State of New Jersey
Department of Health and Senior Services
Office of Emergency Medical Services

EMS COMMUNICATIONS PLAN
JEMS – 4TH EDITION

Created January 1980
Revised October 2003

I. INTRODUCTION

Communications in Emergency Medical Services (EMS) has been aptly compared with the nervous system in higher organisms. Through the communications system, messages of varying complexity are transmitted to other components of an EMS System – such as rescue or ambulance services, hospital emergency departments, to affect their responses to emergency situations. During the emergency period, the responses may be augmented or altered in accordance with new information transmitted via the communications systems.

The efficiency of the EMS response is largely dependent on the communication among components in the EMS network. A well-planned, integrated communications system, with direct radio, and/or landline access to all components, will provide the most rapid transmittal of messages among components and result in minimal response times.

Communications is important for an EMS system from both a medical and legal standpoint. Acceptable medical practices, and controls in pre-hospital and in emergency department care, are essentially developed by the medical profession. To extend these practices into the field to be performed by allied health personnel necessitates medical supervision especially for advanced pre-hospital techniques. This can be accomplished by either wire or wireless communications.

EMS in New Jersey is presently provided with a communication system utilizing VHF high band (155 MHz.) to dispatch ambulances and to connect the hospital bound Emergency Room with Emergency Medical Technician (EMT) at the scene. Since May of 1976, an UHF telemetry system has been used by the Mobile Intensive Care Units (MICU's). The decision to send an EKG tracing via telemetry is made by the physician providing on-line care of the specific patient State of New Jersey EMS Communications Plan and in accordance with medical protocols approved by the New Jersey Department of Health and Senior Services. In 1998, the New Jersey State Police in cooperation with the regional communications centers deployed a statewide 800MGz. Interdepartmental radio network. This allowed all regional communication centers to communicate seamlessly across the state.

Finally, this communications plan is designed to the extent possible, considering the limited frequencies available, for the existing and projected EMS needs of the State and for the techniques, which are employed in the field and the emergency department. A key objective of this plan is to provide a communications system that will allow emergency departments to communicate, in the most efficient way possible, with EMS units in the field to provide prompt and timely delivery of medical services, via medical coordination and supervision, in response to human health emergencies. Given the limitations, this EMS communications plan reflects a priority in favor of critical patient situations.

II. EMS IN NEW JERSEY

A. General

The New Jersey Department of Health and Senior Services is the statuary public health agency of New Jersey. The Prehospital health care delivery system of New Jersey is planned, improved and supervised by the Department with the assistance of the New Jersey State First Aid Council and other health agencies. A semi-mountainous area in extreme Northwestern New Jersey is an obstacle to EMS communications. The hills there range in height from 800 to 1800 feet and contain significant levels of iron ore. On the other hand, a more serious barrier to EMS communications in New Jersey is the highly congested nature of its manmade and urbanized environment. New Jersey is a comparatively small state in terms of surface area. It is, however, the most densely populated state in the nation. Nearly two thirds of the state's population lives in the Metropolitan New York area while still another sixth is found in close proximity to Philadelphia.

In practical terms, a majority of New Jersey's citizens are actually sandwiched between the tall structures of New York City and Philadelphia. The state's two towering neighbors are a barrier to essential radio traffic. Radio interference between New Jersey and neighboring population centers is a problem. Both New York City and Northern New Jersey suffer serious disruptions in essential broadcasts. Philadelphia and Southern New Jersey have had similar experiences. However, the most serious problems with EMS communications are the daily disruptions and endless interference caused by non-EMS providers, such as school buses, hospital security systems, medical transportation services, etc., which have been authorized by the FCC to share the same scarce frequencies used by the Emergency Medical Services.

