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ORIGINAL

# Do-not-do recommendations in the care of critical pediatric patients in emergency departments

**Mª Elena May Llanas[1], Mª Teresa Leonardo Cabello[2], Yolanda Ballestero Diez[3]; on behalf of the Critical Patient Working Group of the Spanish Society of Pediatric Emergency Medicine (SEUP)**

*[1]Pediatrics attending, Hospital Universitari Mutua Terrassa, Terrassa, Barcelona, Spain. [2]Specialist in Pediatric Emergency Medicine, Hospital Universitario Marqués de Valdecilla, Santander, Spain. [3]Specialist in Pediatric Emergency Medicine, Hospital Universitario Cruces, Bilbao, Spain*

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*Niño críticamente enfermo*

## Abstract

*Introduction:* Do-not-do recommendations (DNDRs) aim to avoid unnecessary or harmful practices in healthcare that may negatively affect the health or safety of the patient and increase healthcare spending. Our aim was to was to reach a consensus in selecting a set of DNDRs related to the care of critically ill pediatric patients in emergency departments.

*Material and methods:* The list of recommendations was developed using the Delphi method. The process was conducted in three phases. The first phase involved collecting proposals for DNDRs. The second phase consisted of two rounds of voting. The final phase resulted in the formulation of the ultimate set of recommendations.

Proposals and evaluations were carried out by members of the Critical Patient Working Group of the Spanish Society of Pediatric Emergencies, coordinated via email.

*Results:* In the initial phase, a total of 24 DNDRs were proposed. During the first round of voting, five recommendations received approval. In the second round, two additional DNDRs were accepted, resulting in a total of seven DNDRs selected for the care of critically ill pediatric patients.

*Conclusions:* This study enabled the consensus-based selection of seven recommendations that can improve the initial care of critically ill pediatric patients. Our study is the first on DNDRs for critically ill pediatric patients in pre-hospital care and emergency departments.

## RECOMENDACIONES DE NO HACER EN LA ATENCIÓN AL PACIENTE CRÍTICO PEDIÁTRICO EN LOS SERVICIOS DE URGENCIAS

## Resumen

Introducción: *Las recomendaciones de no hacer (RNH) pretenden evitar acciones innecesarias o perjudiciales en la atención sanitaria, que pueden afectar de forma negativa a la salud o la seguridad del paciente, así como aumentar el gasto sanitario. Nuestro objetivo fue elaborar una lista de recomendaciones de no hacer en la atención del paciente crítico pediátrico en los servicios de Urgencias.*

Material y método: *El proceso constó de tres fases. Primera fase de obtención de las propuestas de RNH. Segunda fase de votación de las propuestas obtenidas en la fase anterior. Se realizó mediante la metodología Delphi. Tercera fase de redacción de las recomendaciones finales. Tanto las propuestas como las evaluaciones fueron realizadas*

Corresponding author:
Dra. Mª Elena May Llanas
*E-mail:* marilenmay@gmail.com

*por miembros del Grupos de Trabajo del Paciente Crítico de la Sociedad Española de Urgencias de Pediatría coordinados por correo electrónico.*

Resultados: *En la primera fase fueron propuestas 24 RNH. Mediante la primera votación se obtuvieron 5 recomendaciones. Las diez propuestas que obtuvieron una puntuación dudosa fueron sometidas a nueva valoración en la que fueron aceptadas dos de ellas, quedando por tanto seleccionadas 7 RNH en la asistencia al paciente crítico pediátrico.*

Conclusiones: *Este proyecto ha permitido seleccionar y consensuar siete recomendaciones que pueden contribuir a mejorar la atención inicial de los pacientes pediátricos graves. Hasta la fecha nuestra publicación es la primera sobre RNH en el paciente crítico pediátrico en el ámbito de la atención prehospitalaria y los servicios de Urgencias.*

## INTRODUCTION

Do-not-do recommendations (DNDRs) aim to avoid unnecessary or harmful practices in healthcare that may negatively affect the health or safety of the patient and increase healthcare spending.

Since the late 1990s, several international medical organizations have promoted the divulgation of efficient and safe medical practices. Examples include the American Medical Association, which has published reports under the slogan "Less is More," the "Do-Not-Do Recommendations" of the British National Health Service (NHS), and the North American initiative "Choosing Wisely"[1]. These initiatives all share the common goal of promoting evidence-based practices to enhance healthcare quality, prevent iatrogenic harm, improve physician-patient communication, and reduce healthcare costs.

