document is intended to assist facility developers and owners in designing a code call system and associated call handling processes, with the purposes of optimizing response time and complying with regulatory requirements.

Scope

Health care facilities are highly complex and highly regulated organizations. When designing a code call system and the associated call handling processes, the following minimum considerations need to be addressed:

- Regulatory Requirements
  - Clinical requirements
  - Code call system requirements
- Areas to be covered and responsibilities of the code response teams
- Code response team personnel
- Code call protocol including:
  - Call initiation
  - Call notification
  - Expected response time
  - Code response procedures
  - Code response team responsibilities
  - Supporting staff responsibilities
  - Call completion and termination
- Training
- Code call system maintenance
- Code events recording, records retention, and reporting requirements
- Other related concerns

Regulatory Requirements

There are two categories of regulations that apply to code call implementation. The first is in the form of clinical regulations that prescribe the protocol and procedures for code events handling (i.e., the interventions and actions required of the health care delivery organization and staff responsible for patient care). These regulations might also prescribe staffing requirements, training, or events reporting, for example. It is the administrative duty of each responsible organization to determine, address, and comply with the requirements that are set forth in this category of regulations.
The other category of regulations, established in the NFPA 99 Health Care Facilities Code, 2012 Edition and later, prescribes the physical architecture, implementation, and operational characteristics of a nurse call system, which are required of all Category 1 and 2 health care facilities. It is the further administrative duty of each responsible organization to determine, address, and comply with the requirements that are set forth in this national code.

In addition to the NFPA 99 code, the NFPA 70 National Electrical Code® (NEC) and state and local building code requirements apply. While most states typically rely on the NFPA 99 and NEC codes, with little if any change, to establish state and local code requirements, it remains the administrative duty of each responsible organization to know and understand the state regulations that govern construction, electrical safety, and Code Call requirements governing their facilities.

As a reference when creating NFPA 99 and state and local building codes, the Guidelines for Design and Construction of Health Care Facilities, published by the Facility Guidelines Institute (FGI), is used by code developers to determine the architecture of a Code Call system. The Guidelines define the types of Code, emergency, and call-for-help stations that should be provided, as well as the general locations and numbers of call stations that should be installed in different areas of a facility. Using this document as a basis of reference, the NFPA 99 code and state and local building codes are developed.

Collectively, the NFPA 99 code, the NEC, state and local building codes, and the Guidelines drive determination of Code Call system implementation, installation, and acceptance requirements for the local Authority Having Jurisdiction (AHJ).

It is important to note that the Guidelines specifically reference the NFPA 99 Health Care Facilities code, the NEC, and the ANSI/UL 1069 Hospital Signaling and Nurse Call Equipment standard. Also, as of the 2015 Edition of the NFPA 99 code, Nurse Call Systems are required for installation in Category 1 and Category 2 facilities and are required to be listed to ANSI/UL 1069 by a Nationally Recognized Testing Laboratory (NRTL).

In general, NFPA 99 is concerned with “the operational fire protection for the many activities that occur in various types of health care facilities.” It includes provisions for “patient care areas (e.g., wards, ICUs, ORs, and hyperbaric facilities), several facility-wide systems, and the overall emergency planning for a facility in the event of an emergency, which may interrupt the delivery of patient care.” This building code defines the performance requirements of electrical systems to ensure optimal level of safety, specifically tailored to health care facilities. As of the NFPA 99 2012 Edition, chapter 7 establishes the requirements for nurse call systems, whereby there is a strong correlation with the Guidelines in terms of system architecture and functional descriptions.

The NEC is concerned with the ways in which electrical systems must be installed to best achieve the desired levels of performance prescribed in other NFPA standards. Therefore, there is a great deal of cross-referencing between the NFPA 99 and NEC codes.

As for the ANSI/UL 1069 standard, detailed and specific construction, reliability, performance, and safety requirements for a Nurse Call system and equipment are defined. The standard defines the fundamental operations of a Nurse Call system and the requirements for installation and user operation, all of which are in accordance with requirements set forth in the NFPA 99 and NEC codes.

Overall, the ANSI/UL 1069 standard defines the mechanical and electrical safety requirements that ensure protection from electric shock and fire hazards, thereby ensuring safe operation at the clinical level for use in patient care areas. To ensure this level of safety, Nurse Call systems and other associated equipment intended to perform Nurse Call fundamental operation must be submitted for independent third-party testing and evaluation by a Nationally Recognized Testing Laboratory. Only those systems and equipment items that have passed NRTL evaluation and assessment can be deemed compliant, “listed,” and suitable for use in a regulated health care facility.
Areas to Be Covered and Responsibilities of Code Response Teams

The needs and operational characteristics of each health care facility are unique and, as such, drive different demands for Code response team make-up and charter responsibilities. Some facilities might have a single response team unit that is responsible for handling Code Call responsibilities for an entire building or campus, whereas other facilities might designate a number of teams responsible for servicing specific and specialized skill areas (e.g., NICU, OR, ICU).