Basic Life Support (BLS) is coordinated by many forms of dispatch and control. Many of the BLS squads in New Jersey are dispatched via home alert or portable alert monitors. Often, New Jersey BLS services share dispatchers with fire and police services. EMS communications are tailored and mitigated by the caprices of local custom. Multiple radio frequencies are used to dispatch emergency care vehicles at the local level. Many of New Jersey's EMS providers avail themselves of the state designated frequency JEMS 2 (155.340 MHz) for two-way voice communications between ambulances and hospitals. The beginning of a BLS communications network exists in the state. However, the network simply will not fulfill its assigned role unless all EMS providers cooperate in a systems approach.

A closer ongoing relationship between the delivery of emergency care and a sound foundation for that care through communications is found at the Advanced Life Support (ALS) level in New Jersey. New Jersey ALS units (MICU) often share the same VHF frequencies for dispatch with BLS units but

utilize the UHF MED channels for medical control and coordination. With the amount of users on these channels, it is clear that systemization of EMS Communications in New Jersey is paramount. While this document attempts to encapsulate current technology, the rapid advancement of other methods of communication may not be addressed.

B. Access

A goal of this plan is to ensure that every citizen of New Jersey be able to obtain emergency care as promptly as possible. National EMS experience suggests that coordinated dispatch with enhanced 9-1-1 is the optimum way to deliver emergency services. In 1977, the Attorney General appointed the Statewide Police Emergency Network Task Force to access all New Jersey police telecommunications. The Task Force prepared a report on its findings, which recommenced that: *"It be the policy of the State of New Jersey, in accordance with national policy, to encourage the implementation of 9-1-1 throughout the State"*

In 1986, the Emergency Response System Study Commission of New Jersey found that it was apparent that public access of New Jersey's emergency services was woefully inadequate and that the need for 9-1-1 was obvious. Since that time, 9-1-1 capability has been installed in all 21 counties. 9-1-1 has provided a uniform emergency access number, which can greatly reduce life-threatening delays in the delivery of emergency care, as it has done elsewhere throughout the nation. 9-1-1 is a boom to emergency care.

C. Dispatch

Since October 22, 1986, the Special Emergency Radio Service (SERS) frequencies shared by EMS have been coordinated jointly by IMSA (International Municipal Signal Association), IFCA (International Fire Chiefs Association), and NABER (National Association of Business and Educational Radio). The Emergency Medical Radio Service (EMRS) was established to provide stricter access to frequencies. However, with the impending split in frequencies from 25MHz to 12.5MHz, the potential for interference from older equipment may prove to be a significant problem.

Dispatch of both BLS and ALS is currently done on a myriad of frequencies. ALS vehicles carry various radios linked to BLS units in the field. MICU hospitals have UHF and VHF capability and, therefore, exercise a large measure of medical coordination in the field. Hospitals are able to communicate with BLS units through VHF radios on JEMS 2 (155.340 MHz.)

The extension of New Jersey's coordinated dispatch capabilities to new areas will be definite advantage in the statewide movement toward improved emergency care. An expansion of the state's current ALS delivery mechanism

requires improved coordinated dispatch capability. With the advent of the New Jersey State Police radio network being available for command and control, the RCC's have the ability to communicate freely across jurisdictional boundaries.

The New Jersey Department of Health and Senior Services supports and encourages training requirements for dispatchers, and for the development and implementation of prearrival instructions to callers of 9-1-1. To this end, a standing committee to the EMS Council was established to review and recommend such requirements.

III. SYSTEM DESCRIPTION

Frequency and Signaling Plan (Statewide) for VHF and UHF The following frequency and signaling plan is utilized to enable all EMS vehicles, dispatch centers, and hospitals to communicate with each other in order to coordinate activities anywhere in the state. This plan also allows out-of-state EMS vehicles and dispatch centers to interface with New Jersey EMS.

A. VHF Radios

Mobile and portable Radios are required on the JEMS systems for all licensed ALS and BLS providers. The four channels are determined as follows:

JEMS 1 – Local Dispatch Primary channel used to communicate to local Dispatch center, regardless of frequency band.

