Analysis of Emergency Medical Services Triage and Dispatch Errors by Registered Nurses in Italy

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Introduction: The major elements of an effective emergency medical services (EMS) system include a single telephone access number, accurate assessment of the urgency of the health problem, and timely dispatch of appropriate personnel and equipment. In Italy, EMS calls are managed by emergency operations centers by registered nurses who have received specialized education in this function. The nurses determine the criticality of the situations and assign an EMS response priority level identified by a color code, ranging from red (very critical) to green (not critical). At times, the severity of a situation may be underestimated, resulting in assignment of a lower EMS response priority and the potential for patient death (code black). The purpose of this study was to analyze factors associated with registered nurse under-triage of EMS calls subsequently found to be associated with deaths, termed "green-black code" cases.

Methods: We carried out a retrospective qualitative analysis of EMS telephone conversations using Fele's conversation analysis method. The characteristics of green-black code calls were compared with the characteristics of the population of all EMS calls during the study period.

Results: The study patients were older, with a mean age of 81.6 years. The callers were individuals calling on behalf of the patients, rather than the patients themselves. The callers reported symptoms that were not life-threatening. Nurse operators did not always inquire about the patients' vital signs as required by the Medical Priority Dispatch System protocol. The phone conversations were shorter than normal (54.26 seconds vs 65 seconds).

Discussion: Although the importance of dispatch system protocols is wellknown, it is also important that nurse triage operators have proper training to ensure that major parameters such as vital signs and symptomatology are obtained and to reduce caller stress level.

Key words: Ambulances/utilization; Emergency medical services organization and administration; Health priorities; Quality of health care; Triage

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Efforts to improve health care outcomes while fostering cost containment through appropriate use of resources have resulted in a proliferation in the provision of telephone assessment and consultation services by registered nurses (RNs) in a variety of settings. Handling a telephone call that may involve a request for emergency care requires substantial expertise. The operator is expected to quickly recognize the severity of the medical condition, identify the possible etiology, and determine the resources required while reducing the caller's anxiety or aggressiveness to obtain the caller's collaboration.[1] The operator should use time efficiently, collecting only the necessary information without prolonging the phone call. Operators require proficiency in effective communication skills to collect all the relevant data. The subsequent decision-making process should lead to the best response—the right emergency care mobile resource and the right staff at the right time.

TABLE 1
Correspondence between color and numeric codes

Color code	Numeric code	Description
White	0	The situation is not an emergency and an ambulance is not needed. The patient is safe or does not have a relevant pathology. The patient's condition is not life threatening.
Green	1	The situation is not an emergency; the patient has an acute but stable pathology. The patient's vital signs are normal.
Yellow	2	The situation is a medical emergency. Intervention cannot be delayed; the patient's vital signs are stable at the moment but should be strictly monitored to prevent possible worsening.
Red	3	The situation is an absolute emergency. The patient's vital signs have deteriorated or indicate an immediate threat to the patient's life. The vital signs must be stabilized and supported during the intervention and transportation.
Black	4	The patient is dead.

In Italy, RNs are responsible for both the triage of patients arriving at the emergency department and the telephone emergency medical services (EMS) dispatch system. Italian law specifies at least 6 months' seniority in emergency nursing to perform medical triage. In addition, emergency operations center (EOC) RN operators are emergency nurses with at least 2 years' seniority in the emergency department and expertise in prehospital care.

At the time of the study, Italy did not have a codified system to standardize the collection and analysis of prehospital data, although processes were in place for selected conditions, such as trauma and cardiac arrest.[2,3] A recent survey by the Italian Ministry of Health showed that EOC operators use a dual-mode (color and alphanumeric) code system to classify both the criticality and the severity of an emergency call[4] (Table 1). The code assigned to the prevailing pathology is the second most important information for emergency dispatchers. When a patient has comorbidities, the operator assigns a code that refers to the most relevant symptoms (Table 2). Finally, the location code indicates where the event took place (Table 2).

Determining Appropriate Response Resources

Emergency dispatching is a dynamic decision-making process,[5] as well as the most important activity performed by EOCs. It consists of 4 phases: taking incoming calls, instructing callers, dispatching the appropriate EMS resources, and instructing the ambulance crew. Appropriate conversation techniques enable the operator to obtain collaboration from the caller. In addition, the use of a standardized interview protocol allows for the collection of all relevant details while avoiding conflicts with the caller.[6,7]

Collaboration depends on 3 caller variables: emotional status, knowledge of the situation, and general behavior when reporting an emergency. Theoretically, the emotional status of the caller does not really affect collaboration because a well-trained operator can guide a scared or angry caller using specific interrogation techniques, as well as a calm voice. An Italian study confirmed that only 4% of callers were annoyed or irritated.[8] The caller may be the patient himself or herself (first-party caller), a person in the patient's direct vicinity (second-party caller), or a person who is not with the patient but is reporting from some distance (third-party caller). About 55% of EMS phone calls in Italy are made by first- or second-party callers[9] who, if correctly interviewed, may provide all the relevant information. That is why the use of a standardized interview protocol, together with appropriate training on how to lead a succinct telephone conversation, is so important. When an emergency occurs, the caller has a distorted time perception. For this reason, it is important that an emergency medical call be answered by at least the third ring, although such a response time—about 12 seconds—would still prove rather lengthy for an emergency call.[10] In the case of life-threatening situations, such as cardiac arrest, electrocution, drowning, and suffocation,[11] the telephone conversation should last less than 1 minute. The mobilization time (from call end to EMS vehicle dispatch) generally varies from 75 to 90 seconds. This time interval is considered part of the standard ambulance response time set by the law in Italy,

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