In Spain, the Ministry of Health initiated the "Do Not Do Recommendations" campaign in 2013. To date, 50 scientific societies have proposed their set of DNDRs[2]. In the field of pediatric patient care, several initiatives have been published in recent years that include lists of DNDRs for different settings[3-6].

The Critical Patient Working Group (CP-WG) was established in March 2018 as a working group within the Spanish Society of Pediatric Emergency Medicine (SEUP). At the time of the development of the DNDRs, the group comprised 57 members, with the majority being physicians practicing in different pediatric emergency departments across the country.

The main objectives of the CP-WG are to promote the improvement of critical patient care and the quality of care in emergency departments through research, educational outreach through courses and publications, as well as the development of consensus documents in our field.

Currently, there is no list of DNDRs in the field of pediatric critical patient care for the initial care received in the emergency department; therefore our group set out to create one with the aim of disseminating a set of basic and essential safe practices to unify the initial care of the pediatric patient in the emergency department or prehospital settings. This initiative is designed to be applicable regardless of the level of care of the hospital at which the patient is treated and the training of the health professional performing such care, with the aim to avoid iatrogenic harm, the practice of procedures or maneuvers lacking scientific evidence, and unnecessary costs.

## OBJECTIVE

The aim of our study was to demonstrate the process of developing a DNDR checklist for the initial care of the critically ill pediatric patient in out-of-hospital settings or in the emergency department.

## METHODOLOGY

The development process consisted of three phases:

1. **First phase.** Collecting DNDR proposals. This phase involved sending e-mail invitations to all CP-WG members to participate through brainstorming. Guidelines were provided including existing examples and the indication that aspects supported by stronger scientific evidence should be prioritized. The invitation was sent to all CP-WG members, allowing each member to submit as many recommendations as they wished.
2. **Second phase.** In this round, the CP-WG members were provided with information about the methodology. Each member was requested to assign scores to each proposal, provide a rationale for the scores, and, if necessary, suggest improvements to the wording. A comprehensive list of all the proposals obtained in the previous phase and the evaluation guidelines were sent to each CP-WG member. The list of recommendations was created using the Delphi methodology, an information-gathering technique that allows the opinion of a group of experts to be obtained through repeated consultations[7]. After the initial brainstorming phase, a vote was conducted on all the proposals using a rating scale (Likert scale) to determine the level of agreement or disagreement with the recommendations obtained in the first phase. The score ranged from 1 (strongly disagree) to 9 (strongly agree). Proposals that received a mean score of 8 or higher and were scored above 7 by at least 2/3 of the participants were selected. Proposals with a mean score below 6 were eliminated. Recommendations that fell into the undecided range, with a mean score between 6 and 8 points, proceeded to a second round in which CP-WG members were asked to re-evaluate them.
3. **Third phase.** Drafting of the final recommendations. The selected recommendations were subjected to a consensus process on their wording and the final list was established.

## RESULTS

During the first phase of the study, 57 invitations to participate were sent to all CP-WG members and a total of 24 DNDRs reported by 25 CP-WG members were collected, resulting in a participation rate of 44%.

In the second phase, 21 members of the CP-WG participated in the first round and five recommendations were selected, which are the ones that became part of the SEUP document[5]. One of them (Delay antibiotics administration in the pediatric patient with septic shock if culture collection is not possible beforehand) was incorporated in the DNDRs of the Infectious Diseases Working Group and was replaced by the next one with more votes (Insert a Guedel airway if the patient is conscious). In the second round, 18 members of the CP-WG participated and two more recommendations were added, resulting in the selection of seven DNDRs for the care of critically ill pediatric patients in out-of-hospital settings or in emergency departments.

Table 1 summarizes the DNDRs and the scores obtained in the first and second rounds.

