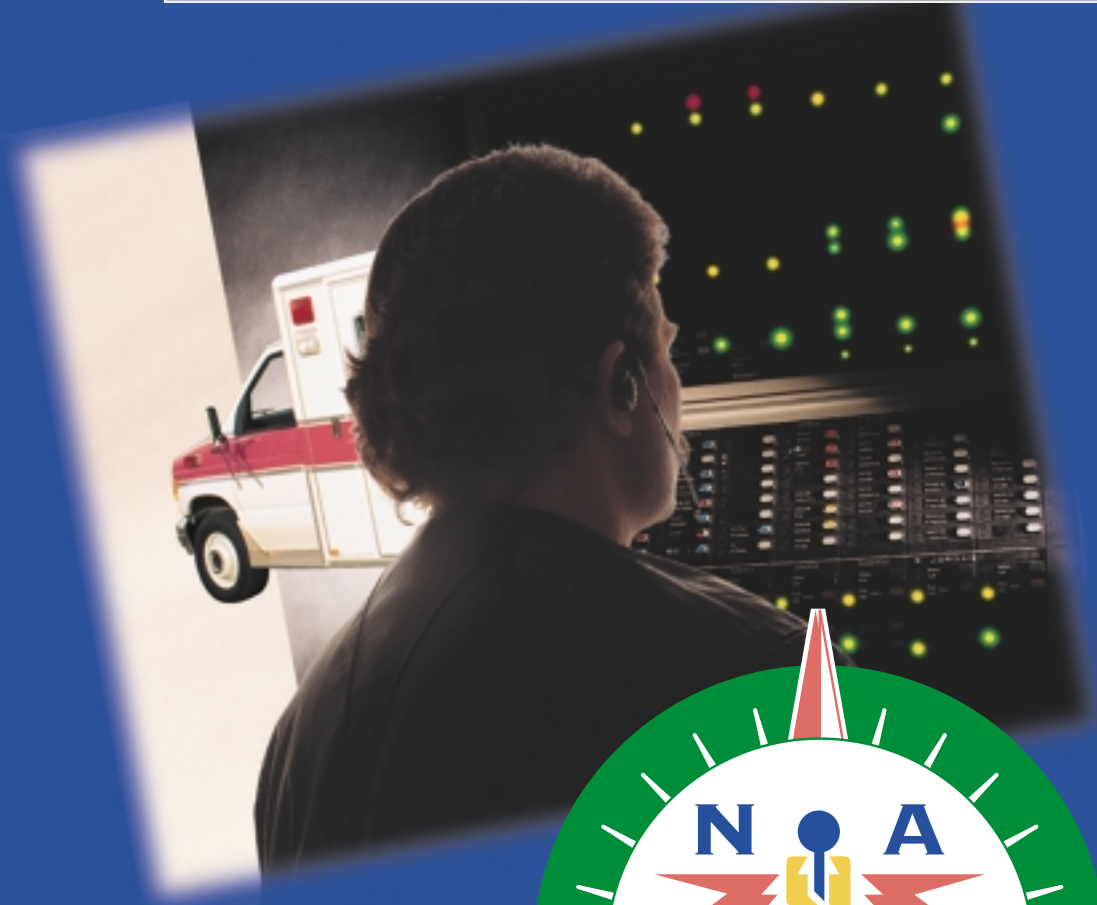


DETERMINANT CODES Versus

RESPONSE

Understanding How It Is Done



exerpts from:

The Principles of Emergency Medical Dispatch
Third Edition (v11.1)

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National Academy of Emergency Medical Dispatch

Library of Congress Catalogue Number: 00-133298

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PRINTER: *Liberty Press*

PUBLISHER: *Priority Press*

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5,857,966; 5,989,187; 6,004,266; 6,010,451;
6,053,864; 6,076,065; 6,078,894; 6,106,459

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Printed in the United States of America

10 9 8 7 6 5 4 3 2

ISBN: 0-9658890-2-5

010323

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*Everything should be as **Simple** as possible, but not simpler.*

—Albert Einstein

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Dispatch Determinant Theory. Once the EMD determines the level of concern using the answers to key questions and the additional information, the proper dispatch determinant can be selected. There are six dispatch determinant categories:

- E = ECHO-level
- D = DELTA-level
- C = CHARLIE-level
- B = BRAVO-level
- A = ALPHA-level
- Ω = OMEGA-level

A vital principle is that the names—ECHO, DELTA, CHARLIE, BRAVO, ALPHA, and OMEGA—of the dispatch determinant levels do not change. EMS systems implementing priority dispatch must understand that the system can design responses to each determinant as best fits their needs (see Response Theory and Local Development in this chapter). Each EMS system must decide which resources the six levels best require. For example, ALPHA-level may mean basic life support COLD and DELTA-level mean advanced life support HOT.