JEMS 2 – 155.340 MHz Ambulance to hospital ER

JEMS 3 – 155.280 MHz Statewide EMS Coordination

JEMS 4 – 153.785 MHz Same as SPEN 4, Statewide mobile public safety coordination (EMS, police, and fire).

EMS agencies licensed by the NJDHSS are required to have an additional channel, which enables the ambulance personnel to contact an approved MICU dispatch center. These frequencies are listed in the ambulance rules (N.J.A.C.8:40, Appendix A). Additional channels may be added to JEMS mobile and portable radios provided that all four JEMS channels are in accordance with the state plan. The JEMS VHF radio system makes use of Dual Tone, Multi-Frequency (DTMF) dialing, continuous tone coded sub-audible squelch (CTCSS) and Digital Coded Squelch for use by radio equipment to selectively call and alert other stations. All conventional radios within this document must have this capability.

Four-digit numbers are assigned for DTMF dialing. Each number is used to call a specific agency or facility within any New Jersey county. DTMF dialing is used to selectively call hospital emergency department on JEMS 2, and also used by mobiles in calling regional dispatch centers on JEMS 3. The DTMF/dial numbers appear on (Table 2). NJDHSS office of EMS will assign DTMF numbers.

JEMS radios must have automatic CTCSS disabled on JEMS 2, 3, & 4. In this fashion, EMS vehicles communicate with their primary dispatch center via CTCSS signaling (on JEMS 1). Communications with other stations are conducted via carrier squelch on JEMS 2, 3 & 4. CTCSS tones are assigned on a county basis. This listing of assigned CTCSS tones appears on Table 3.

B. UHF Radios

In order to provide immediate access to physician medical directions, several UHF frequencies have been reserved for the exclusive purpose of providing on line medical control. New Jersey law requires MICU personnel to contact a physician each time a patient is treated. Mobile Intensive Care Units (MICU) use UHF radio channels in accordance with Part 90 of the FCC Rules and Regulations pertaining to the Emergency Medical Radio Service (EMRS).

The UHF system also used continues tone coded sub-audible squelch; a countywide or a common MICU consortium CTCSS tone is used to call the local MICU hospital. These tones are listed on Table 3.

C. 800 Mhz radio

The statewide 800 trunked network contains various regional talk groups and a statewide talk group. Agencies that may operate on this network include; all RCC's, other MICU dispatch points, NJDOHSS, NJSFAC, NJSP and NJTF1.

D. Emergency Medical Helicopter Response Unit

New Jersey's medical helicopters are equipped with multi-frequency radios, which can tune in to any of the JEMS frequencies as well as VHF fire and police frequencies. In addition, the helicopters are equipped with 800 MHz trunking radios. These radios are interfaced with MICU communications matrix's at the University Hospital in Newark and Virtua Health MEDCOM in Voorhees.

In the field, the helicopter medical crew will use portable radios and state police 800 MHz channel trunking system. This system allows the medical

crew to be directly patched to a regional trauma center or other critical care centers from anywhere in the state.

E. Inter-operability

Out-of-state EMS vehicles using DTMF encoder equipped mobiles in the carrier receive mode can communicate with New Jersey hospitals on 155.340 MHz (JEMS 2). These vehicles may also communicate with New Jersey coordinated dispatch centers via DTMF on 155.280 MHz (JEMS 3). This channel may also be used to communicate with EMS vehicles at large. New Jersey EMS vehicles equipped with DTMF encoders on VHF are able to communicate with out-of-state EMS communications systems on 155.340 MHz and/or 155.280 MHz. New Jersey MICU vehicles equipped with multi-CTCSS tone encoders on UHF are able to communicated with neighboring EMS communication centers on the UHF MED channels.

New Jersey EMS agencies are encouraged to affiliate with local Fire/Police emergency management agencies and centralized communication centers to ensure seamless communication.

IV. Minimum Equipment Standards

A. JEMS Base Stations

1. VHF DISPATCH FACILITY

One primary single channel CTCSS (transit & receive) tone-controlled base station operational on JEMS 1 (mandatory for ALS and BLS dispatch agencies). One primary CTCSS (transit & receive) tone-controlled VHF simplex base station operational with local DTMF decode on JEMS 3 (mandatory for ALS centers optional for BLS dispatch centers).

