

Metro Boston EMS Communication Network

Supersedes:

Effective: 02-01-00

The statewide EMS radio network is comprised of discrete regional radio systems. Each system has the following components: a CMED center, associated ambulance services, hospitals, rescue squads and municipal agencies. The system is designed to meet local needs but adhere to a common design strategy that will afford compatibility across regional boundaries and the interconnection of systems into the statewide network. Operational and medical communications are primarily accomplished via two-way land mobile radio, which usually operates on two bands: very high frequency (VHF) and ultra high frequency (UHF). Utilization shall be as follows:

155.280 MHz	Point-to-Point coordinating frequency and mass casualty channel.
155.340 MHz	Ambulance-to-Hospital channel
462.950/467.950 MHz	“TAC-9”, Intrasystem coordinating and on-scene working/triage channel
463.000/468.000 MHz	(“MED-1”) Ambulance-to-Hospital channels
463.025/468.025 MHz	(“MED-2”)
463.050/468.050 MHz	(“MED-3”)
463.075/468.075 MHz	(“MED-4”) Common calling and coordination channel
463.100/468.100 MHz	(“MED-5”) Ambulance-to-Hospital channels
463.125/468.125 MHz	(“MED-6”)
463.150/468.150 MHz	(“MED-7”)
463.175/468.175 MHz	(“MED-8”)

BIOMEDICAL CHANNEL UTILIZATION AND ALLOCATION PLAN

Massachusetts uses a planned utilization of the medical channels, which includes a “common calling” channel (MED-4), a “critical” channel that is not duplicated with adjacent systems, “secondary” channels that are shared and “overflow” channels. Assignments for the channels are made by the Department of Public Health for each system prospectively with the shared channels to be used according to the principles of real-time sharing.

The utilization plan is intended to:

- Make maximum use of all channels in a spectrum-efficient manner;
- Ensure that at least one channel per system is substantially free of co-channel interference from neighboring systems and thus can be relied on for communications of the most critical nature. Systems must endeavor to fully utilize their critical channels, for only the top priority uses resulting in low loading levels are contrary to the concept of critical channel utilization.

Channel utilization is defined below:

Common Calling Channel (MED-4; all systems)

UHF-equipped EMS units shall obtain channel coordination from Boston CMED by first calling on MED-4, advising Boston CMED of the unit's location and needs and following the instructions of CMED.

Critical Channel

Critical channel use will follow specific system policies and CMED operator discretion. In general, the system's more important communications should take place on this channel. Loading of the channel should be as full as practical. CMED operators should attempt to shift concurrent traffic taking place on a shared channel to the critical channel as it becomes available.

Shared Channel

These channels may be utilized by adjacent systems. Monitoring of the channel to determine its availability shall always precede assignment of a channel by CMED. Short notifications by basic EMS units may be assigned a shared channel directly, even when the critical channel is free, provided that the system's overall utilization of the critical channel remains high. CMED to CMED coordination of shared channels on a real-time basis through the use of 155.280 MHz is encouraged.

Overflow Channels

One system's overflow channels will be the adjacent systems' critical channels. Utilization of an overflow channel shall be only when absolutely necessary and the communication can not be delayed. Use of an overflow channel must be ended no later than 60 seconds following the availability of a critical or shared channel within the system. The field unit shall be instructed to shift channels at the first opportunity.

For purposes of discussion, Boston CMED's channel utilization plan is as follows:

Description	Med Channel
Common Calling	4
Critical	3
Shared	6, 8, 5
Overflow	7, 1, 2

Utilization of shared channels should be according to the listed order. The first channel should be used most heavily of the shared group, the last used the least.

METRO-BOSTON CMED

Boston CMED provides for the coordination of EMS telecommunications in the region. The center is staffed 24 hours a day with specifically trained EMT-Telecommunicators. Boston CMED is responsible for coordinating communications for 62 cities and towns (Region IV). Listed below are a few of the functions of Boston CMED:

- Manage EMS channel usage within the region.

