

**On the “development of a new triage card for multiple-victim incidents in SAMU-Asturias using the ‘double diamond’ methodology: an example of non-technological innovation in health care**

*Sobre el “Desarrollo de una nueva tarjeta de triaje para incidentes de múltiples víctimas en el SAMU-Asturias mediante la metodología “Double Diamond”: un ejemplo de innovación no tecnológica en salud”*

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Guillermo Burillo-Putze.

**To the Editor,**

I have read with interest the original article by Tatiana Cuartas-Álvarez *et al.*, published in this journal.<sup>1</sup>

It describes the development of an out-of-hospital triage card tailored to the Emergency Medical Service (SAMU) of Asturias, designed by its professionals using the Double Diamond methodology. This is innovative compared with other tools such as the Delphi methodology, brainstorming, or Philips-66, among others.

When comparing it with other commercialized triage cards,<sup>2</sup> we would like to make several considerations.

Most known cards include, within the card itself, the decision tree used to

categorize injury severity in Basic Triage (first responders). At those initial moments of intervention, characterized by chaos, it would be unreasonable to expect responders to recall from memory the decision tree of the triage system employed (commonly START or Careflight Triage).

With respect to Advanced Triage (physicians and nurses), the cards usually incorporate the survival scale of the triage system employed, as do all international advanced systems (SORT, T-RTS, STM, NTS, MGAP, etc).

This is important for making decisions on care prioritization: determining which injured patient among those classified as immediate priority (RED-1) should be treated first, and so on, based on survival probability. Among those, the higher the probability of survival, the greater the priority.

Furthermore, in other triage cards, Evacuation Triage (priority of immediate surgical need) is included, with scoring of variables used internationally in the Shock Index, its adaptation for pediatrics (ISPA), or the ABC Score for Massive Transfusion. These provide thresholds that indicate immediate evacuation according to urgent surgical need.

By not including the decision tree of the Basic Triage System used, the Survival Scale, or the criteria for immediate evacuation, receiving professionals (usually in hospitals) would not know which criteria had been followed.

In other cards, a BLUE tag appears to identify patients considered initially “non-viable” or “depassés,” differentiating them from deceased patients (BLACK-0).<sup>3,4</sup> (Figure 1).

Another innovation to consider are triage cards linked to electronic triage (eTriage) applications through mobile devices, identifying each casualty with a barcode, QR code, or RFID. Electronic triage allows unequivocal identification and geolocation of the casualty in real time, provides information on injuries, clinical and hemodynamic status, and treatments or techniques applied—also in real time. This is of great value for the Emergency and Disaster Coordination Center (CECUE), emergency services, and other stakeholders in the receiving hospital, as well as for monitoring time to hospital arrival.

In Spain, two such tools have been developed: Crima (Indra) and Fast Triage Tag (Innomax). Both are linked to an electronic triage application (Crima and Fast Triage App). Internationally, the following electronic triage apps are known: “Triage,” “Triage Facile,” “Triage Master,” and “Triagem START.”<sup>5</sup>

In any case, this card is a welcome addition to the existing repertoire. We hope that healthcare professionals in Asturias encounter fewer difficulties with the new card than with the previous one, ensuring maximum effectiveness for SAMU professionals in Asturias (Spain).

**1 TRIAJE BÁSICO (Triage Care Flight)**

**2 TRIAJE AVANZADO (Triage Score Revised)**

Variable	0	1	2	3	4
Edad	18-24	25-34	35-44	45-54	55-64
Sexo	M	F	M	F	M
Estado de conciencia	1	2	3	4	5
Respiración	1	2	3	4	5
Circulación	1	2	3	4	5
Exposición	1	2	3	4	5

**ACTIVACIONES RECOMENDADAS**

**CATEGORÍA**

**SECUCENCIA DEL PRIMER TRIAJE**

**EXITUS**

**PRIORIDAD 0**

**PRIORIDAD I**

**PRIORIDAD II**

**PRIORIDAD III**

**4 TRIAJE DE EVACUACIÓN (Prioridad de necesidad quirúrgica inmediata)**

**INTERVENCIÓNES TERAPÉUTICAS**

Intervención	Realizada	Completada	Observaciones
Respiración	SI	NO	
Circulación	SI	NO	
Exposición	SI	NO	
Exposición	SI	NO	
Exposición	SI	NO	
Exposición	SI	NO	

**TASSICA\***

**4950**

**2º TRIAJE**

**PRIORIDAD DE EVACUACIÓN**

**4950**

**Tassica 4950**

**Tassica 4950**

**Tassica 4950**

**Tassica 4950**

**Tassica 4950**

Figure 1. Out-of-hospital triage cards designed by Spanish authors: the Tassica Card and the Fast Triage Tag (Innomax). Decision trees are shown to categorize severity and the Survival Scale to categorize care priority. Both incorporate a BLUE tag for casualties initially considered “non-viable” or “with poor viability.”

