Report on the Secondment to the Department of Health/ Federal Emergency Management Agency Washington DC

By David George Ward, Principal Health Emergency Planning Officer

During the summer of 1982, I was involved on the fringe of a secondment of Saudi Police officers to the Greater Manchester County Emergency Planning Team, the period of the secondment was for two weeks. I found their approach to 'all hazards' emergency planning most interesting.

From the Saudi secondment, I made enquiries via several embassies and overseas addresses for information on their approach to emergency planning. I received initial responses from Hong Kong, New Zealand, Canada and the United States of America; in particular the United States were extremely helpful, providing information on several areas of emergency planning including the medical response. The process of exchange for information was extremely slow, with a period of some three months turn around of correspondence.

During late 1983, I was offered a secondment to the Federal Emergency Management Agency DC, unfortunately I was not in a position to take up this offer, however, the agency left the invitation open. Just before my appointment to the NWRHA I was sent a copy of a concept paper on Health Emergency Planning, which I was asked to comment upon, which I duly completed. I also included in my return the fact that I was appointed to the NWRHA, the response from Washington was to place me in touch with the Department of Health, Washington DC, who further offered the opportunity of a non-financed secondment. From this point I was in correspondence with the Department of Health exchanging ideas and views, however, like FEMA, it was and still is a very slow process.

The value of a secondment had a two fold effect, the Americans are spending large amounts of money on research into Mass Casualty and Major Disaster scenarios, and to this, it was similar to areas of work I was undertaking for the Emergency Planning Department at Region. The secondment would give me a further chance to expand the research by meeting other related agencies, and visiting people at their place of work and therein develop a line of questioning or theme.

During my early days at Region I was encouraged to develop the areas of work, which was thought to be and indeed is beneficial for the Authority. Churchill was once quoted as saying 'travel broadens the mind', and this is certainly true of my time in the States. It would be an understatement to say I was not a better Emergency Planning Officer for the experience.

Support for my application to the Allan Brooking Fellowship was supported initially by Dr. Fairfax, Regional Specialist in Community Medicine, Dr. Lane, Regional Medical Officer, Mr. Groves, Planning and Review Officer and Mr. Davis-Rice. Unfortunately the fellowship felt that my application did not meet the criteria, but suggested forwarding the application to the Kings Fund. This was done with the support of Mr. Bailey, Regional Health Emergency Planning Officer, Mr. Howarth, Regional Training Manager, and once again Mr. Davis-Rice then Acting General Manager. The financing for the trip was granted by an award by the Kings Fund and an equivalent sum from the Regional Training Budget.

I was informed by the Kings Fund Board that my application was successful from eighty plus candidates, and I was, further, the first person from the Health Emergency Planning discipline to receive such an award.

My time-table was extremely hectic in the States. I flew out from Gatwick on Thursday, 26th February, 1987, and arrived in New York late that afternoon. I suffered badly from the jet lag, which took several days to get over. However, I have planned for this eventuality by leaving the first weekend free, which also left time to travel down by train to Washington DC to commence the secondment proper on Monday, 2nd March, 1987.

Monday 2nd March 1987

Arrived at the Department of Health, welcomed by Mr. Reddick, Director of International Affairs.

Introduced to Director of the National Disaster Medical System.

Office and telephone provided, with secretarial services provided.

Afternoon, I was intived to attend the NDMS quarterly meeting, including members from FEMA, Veterans Administration, Department of Transport, The Pentagon.

Tuesday 3rd March 1987

Introduced to several members of the NDMS system.

List of contract numbers for 'side visits' extra to the secondment.

Rest of morning in the resource and library section.

Afternoon, individual meetings with Dr. Mahoney, NDMS Concept Designer, followed by Mr. Ballue, Logistics Manager.

Wednesday 4th March 1987

Federal Emergency Management Agency, Medical Concepts Analyst, Mr. Bosner followed by Mr. Swisher, Research Director, Emergency Planning.

Afternoon/Evening, The Pentagon Lt. Col. Mulhalley, Emergency Planning Chief for Civillian Disasters.

Thursday 5th March 1987

Meeting Dr. Cowan, United States Navy, Specialist in Mass Casualty Disasters.
Afternoon, National Disaster Medical System, Ms. Gainer, Mr. Rebuck.

Friday 6th March 1987

Mr. Reutershan, Director National Disaster Medical System.
Afternoon, collation of weeks meeting/work.

Monday 6th March 1987

Meeting with Director and Senior Staff, Veterans Administration, Mr. Illardi.
Afternoon, Meeting with Emergency Co-ordinator, Dr. Deat'lee, Washington Memorial Hospital.

Evening, Video (Major Disaster Exercise) and tour of Trauma Unit, Washington Memorial Hospital.

Tuesday 7th March 1987

Maryland County, Fire, Paramedic, and Emergency Planning Departments, Captain Bichom, Sergeant Zvelsi and County Emergency Planning Officer, Mrs. Micos.

Wednesday 8th March 1987

Martinsburgh West Virginia, Veterans Administration, Major Teaching and Trauma Hospital, Professor Jorgenson, Surgeon General VA.

Thursday 9th March 1987

Baltimore General and University Hospital, Dr. Cowley, Director of the Emergency Medical System.

Friday 13th March 1987

Travel to Shannandoah County.

Saturday 14th March 1987

Health Emergency Planning Seminar and Lecture.
Evening, Meeting with Director of American Red Cross, (Third World Relief)

Sunday 15th March 1987

Travel down to Florida.

Tuesday 17th March 1987

Meeting with Director of Emergency 911 System.
Afternoon, Attendance of Joint Services Emergency Planning Committee.

Wednesday 18th March 1987

Meeting Director of State, Emergency Medical System (Administration), Ms. Joan Pyle.

Thursday 19th March 1987

Meeting Atlanta Georgia, Department of Communicable Diseases.
Early Morning, Mr. Briggs, Assistant Director, International Health, Dr. Dicker, Director, Epidemiology.
Working Lunch, Mr. Gray, Chief of Emergency Response Group.
Afternoon, Dr. Houk, Director for Centre of Environmental Health USA.
Meeting with Dr. Sue Binder and staff, Emergency Response Co-ordination Group.

Friday 20th March 1987

Meeting with United States Navy, Florida - Civil Support Co-ordination, Lt. Commander Burrie.

Monday 23rd March 1987

Washington, Federal Emergency Management Agency, further meeting with Mr. Bosner on mass casualty situations.
Working Lunch, Director of Transport, Branch of US Coastguard, Mr. Birt.
FEMA Meeting Group Discussion.

Wednesday 25th March 1987

New York City, Health Department, Mr. Alexander.

Thursday 26th March 1987

Late flight back to the UK (returning 10.30 a.m. Friday, 27th March 1987).

Because of the expense and complexity of such a unit and the rarity of its use, no civilian model of a mobile field surgical unit has yet been formed in the United States. NDMS has proposed such units at a future date. Until such time as it becomes practical to form such units, field surgical services can only be made available through military units. Unless these are immediately available, a catastrophic incident may require reserving surviving hospital resources in the affected area for urgent surgical patients. This may in turn require seriously injured but stable patients to be evacuated elsewhere for hospital care, and also force moderately injured patients to be treated definitively in the field.

Each patient with a major illness or injury will finally reach definitive medical care in a fully functioning hospital, possibly outside the affected area. Any hospital with adequate general medical and surgical services to which transport is feasible can handle the "average" disaster patient. A variable number of patients require specialty services, i.e. burn treatment, eye surgery, and the like, and in many areas trauma systems have been set up to deal with them. All such systems have provision for multiple-casualty incidents, but none have capacity on the scale required for great disasters.

NDMS has created a network of hospitals spanning the major metropolitan areas of the country. All hospitals in this network have agreed to accept disaster victims from NDMS in an emergency. This network provides sufficient hospital bed capacity to deal with catastrophic incidents.

Mutual aid will take two forms. Aid teams will move in to provide triage, stabilisation, and the most austere medical treatment sufficient to preserve life. Major injuries requiring hospital care will be transported out of the affected area to undamaged distant areas for definitive care. This concept of operations is identical to the NDMS concept.