- Coordinate channel management with neighboring CMEDs as a part of the statewide network.
- Serve as a clearinghouse for EMS resource status information (e.g., emergency room diversions, loading, bed status, specialty care facilities, ambulances, etc.).
- Monitor the radio traffic to determine the quantity and quality of transmissions and to detect and resolve outages.
- Provide Command/Control/Communications/Intelligence (C³I) functions during mass casualty or disaster responses in cooperation with authorized scene commanders and medical control physicians.
- Coordinate EMS with other public safety agencies through the use of radio channel patch capabilities.
- Provide general assistance as requested by any EMS agency in accordance with system procedures.
- Aid out-of-region (“foreign”) ambulances and other EMS units entering or passing through the region.

System Elements

EMS Provider agencies in the Metropolitan Boston region utilize both UHF and VHF band radios to coordinate field operations and medical direction. The communications system that employs these radios also includes special telephone and microwave links for interconnection of certain fixed points. Basic components of a communications system generally include (1) portable and mobile transceivers; (2) base stations; and (3) central and remote control consoles.

Special Features

Operationally, this design provides total control of base stations and mobile relays so that interference and extraneous signals are minimized. More importantly, this centralization allows functions such as radio-telephone crosspatching, UHF/VHF crossbanding and dynamic channel assignments to be performed.

This EMS communications system is designed for maximum technical efficiency and channel utilization. However, the system’s efficiency is primarily a function of how the user verbally communicates his information. With this in mind, this protocol for communications has been written to assist the Basic EMT, Advanced EMT, emergency department nurse and medical control physician in operating an EMS radio.

Dedicated Network

CMED Responsibility

Radio communications which concern any of the Metro Boston network hospitals should be coordinated by the designated network control station (“Boston CMED”). CMED is responsible for continually monitoring and expediting radio traffic to keep the network operating efficiently. All UHF communications between field units and hospitals, and those VHF communications to and from hospitals that do not possess VHF equipment,

shall be directed to CMED for the particular frequency being used, or agency being called upon. VHF communications concerning basic life support activities between field units and hospitals equipped with VHF radios shall be direct and on 155.340 MHz.

Radio Frequencies

Tone Squelch Assignments for UHF Radio Equipment

Metro Boston: 151.4 Hz

Statewide: 192.8 Hz

Digital Dial and Touch-Tone™ Squelch for VHF Radio Equipment

Boston CMED: 3100

Point-to-Point Communications

- Point-to-Point communications for coordination of critical transfers, mutual assistance and mass casualty incident management will normally be conducted on VHF radio frequency 155.280 MHz.
- Coordination of Intersystem MED-channel assignments shall be conducted on MED-channel FOUR by monitoring the co-user base station transmit frequency (463.075 MHz). While communications between CMED centers is normally restricted to the VHF frequency 155.280MHz, certain emergencies will permit the use of MED-4 for coordination purposes.
- Where capabilities exist, point-to-point communications may be conducted on remote radio control lines or microwave audio sub-carrier channels.
- Where VHF radio frequency 155.280 MHz is not available at certain resource coordination centers, frequency 155.340 MHz may be used for intersystem coordination.

GENERAL PROCEDURES

F.C.C Rules

The applicable rules and regulations of the Federal Communications Commission shall govern the general operation of the EMS radio channels.

Monitor Frequency

All persons operating EMS radios must monitor the frequency on which they desire to operate, prior to transmitting.

Transmitting Names

All communications shall be kept impersonal. When names are transmitted, the full name or last name with title only shall be used. Names may also be substituted for call signs.

In order to maintain patient privacy rights, patient names shall not be transmitted except in cases of extreme emergency, and only when the conduct of the medical care to be

provided requires specific patient identification. Only medical personnel at a hospital may determine that a patient's name needs to be transmitted.

Identify Every Transmission

Unit identifiers are to be said in every transmission.

Intonation and Voice Level

Word or voice inflections that reflect irritation, disgust or sarcasm must not be used. Relations with other users shall remain cordial at all times. Do not yell under any circumstances.