The E-D-C-B-A-Ω determinant levels are vital for meaningful data collection and quality assurance. The ability to gather meaningful statistical data with this standard coding system allows performance comparisons between cities, regions, and even countries. In this sense, priority dispatch is the first EMS data

collec-tion system with more than a local meaning—it has an inter-national scope. The capacity to participate in a broad-spectrum priority dispatch

database using this system is useful in an era where procedures, outcomes, and, more recently, payments for emergency services are increasingly scrutinized.

Use of the statistics generated through use of the dispatch determinant codes can demonstrate accurately what types and severity of calls an EMS system has spent its resources handling. For example, there is a perception within EMS that about 5 to 10 percent of calls are of a life-threatening nature, but no one really knows if this is accurate. Priority dispatch allows for evaluation and

verification that the system is being used appropriately and effectively.¹⁶⁶

Dispatch determinants do not indicate the sever-ity of a situation. That is, the E-D-C-B-A-Ω levels are not related in a linear sense of becoming progressively worse. Rather, they have to do with how many responders will go and (when there are tiers of capa-bility), which levels of expertise are needed, and how rapidly they are needed. The system operates as a two-dimensional, non-linear matrix (see figure 3-14).

The vertical axis on the grid relates to response time. Could responders travel COLD, or are they needed HOT? The horizontal axis relates to rescuer ability. Could basic life support providers handle this or are advanced life support providers needed?

Priority dispatch promotes the concept of using the most appropriate resources.

Priority dispatch has replaced the traditional “more is better” concept. When a crew’s training and manpower is matched to a particular situation, that crew can more efficiently handle it. For example, basic-level EMTs are experts at splinting, bandaging, and other basic skills. There is no reason they cannot be trusted to handle basic-level situations, freeing advanced life support providers (who are invariably fewer in number) for advanced-level situations.

The ability to gather meaningful statistical data with this standard coding system allows performance comparisons between cities, regions, and even countries.

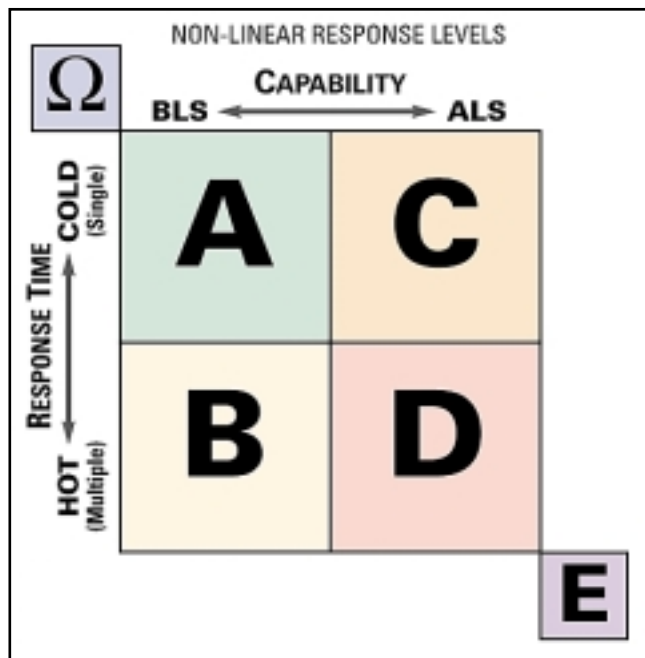


Fig. 3-14. Non-Linear Response Level Theory. The MPDS, v11.1 protocols. ©1978-2001 MPC.

In a study of the Long Beach, California system published in the *Journal of Prehospital and Disaster Medicine* in 1992, Stratton, et al., concluded:

*Emergency Medical Dispatchers, medically controlled and trained in a nationally recognized dispatcher triage system, were able to provide medical triage to incoming emergency medical 9-1-1 calls with minimal error for under-triage of ALS runs and high selectivity for non-emergency situations.*³⁴

Understanding Determinant Terminology

First-time users of priority dispatch are sometimes confused by the terminology, especially in the determinant response section of the protocol where terms such as “determinant,” “determinant code,” “determinant level,” “response code” and “response mode” sound so similar. The following discussion will help take the mystery out of the determinant response section of the protocol.