2. REGIONAL ALS COORDINATING CENTER

Ability to transmit on Med. 1 – 10 on appropriate side of paired frequencies and other frequencies as determined by the New Jersey Department of Health and Senior Services. Ability to transmit and receive on JEMS 1, 2, & 3 Time-out Timers on all transmitters (Max. setting to be determined by ALS coordinating centers). Ability to route medical control channels to MICU hospital for medical control.

3. HOSPITAL EMERGENCY DEPARTMENT

It is recommended, emergency departments have a single channel JEMS 2 DTMF carrier squelch mode controlled VHF simplex base station. Time-out Timers on all transmitters set at max. of 90 seconds.

4. MICU MEDICAL COMMAND SITE

Medical command sites shall have the capability to receive and transmit voice communications to the paramedic/MICN at the patients beside. In addition, have the capability to receive ECG transmissions from the field.

B. JEMS RADIOS

1. VHF Mobile

Shall have a minimum of the four JEMS channels. It is recommended that additional capability be utilized so that interoperability between adjacent MICU and EMS agencies. DTMF encoder. Time-out Timer on all transmitters (maximum setting of 60 seconds).

2. VHF Portable

Shall have a minimum of the four JEMS channels. It is recommended that additional capability be utilized so that interoperability between adjacent MICU and EMS agencies. DTMF encoder. Time-out Timer on all transmitters (maximum setting of 60 seconds).

3. PORTABLE MEDICAL COMMAND COMMUNICATIONS

Medical command portable shall have the capability to receive and transmit voice communications to the Medical Command Physician from the patients beside. In addition, the paramedic/MICN shall have the capability to transmit ECG transmissions to medical command. Transmitting voice and data may be done on separate devices.

V. TYPICAL SYSTEM OPERATIONS

1. ACCESS

Public education in cooperation with New Jersey Telecommunications will be used to inform citizens of how and when to request EMS. When the need for EMS arises, a citizen will activate the system by dialing 9-1-1.

2. DISPATCH

Dispatch centers will secure the necessary information, pinpoint the caller's location, via a manual or computer file, and select the appropriate EMS assistance utilizing pre-established medical dispatch protocols. All assistance will be dispatched simultaneously. Depending on the patient's medical need, the EMS assistance may include any of the following:

a) Pre-arrival instruction from a certified Emergency Medical Dispatcher

b) First responders

c) Basic life support and advanced life support

d) Fire department units

e) Rescue/extrication units

f) JEMSTAR- aero-medical program

g) Other public safety and community resources

The dispatch center will advise callers of the appropriate action to take until help arrives and provide pre-arrival instructions. EMS providers will be mobilized via wireless/wire, telephones, and/or radio tones alerting.

3. RESPONSE

Field units utilizing radios, will advise the dispatch center as they begin their response, arrive at the scene, begin transport to acute care facility, arrival at acute care facility, and as necessary, or request additional assistance, on their assigned frequency. The dispatch center will document all time accordingly. Out-of-state EMS units will be able to communicate with New Jersey EMS dispatch centers and New Jersey EMS units on JEMS 3.Communicating with other public safety agencies will take place on JEMS 4 (153.785 MHz), which is also known by other public safety agencies as SPEN 4. BLS units will dial in to hospitals on JEMS 2 as necessary. (see table 2 for DTMF codes). MED 9, MED 10 and statewide 800 trunked network will be utilized for coordinating communication activities between ALS units and the Regional Coordinating Center (RCC).

The State Office of Emergency Medical Services and the communications committee recognize that EMS communications are forever changing. This plan is intended to guide EMS agencies in the use of technologies, as it becomes available. However, the department and its communications committee are committed to periodic review and revision of this plan as technology changes.