Rescue and first aid services are to be provided by local search and rescue personnel from fire and law enforcement agencies, who have their own mutual aid backup system.

The first point of medical care is the "casualty collection point" (CCP), to which casualties are to be delivered by rescue personnel and where triage, stabilisation, and queueing for transport are to take place. Most of the constituent counties have predesignated casualty collection points. Some jurisdictions have predesignated staff and equipment to operate them. Counties vary in their staffing and equipment patterns for CCPs, indicating some differences of approach to medical care functions. In most areas CCPs are equipped only with analogues of 1950s Civil Defence First Aid Station kit and so staffed, indicating that surgical service will not be available and only limited stabilisation of shock will be possible. At the other extreme, other affluent areas have developed a 25-cot "rapid response unit" very austerely equipped to provide surgical services including laparotomy and possible craniotomy, providing shelter and utilities are available.

From the CCP patients will to be transported to surviving hospitals or, if none are available, to "disaster support areas" (DSAs) where they will be further sorted, emergent surgical care rendered, and they can be loaded onto fixed-wing aircraft to be taken to capable hospitals outside the affected area. There are currently two designated DSAs in the State. The National Guard combat support hospital or evacuation hospital is designated to serve each DSA when activated, providing both field surgical services and aeromedical staging services. State disaster authorities have recommended designation of further DSAs or "multi-purpose staging areas" to handle the large volume of incoming resources and the large number of casualties to be evacuated. Each expansion DSA will be located on an airfield suitable for C-130 aircraft. No medical units are presently designated to serve these sites.

System command and control provisions are hierarchical. Under State law and administrative guidelines, county health officers are responsible for disaster medical and health care. It is assumed that county health departments will survive to co-ordinate the local response and supervise incoming mutual aid. Mutual aid regions acting as branches of the State Office of Emergency Services are to broker mutual aid within a multi-county region. The State Emergency Medical Services Authority (EMSA) is to co-ordinate major and extra-regional mutual aid, and will be responsible for medical regulation and major logistic support.

The plan relies heavily on mutual aid, as all resources in the affected areas will be committed. Incoming mutual aid units will be reasonably self-sufficient to be readily deployable, as logistic support for them must be improvised.

Each state maintains disaster plans, tailored to foreseeable disasters likely to affect that geographical area. The nature of the area determines the range of foreseeable disasters. Any industrial State plans for a technologic disaster, such as an explosion or other incident in a large chemical plant. Regardless of the area of the type of accident, all medical disaster plans share certain elements. They recognise that in disaster, existing medical resources may be overwhelmed. Medical care must be delivered in unconventional ways. Outside aid must be obtained to provide necessary services not available in the affected area.

The United States is amply provided with health personnel and hospital beds. These health care assets, though, are proportioned to normal demands for health care. A disaster may cause a sudden "surge" of casualties far in excess of the usual health care demand. Sometimes this surge may represent a large fraction of the exposed population. The additional demand, moreover, is principally comprised of trauma victims, who require more services than everyday patients with illnesses of a predominately medical nature.

The typical American metropolitan area has an emergency medical services system and several medical centres specialising in trauma services. An emergency medical services system typically anticipates about 100 to 200 emergency cases daily per million population, estimated from typical ambulance calls. The trauma system might normally handle about five to ten serious trauma cases. Both EMS and trauma systems have substantial reserve capacity, and can usually handle two to three times their average workload when multiple-casualty incidents occur. In most areas field EMS services can be augmented by mutual aid from nearby areas, which can provide additional ambulances and staff when local response capability is strained. In some areas this reserve capacity is augmented by civilian helicopter ambulance services that permit rapid transport of victims in excess of local capacity to trauma centres in nearby areas. However, these augmentation provisions typically are scaled for foreseeable multiple casualty incidents of twenty to a hundred victims. They are seldom scaled for true disasters.

In the States a disaster is conventionally considered to be an incident whose magnitude or severity exceeds the affected area's response capacity. The disasters that have struck American cities in recent times have fortunately not caused substantial morbidity or mortality. Because of the small number of recent disasters that have caused substantial injuries, the health care systems of American cities have not been recently challenged.

A disaster may easily create morbidity rates of one per thousand among the population exposed to it. The 100,000-casualty estimate for the Great California Earthquake represents a morbidity of ten per thousand. It is clearly beyond the capacity of any American metropolitan area to respond adequately to the casualties of such events, especially as almost all casualties arise at the time and therefore present simultaneously for treatment.

A system for dealing with disaster casualties must therefore provide for external aid through a medical mutual aid system. In order to cope with very large incidents, this mutual aid system should be national in scope, and should be able to handle surges as large as those of the maximum plausible incident.

Surge demand is a common problem of military medicine. Rising costs of medical care have made an adequate surge capability economically impossible within DoD. The US military hospital establishment currently totals approximately 18,000 beds, 2,000 of which are overseas. These beds, and their staffing, are scaled for the care of a relatively healthy peacetime active duty population. They are clearly inadequate for a military contingency. Augmenting this capacity by military mobilisation takes time. Recognising this, the Department of Defence in 1980 established the Civilian-Military Contingency Hospital System (CMCHS).

CMCHS was a co-operative venture that was begun by DoD and later developed by DoD and the Veterans Administration (VA) in partnership with the civilian hospitals of the Nation. CMCHS was locally co-ordinated by major Federal hospitals in urban areas. Each Federal "co-ordinating hospital" was responsible for patient reception and sorting, for local medical regulation, and for patient administration. CMCHS "participating hospitals" agreed to accept patients (up to 10% of their licensed bed capacity) from the Department of Defence in the event of a military emergency, and to participate in education and exercise programs in mass casualty care. CMCHS was initially targeted to comprise 50,000 beds; at the beginning of 1985 it comprised approximately 63,000 hospital beds in 770 participating civilian general hospitals in 48 CMCHS areas.

The CMCHS program was designed to access civilian hospital beds to care for military casualties exceeding the capacity of DoD and VA hospitals. CMCHS carried out an extensive education and exercise program, but had no deployable medical resources. For a non-military emergency it was therefore a resource for hospital beds only. CMCHS did, however, awaken strong interest in emergency preparedness in the American health care community. This interest led to the establishment of NDMS.

On December 17, 1981, the President established the Emergency Mobilisation Preparedness Board (EMPB) to develop national policy and programs to improve emergency preparedness. The EMPB delegated health program development to its Principal Working Group on Health (PWGH). Chaired by the Assistant Secretary for Health, the PWGH included representation from all Federal agencies concerned with health care. The PWGH responded to the Presidential mandate by developing the National Disaster Medical System design.

The National Disaster Medical System is designed to fulfil three main objectives:

- To provide medical assistance to a disaster area in the form of medical assistance teams and medical supplies and equipment.

- To evacuate patients that cannot be cared for on-scene to designated locations elsewhere in the Nation.

- To provide hospitalisation in a nationwide network of hospitals that have agreed to accept patients in the event of a national emergency.

The system is designed to care for the victims of any incident that exceeds the medical care capability of the affected State, region, or Federal medical care system. It can be used in a variety of emergency events, such as a refugee influx, an earthquake, a technologic disaster, or a conventional military conflict. The system is designed to supplement, not to supplant, the efforts of the responsible jurisdiction.

While larger numbers of casualties are possible (as in the Bhopal incident), NDMS planners consider the maximum plausible incident to be a very large California earthquake, which might create 100,000 major injuries. The system is therefore scaled to enable it to accept a surge demand up to 100,000 serious injuries requiring hospitalisation. This renders NDMS consisted with DoD needs for medical backup, and enabled DoD to offer CMCHS as the foundation on which NDMS will be built. NDMS planners caution, however, that the system is neither designed for nor capable of dealing with the casualties of nuclear warfare.