Determinant Coding Components. First, consider the E,D,C,B,A (and in some instances Ω) classifications. These letters correspond to the determinant levels ECHO, DELTA, CHARLIE, BRAVO, ALPHA, and OMEGA as discussed earlier in this book. Within each determinant level there can be a number of determinant descriptors, listed roughly in order of decreasing significance. The determinant descriptors within a determinant level have

a medical relationship to each other, which suggests a similarity of response. Put the two together (dispatch level and determinant number) with the protocol number (e.g., 12) and the Determinant Code is the result. For example, after inter-rogating the caller on protocol 12, the EMD determines that the most appropriate classification is the “continuous or multiple seizures” determinants. This is the first (and in some instances the most critical) of the determinants listed in the DELTA-level, and results in a “12-D-2” Determinant Code (see figure 3-15).

Response Assignment Components. Next comes the Response Assignment, which is where the dispatching agency determines what resources should be assigned, whether mobile or referral, and their mode of travel to the scene. Each agency, through its Medical Control and EMS administration, establishes which Response Assignment best fits each Determinant Code as most appropriate—given the agency’s available resources, geography, and political mandates prior to using priority dispatch on-line.

The Response Level is the *type* of responders—specifically, their training or certification level (advanced life support versus basic life support in North America; Paramedics versus Qualified Ambulance Officers in Australasia; or Paramedics versus Ambulance Officers in the United Kingdom).

LEVELS	#	DETERMINANT DESCRIPTORS	CODES	RESPONSES
D	1	Not breathing (after Key Questioning)	12-D-1	
	2	CONTINUOUS or MULTIPLE seizures	12-D-2	
	3	Irregular breathing	12-D-3	
	4	Breathing regularly not verified ≥ 35	12-D-4	

Fig. 3-15. The MPDS, v11.1 protocols. ©1978-2001 MPC.

Determinant Coding Components					
Protocol Number	Determinant Level	Determinant Number	Determinant Descriptor	=	Determinant Code
12	D	2	CONTINUOUS or MULTIPLE seizures	=	12-D-2*

*Note: Several protocols contain additional code-type differentiator letters at the end of the full code called suffixes (see figure 3-22).

Fig. 3-16. Determinant coding components diagram.

Response Assignment Components			
Response Level	Mode	=	Response Assignment
Advanced Life Support (Amb)	HOT	=	ALS Amb HOT

Fig. 3-17. Response assignment components diagram.

Finally, comes the Response Mode, which is what the dispatching agency determines the urgency of response travel to the scene to be. This is done by designating a HOT (lights-and-siren) or COLD (routine) response. Remember, of course, that the EMD always has the option to override the recommended Response Assignment and send a higher level of response if circumstances warrant it. Sending a lower response is not allowed unless patient symptoms or situations are determined to have subsequently improved.

Defining Response Assignments is the responsibility of each agency's Medical Director, Medical Dispatch Review Committee, and Steering Committee. Using the 12-D-1 Determinant Code as an example, the Medical and Dispatch Oversight Committees may decide that an advanced life support unit responding with lights-and-siren is typically the most appropriate response.

The Response Assignment (an advanced life support unit) may be shown as "Amb" and the Response Mode as "HOT," thus generating the Response Code of "ALS Amb HOT" (see figure 3-17).

Priority dispatch has two very important coding systems. The first, the Determinant Codes, are determined and maintained by the Academy's College of Fellows, according to current medical practices, user feedback, and on-going evaluation. The second, the Response Assignment is determined and maintained by each agency according to its available resources, user feedback and on-going evaluation. In a properly established priority dispatch environment, the code and response areas of the system work together to ensure that EMDs choose the most appropriate clinical determinant and assign the most appropriate responses. Figure 3-18 is an example of one particular system's baseline response assignments to each level (but not necessarily to each Chief Complaint). This would be this system's starting point for developing responses to match the codes.

Avoiding Response Code Confusion

The Academy has received requests asking for clarification of how to assign priority dispatch determinant response codes; or more specifically, how to properly assign system resources to the determinants. Typically, an agency requests to make changes in the determinant section of the protocols in an effort to match them to local field responses.

Frustration results when EMDs or their managers confuse the determinant *codes* with unit *response*

assignments. Each determinant code is just that—a code. These clinical codes have no response value as such. In essence, these codes are the dispatch equivalent to a type of medical coding system called diagnosis-related groups (DRGs) used by most hospitals and clinics to bill patients. While these groups are universal (like priority dispatch codes worldwide)

These baseline response assignments are, in essence, the most commonly used response modes for each level.

the specific amount billed for each code by one hospital may differ from that billed by another (just like different agencies may respond differently to the same determinant code). It is unnecessary to change or move the determinants in either case, as they only represent the medical (clinical) classification determined by the system, and not a response assignment per se. Changing determinant code numbers or positions is not allowed by the Academy. Changing responses to them is.