Message Brevity

All messages shall be kept brief and to the point.

Answering Radio Calls

All radio calls must be answered. When busy with patient care activities or traffic on another channel, the phrase "STAND-BY" shall be used to indicate receipt of call and intent to answer when available.

Radio unit Identifiers

Every user should utilize an ID consistent with these procedures. Each ID shall have a short and long form. The long form of an ID shall be used when initially establishing contact with another unit. The short form may be used to enable brevity through the balance of a message. When in doubt, use the long form ID

Composition

Radio unit identifiers shall be issued by the Commanding Officer of the Boston EMS Dispatch Operations Division, or his designee. Identifiers shall be alphanumeric characters or proper names of persons, hospitals or geographic locations. Examples:

Long Form	<u>Short Form</u>
North Shore CMED Center	North Shore
Worcester CMED Center	Worcester
Massachusetts General Hospital	MGH
Boston Medical Center-Harrison	BMCH

Mobile Units

A mobile (or portable) unit may be an ambulance, a paramedic squad or an EMS supervisor. Mobiles and their corresponding portables shall incorporate a number in their ID; the short form ID being the number alone. The first digit of the number will correspond to the unit's region; the succeeding digits will be assigned according to a regional plan that meets local needs.

Personnel Identifiers

All medical control communications will identify EMS personnel by an assigned ID in addition to the use of unit ID's. BLS units requesting consultation (advice) shall also use personnel ID's. After initial contact has been made by using the long form unit ID, communicating personnel shall use their personnel ID instead of the short form unit ID.

Examples:

EMT Jones	For a Basic EMT
Intermediate Jones	For an EMT-I
Paramedic Jones	For an EMT-P
RN Jones	For a nurse
Dr Jones	For a physician

Regions and/or locales may opt for assigning numbers in place of surnames. The level of certification should still precede such a number for the complete (long form) identifier; e.g. "Paramedic 123".

Purpose of Call Signs

According to F.C.C. rules, call signs are to be used as identification. In addition, unit identifiers will be used at the beginning of a transmission to prompt the voice-actuation circuits in a "patch" condition. Any unit (i.e., two-way radio) must be authorized for use by an F.C.C. license. Mobile and portable units are typically authorized under a base station or system license. In such instances, the unit identifier may be used alone. Base stations located at hospitals (VHF) or stations operated in a system with a C-MED Center (VHF and UHF) shall normally say the call sign at the close of a series of transmissions.

Example:

"4-2-2-2, Metro Boston C-MED. Roger your arrival at MGH. This is KIR-735, Boston CMED, out."

Language Format

These procedures endorse the principal that Plain English, coupled with accepted medical terminology, is the surest way to accomplish effective communications, either via radio, telephone or in person. This document lists preferred terms or phrases that have been shown to be particularly effective. EMS personnel are encouraged to routinely use these terms. Except for Priority Codes, radio codes are discouraged as a rule. Should local needs dictate the use of codes they should be minimized. In such areas, EMS personnel should be capable of switching to a code-free message when operations demand communications with non-local hospitals, ambulances or CMEDs.

CALLING PROCEDURE

Procedure When Requesting Channel Assignment and/or Radio Patch

Field providers hailing CMED on MED channel 4 should always note their proper Unit ID and physical location. For example "Metro-Boston CMED, this is Framingham Paramedic 1 on Rte 9 in

Framingham calling”. The CMED operator will answer the unit on the correct base station and clearly state “Framingham P-1, this is Metro-Boston CMED, go ahead”. Once acknowledged by the CMED operator, the field unit will then proceed with their request: “Metro-Boston CMED, this if Framingham Paramedic 1 requesting a Priority 2 entry note to Metro-West Framingham”. The CMED Operator will then acknowledge the request and direct the unit to a specific medical channel. “Framingham P1 from Metro-Boston CMED: please shift to MED 7 for your entry note to Metro-West Framingham.” Using the above procedure will help prevent confusion when multiple units simultaneously call CMED. This specific information is essential for each call, as it allows the CMED operator to quickly and easily: 1) know which unit to answer, 2) which base station to use (for best coverage), and 3) how to prioritize radio traffic when handling multiple, simultaneous requests.