NDMS comprises four principal elements: facilities, manpower, logistic support, and command and control. American medical facilities and manpower resources are highly decentralised, and primarily under the control of the private sector and of State and local governments. Logistic support resources and command and control resources are strongly centralised, although they are divided between several large corporations and Federal agencies. NDMS will therefore develop facilities and manpower on the basis of "NDMS areas" centred in major metropolitan areas of the country. Logistic support and system co-ordination is managed centrally.

There are three criteria for NDMS patient reception areas to be included in the system:

- Available beds. The are should have a minimum of 2,500 acute care hospital beds.

- Co-ordinating centre. The area must have a Federal or non-Federal facility capable of acting as a co-ordinating centre, to link hospital beds with transportation, communication, and other resources, and to establish patient administration procedures.

- Air access. The area must possess an airport capable of accommodating areomedical aircraft.

Sixty-seven urban areas meet these criteria. Twenty-three of these areas did not participate in CMCHS. Four existing CMCHS areas fall slightly below the 2,500-bed threshold, but will be included as exceptions to the criteria.

The co-ordinating centres and participating hospitals of the CMCMS program form the foundation of the NDMS facilities element. Hospital enrolment criteria and procedures are patterned after the former CMCHS program. Accredited hospitals of 100 or more beds may participate voluntarily in the program, agreeing to adhere to a specified training and exercise program, and to accept NDMS patients upon activation of the system. It is anticipated that when fully developed the system will contain at least the 100,000 beds required for the maximum plausible incident.

The manpower-intensive elements of NDSM are medical clearing, medical staging, and field surgical stabilisation. NDMS will first develop organised medical assistance teams capable of medical clearing in a disaster area or medical staging for the evacuation system. Later, should resources permit, it may develop other more specialised assistance teams to provide field surgical services in extreme disaster circumstances.

The entire unit could operate a large clearing station in a disaster area, a standard 250-patient aeromedical staging unit, or a fixed refugee care site providing screening, ambulatory medical care, and intermediate nursing care for a population of 10,000 refugees.

Medical assistance teams are formed by participating hospitals and agencies. Larger hospitals form one team from among interested clinical personnel. Major medical centres, health departments and voluntary agencies will provide headquarters units from among their administrative and support personnel.

Each NDMS region will form at least one team, and preferably one clearing-staging unit, to enable it to receive patients dependably at its principal entry port. Several units will be formed in large metropolitan areas, thus creating units deployable to a disaster site upon need. The maximum plausible 100,000 casualty scenario requires 150 clearing staging units, half to remain at home to receive patients, and half deployed to the disaster area. HHS studies demonstrate that maximum system development is quite feasible in all proposed system areas. In almost all areas, volunteer personnel required to develop one unit for each 4300 beds of regional capacity comprise less than 1% of available personnel in the area.

The NDMS Mobile Surgical Unit. In an extreme disaster situation field surgical services are available to render unstable but salvageable patients fit for evacuation. Such services are provided by a highly mobile and surgically intensive field unit. NDMS has designed a 215-person mobile unit equivalent to a Mobile Army Surgical Hospital. Ten to fifteen such units are available for the maximum plausible incident, and are feasible from the standpoint of manpower availability. However, equipment for such a unit is both expensive to procure, and difficult to move as rapidly as may be necessary for timely response. Development of this equipment awaits resolution of cost and deployability issues.

A Federal co-ordinating organisation. In the future it is intended that all NDMS volunteers and units will be members of a Federal organisation modelled on the Cost Guard Auxiliary. This will facilitate transportation, equipment, and training. This organisational method also serves two important medicolegal purposes.

- First, emergency services laws across the United States do not uniformly absolve out-of-State disaster workers from requirements for State professional licensure. Teams organised in one State might not be legally able to work in another without obtaining professional licensure or waiver. This is of course impractical at a time of emergency.

- Secondly, although there is no precedent for substantial malpractice issues arising out of disaster medical services, the conceptual threat of liability exposure renders disaster service potentially risky both for the individual and for the institutional sponsor.

While units and individual volunteers are in training they act as individuals and/or as agents of their sponsoring institution. However, each individual is also appointed in an auxiliary capacity in an element of the Public Health Service serving the National Disaster Medical System. Upon system activation each individual will be employed in this Federal capacity. Thus, when called into Federal disaster service NDMS volunteers would not be subject to State licensure requirements. Teams organised in one State could freely work in another without special concerns about individual licensure. In addition, the individual volunteers would be under the protection of the Federal Tort Claims Act and the Public Health Service Act, limiting personal liability. The team as a whole would at this time be a Federal institution, because it would be disengaged from the original sponsor.

Sponsorship of medical assistance teams. An agency sponsoring a NDMS disaster medical assistance team is usually a licensed hospital, a State-approved non-hospital health agency, a disaster or emergency services agency, or another organisation capable of providing disaster health services. The sponsor will then agree to organise and maintain a unit conforming to NDMS specifications and available for service in a national disaster or a local/State emergency. The sponsor will enter into a voluntary agreement with the Federal government.

The principal logistic functions include finance, transportation, supplies and equipment,and communications. Plans for each logistic component are under development by inter-departmental task forces, and will be completed at the time formal organisation of NDMS is accomplished.

Finance. A Finance Task Force of the PWGH is developing policy options and systems for financing NDMS services. It has developed criteria for patient eligibility, facility compensation, and compensation of medical assistance teams. It has developed a mechanism for payment of participating hospitals for their billed charges.

Transportation. A Transportation Task Force has developed procedures to utilise the military aeromedical evacuation system, augmented as appropriate with civilian aircraft and alternate modes of patient transport.

Supplies and Equipment. Specifications for supplies and equipment for disaster medical assistance teams are under development. Durable equipment will be drawn from existing Packaged Disaster Hospitals and available surplus to minimise expense. Consumable supply kits will be provided by NDMS on activation of a unit. These kits are designed for a deployment of approximately 5 days, and will be assembled at depots and drop-shipped to destinations at activation, to minimise warehousing and perishability problems.

Development of the system is carried out by an Implementation Task Force staffed by HHS(PHS), DoD (OASD/HA), the Veterans Administration (VA), and the Federal Emergency Management Agency (FEMA). The Implementation Task Force develops informational materials; integrates CMCHS areas into NDMS and recruits new areas; writes procedure and operations manuals; and develops data systems for use in operating the system.

The system can be activated in three ways. In the event of a civilian disaster, the Governor of an affected State may request Federal assistance under the authority of the Disaster Relief Act of 1974. A Presidential declaration then triggers a series of Federal responses co-ordinated by FEMA, which might include the activation of NDMS when appropriate. In the event of a national security emergency, the Secretary of Defence would have authority to activate the system. In the event of other emergencies, particularly incidents requiring immediate response when a Presidential declaration might be delayed, the Secretary of Health and Human Services may activate the system under authorities contained in the Public Health Service Act.

Whichever way it is activated, NDMS will identify and activate appropriate resources outside the affected area to provide the medical mutual aid required by the situation.

Upon system activation, a National Disaster Medical Operations Centre (NDMOC) will then become operational. NDMOC will include representatives of HHS/PHS, DoD, FEMA, the VA, and other Federal and voluntary agencies concerned with medical services or medical logistics. NDMOC will work in co-operation with the affected State emergency medical authorities, the Armed Services Medical Regulating Office, and the Federal co-ordinator at the disaster site. In a civil emergency, the principal interface would be through FEMA and HHS regional co-ordinators to the State disaster medical and health co-ordinator. In a military contingency the principal interface will be directly between the regional co-ordinating hospital and the local participating facility.

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If the system has to be activated in a civil disaster, the lead agency would be HHS; if activated in a national security emergency, the lead agency would be DoD. Each participating agency is responsible for managing its own resources in accordance with the general policy determined by the NDMOC co-ordinating group.

First aid at an actual rescue site and definitive care, are related to NDMS field response but are tasks outside the scope of duties of NDMS medical response teams. Field rescue and first aid services are provided by State and local agencies, and in turn feed patients into the system. Definitive care, on the other extreme of the path of patient care, would be provided by NDMS hospitals accepting patients from the evacuation system.