In the case of priority dispatch, each locality's responses are always selected by their responder agency, approved by the agency's medical director, and then listed in the Responses-Modes section. On the printed protocols these are located to the right of the determinants

Baseline Response Example		
All actual response assignments are decided by local Medical Control and EMS Administration		
Level	Response	Mode
ECHO	Closest Apparatus—Any (includes Truck Companies, HAZMAT, or on-air staff)	HOT
DELTA	Closest BLS Engine Paramedic Ambulance	HOT HOT
CHARLIE	Paramedic Ambulance	COLD
BRAVO	Closest BLS Engine BLS Ambulance (alone HOT if closest)	HOT COLD
ALPHA	BLS Ambulance	COLD
OMEGA	Referral or Alternate Care	

*Note: This is not to be considered the Academy's official recommendation for Baseline Responses.

Fig. 3-18. Example of one system's baseline response choices for each level. The MPDS, v11.1 protocols. ©1978-2001 MPC.

LEVELS	#	DETERMINANT DESCRIPTORS	CODES	RESPONSES	MODES
D	1	Unconscious or Arrest	3-D-1	Priority 1	
	2	Not alert	3-D-2	Priority 1	
	3	DANGEROUS body area	3-D-3	Priority 1	
	4	Large animal	3-D-4	Priority 1	
	5	EXOTIC animal	3-D-5	Priority 2	←
	6	ATTACK or multiple animals	3-D-6	Priority 1	
B	1	POSSIBLY DANGEROUS body area	3-B-1	Priority 2	
	2	SERIOUS hemorrhage	3-B-2	Priority 2	
	3	Unknown status (3 rd party caller)	3-B-3	Priority 2	
A	1	NOT DANGEROUS body area	3-A-1	Priority 3	
	2	NON-RECENT injuries (≥ 6hrs)	3-A-2	Priority 3	
	3	SUPERFICIAL bites	3-A-3	Priority 3	

Fig. 3-19. Example of an intra-level locally chosen response variation. The MPDS, v11.1 protocols. ©1978-2001 MPC.

LEVELS	#	DETERMINANT DESCRIPTORS	CODES	RESPONSES	MODES	
E	1	INEFFECTIVE BREATHING * (to be selected from Case Entry only)	6-E-1	Closest Staff (any) Paramedic	HOT HOT	
	D	1	SEVERE RESPIRATORY DISTRESS	6-D-1	Closest BLS/Paramedic	HOT
		2	Not alert	6-D-2	Closest BLS HOT/Paramedic	COLD
3		Clammy	6-D-3	Closest BLS/Paramedic	HOT	
C	1	Abnormal breathing	6-C-1	Closest BLS/Paramedic	HOT	
	2	Cardiac history	6-C-2	Paramedic	COLD	

Fig. 3-20. Sample of response assignments. The MPDS, v11.1 protocols. ©1978-2001 MPC.

! Authors' Note

Version 11.0 contains the results of over 400 submitted proposals for change recommendations, as well as a roughly equivalent number of Academy-initiated changes.

(numerals). It is not necessary to assign the same response (or approved referral for OMEGA) to all determinants within a determinant level (ECHO, DELTA, CHARLIE, BRAVO, ALPHA, or OMEGA).

By virtue of their medical relationship to one another, determinants are grouped into one of the six levels. On a local response basis however, it is not necessary to adhere to this grouping concept by assigning the same response to all determinants within a given level.

For example, if an agency wishes to assign a response group to the “EXOTIC animal” determinant (3-D-5)” that is different from the baseline response group assigned to the five remaining DELTA determinant codes,

they should not attempt to move the determinant text to another level, rather they should assign the desired response assignment to that code where it lies (see figure 3-19).

The Academy recommends initially assigning a baseline response to each different determinant level—ECHO DELTA, CHARLIE, BRAVO, ALPHA, and OMEGA. ECHO responses, as discussed earlier, may involve different resources on different protocols (refer to fig. 3-18).

These baseline response assignments are, in essence, the most commonly used response modes for each level. They represent the four basic responses for each determinant level and are initially agreed to independent of any chief complaint. This forms a common starting point from which to specifically examine if each chief complaint's individual determinant codes can be appropriately handled by the baseline response type.