The type of code response team has a direct impact on how the Code Call system should be implemented and configured. Therefore, much thought and user input must be applied to the planning phase of facility conceptualization. Among the chief considerations that must be resolved is: What will be the worst case “travel time” from the various locations where team members might be at any given time, relative to where a Code Call can originate?

While the intention of this paper is not to specify or recommend what should be a typical or desired Code Call response time, which might actually be governed by clinical regulation, the purpose is to instead emphasize that a maximum code team response time must be determined by the responsible organization. It is imperative to determine whether the code response team is actually capable of responding to a Code Call event within the “end-to-end” required time, throughout all parts of the facility.

Doing so subsequently drives the implementation and installation of the Code Call system. In particular, determining the locations and distribution of Code Call initiation stations throughout the facility will have a direct impact on whether or not the desired Code Call response time can be achieved. The Code Call response team and system implementation will then necessarily comply with any clinical regulation and all national, state, and local building code requirements that might apply.

Note that there might be other extenuating factors or obstacles that can have a counter or negating influence on achieving desired code call response times. Therefore, it is recommended that a comprehensive and detailed risk analysis be performed for each Code Call response team, with respect to desired Code Call response handling requirements and implementation of the Code Call system.

Code Call Response Team Personnel

As each health care facility will have its own unique Code Call response team composition, these teams will have specific skill sets and will require specialized medical equipment and instruments (such as a defibrillator) necessary to provide immediate life-saving treatment. While Code Call response team members might be dedicated solely to Code Call protocol handling, or might have other duties that can be immediately dropped when responding to a Code Call, of particular importance is the assignment of an operator or dedicated staff member who will be responsible for announcing Code Calls over the paging system.

This position is an extremely important and often overlooked one to address. The designated individual would need to be capable of clearly announcing the Code Call condition and associated room or area where the call was initiated. It is usually a 24-hour, staffed position and is typically assigned to an operator or security person. Provision must also be made for when this person goes off duty or needs to leave their assigned post for any reason. The position must always be covered, with a trained and competent attendant.

It is highly recommended that this centrally located Code Call response team member be equipped with the necessary resources (e.g., a back-up communication device, such as a walkie-talkie or other portable communication device) to verify that voice audio pages actually do go out over the paging system and have been heard and acknowledged by the rest of the response team. It is also necessary for this individual to be trained in Code Call system implementation and its operation, as well as in all Code Call
response protocols that are enacted throughout the facility, and to be completely familiar with the facility layout, rooms, and area designations (e.g., NCIU, ICU, OR).

**Code Call Response Protocol**

At the highest level, Code Call response protocol covers three specific sequences: Initiation; Notification to the response team; and the desired response time of team to react to the Code Call.

1) **Code Call Initiation**

While national, state, and local building codes might define minimum requirements for Code Call system implementation, each responsible organization has the opportunity to determine additional (and in some cases alternate) locations for Code Call initiation stations. For example, some facilities might choose to have a Code Call station in all patient rooms or in care areas beyond those required by building codes (e.g., all examination and treatment rooms), while others might choose to have a station available at each nurse’s control console.

It is generally understood by responsible organizations and AHJs that Code Calls are initiated only by trained staff, the premise being that a patient who has regressed into a Code condition cannot be expected to initiate a Code Call alarm on their own. Even if a family member or visitor happens to be in the room or area where the Code event happens, it’s unlikely that they would be trained in the Code Call process or response requirement.

State-of-the-art nurse call systems offer many options for Code Call initiation stations. They can be built into a standard patient station or installed as a unique dedicated station. A common option for many facilities, especially for use in ICUs, is the addition of a Code Call timer. This is typically a digital clock that begins a “count up” process at the moment a Code Call is initiated. The counter timer is intended to be used by the Code response team to monitor their progress during an event. The timer can be stopped only by a dedicated manual cancel button that is separate and unique from the Code Call system. If the Code Call is reset or canceled at the Nurse Call initiation station, the counter will continue counting until it is manually and purposefully canceled or reset as a required separate action.

2) **Code Call Notification**

Both the NFPA 99 code and the ANSI/UL1069 standard require Nurse Call systems to have redundant local notification, meaning that a Code Call initiated in a room must be visibly and (optionally) audibly annunciacted at the call initiation station, as well as visibly annunciacted by the illumination of one or more associated room corridor lights. All Code Calls must be audibly and visually annunciacted at a primary nurse control console.

Additional notifications might also be annunciacted at additional nurse’s duty or staff stations and at other stations installed and configured on the system and distributed throughout the facility. Additional supplementary notification options might also be provided. For example:

- Code Calls could be sent to pocket pagers or wireless cell phones carried by the Code Call response team.
- A designated staff member could verbally announce the Code Call using the overhead paging system.
- A Code Call could be announced using an automated voice paging system.
- A designated staff member could use a nurse control console to manually page/call the wireless devices of the Code Call response team.
The Code Call could be sent to additional nurse control consoles at designated page points (typically, the hospital operator or security), who could then announce Code Call on the overhead page system and/or manually page/call the wireless devices of the Code Call response team.