TABLE 1
VHF CHANNELS TO REGIONAL MICU COMMUNICATION CENTERS
(BY COUNTY)

COUNTY	FREQUENCY	CTCSS	AREA
Atlantic	155.175 MHz	118.8	County Wide
Bergen	155.205 MHz. 155.175 MHz.	192.8 100.0	Eastern portion Western portion
Burlington	155.295 MHz.	127.3	County Wide
Camden	155.235 MHz.	192.8	County wide
Cape May	155.295 MHz.	118.8	County wide
Cumberland	155.220 MHz.	179.9	County wide
Essex	155.295 MHz. 155.400 MHz.	100.0 127.3	County except Newark Newark
Gloucester	155.265 MHz.	167.9	County wide
Hudson	155.235 MHz.	146.2	County wide
Hunterdon	155.205 MHz.	146.2	County wide
Hunterdon	155.205 MHz.	192.8	County wide
Mercer	155.265 MHz.	103.5	County wide
Middlesex	155.220 MHz.	103.5	County wide
Monmouth	155.175 MHz.	151.4	County wide
Morris	155.265 MHz.	241.8	County wide
Ocean	155.205 MHz.	186.2	County wide
Passaic	155.220 MHz.	100.0	County wide
Salem	155.295 MHz.	186.2	County wide
Somerset	155.235 Mhz.	*	County wide
Sussex	155.295 MHz.	*	County wide
Union	155.175 MHz.	85.4	County wide
Warren	155.265 MHz.	*	County wide

* **to be determined**

Table 2
JEMS DTMF RADIO DIRECTORY
JEMS 2- HOSPITAL FREQUENCY (155.340 Mhz.)
JEMS 2/3 – COUNTY AND REGIONAL DISPATCH CENTERS

COUNTY	DIAL NUMBER
ATLANTIC COUNTY (51)	
Atlantic City Medical Center	5101
Atlantic City- Mainland Division	5104
Shore Memorial- Somers Point	5102
William B. Kessler Memorial- Hammonton	5103
BERGEN COUNTY (52)	
Bergen Regional Medical Center- Paramus	5201
Englewood Hospital Medical Center	5202
Hackensack University Medical Center	5204
Holy Name Hospital- Teaneck	5205
Pascack Valley- Westwood	5206
The Valley Hospital- Ridgewood	5210
BURLINGTON COUNTY (53)	
Burlington County Central Communications	5300
Memorial Hospital- Mount Holly	5301
Memorial Rancocas- Willingboro	5303
Virtua- Marlton	5302
Walston Army Hospital	5305
CAMDEN COUNTY (54)	
Camden County Communications Center	5400
Cooper Medical Center- Camden	5402
JFK- Cherry Hill Division	5401
JFK- Stratford Division	5403
Our Lady of Lourdes	5404
Virtua- Berlin Division	5407
Virtua- Camden Division	5406
Virtua- Voorhees Division	5405
CAPE MAY COUNTY (55)	
Burdette Tomlin- Cape May Court House	5501
CUMBERLAND COUNTY (56)	
Cumberland County Communications	5600
Bridgeton Hospital	5601
Millville Hospital	5602
Newcomb Hospital	5603

ESSEX COUNTY (57)	
REMCS Regional Dispatch Center	5700
Clara Maass- Belleville	5701
Columbus Hospital- Newark	5702
East Orange General	5704
Hospital Center at Orange	5705
Irvington General	5706
Mountainside- Montclair	5709
Newark Beth Israel	5710
St. Barnabas- Livingston	5711
St. James- Newark	5712
St. Michael's- Newark	5714
University of Medicine & Dentistry	5707
Veterens Admin. Medical Center	5718
GLOUCESTER COUNTY (58)	
Gloucester County Communications Center	5800
JFK- Washington Twp. Division	5802
Underwood-Memorial Hospital	5801
HUDSON COUNTY (59)	
Bayonne Hospital	5901
Christ Hospital- Jersey City	5902
Jersey City Medical Center	5905
Meadowlands Hospital- Secaucus	5907
Palisades General- North Bergen	5911
St. Mary's- Hoboken	5909
West Hudson- Kearny	5910
HUNTERDON COUNTY (60)	
Hunterdon County Communications Center	6000
Hunterdon Medical Center- Flemington	6001
MERCER COUNTY (61)	
Hamilton Hospital- Hamilton Twp.	6102
Helene Fuld Medical Center	6103
Mercer Medical Center	6104
Medical Center at Princeton	6105
St. Francis Medical Center	6106
MIDDLESEX COUNTY (62)	
JFK-Medical Center- Edison	6201
Memorial Medical Center- South Amboy	6205
Old Bridge Regional Hospital	6206
Robert Wood Johnson University	6202
Raritan Bay Medical Center	6203
St. Peter's- New Brunswick	6204
MONMOUTH COUNTY (63)	
Monmouth County Communications Center	6300