With these initial baseline responses in mind, each protocol should then be carefully reviewed by local medical control, with special attention given

LEVELS	#	DETERMINANT DESCRIPTORS	Correct		Incorrect
			CODES	RESPONSES	MODES
D	1	Not alert	1-D-1	Zulu HOT	Delta HOT
C	1	Fainting or near fainting ≥ 50	1-C-1	Yankee COLD	Charlie COLD
	2	Females with fainting or near fainting 12-50	1-C-2	Yankee COLD	Charlie COLD
	3	Males with pain above navel ≥ 35	1-C-3	Zulu HOT	Delta HOT
	4	Females with pain above navel ≥ 45	1-C-4	Yankee COLD	Charlie HOT
A	1	Abdominal pain	1-A-1	X-ray COLD	Alpha COLD

Fig. 3-21. Sample of “correct” vs. “confusing” response assignment localizations. The MPDS, v11.1 protocols. ©1978-2002 MPC.

to any determinant code whose optimal response type (from the agency’s perspective) doesn’t exactly fit the baseline response for that level. Such special resource assignments are therefore *exceptions* to the base-line. From a legal stand point, it is essential to document the rationale for why each exception to the baseline response was preferred. This documentation then becomes the agency’s self-defined standard of practice for responding.

Each agency, therefore, may define specific responses for any one of the 296 separate determinant codes that

are found in priority dispatch. Theoretically, it is conceivable that an agency could have up to 296 different response assignments in a

single protocol set, although the average agency appears to only use approximately three. For example, the CHARLIE-level determinants on protocol 10: Chest Pain could appear as shown (see figure 3-20).

Additional confusion may occur if an EMS agency uses the same names or letters for their response groups that are used within the protocol for its codes—e.g., ALPHA, BRAVO, CHARLIE, DELTA, or ECHO. When this is the case, baseline excep-tions to response assignments can be extremely confusing (i.e., “send a BRAVO response for an ALPHA determinant code”). The Academy recommends that agencies choose response group terms such as numerals, proper names, or unused letters of the phonetic alphabet such as X-RAY, YANKEE, and ZULU to avoid this inevitable confusion (see figure 3-21).

In accordance with the Academy’s scientific process, individual users are not to make changes to, or deletions from, the Academy-approved protocols. Such revisions are properly implemented only through the Academy’s College of Fellows and may be requested by a user submitting a formal “Proposal for Change” form (see Appendix A) with appropriate rationale, case studies, data, or research to the Academy as outlined in the appendix of each EMD Course Manual and this book.

Certain protocols (4, 6, 15, 23, and 27) also have determinant code **suffixes**. These suffixes are used to aid in the computerized relay of specific sub-types within a chief complaint to CAD systems which need to identify these differences for add-on responses such as scene security by police in violent situations. For example, it is important to differentiate a stabbing situation from a shooting for responder safety reasons. Safe distance for knives is obviously different than for guns. You can shoot a gun a lot farther than you can throw a knife. A 27-D-3s (stab) versus a 27-D-3g (gunshot) makes this distinction possible to relay electronically (see figure 3.22).

LEVELS	#	DETERMINANT DESCRIPTORS
D	1	Unconscious or Arrest
	2	Not alert
	3	CENTRAL wounds
	4	Multiple wounds
	5	Multiple victims
B	1	NON-RECENT (≥ 6hrs) single CENTRAL wound
	2	Known single PERIPHERAL wound
	3	SERIOUS hemorrhage
	4	Unknown status (3 rd party caller)
A	1	NON-RECENT (≥ 6hrs) PERIPHERAL wounds

Fig. 3-22. The MPDS, v11.1 protocols. ©1978-2001 MPC.

Well-delineated determinants allow for even more accurate information. For example, note that the CHARLIE-level determinants for protocol 12: Convulsions/ Seizures, are numbered one through three (see figure 3-23).

LEVELS	#	DETERMINANT DESCRIPTORS
D	1	Not breathing (after Key Questioning)
	2	CONTINUOUS or MULTIPLE seizures
	3	Irregular breathing
	4	Breathing regularly not verified ≥ 35
C	1	Pregnancy
	2	Diabetic
	3	Cardiac history
B	1	Breathing regularly not verified < 35
A	1	Not seizing now and breathing regularly (verified)

Fig. 3-23. The MPDS, v11.1 protocols. ©1978-2001 MPC.