First, assistance teams are organised in order to function; this organisation could not be done at the time of the incident. Units would be created before a disaster. They are trained so that they are skilled; they would be equipped; and would be capable of mobilisation and deployment on need. For various logistic reasons units with a working strength of about 100 members are the smallest units that could be cost-effectively formed and supported.

There are many ways to configure units to serve these functions, and potential sponsors are encouraged to craft units adapted to local needs. NDMS proposes national models that would simplify the processes of organisation, recruitment, training, and equipment. Moreover, deployment and logistic support in an actual emergency depend on a reasonable measure of standardisation in numbers, weight of equipment, and patient care capability.

Each type of team would have to meet the functional requirements of its principal task. The team must be able to provide medical care appropriate to clearing, to staging, or to surgical care, and they must be able to serve the requisite number of patients. Teams sent to a disaster area as "incoming aid" must meet an additional set of functional requirements. These must be transportable. These also must be self-sufficient in some respects for an initial period of operations, as they cannot depend on the affected host area for shelter, food, and supplies.

Many hospitals maintain a "triage team" for external disaster response. Such a team usually consists of six to eight persons, usually including two to four physicians and two to four nurses. Such a team can triage large numbers of patients, and can provide advanced trauma life support services to a limited number, usually not exceeding ten or fifteen. It usually works in close co-ordination with a rescue agency, which provides EMT or EMT-paramedic aid and has adequate transport available to move urgent patients to hospital rapidly. The triage team is an appropriate unit for triage at the site of the limited mass casualty incident. It requires augmentation, however, to serve the more demanding role of clearing at a large disaster.

In the States the clearing functions in a mass casualty situation recommend a minimum of about 14 staff. At least one physician to supervise casualty clearing, and provide diagnostic and therapeutic oversight. Usually two professional nurses, for resuscitation and care functions. Many hospitals already identify a "triage team" in their disaster plans. That triage team is capable of triage at a multiple-casualty incident, but it can effectively perform stabilisation of only one or two patients requiring advanced trauma life support services. More staff are required for an actual disaster casualty clearing operation. Such a situation requires triage of numerous patients, and simultaneous stabilisation for some and simple wound care for others. Disaster medical clearing also imposes additional responsibilities for patient holding at the clearing station that are not present in the localised multiple casualty incident. These considerations require the staff of the clearing operation to be larger than that of the simple triage-and stabilisation operation. These additional needs are served by a combination of licensed vocational nurses, emergency medical technicians, optimally including eight persons to enable sage movement of litter patients. Two additional recorders, and one for admitting and another for discharging patients. One individual sees to supplies and equipment. A large disaster relief operation is rarely over before relief is required for workers. Two-shift coverage doubles the numbers above, and leads to a minimum "deployable" unit of about 28 persons.

The clearing functions seem to require about one worker for every five or so patients, depending on the kind of service to be provided at the clearing point. Austere surgical capability, for instance, requires one worker for every two to three patients. Conversely, if immediate evacuation is feasible and patients need not be held at the CCP, a staffing ratio of one to eight might seem to be the norm. Two shifts at these staffing ratios are necessary if a CCP must operate continuously for three to five days. A 250-patient clearing unit would therefore require minimum of about 100 staff, assuming it does no substantial surgery and holds some patients because of limited transport.

The Army's Medical Clearing Company (US Army Medical Department: TOE 8-128 (Medical Clearing Company) is built according to the concepts previously discussed. The whole unit can operate a single clearing facility with a maximum capacity of 240 patients. Its three constituent clearing platoons can with limitations operate 3 closely located facilities with capacities of 80 patients each. At full strength the military unit contains 13 officers, seven of whom are physicians, and 120 enlisted personnel, most of whom are various health care technical personnel. The unit is primarily designed to receive, sort, resuscitate, and maintain about 240 patients until evacuated. It can feed and shelter itself and its patients. It is partially mobile in its own vehicles, and completely transportable by medium military aircraft.

NDMS has designed a civilian disaster medical assistance team (DMAT) comprised of 29 persons, which generally resembles both the Dutch disaster medical team and a military clearing platoon, and a Clearing-Staging Unit (CSU) comprised of three such teams with a small internal support staff.

- Each DMAT can operate a disaster casualty clearing operation around the clock, providing for shift relief. The DMAT would have little self-sufficiency in terms of food or shelter, so its deployability would be somewhat limited.

- The larger Clearing-Staging Unit would add logistic support capability, and could feed, shelter, and supply its DMATs and their patients.

Together they could operate one to three clearing stations with a working minimum of 103 personnel: 19 professional staff, 44 technical staff, 13 clerical personnel, and 27 attendants. The "core" of the unit would comprise of about 25 leaders organised and highly trained in disaster operations, and another 35 preassigned and oriented professionals and technicians with emergency medical skills. About 40 less skilled workers would serve as litter bearers and nursing aides, and provide general support services; these could be recruited on activation, but ideally should be preassigned and oriented.

This civilian unit is not as capable as the military example because of limited transport, communications, and supply resources. Such a unit, however, can be formed from available skilled manpower in most major health facilities in the country. Extensive training is not required if the skilled volunteers are available. Most of the necessary equipment is available, some already in each community in the form of outdated Packaged Disaster Hospitals, and some from existing surplus. The intrinsic transport and some laboratory and X-ray capability of the military model have been sacrificed to minimise equipment cost and simplify transport. Development of clearing units can be developed relatively quickly, in a period of about twelve months under the conditions facing the average volunteer disaster response organisation.

Some patients may require to be surgically stabilised before transport. Since surgical teams would be difficult to equip and transport, there are only a few of these. Such units are self-sufficient medical and surgical units capable of handling a variety of immediate life-threatening conditions by medical or surgical means. Such a unit would be able to:

1. Be transported quickly to a suitable site and be operational in a minimum amount of time;

2. Receive critically injured patients from clearing stations or directly from the site of rescue;

3. Provide rescuscitative surgery and medical stabilisation necessary to prepare critically injured casualties for further evacuation;

4. Provide pre- and post-operative care for patients until they can be safely evacuated;

5. Transfer patients to outgoing transport;

6. Shelter and feed its patients and staff.

A unit similar to the current Mobile Army Surgical Hospital (MASH) would be adequate. The current MASH unit is a portable 60-bed surgical hospital. It is staffed by 224 personnel. These comprise of approximately 66 officers, of whom 17+ are surgeons, 41+ are nurses, and 6+ are other health professionals, and 164+ enlisted men, who represent a variety of medical technicians and support personnel. It has professional services for surgery, emergency medicine, pharmacy, laboratory, X-ray, and intensive care wards. It has organic administrative support in patient administration, communications, supply and transport, litter bearers, and general administration. Its equipment kit provides austere equipment for all the above services, and weighs in total about 230,000 pounds. The military unit is substantially mobile in its own vehicles, and complete transportable in cargo aircraft.

TRAINING THE DISASTER TEAM

Two kinds of training are considered: individual training and group training. Individual training is aimed at preparing each team member to perform his/her assigned tasks within the team. Group training is further aimed at preparing the team as a whole to perform its assigned mission.

Training plans are geared so that the participation of team members and sponsors is voluntary and uncompensated. Training activities are not there to impose undue burdens on participants. The training activities are conveniently scheduled, directly relevant to knowledges and skills in disaster medical care, and limited in total time commitment required of participants.

The need to use training time efficiently means that the topics of training courses are chosen with careful consideration. The scheme assumes that all professionally or technically qualified personnel will have the basic skills of their specialty area. Training does not focus on those skills already acquired through basic professional or technical credentials but on the areas of potential weakness or under-development.

The main focus of the training program for the disaster teams is on those special professional or technical skills required to provide emergency medical or nursing care in the field. A secondary focus is placed on those personal skills required to cope with the austere milieu of the disaster environment. If the disaster unit is to be successful over an extended period of time, then the training programs tries to consider skills maintenance as well as skill acquisition.

It has been identified that some personnel, require more training than the majority of unit members. Team and unit leaders require special training in disaster management skills. The staff responsible for internal logistic support also require additional training opportunities, as equipment, supply, shelter, communications, and transport services in disaster may be radically different from their normal experiences.