Initial Contact With a Hospital

When calling a station, say the name of the station or unit you are calling, followed by the words, “This is” and then your call sign, ending with the proword “OVER.”

“Carney Hospital, this is Medic One Ten, over.”

Answering Procedure

To answer a call, use the same procedure as described above.

Message Precedence

In order to distinguish between routine message and those which require immediate action, the following prowords shall be used (as necessary) to identify the priority of the radio traffic which is to be transmitted.

PROWORD	MEANING
“Priority One”	Communications concerning a life-threatening condition, requiring an immediate patch to a hospital.
“Priority Two”	Communications concerning a potentially life-threatening condition, requiring a patch as soon as possible.
“Priority Three”	Communications concerning conditions which are not life-threatening, requiring a patch as soon as possible.
“Priority Four”	Communications which are administrative or informational only.

Whenever possible, Priority Four traffic should be relayed through a local dispatcher and then by telephone so as to avoid unnecessary congestion of the system.

Note: Most Boston hospitals do not require Priority Three notifications. Conference of Boston Teaching Hospitals (COBTH) policy states that no Boston hospital shall require Priority Four notifications.

Acknowledging Messages

Messages should be acknowledged by saying the unit identifier, the proword “ROGER” and repeating the essential parts of the text of the message back. If there is a question as to whether or not the received message is correct, the proword “CONFIRMED” shall be said at the end of the message when repeated.

Prowords and Phrases

Experience has proven that some words when spoken over a two-way radio can be easily confused with other words and result in disastrous miscommunication. The words and phrases in this list are ideal for avoiding this type of problem and all radio users should become comfortable with their use.

Word or Phrase	Definition (for radio use)
ACKNOWLEDGED	I have received your message and will act upon it.
ACUTE	Condition of rapid onset.
AFFIRMATIVE	Yes. (Spoken over a radio, “yes” is easily confused).
ARRIVAL	Unit has arrived at its intended destination.
ASSIGNMENT	Assignment to an incident or radio channel.
BREAK	To interrupt in an emergency, or to separate parts of a group of messages.
CALIBRATION	A telemetry signal that when transmitted produces a 1mv output at the EKG display. (Similar to “standardizing” an EKG strip)
CHANNEL (e.g. MED 1)	The radio frequency or pair of frequencies used in a radio system.
CONTACT	Establish communications.
CLEAR	Available; I am terminating this communication (or incident).
DISREGARD	Do not take action on last transmission.
ENGAGED/DISENGAGED	Radio patch connected/disconnected.
ENROUTE	Traveling to a specified destination.
FREQUENCY	The technical expression of an electronic signal expressed in cycles-per-second (cps), or hertz (Hz), or megahertz (MHz) of a base-line signal. In general use frequency refers to the signal used in a radio system. (E.g., 155.340 MHz, or tone code 7A~192.8 cps).
HOLD	Remain at present location or specified position.
INCIDENT	An emergency at which EMS is required.

INCORRECT	Wrong.
LANDLINE	Order to make call by phone or refers to telephone company supplied circuits that connect a radio system.
MONITOR	Listen to all traffic on a radio channel.
NEGATIVE	No.
OBTAIN	Get.
OUT	I have finished all messages, do not expect a replay and the channel is open to others.
OVER	I have finished my message and expect a reply from you.
QUIET RESPONSE	Without use of siren.
RELAY	Pass the traffic on to another person or station (repeat message verbatim).
ROGER	As in acknowledge, I have received your message and will act on it.
REPEAT	Administer the indicated therapy an additional time. (See SAY AGAIN).
SAY AGAIN	Repeat the last message transmitted. (Not to be confused with REPEAT).
SHIFT	Change channel as ordered.
SHIFT AND ACKNOWLEDGE	Change channel as instructed and say on the new channel your ID and acknowledge the shift.
SHIFT AND CONTACT	Change channel as instructed and call the desired station.
SHIFT AND STANDBY	Change channel as instructed and listen for further traffic.
STAND-BY	Answer to request is not immediately available, or user is busy with competing traffic. The order stand-by implies that a unit should stay on channel until called upon; order should not be acknowledged.
STATUS	A unit's present activity.
TRAFFIC	Messages transmitted by radio between units and/or stations.
TRANSPORT	Commence transportation of a patient by ambulance.