## DISCUSSION

The CP-WG has compiled a list of DNDRs for the initial care of critically ill pediatric patients, as presented in Table 2. These recommendations are founded on both expert opinions and scientific evidence, with the objective of reducing

**TABLE 1.** List of recommendations with the scores obtained in the first and second round of voting and final result.

| Action to avoid | Score first round | Nº of scores > 7 first round | Score second round | Nº of scores > 7 second round | Final result |
|---|---|---|---|---|---|
| Delay intravenous adrenaline administration until vascular or intraosseous access is obtained in a pediatric patient in cardiorespiratory arrest with a nonshockable rhythm | 8.6 | 21/21 | | | Accepted |
| Interrupt chest compressions during CPR except for specific interventions | 8.1 | 19/21 | | | Accepted |
| Delay placement of an intraosseous line in a critically ill pediatric patient for more than 5 minutes if peripheral venous access is not available | 8.04 | 19/21 | | | Accepted |
| Delay the use of vasoactive drugs in patients with fluid-refractory shock. Its peripheral or intraosseous infusion is safe and does not require placement of a central line | 8.1 | 18/21 | | | Accepted |
| Delay antibiotic administration in the septic pediatric patient if prior culture collection is not possible[1] | 8.8 | 21/21 | | | Accepted |
| Insert a Guedel airway if the patient is conscious | 8.1 | 18/21 | | | Accepted |
| Delay the administration of blood products in hemorrhagic shock. Administer after 20 ml/kg of crystalloids | 7.9 | 19/21 | 8.05 | 17/18 | Accepted |
| Use hypotonic solutions in brain-injured patients | 7.4 | 15/21 | 8 | 16/18 | Accepted |
| Transfer a polytraumatized patient before performing primary assessment and stabilization | 7.8 | 16/21 | 7.8 | 16/18 | Eliminated |
| Administer muscle relaxants to a patient for intubation without ensuring that the patient has received adequate sedation and analgesia | 7.6 | 16/21 | 7.8 | 16/18 | Eliminated |
| Use hyperventilation in patients with severe traumatic brain injury without evidence of brain herniation | 7.6 | 19/21 | 7.3 | 14/18 | Eliminated |
| Administer a new fluid load in a shock patient if fluid overload has not been reevaluated and verified | 7.6 | 18/21 | 7.2 | 14/18 | Eliminated |
| Use bicarbonate in diabetic ketoacidosis, except in extreme situations such as pH < 6.9, inotropic requirements, or severe hyperkalemia | 7.6 | 18/21 | 7.2 | 14/18 | Eliminated |
| Use colloids as first-line treatment in the resuscitation of patients with septic shock | 7.6 | 19/21 | 7.1 | 13/18 | Eliminated |
| Avoid parental presence during stabilization and resuscitation maneuvers of the critically ill pediatric patient | 7.4 | 17/21 | 7.2 | 13/18 | Eliminated |
| Perform permissive hypotension in patients with hemorrhagic shock and associated traumatic brain injury | 7.4 | 19/21 | 6.5 | 11/18 | Eliminated |

.../...

**TABLA 1 (Cont.).** Listado de recomendaciones con las puntuaciones obtenidas en primera y segunda ronda de votaciones y resultado final.

| Action to avoid | Score first round | Nº of scores > 7 first round | Score second round | Nº of scores > 7 second round | Final result |
|---|---|---|---|---|---|
| Prioritize endotracheal intubation if management with bag-mask ventilation is adequate | 7.4 | 13/21 | | | Eliminated |
| Use antihistamines as first-line treatment in severe allergic reactions | 7.3 | 14/21 | | | Eliminated |
| Routine administration of bicarbonate in during cardiac arrest in pediatric patients | 7.2 | 14/21 | | | Eliminated |
| Use atropine as the drug of choice in pediatric patients with unstable bradycardia except if bradycardia is caused by increased vagal tone | 7 | 13/21 | | | Eliminated |
| Use of etomidate as a sedative in the septic shock patient. Rationale: although etomidate has minimal effect on cardiac and circulatory functions and is the sedative of choice in patients with hemodynamic instability, it suppresses adrenocortical function, which discourages its use in patients with septic shock | 6.7 | 13/21 | | | Eliminated |
| Transfer patients with a Pediatric Trauma Score (PTS) <9 to a non-trauma center | 6.5 | 12/21 | | | Eliminated |
| Call for help after delivering 5 initial breaths in basic life support in the case of a single rescuer | 6.4 | 12/21 | | | Eliminated |
| Check safety before performing CPR | 5.9 | 11/21 | | | Eliminated |

unnecessary treatments or procedures that do not contribute to the quality of care, minimizing potential risks for critically ill patients, and enhancing the efficiency of healthcare resources.