Most of the required knowledge is taught in periodic seminars held at convenient times at sponsoring institutions. Most of the required skills, including group skills, are taught in periodic exercises. In the main, the special training requirements of leaders and unit support staff are met through judicious use of existing training courses for other emergency service personnel.

For efficiency, training is planned on a unit or regional level. This avoids imposing undue burdens on individual participating hospitals. It also creates a larger "pool" of trainees for some training activities that might otherwise draw only three or four members.

The training officer outlines a simple training plan for the unit or for several units in this region. This consists of an individual training element to develop individual skills of each team member, and a group exercise element to develop team skills.

- The individual training element utilises existing opportunities for training as much as possible. Training modules developed for NDMS and the Civilian-Military Contingency Hospital System are used. Some other courses are available through regional emergency service agencies. In addition, opportunities for training of selected individuals in mass casualty care is available through a military co-ordinating hospital.

- The group training element consists of exercises. These are planned in conjunction with the JCAH exercises of participating hospitals.

Required training is kept to the minimum feasible, to avoid excessive imposition on the time and resources of participants.

The Executive Officer and the Supply Officer identify sources of equipment for the unit. The best and most appropriate source is an obsolete Packaged Disaster Hospital, from which most of the durable medical equipment needed for clearing and staging operations is drawn. Further equipment can be obtained from surplus and from donations. Each team possess an immediate response kit as well: this duplicates the "triage kit" found at many hospitals already.

THE NDMS CLEARING - STAGING UNIT

The fundamental NDMS medical care organisation is the Clearing-Staging Unit. This large unit will provide all necessary field medical care functions needed in a disaster except major surgery. It is adaptable enough to provide other kinds of non-institutional care if necessary. Most importantly, its command and support element is potent enough to provide logistic support to its constituent teams. In non-emergency circumstances this command and support element can aid teams in administration, in obtaining equipment, and in training their members.

The NDMS Clearing-Staging Unit is designed to fill three missions:

1. To receive, sort, and provide emergency care and supportive treatment for trauma patients until evacuated.

2. To provide definitive care for patients with minor illnesses or injuries.

3. To provide limited support for itself and its patients in field operations.

The Clearing-Staging Unit has several roles consistent with these missions. In a disaster situation it can clear patients at the scene; in so doing it triages them into priority categories, stabilises them to render them fit for evacuation, and provides supportive care until they can be evacuated. In any sort of emergency it can stage patients in the process of evacuation to definitive care; in this case it receives and sorts patients for further transport, and provides supportive care until they can be sent on. In other situations such as a refugee influx or an evacuation related to disaster threat, it could provide ambulatory care and intermediate nursing care for patients not warranting hospitalisation.

The CSU is designed to be modular. The entire unit is designed to operate a large emergency medical facility of a nominal 250-patient holding capacity. It contains smaller units, called Disaster Medical Assistance Teams or DMATs, that can carry out their missions semi-independently. There are usually three DMATs in a CSU; some CSUS MAY HAVE FOUR. Each of the constituent DMATs can operate a smaller facility of a nominal 80-patient holding capacity.

The DMATs can easily be employed independently in their home areas. They have no internal support capability, however, and must be supported logistically by their parent unit when away from their home base. In these circumstances the unit may have to arrange food, shelter, and supplies for its teams, even though they may be geographically separated, as command support personnel are too few to divide into teams.

The unit's basic organisational element is the DMAT, whose members ideally are drawn from the same sponsoring institution. If feasible, each DMAT should be organised around a pre-existing external response team, and will fill the external response role in the hospital's own disaster plan. Its leaders are chosen for competence in trauma care and interest in disaster services.

The recommended staffing pattern of a CSU is configured to allow the unit to operate 24 hours a day without vacation, holiday, or sick time relief when in disaster service. Numbers of personnel are calculated for two twelve-hour shifts, and will not allow three eight-hour shifts unless capacity is diminished by 80 patients, by dividing one team into the two others.

Team and unit sponsors are encouraged to make minor modifications to the team design to adapt it to local conditions, providing working strength and competence are preserved. Total DMAT personnel may range from 29 to 40. Total working strength of a CSU may range from a minimum 103 to a maximum of approximately 130 (160 for a CSU with four DMATs).

Numbers of each class of personnel are usually increased as appropriate for the local situation. However, there are some general limits on the number of added personnel that are actually utilised in some circumstances. For units transported by air to distant disaster sites, for example, aircraft carrying capacity may impose an absolute limit.

DISASTER MEDICAL ASSISTANCE TEAM (3 PER C/S UNIT)

2	Medical officers
1	Head nurse - clinician
2	Staff nurses (RN)
4	Licensed vocational nurses
2	Surgical technicians
1	Laboratory technician
1	Pharmacy technician
3	Emergency medical technicians, basic
2	Medical records clerk
1	Pharmacy clerk
1	Supply clerk
9	Ward attendants - litter bearers
29	Team personnel

UNIT COMMAND AND SUPPORT STAFF

1	Chief medical officer
1	Nursing supervisor
1	Health administrator
1	Supply officer
1	Administrative assistant
1	Clerk
1	Supply clerk
1	Senior supply specialist
2	Equipment operators/repair men

FOOD SERVICE STAFF

1	Food service supervisor
1	Chief cook
4	Assistant cook/helper

ORGANISING A DISASTER MEDICAL UNIT

The creation of a volunteer disaster response unit is seen as a community organisational process. It requires the involvement of many participants. Some are leaders of important professional societies, hospitals and other health care institutions, or officials of local government. Many are individual health professionals who in the future will take on the leadership of the unit. Each of these participants are made aware of the program, knowledgeable about disaster medical care, and personally interested in supporting the development of a NDMS response capability. All those who participate, do it from a sense of community need, and not from any sense of personal gain.

A regional NDMS co-ordinator will usually start the process through contacts with community leaders whose institutions may sponsor teams or units. These institutional sponsors will themselves recruit leaders for team development. In a few areas, leaders of the professional community have themselves initiated the process of team development, involving the regional co-ordinator at a later time. In either case, the development and maintenance of a disaster medical response program is a group affair shared between the regional co-ordinator, community leaders, the management of sponsoring institutions, and the leaders of the medical response units in the region.

The civil emergency services community is broadly based. It is the first place to anticipate support and participation.

- In the private sector, interest in disaster medical services is concentrated in particular parts of the health services sector. Disaster medical services committees of local medical societies and hospital councils spend their major efforts in stimulating programs essentially identical to NDMS but for scale. Most larger areas have local chapters of medical specialty societies with long records of support for disaster preparedness. These include the American Academy of Orthopaedic Surgeons, the American College of Emergency Physicians, the American College of Surgeons, and the American Trauma Society. Of nursing organisations, the American Association of Critical Care Nurses and the Emergency Nurses' Association are known for interest in disaster care.

- In the public sector, NDMS is able to count on the support of local, regional, and State disaster services agencies, and on the support of disaster medical and health services officers. Also influential in local disaster services are public safety officials, including both police and fire services. About half the major metropolitan areas of the U.S. are served by emergency medical services (EMS) agencies, many of whom have regional co-ordinating networks and disaster responsibilities that parallel those of local or district health officers may be responsible for disaster medical services. Public sector emergency and disaster services personnel have many organisations of their own, notably disaster councils, emergency services associations, rescue and paramedic associations, and associations of communications officers. Where such organisations are based in the NDMS region, their support should be sought.

- In the academic community there are several sources of support. Academic medical centres frequently serve as trauma centres for the region; prominent members of their faculty may be recognised as community leaders in emergency medical care. Many such medical centres have already organised small response teams for local disasters, and are affiliated to the NDMS. Elsewhere among academic institutions, many community colleges possess emergency medical technician training programs, and their faculty are involved in support of local disaster response.

- Lastly, several voluntary agencies exist principally to serve emergency needs. Paramount among these is the American Red Cross, whose chapters span the Nation and whose support for disaster relief is its principal reason for being. In many areas other agencies, such as the Salvation Army, are also active in disaster relief and should be considered as potential supporters of NDMS.