Transmitting Numbers

In order to avoid errors when measurements of medications are ordered, or addresses are transmitted, numbers should be transmitted DIGIT-BY-DIGIT and pronounced as described below:

1	“WUN”	Strong W and N
2	“TOO”	Strong and long OO
3	“THA-REE”	Strong TH and R
4	“FOWER”	Strong O, Strong W and Final R
5	“FIE-YIV”	Strong I changing to Strong Y and V
6	“SIKS”	Strong S and KS
7	“SEV-VEN”	Strong S and V
8	“ATE”	Strong A and long T
9	“NINER”	Strong NI and sounded ER
0	“ZEE-RO”	Strong Z and Short RO

Transmitting Directions

When transmitting directions by radio, providers should use proper names and avoid using slang or abbreviations, particularly when describing locations. Use specific instructions, said in phrases, such as “PROCEED TO”, “TURN”, “HOLD”, “MONITOR”, “ADMINISTER”, etc.

MEDICAL COMMUNICATIONS

Medical communications, and medical consultation refer to communications which take place between the field and hospital, or the field, specialty center and hospital. Whether the communications are to direct ALS treatment, support the Basic Life Support effort, or exchange critical patient care data, the communications must be accurate if they are to be effective.

In the following paragraphs are guidelines that essentially create the structure for reporting and exchanging patient data and clinical information. These guidelines have been written with consideration that medical communications are lengthy in duration and are often much more detailed than dispatch or operational traffic. Throughout this chapter, special phrases and radio prowords are used to facilitate brevity; however, the main concern is that the communicating parties clearly understand each other.

The primary goal in communicating clinical information by radio is to assist the nurse and/or physician decision-maker. In order to provide this assistance, the EMT, Advanced EMT and EMS Supervisor must communicate his information clearly, directly, and in an objective manner to create an accurate mental picture for the nurse or physician.

Secondarily, structured medical communications supports the transition between first responder, EMT, Advanced EMT, nurse and physician provider. In a sense, the guidelines that follow create a context for the entire system to communicate the patient’s condition to the next level of care.

Coordination and Monitoring of Medical Traffic

All advanced life support communications concerning patient care, ambulance transportation to the hospital, point-of-entry and hospital-to-hospital traffic shall be coordinated by the communications coordinating center, "CMED."

The CMED Operator shall assign channels, activate hospital remote control stations, alert medical control physicians and continually monitor the voice and telemetry signals to ensure reliability of the communications in progress. In addition, he will collect and maintain status data on hospital resources, supervise point-of-entry plans and, in general, be responsible for establishing the communications required between the field and the hospitals.

MEDICAL CONTROL

Receiving Hospital Conference

Ambulances transporting patients under medical control shall notify the receiving hospital as soon as is practical during transport. As necessary, or as directed by Medical Control, the hospital receiving the patient may confer with the Medical Control Physician.

EKG Telemetry

The use of EKG telemetry will be in conformance with the Statewide "Advanced Life Support Pre-Hospital Clinical Protocols."

Individual transmissions of EKG telemetry signals shall not last longer than 30 seconds. Medical Control will request repeat transmissions as often as is felt to be appropriate.

General Overview of Patient Report

Radio medical reports will always be concise and as brief as possible. They do not replace nor are they the same as a complete run report that is transferred in writing and/or orally after arrival at a hospital. Patient Care Reports include much information that, while important, should not be communicated by radio. Any prolonged communication must contain periodic breaks in the transmission so that other users who have a need to communicate can be detected.