While colleagues from various societies have previously developed DNDRs for different pediatric scenarios, including the intoxicated patient[3] and patients in pediatric intensive care units[6], here we present a set of recommendations specifically focused on the care of critically ill pediatric patients in prehospital and pediatric emergency department settings. The recommendations are in line with the most recent updates in the guidelines for the management of these patients.

Some of the DNDRs refer to the management of the patient in cardiac arrest, such as early administration of adrenaline in CRA with a non-shockable rhythm or minimizing interruptions in chest compressions during cardiorespiratory resuscitation (CPR). Other recommendations emphasize the appropriate use of devices and/or techniques during stabilization of critically ill patients, such as intraosseous lines and oropharyngeal or Guedel cannulae.

A third category of recommendations involves the administration of drugs and fluids in various stabilization and resuscitation scenarios, such as the early use of vasoactive drugs, blood products for hemorrhagic shock, or fluids for patients with brain injuries.

The significance of different societies issuing DNDRs lies in their commitment to safeguarding human health. It is unacceptable for medical actions to potentially harm our patients. Therefore, DNDRs should be included into quaternary prevention strategies, which focus on preventing, reducing, and mitigating the harm caused by medical interventions.

One of the main limitations of our study is the fact that the list of recommendations was developed through expert consensus rather than exclusively relying on scientific evidence. This limitation is due to the difficulty of obtaining robust scientific evidence in the context of critically ill pediatric patients, because of their, fortunately, low incidence and the ethical dilemmas associated with conducting prospective comparative studies in life-threatening situations. Another limitation is the variability in participation rates across different phases of the study. Out of the 25 members who initially proposed DNDRs, only 21 and 18 participated in the voting phases for the proposals, respectively. In addition, there was heterogeneity in the professional experience of the participants

## CONCLUSIONS

DNDRs are intended to encourage safer clinical practices with the aim of preventing iatrogenic harm, promoting physician-patient communication regarding decision-making, and reducing unnecessary healthcare costs.

To date, our study is the first on DNDRs for critically-ill pediatric patients in prehospital and emergency department settings.

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**TABLE 2. Definitive list of do-not-do recommendations for critically ill patients and the rationale behind them.**

| Action to avoid | Rationale |
|---|---|
| Delay intravenous adrenaline administration until vascular or intraosseous access is obtained in a pediatric patient in cardiac arrest with a non-shockable rhythm | Early use of adrenaline is associated with better prognosis in children with cardiac arrest and non-shockable rhythm both in and out of hospital[8-13] |
| Interrupt chest compressions during CPR except for specific interventions | The American Heart Association recommends minimizing interruptions in compressions and defines high performance CPR as achieving a chest compression fraction greater than 80%[14] |
| Delay placement of an intraosseous line in a critically ill pediatric patient for more than 5 minutes if peripheral venous access is not available | The peripheral intravenous line is the first choice for vascular access in the critically ill pediatric patient, but in case of emergency the placement time should be limited to 5 minutes (2 attempts) at the most or 1 minute in cases of cardiac arrest. When peripheral venous access is not possible, the main alternative is intraosseous access, if possible by means of mechanical insertion[13] |
| Delay the use of vasoactive drugs in patients with fluid-refractory shock. Its peripheral or intraosseous infusion is safe and does not require placement of a central line | It is recommendable to use vasoactive drugs early, even peripherally at an adequate dilution after initial volume resuscitation in patients who remain hemodynamically unstable or who show signs of fluid overload, with noradrenaline or adrenaline as first-line vasoconstrictors and dobutamine or milrinone as vasodilators[15-17] |
| Insert a Guedel airway if the patient is conscious | The oropharyngeal cannula should be reserved for unconscious patients with absent pharyngeal and laryngeal reflexes[18,19], to prevent vomiting and bronchoaspiration and maintain a patent airway |
| Delay the administration of blood products in hemorrhagic shock. Administer after 20 ml/kg of crystalloids | Early administration of blood products in hemorrhagic shock, ideally reducing the use of crystalloids to a maximum of 20 ml/kg, has been shown to improve patient prognosis[20-25] |
| Use hypotonic solutions in brain-injured patients | In the management of brain-injured patients, it is important to avoid the administration of hypotonic solutions, as they have been associated with increased cerebral edema. The optimal choice between isotonic and hypertonic fluids remains to be clarified[26-30] |

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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