There are various benefits to knowing which of the conditions (pregnancy, diabetes, or cardiac history) was present during a convulsion or seizure. For example, a 12-C-3 determinant means the caller reported a person with a cardiac history who was having a seizure. Field crews receive more accurate information. The patient theoretically receives the benefit of helpers carrying the correct equipment. The data collected is more useful. And the quality improvement manager has better information.

Response Theory and Local Development. At a certain point during initial priority dispatch implementation, a committee including medical directors, field personnel, managers, and administrators faces the task of defining the response assignments to each protocol. The goal of response configuration is to match local EMS capability with the dispatch determinant codes on each protocol. It does not change the protocol; rather, it allows for each community to choose what resources to send for each of the determinant levels—ECHO, DELTA, CHARLIE, BRAVO, ALPHA, or OMEGA.

The political element of establishing localized responses for the dispatch determinants is probably the biggest hurdle an EMS system faces when implementing priority dispatch. Different EMS services within a region (each possibly a bit protective of its territory), different hospital base stations, and different medical directors, may initially complain to priority dispatch advocates that “this concept may work elsewhere, but won’t work here.”

The more relevant point is to look at what these somewhat diverse entities have in common: a desire to serve the public, and a commitment to emergency patients, and the safety of responding crews. They must eventually sit together and objectively assess the purpose and structure of priority dispatch. Implementation may be an initial challenge, but it has been accomplished successfully in the full range of EMS system designs and community sizes around the world.

! Authors’ Note

So-called American “ingenuity” in this regard has at times been a detriment to system design by creating regionally fragmented response methodologies. The “commonly organized” U.K. system, by design, has limited their response chaos. However, the fear of “prioritization” which conjures up visions of patient care “rationing” as it is referred to in the U.K. has briefly delayed the movement nationally from a time-based response standard (ORCON) to a more useful clinical one.

Not every EMS system is like the example shown. Currently the diversity of response capability from system to system is amazing. But each EMS system, with its unique characteristics, can maximize the efficiency of their response with correct use of priority dispatch.

Not usually understood, nearly every volunteer service can benefit from priority dispatch because it is no longer necessary for every available volunteer to respond on every call. Volunteer time and talent can thus be used more appropriately. Busy volunteer systems might configure their responses as shown here:

- ECHO:** Police HOT on-call
EMTs HOT
Back-up crew HOT
- DELTA:** On-call EMTs HOT
Backup crew HOT
- CHARLIE:** On-call EMTs HOT
Backup crew COLD (for extra man power if needed)
- BRAVO:** On-call EMTs HOT
Backup crew stand-by at home
- ALPHA:** On-call EMTs COLD

An Example of Response Configuration—How One System Does It.

Take, for example, a not so mythical EMS system where a private ambulance company provides basic life support-level transport services for a fire department-based EMS system. Each fire station has EMT-level first responders. Advanced life support is provided by firefighter/paramedics at a few of the strategically placed fire stations. Since the ambulance always responds, there are five tiers available to the system and six response-group options. With this sort of configuration, the response section next to the determinants truly demonstrates the user-defined flexibility of priority dispatch.

ECHO-level

Closest apparatus of any kind HOT, ALS responders HOT.

Local rationale: The correct use of ECHO now allows this system to implement reasonable use of non-standard EMS responders such as truck companies, the HAZMAT unit, and other approved on-air staff to immediately aid patients who are literally dying right now. ECHO-initiated crews must be at minimum BLS trained and understand scene safety entry procedures. For 9-E-1 patients, several police units that now carry AEDs are dispatched as "first in."

DELTA-level

Maximal response (both basic and advanced life support providers).

Local rationale: While advanced life support providers would always go HOT, the basic life support transport unit may respond HOT to cases of critical trauma where rapid transport is essential, or they may respond COLD when a medical cardiac arrest patient will be worked for 20 to 30 minutes at the scene. There will always be situations that warrant having every appropriate responder travel HOT to the scene.

CHARLIE-level

Closest advanced life support unit COLD (occasionally HOT), basic life support transport COLD.

Local rationale: Facets of the caller's interview have identified a need for the expertise, judgment, and skills of advanced life support providers. Also, the need for patient transport is likely, so basic life support transport is dispatched COLD, since advanced life support crews will take a few minutes to evaluate and treat the patient at the scene.

BRAVO-level

Closest basic life support unit HOT (occasionally COLD).

Local rationale: Something about the situation merits a rapid response, but the entire system does not need to be mobilized. Since there are inevitably more basic life support providers than advanced life support, they are usually not only closer, but also more available. Depending what the "first-in" crew finds, BRAVO-level calls may result in occasionally discovering a patient who needs advanced life support evaluation or care, and they can request an such a response while providing on-scene basic life support.