PATIENT NAMES

In order to respect patient confidentiality, patient names must not be routinely transmitted over the air. In rare instances, and only as a last resort, a patient's name may be transmitted if there is a medical reason that will directly effect patient care on arrival of that patient at the hospital. Only medical personnel at a hospital are appropriate to determine if there is a justifiable reason to request a name.

In general, ALS cases and Priority Ones and Twos will provide complete medical reports. Priority Three cases should normally limit the report to Age, Sex, and Chief Complaint followed by the ETA.

The presentation of a patient by radio or telephone requires that particular attention be paid to certain discrete areas. These are:

- Identification of the patient in terms of age, sex and a reference to the degree of distress.
- The chief complaint in a word or phrase.
- Present status in more specific terms; what body systems are affected or stressful.
- Pertinent negatives which are diagnostic.
- Past medical history.
- Medications.
- Physical findings to include vital signs.
- Treatment rendered thus far, to include transportation.

Reference Assessment Procedures

The presentation of a patient report by radio or telephone is a function of the initial assessment. An incomplete assessment leads to an incomplete communication, which in turn, leads to incomplete patient care. On the other hand, lengthy, rambling, unstructured presentations are a waste of time and often are as detrimental to the patient as a fragmented report.

To reinforce the structure and completeness of the patient report, a thorough assessment is necessary.

Become thoroughly familiar with these assessment procedures so that only pertinent data is communicated in your patient report.

General Voice Procedures

Avoid abbreviations that are not commonly used. Instead, use commonly accepted descriptive clinical terms.

Identify each transmission using identifiers, especially when acknowledging orders.

Acknowledge treatment orders by repeating them back exactly as you have received them.

Follow the order of the reporting format when transmitting a patient report

Disaster Procedures

Definitive disaster procedures are the responsibility of regional and local agencies. EMS users are expected to be thoroughly familiar with local procedures. These procedures include basic principles that should be common statewide.

Most “disasters” are mass casualty incidents (MCI) and as such only local units should be involved per local plans. True disasters may utilize foreign units but such units shall only participate when requested by the EMS agency in primary command. Local units by definition, have compatible communications, foreign units may not.

Ambulance response and scene command shall be conducted on a separate frequency from the one used for medical communications, if possible. Medical communications should be coordinated by a C-MED center or other party according to plan. Ambulances evacuating patients to hospitals shall be assigned by C-MED or scene commander and will not radio a full medical report.

Users of VHF channel 155.340 should respect that the channel will be in use in nearby areas for routine operations. MCI operations may not "take over" 155.340, thus interfering with communications in areas unaffected by the incident.

Hospital resources or other special needs not available regionally will be requested via an adjacent region's C-MED. In most cases a local C-MED will be asked by an EMS commander to secure specified resources, such as burn beds. That local C-MED will contact an appropriate distant C-MED which will in turn poll for resources within its jurisdiction.

Prompt and repeated updates of an incident shall be communicated to all hospitals with a potential to receive patients and to nearby hospitals which may be indirectly impacted by an MCI. The hospital will use such information and determine if its institutional disaster plan should be executed. All information should be qualified according to the degree of information needed to be transmitted.

Local ambulances with emergencies unconnected with an MCI in progress shall follow local procedure for such circumstance. Foreign units unknowingly encountering an area with a MCI shall be asked by the C-MED or hospital: "We have an MCI in progress, what is your priority?" If the Priority is Three or Four, the ambulance should be told to defer to another facility and/or discontinue further use of the communications channel(s). If the Priority is One or Two, the ambulance should be interrogated further to determine what is best for the patient considering the circumstances of the MCI. Critical patients should not be arbitrarily deferred.

Reference: This document is based on the "Massachusetts Emergency Medical Services Systems Communication Plan" which was adopted by the Department of Public Health's Emergency Medical Care Advisory Board in June, 1984