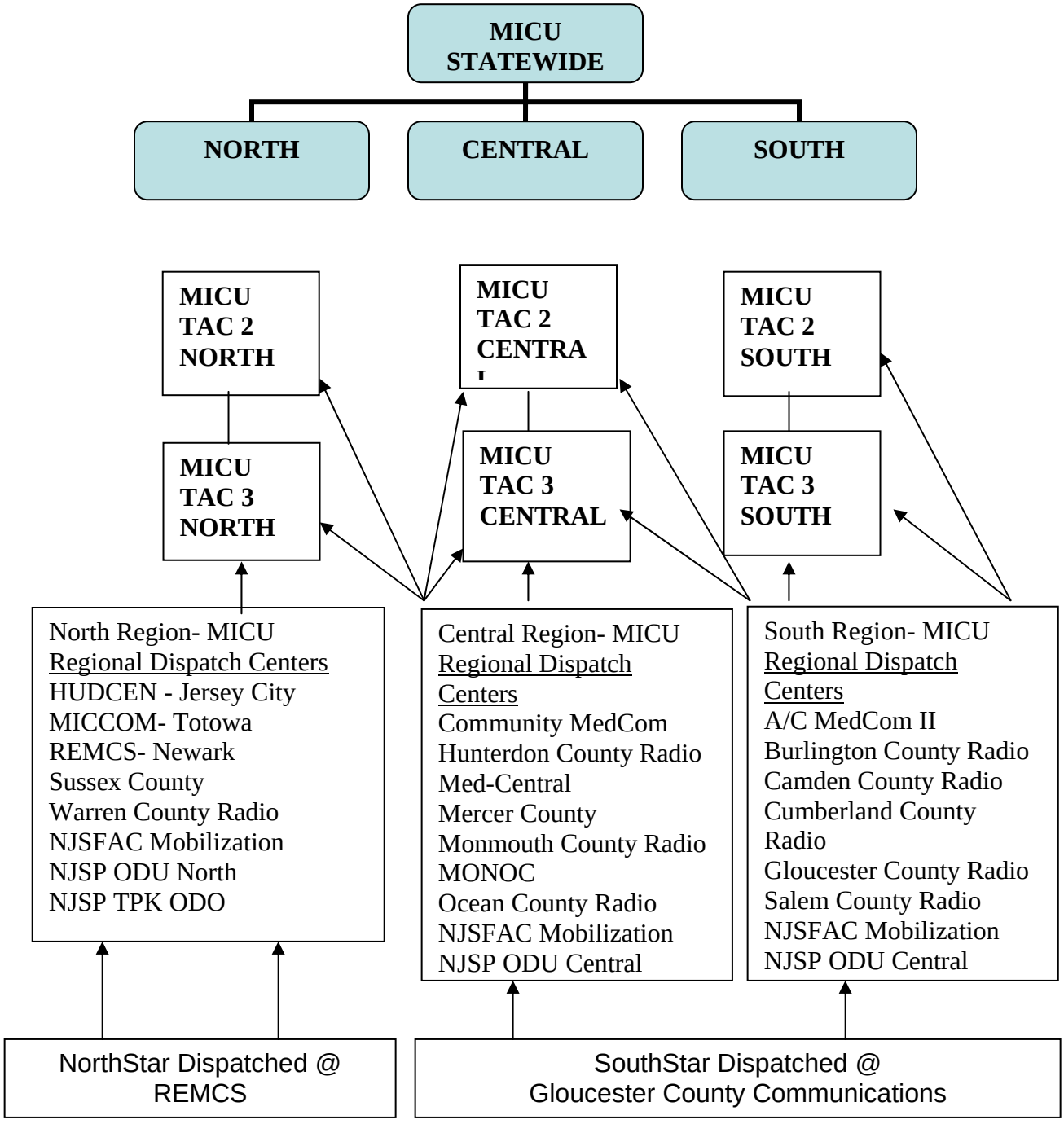
Bayshore- Holmdel	6301
Centra State- Freehold	6302
Jersey Shore- Neptune	6303
Monmouth Medical Center- Long Branch	6304
Riverview- Red Bank	6305
Patterson U.S. Army Hospital- Fort Monmouth	6306
MORRIS COUNTY (64)	
Chilton Memorial Hospital- Pompton Plains	6401
Morristown Memorial Hospital	6404
St. Clare's- Denville	6406
St. Clare's- Dover	6403
OCEAN COUNTY (65)	
Brick Hospital	6505
Community Medical Center	6501
Paul Kimball- Lakewood	6502
Point Pleasant Hospital	6503
South Ocean County- Manahawkin	6504
PASSAIC COUNTY (66)	
Barnert Memorial- Paterson	6601
Beth Israel Hospital Passaic	6602
Wayne General Hospital	6603
Passaic General Hospital	6604
St. Joseph's Hospital & Medical Center- Paterson	6605
St. Mary's Hospital- Passaic	6606
SALEM COUNTY (67)	
Salem County Communications Center	6700
Elmer Community Hospital	6701
Memorial Hospital of Salem County	6702
SOMERSET COUNTY (68)	
Somerset Hospital- Somerville	6802
SUSSEX COUNTY (69)	
Newton Memorial	6903
St. Clare's- Sussex Division	6902