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### Editor in Charge:

Guillermo Burillo-Putze.

## Authors' reply

### Respuesta de los autores

#### To the Editor,

We have read with interest the letter to the editor regarding our article "Development of a New Triage Card for Mass Casualty Incidents in SAMU-Asturias Using the Double Diamond Methodology: An Example of Non-technological Innovation in Health."<sup>1</sup> While the author makes several interesting considerations, we would like to respond to some of them within the framework of scientific discussion, which should characterize us.

Different authors have identified that triage cards are rarely used despite being widely recommended.<sup>2</sup> One of the causes identified has been poor legibility due to the attempt to include excessive information. Therefore, we believe that including decision trees may hinder readability and make the use of the triage card more difficult. The author adds images of commercial triage cards that, in our opinion, contain a large amount of data to be completed, which is one of the

factors described as minimizing their use.<sup>2</sup> Regarding the blue color tag, and given the practical and ethical difficulties of its use, there is some controversy about its real applicability in pre-hospital mass casualty incidents (MCIs). Therefore, our working group decided not to include it, to facilitate decision-making in a context of care pressure that requires simple actions.

Currently, no survival scale has been validated with real MCI patients. Most survival scales, such as the one linked to the Revised Trauma Score (RTS), have been calculated with trauma patients treated individually. Specifically, the RTS was developed using the trauma registry of the Washington Hospital Center between 1982 and 1985.<sup>3</sup> These patients had characteristics very different from those of MCI patients; thus, we believe such scales should not be used in these cases.<sup>4</sup> For example, a patient with facial burns may have a high survival probability according to these scales, yet their prehospital care is a priority due to the risk of airway compromise. In addition, in a MCI we will not necessarily have only

trauma patients. For instance, a fire, the second most frequent type of MCI according to some studies,<sup>5</sup> can generate multiple patients with respiratory symptoms from smoke inhalation, for whom trauma scales are of no use. For this reason, our triage card is adapted to the *Modelo Extrahospitalario de Triaje Avanzado* (META), a non-commercial, freely available model widely used in different emergency systems in Spain. In our case, it was the model adopted by consensus by the MCI and Disaster Working Group of SAMU-Asturias. The META does not differentiate between trauma and non-trauma patients, and its sensitivity and specificity have been calculated with real MCI patients,<sup>6</sup> although definitive validation through prospective studies is complex given the difficulties of prehospital clinical research in MCIs. Nevertheless, acceptance by professionals is an important element to consider when introducing innovations into the health system.

Another important issue is not to lose the opportunity for professionals themselves to design or contrib-

ute to the creation of their own response procedures, deciding on issues such as which triage system to use, which triage cards to employ, or whether to use digital management systems. These management or digital triage systems often provide a final product independent of the specific procedure, leading to the paradox that the procedure ends up being adapted to the product when, in our view, it should be the other way around. We must emphasize that our triage card is freely available as long as it is appropriately cited, something that has already been requested by some emergency services in Spain. SAMU-Asturias has been a pioneer in generating knowledge related to MCIs, being among the first Emergency Medical Systems in our country to have a response procedure for MCIs, and we are pleased to see that other commercial triage cards have adopted the two green bands, which our service was the first to introduce almost 20 years ago.<sup>7,8</sup>

We wish to highlight that innovation in health can be generated by professionals themselves, that it does not necessarily have to be technological,

and that ideally the industry should engage with professionals to respond to identified needs.<sup>9</sup> Without doubt, the inherent difficulties of research in the field of MCIs leave open an interesting scientific debate where science, innovation, and real-world implementation must go hand in hand.

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### Editor in Charge:

Rafael Castro Delgado.

## Psychomotor agitation: safety and quality of care

### Agitación psicomotora en emergencias: seguridad y calidad asistencial

### To the Editor,

Severe psychomotor agitation or excited delirium, whether associated with concurrent substance use or not, represents a growing public health and clinical care problem in our society. The therapeutic goal for

this type of emergency must be the safe control of agitation, protecting both patients and those who assist them to achieve the highest quality of care with the fewest adverse events.

In the prehospital setting, the literature on this subject is scarce. A recent publication reported on a case of physical restraint of an agitated patient who was also administered ketamine and subsequently died, which resulted in a criminal conviction of the paramedics who provided care.<sup>1</sup> Aware of the differences among

emergency medical systems worldwide, we express our concern regarding the management of these situations.