The military reserve community is another potential source of support. The endorsement of prominent Reservists and National Guardsmen who occupy positions of influence in the civil community would be helpful. Many of these are senior members of the health care community.

These supporters are consulted early in the process of establishing NDMS response teams in a region, and their aid solicited. Early in the organisation process, their aid will help identify the form of the community emergency response network, and point out important contacts who should be educated about NDMS. Later, such supporters can be expected to assist in promotion of the program, in gaining institutional sponsors, in recruitment of capable leadership for NDMS units, and in training of unit members. Where practical, these key supporters might be asked to join in a small community-based task force to organise the program. From these interested community leaders will spring the leaders of the teams themselves. The teams that will then develop will be strongly rooted in the community's own leadership structure. They will grow in accordance with the community's own needs for disaster medical care, and they will endure because they serve their community first.

In each NDMS area a regional co-ordinating centre will be established. In many existing NDMS areas this co-ordinating centre has been established in a local military or Veterans Administration Hospital. In a number of newer areas the regional co-ordinator would be a non-Federal health facility, an emergency medical services agency, or a disaster agency. One person at this co-ordinating centre may bear the title of "NDMS Regional Co-ordinator". This would be a part-time responsibility, which is usually held by an assistant hospital administrator or emergency preparedness officer.

The responsibilities of the co-ordinator require him to advise the local health care system of the program, to enroll hospitals in the facilities element of the System, to recruit and support sponsors of teams and units for the medical response element of the System, to operate a training and exercise program, and to administer NDMS locally on activation.

In some areas, the Public Health Service has identified another individual who serves on a part-time basis as Regional Co-ordinator, Medical Response. In these areas this individual may share some of the Regional Co-ordinator's task related to response team development.

If community leaders have not themselves initiated a disaster medical response capability, the regional co-ordinator identifies existing support in the community for its development. He identifies community leaders and potential sponsors capable of organising and maintaining volunteer response units. He then educates the community in the need for organised response capability. He persuades capable institutions to undertake sponsorship of teams or units. He assists them in identifying leaders for the unit, and then takes on a supportive and encouraging role as the cadre itself begins the task of unit development.

Regardless of who initiates response team development, continuing support by the regional co-ordinator is necessary during the development of the unit and the succeeding maintenance phase. The regional co-ordinator will assist unit leaders to identify the resources needed for development of the regional manpower component, identify possible sources, and stimulate sharing of resources and training opportunities so that all units become fully capable at minimum cost to themselves and their sponsoring institutions.

- **Resources for program development.** In developing NDMS facilities, transportation, and communications plans for his area, the regional co-ordinator will become familiar with the structure of the local emergency services community, and can link leaders of response teams to community sources of aid. If indicated, the regional co-ordinator can aid in linking medical response teams to the local disaster response plan, and can aid in identifying local sources of manpower, equipment, and other support.

- **Training programs.** Resource sharing is an essential component of NDMS program maintenance. The most important resources to be shared are training opportunities. Most team sponsors will have resources for training of technical personnel and limited resources for specialised professional education. Most unit sponsors will have extensive resources for teaching specialised subjects such as advanced trauma life support. Individual sponsors, however, lack some resources essential to training of potent disaster medical assistance teams. These include resources or facilities to teach the kind of austere medical care appropriate to field disaster situations, or to exercise in conjunction with aeromedical evacuation services. The regional co-ordinator can stimulate training activities shared by all participating institutions. The regional co-ordinator can also operate a regular regional exercise program involving participating institutions with other parts of the regional emergency response community. All regional co-ordinators, whether military hospitals or civilian institutions, are expected to organise an educational program and at least one community-wide exercise annually. Co-ordinators in military hospitals may have the additional opportunity to make specialised military courses in mass casualty care available to selected leaders of NDMS response units.

Potential sponsors are considered at two levels: 29-person disaster medical assistance teams, and 103-person clearing-staging units. Most community hospitals can organise a team of 29 individuals, drawing professional and LVN staff from the hospital and emergency medical technicians from other sources in the community. Only a large medical centre or a non-hospital health agency can recruit and support an entire unit, or provide the unit-level management and support personnel that are necessary to make the unit mobile to a distant disaster. It is, therefore, natural to look to teaching hospitals and to non-hospital health agencies for the administrative nuclei and immediate-response elements of clearing-staging units, and to community hospitals for general-purpose disaster medical assistance teams.

Team sponsorship are hospitals of 250 beds or more, with a full range of general medical and surgical services. Such institutions have numerous and diverse staff capable of filling all the roles on the team, and would not be significantly impacted by temporary absence of the team in a disaster situation. Such institutions generally also possess internal educational resources sufficient to carry out most of the necessary individual training involved.

Ideal candidates for unit sponsors are of two types: those chosen for professional leadership (for example, a trauma centre), those chosen for administrative support capability (for example, a health department or a regional EMS agency).

In NDMS regions with regional emergency medical services councils or disaster councils, similar briefings are scheduled to familiarise these agencies with NDMS. If appropriate, non-hospital sponsors for NDMS teams should be sought from health agencies participating in EMS or disaster programs.

The Sponsorship Agreement provides for the development of a medical response team or unit conforming generally with NDMS guidance.

- The sponsor will agree to recruit qualified members and assist them in gaining necessary skills in disaster health care. Further, it will agree to accept equipment for the team or unit from donor sources. It will agree to participate in periodic disaster exercises. It will agree to make the team available for disaster service in local, state, or national disaster situations. The agreement provides that the sponsor will release the team and its members to the Federal government in the event of a Federal activation, with the intent that the local sponsor would thereby limit its potential liability exposure in such a situation.

- In return the NDMS agrees to provide guidance in organising and equipping the team, to provide logistic support for the team when in Federal disaster service, to appoint the team and its members to a Federal status in the event of a Federal activation, with the intent of making the team and its members Federal agents, obviating the need for licensure in all States and limiting their exposure to liability claims arising from disaster service.

Once an institution has agreed to sponsor a team or unit, it will designate a leadership cadre as soon as possible. The regional co-ordinator will then arrange a regional meeting for detailed group briefing of cadres of all teams. Local and regional disaster service agencies and public health agencies will then participate in this meeting, as they are generally responsible for co-ordinating local disaster response. At this meeting the cadres will jointly form a task force to plan regional team development, and

divide activities (particularly training of team members) between participating institutions so as to minimise workload and share resources effectively. A major institution, particularly a teaching hospital with a trauma program, will take the lead in professional training activities. Another training institution, possibly a community college, might take the lead in technical training activities, particularly for emergency medical technicians (EMTs). The local health department or disaster services agency would also assist, particularly to identify obsolescent packaged disaster hospitals from which equipment for the teams may be salvaged.

The sponsor chooses key leaders for its team or unit. These people are individuals who are knowledgeable in emergency medical services and concerned with disaster medical care. At unit level, the key individuals are:

- The Unit Medical Commander. This is usually a surgeon or emergency physician. It may be a medical administrator, but if so he would be adequately backed up by trauma physicians. His principal tasks are to lead the organisational process, and to provide medical guidance for unit operations.

- The Executive Officer. This is usually an established health administrator, one familiar with military or civilian disaster medical operations. His tasks are to set up an appropriate administrative structure for the unit, to ensure an orderly organisational process, and to ensure that the unit is made ready for service.

- The Chief Nurse. A supervising nurse, with emergency or surgical supervisory experience. Her principal tasks is to organise nursing staff for the unit and its three teams, and to ensure proper nursing care in disaster operations.

- A Training Officer. This person is not always a member of the unit; this function is usually served by a Director of Education for one of the participating institutions. His task is to organise a training program for the unit or, if appropriate, for several units in the same NDMS region, and to ensure that members of the units become skilled in disaster medical care.

At the team level, a team leader (supervising physician) and a supervising nurse-clinician are the key leaders. Addition of an enthusiastic senior paramedic or emergency medical technician will substantially add to team capability in recruitment and training of emergency medical technicians.