UNION COUNTY (70) Elizabeth General Medical Center Union Hospital Muhlenburg- Plainfield Overlook Hospital- Summit Rahway Hospital St. Elizabeth- Elizabeth	7002 7003 7004 7005 7006 7007
WARREN COUNTY (71) Hacketstown Community Warren Hospital- Phillipsburg	7101 7102

TABLE 3
CTCSS ASSIGNMENTS
(BY COUNTY)

COUNTY	STATEWIDE	LOCAL
Atlantic	141.3	156.7
Bergen	141.3	192.8
Burlington	141.3	167.9
Camden	141.3	162.2
Cape May	141.3	179.9
Cumberland	141.3	206.5
Essex	141.3	203.5
Gloucester	141.3	173.8
Hudson	141.3	146.2
Hunterdon	141.3	156.7
Mercer	141.3	151.4
Middlesex	141.3	186.2
Monmouth	141.3	179.9
Morris	141.3	162.2
Ocean	141.3	210.7
Passaic	141.3	210.7
Salem	141.3	186.2
Somerset	141.3	206.5
Sussex	141.3	167.9
Union	141.3	179.9
Warren	141.3	179.9

State of New Jersey Emergency Medical Service
MICU Communication System
State Police Trunked Network



UMDNJ REMCS will act as the lead agency, responsible for interaction with the New Jersey State Police Radio Maintenance Unit. All billing for each unit usage will be sent by the NJSP to REMCS who in turn will create an invoice for each user agency.

The system operates on the New Jersey State Police 800Mhz. radio network utilizing type II trunked radios. The purchase of and the maintenance for the radios is the users responsibility. All programming will be arranged by REMCS.

Each agency may have a base control station and 1 portable. Requests for additional units will be reviewed by REMCS (i.e. Mobile field com is appropriate).