ALPHA-level

Closest basic life support transport unit COLD.

Local rationale: Basic EMTs are educated to handle anything that appears in this category. Since the transport company has EMTs driving their ambulances, the fire department does not need to respond at all, leaving that resource available in case of other emergencies. The Salt Lake City Fire Department decreased the need for its EMS fire apparatus at 33 percent of its calls in the first year of full implementation. The private ambulance company handling basic life support (fortunately under the same medical control as the fire department), was able to handle the majority of ALPHA-level calls without any compromise to patients.

OMEGA-level

Special referral and special response as approved.


Local rationale: This system's high compliance to protocol assures that patient situations identified as OMEGA can be safely and more effectively handled by non-traditional response means. An appropriate joint policy with the regional Poison Control Center allows caller transfer for in-depth evaluation and handling of certain types of asymptomatic poisoning and ingestion cases. Carefully evaluated EXPECTED deaths are more correctly and tactfully handled without EMS responders. Customer service to callers in need of physical help for people who are uninjured but have fallen or need aid returning to their usual resting place can be aided by various crews sent non-urgently under their PUBLIC ASSIST assignment program. This system is seeking Accredited Center of Excellence designation so that it can implement the full 21 OMEGA protocol determinant levels in the near future, many safely handled in conjunction with an established nurse advice line service. 

Fig. 3-24. One example of an individual system's response configuration thinking.

Priority dispatch responses can also be configured for rural BLS services. In some cases, there are so few calls per year that everyone is more than willing to drop everything to respond. The main issue is whether they should drive HOT or COLD.

For this example, let us also say this group has distant ALS backup, such as a helicopter:

- ECHO:** Police HOT on-call
EMTs HOT
Back-up crew HOT
- DELTA:** Everyone HOT
Helicopter dispatched
- CHARLIE:** EMTs HOT in EMS unit
EMT COLD with personal vehicle
Helicopter on stand by
- BRAVO:** EMTs HOT in EMS unit
EMT COLD with personal vehicle
- ALPHA:** EMTs COLD in EMS unit

Knowing that priority dispatch is being used to determine an ECHO- or DELTA-level situation would increase the flight services comfort-level with an “early” dispatch command.

There are five rules for system planners to remember when assigning field responses to the dispatch determinant codes.²⁴

1. Will time make a difference in the final outcome?

In other words, is the patient’s problem one of the few true time/life priorities requiring the fastest possible response time, with a goal of less than five minutes? Most systems identify the most time critical calls as cardiac or respiratory arrest, airway problems (including choking), unconsciousness, severe trauma or hypovolemia, and true obstetrical emergencies. The early identification of these chief complaints means a maximum response is sent. For the majority of other problems planners need to carefully consider using a less than all-out response.

For example, situations that tend to generate a misdirected sense of urgency (in both the EMD and in field personnel) are those involving “dispatcher hysteria.” One classic case is abdominal pain. Unexplained abdominal pain is frightening, yet true abdominal pain, except in rare instances, is not a prehospital medical emergency. The great majority of patients with abdominal pain face a lengthy workup in the emergency department.

! Authors’ Note

The State of Pennsylvania has currently before it proposed EMS rules for the use of lights-and-siren. Pending official approval, their draft 4 includes:

Operators of EMS vehicles have the privilege of using emergency warning lights-and-siren to decrease their response times to life-threatening or potentially life-threatening conditions. Operating emergency vehicles with lights-and-siren has potential for emergency medical vehicle crashes which would not have occurred during non-lights-and-siren responses. Studies have shown that the use of lights-and-siren may only decrease transport time by a couple minutes in most systems and by less than one minute in many systems. Every decision to use lights-and-siren must be based upon the patient’s clinical condition, the estimated time saved by a lights-and-siren response/transport, and the increased risk of an emergency medical vehicle collision during such response/transport.

Lights-and-siren may only be used when responding to or transporting a patient with a life-threatening or potentially life-threatening condition.

Dispatch centers and EMS regions are encouraged to have medically approved EMD protocols that differentiate emergency (for example, emergency, code 3, red, CHARLIE, etc...) responses from a lesser level of response (for example, urgent, code 2, yellow, ALPHA, etc...) based upon medical questions performed by the dispatcher.

Each licensed EMS service must assure that every EMS vehicle driver reads and signs a copy of this policy. This applies to all advanced life support, basic life support, and quick response service units.