Once team structure has been established, the cadre undertakes a recruitment program in their institutions, they will obtain volunteers to staff the unit or its teams. The personnel mix does not have to imitate the NDMS design, so long as the unit's capabilities are preserved. In general, each personnel slot on the unit is described in terms of the minimum qualifications to do the job adequately. Recruitment of higher-qualified volunteers is encouraged. The main methods of recruitment are personal recruitment by cadre members, promotion through professional newsletters, and organisational meetings, which prove to be successful.

Training Officers are appointed to each NDMS medical assistance unit, they are usually professionally qualified individuals. Many institutions sponsoring a disaster response team employ a Director of Professional Education. In other situations the local Health Department, Disaster Council, or a voluntary agency such as the Red Cross provide emergency medical training and would appropriately serve this function. A member of the unit in some cases serves as Training Officer in addition to his/her primary function in the unit. The Training Officer has a responsibility to ascertain the training requirements of the unit at large and of its individual members, and then develops a training plan for the unit that assures that training needs are met appropriately.

For certain specialised subjects the number of participants from any single sponsoring institution is likely to be small. All sponsors in each area, however, generally share similar needs for training. Whether or not a regional or unit training co-ordinator is appointed, therefore, sponsors share special training resources, and divide responsibility for training courses or seminars among themselves.

Several example courses can be used as models for training in disaster medical services, using local experts as faculty.

- The Public Health Service designed a course to orient its managerial personnel to disaster services. This "USPHS Course in Mass Casualty Care" covers both management of disaster health services and practice of disaster care. This course consumes at least three days; four to five days allow better field practice. A "San Bernardino Disaster Medical Services Course" serves as an example of a course designed primarily to orient practitioners to deliver of disaster medical services. This course consumes only half a day.

- The California Specialised Training Institute (CSTI) has designed a one week course to train health services personnel in medical disaster management. FEMA and the American College of Emergency Physicians have designed a course to train medical practitioners in disaster medical practice skills.

- Other courses in disaster services appropriate for high-level managers are the FEMA course in Civil Emergency Management and several similar courses given at the California Specialised Training Institute. These are designed primarily for public service and public safety management personnel. Each requires a commitment of four and a half days. FEMA offers other courses in civil emergency management at the National Emergency Training Centre in Emmitsburg, Maryland. Some of its offerings are also available as home-study courses.

Team members are volunteers, and the time demands of any training needed are related to their ordinary activities. Individual training is, therefore, arranged to consume the least time practical, and is scheduled as attractively as possible to encourage attendance.

The unit commander, executive officer, supervising physicians, nurses, Training Officer, and the Supply Officer are trained in principles of medical disaster management at a higher level than other team members. A short course on mass casualty care is given.

All classes of personnel are given instruction to the rationale of the National Disaster Medical System and the Disaster Medical Assistance Team. They are aware of their duties and obligations as disaster service workers, and are familiar with the difficult circumstances under which they may be called upon to work in disaster relief.

All volunteers are familiar with the provision of medical care in austere field conditions beneficial to team performance. Opportunities for realistic training of this nature is, however, limited. Opportunities are sought for a small number of team and unit leaders to experience a military medical field training exercise or an organised course such as the Air Force Medical Red Flag course. A limited number of opportunities for such training arise through military co-ordinating hospitals.

Each class of professional personnel is competent in those special skills needed to practice his/her profession in austere field circumstances of disaster relief operations. Certain skills are critical to successful patient care. These are approached from the task analysis aspect in the team prepared Consolidated Task List; however, because of variations in licensing and community standards in different States, some tasks may be performed by different personnel classes. For instance, intravenous infusions may only be administered by physicians and nurses in some States, while emergency medical technicians may be authorised to administer them (under orders) in other States. Each unit, therefore, tries to identify critical tasks for each personnel class appropriate to the licensing and practice of the home State. This task list should then be used to evaluate and develop the capability of each team member for his/her assigned role.

Physicians. All physicians in the scheme have completed the basic requirements for certification in their State of regular practice.

To develop their emergency medical skills, lead physicians ideally undertake training equivalent to certification in Advanced Trauma Life Support (ATLS) by the American College of Surgeons. This training is normally obtained through postgraduate professional education channels, rather than through the NDMS training program. Most individuals certified or eligible for certification by the American Board of Emergency Medicine or the American Board of Surgery are considered to have adequate skills in this area, whether or not they hold the certificate.

The National Disaster Medical System, how can we utilise the scheme in the United Kingdom.

In times of scarce finance equated against the probability of a major disaster occurring within the UK, it is perhaps difficult to see the need for a national response to a major disaster on an initial assessment.

It would seem that the UK only act after a major disaster occurs, but timely global reminders such as, India - Bhopal, Mexico City, Italy - Seveso, Russia - Chernobyll, USA - Three Mile Island, and many others, the question that must be asked is how did the emergency services respond? It is true in disasters like Flixborough, Moorgate, and the Manchester Air Crash that the emergency services responded magnificently but what would have happened if the Tennerieffe disaster had occurred at somewhere like the East Midlands or Manchester Airports. The most serious question that has to be asked what happens when the incident goes beyond the resources of a district or even a region or two regions. There are many plausible scenarios in the UK where the potential for a disaster of thousands of casualties and dead could occur. Based upon health service response to a mega disaster.

National Disaster Medical System UK

(1) Placing the administration for such a system could either be placed centrally with the DHSS or placed with a Regional Health Authority as a lead authority, from a financial aspect the latter of the two suggestions would for practical and theoretical purposes be more advantageous.

(2) The lead authority would have a responsibility for identifying and utilising existing resources within the National Health Service, both manpower and equipment (information via the Health Emergency Planning Officer), and therein producing a call out and resources register, on a twenty four hour seven days a week national basis.

(3) Initially each region would be required to nominate a pre-agreed amount of beds to the system, a national target figure of fifteen thousand (approximately 1100 beds per region) would seem a suitable ratio to the UK population head.

(4) The criteria for the bed commitment would also require the aligned services of the appropriate medical staff to support the nominated beds. Further to this experts with the skill and knowledge of field surgery, amputation, and triage would be required to be added to the resource of each region.

(5) Transportation in the UK, in most disasters, could be met by the ambulance service, but there would be occasions where the use of aircraft to disperse casualties from a disaster area or the flying in of medical teams may be required. Other consideration should be given to identifying agreements and contracts with helicopter company's and the military for use in areas where the road and rail network has been lost. Most airports in the UK are served by both road and rail and this in time of a major disaster could be utilised as Casualty Clearing Heads. The mention of helicopters and use of aircraft is often frowned upon as an unnecessary luxury in British Emergency Planning, but when time is of the essence, this outdated view must be dispelled, and a far more professional outlook must be given to the use of such craft. Formalising a policy could be undertaken in conjunction with the Department of Transport and the DHSS.