The Emergency Medical System (EMS) of the Generalitat of Catalonia is the public entity responsible for managing and responding to prehospital health emergencies and urgent care in Catalonia. For cases of extreme agitation, EMS has established a joint intervention protocol with the police (in place since 2019 and updated in November 2024) that sets out guidelines, roles, and responsibilities among all participants in care,<sup>2</sup> in line with protocols developed in other Autonomous Communities.<sup>3-5</sup> The EMS procedure describes management of agitation from the moment the alert enters the Health Coordination Center (HCS), assesses the potential or real risk of extreme agitation, and proposes control measures through verbal, mechanical, or pharmacological restraint. From the HCS, a hospital pre-alert is issued with an "agitation code" that determines three levels of priority: Priority 0 (pharmacological and mechanical restraint in severe psychomotor agitation); Priority 1 (voluntary pharmacological restraint with risk of escalating agitation); and Priority 2 (verbal restraint without risk of escalation). According to internal data, from January 1<sup>st</sup> through December 31<sup>st</sup>, 2024, EMS advanced life support units performed 148,394 interventions, of which 2,711 (1.8%) were for patients with psychomotor agitation. The epidemiological characteristics and treatments of these patients are shown in Table 1, highlighting the size of this problem. We have detected cases in which pharmacological restraint and transport were performed with mechanical restraints not contemplated in our standardized operating procedures, as well as incomplete hemodynamic monitoring and continuous observation, thereby failing to meet EMS's quality standards and patient safety regulations.

As a prehospital EMS, our obligation is to provide optimal health care without minimizing or stigmatizing such alerts and to avoid adding risks

**Table 1.** Interventions by the emergency medical system of the Generalitat of Catalonia in 2024 for psychomotor agitation

	Total N = 2,711 n (%)
<b>Gender</b>	
Female	919 (33.9)
Male	1,792 (66.1)
<b>Age, years [mean (SD)]</b>	38 (18)
<b>Place of intervention</b>	
Street/public place	1,402 (51.8)
Home	1,309 (48.2)
<b>Associated risk factor</b>	
Psychiatric disorders	1,158 (42.7)
Substance use/abuse	271 (10)
ASD	142 (5.2)
Cognitive impairment	107 (3.9)
ADHD	15 (0.5)
Down syndrome	12 (0.4)
Asperger syndrome	7 (0.2)
Other	57 (2.1)
<b>Associated substances</b>	
Alcohol	111 (4)
Cocaine	58 (2.1)
Medications	38 (1.4)
Cannabis	11 (0.4)
Opioids	3 (0.1)
Other/unspecified drugs and toxins	50 (1.8)
No toxic substance recorded	2,440 (90)
<b>Monitoring of vital signs</b>	
Blood pressure	1,009 (37.2)
Heart rate	1,414 (52.1)
Respiratory rate	1,026 (37.8)
Oxygen saturation	1,351 (49.8)
Blood glucose	761 (28)
Axillary temperature	369 (13.6)
Cardiac monitoring	178 (6.6)
No monitoring recorded	872 (32.1)
<b>Pharmacological treatment administered</b>	
Midazolam	1,281 (47.2)
Haloperidol	296 (10.9)
Propofol	257 (9.4)
Ketamine	91 (3.3)
Oral diazepam	73 (2.7)
Clonazepam	21 (0.7)
Chlorpromazine	6 (0.2)
No pharmacological treatment	686 (25.3)
<b>Type of transport</b>	
Non-voluntary	1,229 (45.3)
Voluntary	1,185 (43.7)
<b>Mechanical restraints during non-voluntary transport</b>	
Restraints recorded	158 (5.8)
<b>Final destination</b>	
Transfer to referral center	2414 (89.1)
Discharge on site (resolution of episode)	297 (10.9)

Source: Emergency Medical System (EMS). Department of Health. Generalitat of Catalonia. ASD: Autism spectrum disorder; ADHD: attention-deficit/hyperactivity disorder.

through inadequate interventions. A correct anamnesis (considering the presence of toxins, medical, psychiatric, or metabolic disorders),<sup>6</sup> non-injurious mechanical restraint, or pharmacological restraint with benzodiazepines (commonly used in

our setting) or ketamine (widely used in the United States),<sup>7</sup> always individualized according to the level of agitation and the patient's environment, are key components of care.

Avoiding subjectivity and bias,<sup>8</sup> enhancing empathic communication,

performing continuous monitoring and observation, updating joint protocols with police, strengthening staff training,<sup>9,10</sup> and even developing a new quality indicator<sup>11</sup> to identify practices to avoid and to detect possible iatrogenic effects from mechanical restraints and pharmacological sedation in patients with psychomotor agitation,<sup>12</sup> are all indispensable tools to achieve significant improvement in the management of these emergencies.

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