Through careful use of the key questions, the EMD can determine whether a person is within the parameters of those rare situations that might

be time-critical. To have an ambulance crew, or worse yet, a full-tiered response, running HOT to any but those rare cases is unnecessary and hazardous (see Authors' Note).

2. **How much time leeway is there for this problem?** That is, what range of time is appropriate for the problem? In medicine, this ranges from seconds to minutes to hours to days. The trained EMD knows that time can make a difference in life-threatening situations, so there is little time leeway; emergency crews must arrive at the scene as quickly as possible. However, the majority of calls lie in a range from those warranting prompt (but not breakneck) responses to those where there is significant time leeway for minor problems.
3. **How much time can be saved by responding HOT?** Accurate information about HOT vs. COLD response times is uncommon but increasing.^{36, 37} Response times from time of call to patient contact (vs. pulling up at the address) have not been well-reported. Typical local traffic patterns, time of day, how fast local ambulances actually roll, typical roadway conditions such as stoplights, roads that demand frequent deceleration or acceleration, and local speed limit laws for emergency units should be some of the committee's concerns. If an EMS unit has to respond a mile or two, are the very few seconds saved running HOT worth the disruption to traffic and pedestrians, not to mention the safety of the motoring public and prehospital crew?

New studies published regarding whether time is actually saved running HOT reflect clinically minimal time differences between responding HOT and COLD—yet the relative safety of a COLD response is well-demonstrated and also medically appropriate (see figure 3-25).^{25, 36, 38}

The collective perception of lights-and-siren is that their use indicates a real emergency situation. The

principles of priority dispatch have resulted in a redefining of emergency. Reducing the use of lights-and-siren is, in itself, a concept that can save lives.^{11, 38} When a person's life clearly depends on quick action and rapid motion, lights-and-siren is an important tool. However, there are many times when a situation that appears urgent in the field will not be helped by the use of lights-and-siren. The time saved using them (either going to the patient or to the hospital) is long gone before the patient benefits from definitive care. An ever-increasing number of public safety agencies are adopting a more responsible approach in limiting lights-and-siren use to potentially critical emergencies.

4. **What time constraints are present in the system?** Each system design has its limitations. In some areas, the crews are all-volunteer, and it routinely takes 10 minutes or more to get to the ambulance shed. There is a greater inherent time constraint there than a setup in which prehospital personnel await calls from inside an ambulance stationed on a street corner when the posting selection is done through use of a well-designed system status plan fluidly redeploying available units based on call-frequency predictive analysis.⁴⁰ Their departure is immediate and their arrival significantly shortened overall.
5. **When the patient gets to the hospital, will the time saved using lights-and-siren be significant compared to the time spent awaiting care?** This is the most ignored rule. When the critical needs of the patient do warrant the fastest possible response time to the hospital, proper advance notification of the emergency department staff results in immediate, continuing definitive care after arrival.

However, except for the most critical cases, patients do a great deal of waiting. Each usually first sees the ward clerk (who has to generate paperwork), and the health aide (who dresses the patient in proper emergency department attire). Only then might a nurse or a doctor enter the room. Non-critically ill

Tualatin Rural Fire Protection District Priority Dispatch Implementation Study				
Period	Before Implementation		After Implementation	
Cases	905		1057	
Lights-and-Siren	905	(100%)	406	(38%)
No Lights-and-Siren	0	(0%)	651	(62%)
Response Time	4:31		4:58 (10% increase)	
Time difference after implementation = 27 seconds.				

Fig. 3-25. Tualatin Rural Fire Protection District study shows a 27-second response time difference after implementation of priority dispatching in 1985. (Courtesy of Diane Brandt and Pat Southard.)

or injured people in an emergency department wait for their turn with the doctor, then for transport for X-rays, for the person who will take blood for lab tests, for test results, for the doctor's decision, and for finalization either of admission to the hospital or subsequent release. This process can take many hours and requires much endurance. Did the HOT ride in really help? In essence, was it medically ethical?

Assigning response configurations to all determinant codes is also a political process. No one can expect to sit at a meeting table and hammer out every possible contingency. Something normally handled COLD may—due to weather, traffic, or other unusual circumstances—someday at some particular time warrant a HOT response. The EMD can be provided with the flexibility to choose other options as clearly defined in locally written dispatch policies. The process should obviously be backed up by strong, attentive medical control (see Chapter 12: Quality Management).

Don't rely on words or equations, until you can picture the idea they represent.

—Lewis Epstein and Paul Hewitt



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