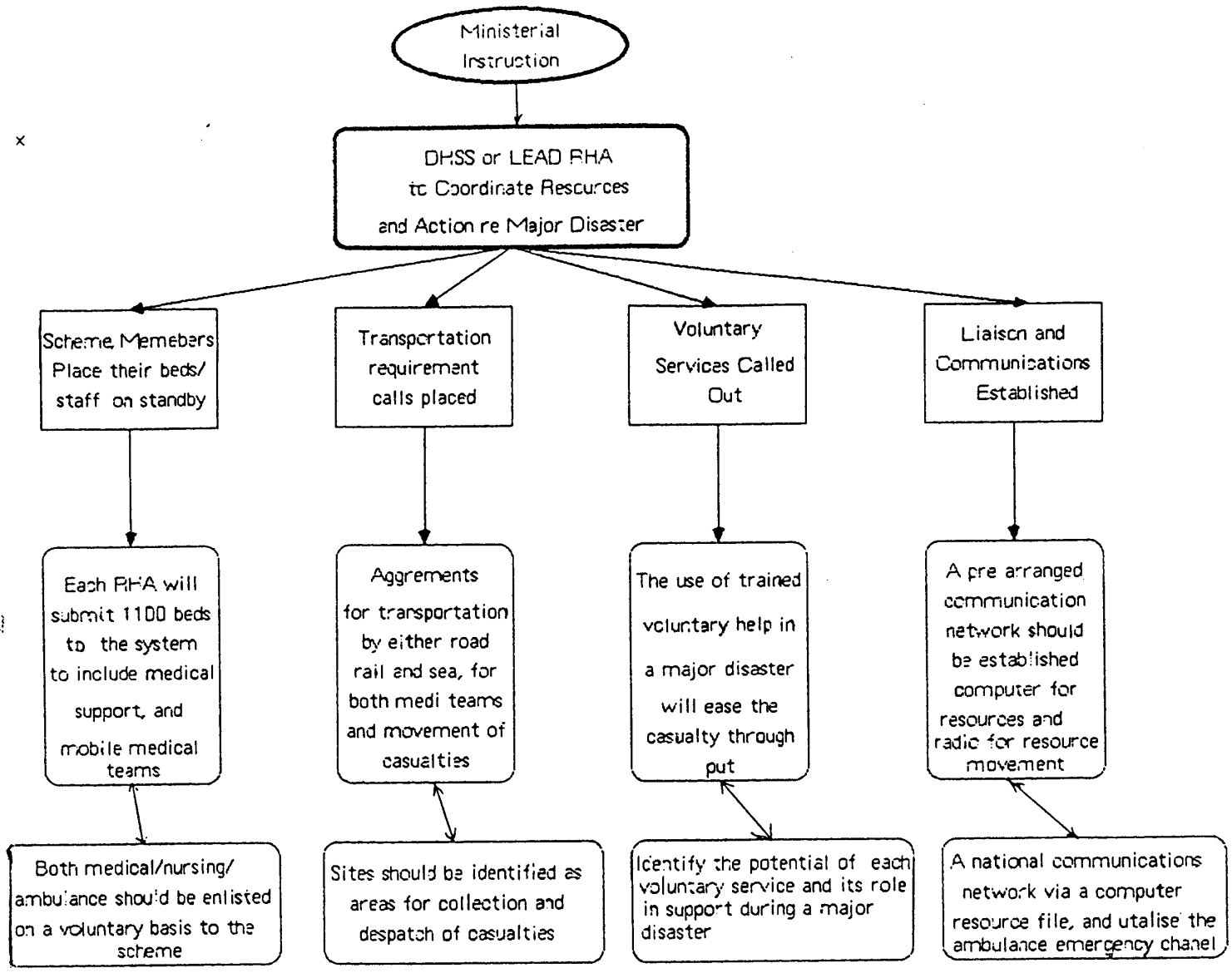
(6) Ambulance crews to be upgraded and trained to a paramedic level, this action would assist greatly with the medical presence at the scene of a major disaster and would further enhance the triage of casualties. This in turn would supplement the limited numbers of mobile medical teams. It would be advantageous to train further doctors, nurses and ambulance personnel in air ambulance training, a technique which is mainly found within private companies.

(7) The whole concept of the NDM scheme is not to disrupt the everyday workings of the NHS but to identify the resource and develop a flexible co-ordinated response to a given major disaster. Upon ministerial instruction the scheme could be brought into action by the lead RHA. The following models will give an indication as to the implementation of the scheme.

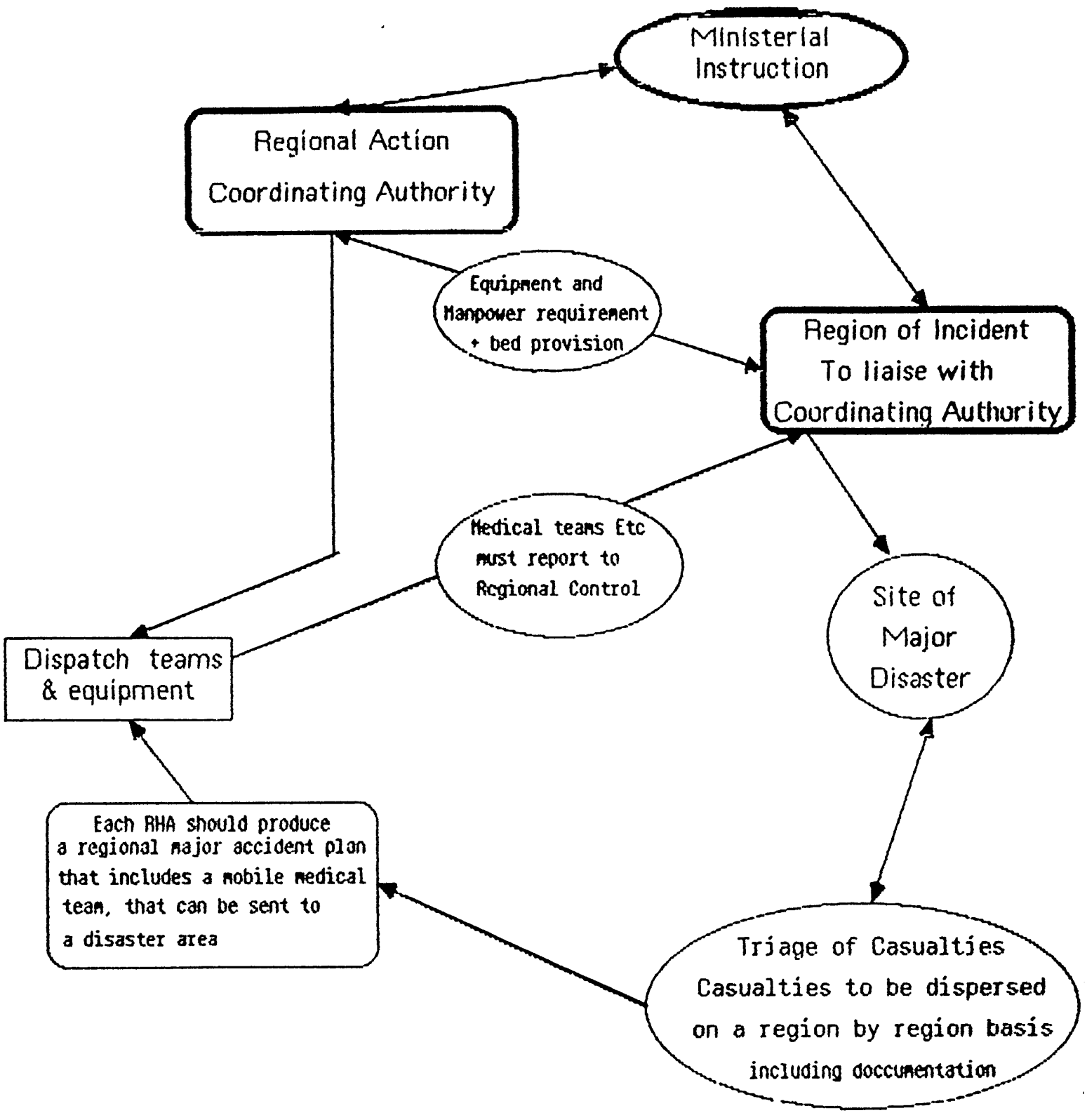
(8) See model 8.

(9) See model 9.

(10) In relation to the format of mobile medical teams, casualty clearing centres receiving hospitals and administration the outlined US scheme would be the main guidance and specification for the development of the UK scheme.


Ministerial Instruction
DHSS or LEAD RHA to Coordinate Resources and Action re Major Disaster
Scheme Memebers Place their beds/ staff on standby
Transportation requirement calls placed
Voluntary Services Called Out
Liaison and Communications Established
Each RHA will submit 1100 beds to the system to include medical support, and mobile medical teams
Aggrements for transportation by either road rail and sea, for both medi teams and movement of casualties
The use of trained voluntary help in a major disaster will ease the casualty through put
A pre arranged communication network should be established computer for resources and radio for resource movement
Both medical/nursing/ ambulance should be enlisted on a voluntary basis to the scheme
Sites should be identified as areas for collection and despatch of casualties
Identify the potential of each voluntary service and its role in support during a major disaster
A national communications network via a computer resource file, and utalise the ambulance emergency chanel

MODEL 8



MODEL 9