Note that if Code Calls are automatically forwarded to the Code response team for event alerts on wireless devices (which, per NFPA 99 code and ANSI/UL 1069 standard is considered to be supplemental operation), it is highly recommended to also set up and plan for local manual announcement via the overhead page system or physical presence by a non-clinical team member at the Code Call location to ensure call verification and Code team response.

3) Expected Response Time

As discussed earlier, it is the duty of the responsible organization to determine the expected response time for Code Calls relative to the types of patient care functions provided, to anticipate the potential life-threatening emergencies that might be encountered, and to comply with clinical regulations that apply.

Two crucial factors that must be accounted for are the worst case aggregate team and individual team member locations at any given time and the overall installation layout and implementation of the Code Call system.

Training

Clearly, Code response team members must have special training. But it is also important to consider Code Call protocol training for all patient care staff and administrative support staff.

As important as being able to effectively deal with an actual Code Call emergency is how the facility deals with “false” Code Calls. What if, for example, a Code Call is inadvertently placed and then immediately reset? What should be the response, and what—if any—additional training or measures should be taken to avoid future false Code Call events?

Consideration for additional back-up support staff should be taken into account, depending on the structure of the Code response team (e.g., 24-hour staff for localized NCIU response versus 24-hour staff for facility-wide response). Additional personnel, who might be available in other areas of the facility, should also be trained for Code Call response protocol.

Code Call training records should always be retained. Code Call training should always be part of any new employee orientation. Training should be reviewed periodically, as determined or mandated by clinical regulations. If Code Call training regulations do not prescribe re-training or renewal training requirements, it is nevertheless recommended to revisit such training at least once per year.

Call System Maintenance

Code Call systems are required to be maintained per manufacturer’s recommendations and instructions, in accordance with the requirements prescribed in NFPA 99, chapter 10, 2012 edition and later. General practice typically includes periodic replacement of stand-by batteries, as well as periodic testing and drill of Code Call devices and event handling procedures.

Bear in mind that per NFPA 99 code, records for periodic testing and system maintenance must be retained. There should also be a defined procedure that describes how to respond to any supervisory event on the Code Call system (e.g., call system device failure or intermittent loss of communication with
call stations or pendants). Such failures or abnormal incidents, especially those that result in an adverse patient safety event, require reporting to a governing national authority (i.e., the FDA in the US).

**Code Call Events Recording, Records Retention, and Reporting Requirements**

As discussed above, regulations usually require the recording and reporting of each Code Call event, including any false alarm event that might have occurred. It is important to note that the NFPA 99 code describes specific requirements for “Record Keeping—Patient Care Appliances,” as well as training requirements for maintenance personnel. Overall, there are many considerations related to regulatory requirements for Code Call implementation. It is the duty of each responsible organization to ensure compliance with all such regulations and applicable requirements.

**Other Related Concerns**

Code Call systems have been around for many years and system implementation has become quite mature. Pitfalls have been and continue to be encountered. As a result, many lessons have been learned, including:

- Be careful when using citywide or satellite pocket paging services, or any other wireless device service, such as texting. While the obvious and apparent advantage is that any team member can be reached virtually anywhere and at any time, the not-so-obvious disadvantage occurs with notification reliability.

  Beyond being unable to validate or control the uptime reliability of links to citywide paging or texting systems, those systems typically do not provide prioritization for pages or texts. These systems typically cannot distinguish or filter Code Call priority messages from routine or personal messages. As a result, pages and text messages are typically queued and subject to “first-in-first-out” processing. In a busy system, delays can be measured in minutes, not seconds. Also, there might be no system provision to ensure message delivery or receipt confirmation. Hence, the need for a designated person to be responsible for manually announcing Code Call events by way of the overhead paging system.

  If this type of supplemental notification is employed, be aware that it should be utilized as secondary only. Make it an addressable action item in your risk management file, have on-site primary Code Call notification handling procedures in effect, and make sure to periodically evaluate the worst case queue time for all forms of remote notification.

- Severe weather events can cause primary power interruptions that might be of sufficient duration that even backup generators can’t keep critical branch circuits and systems operational. Loss of primary and secondary power would mean a complete loss of the Code Call system.

  Although these types of catastrophic conditions are very rare and might be limited to specific areas of the country, many measures can be put in place to avoid such occurrences. Responsible organizations need to plan and provide for manual back-up procedures to cover Code Call protocol. Specific state, local, and clinical regulations might apply.

  If such a condition does occur, once power is restored, it is highly recommended that the restored Code Call system be fully tested to verify that all call system devices and overall nurse call system operations have been restored.