be foreseen to implement new technology such as point-of-care ultrasound (POCUS) and telemedicine to optimize care; POCUS can, in fact, allow an accurate diagnoses and thus enhance prehospital and telemedicine consultation with ECG transfer.

We should emphasize that all patients with moderate and high risk of ACS should be transported, if possible, within the professional ALS-staffed EMS to provide an ideal chain of survival. This will also optimize the application of national and international guidelines wherein the initial evaluation of the patient should include the initial diagnosis process, estimation of the probability of experiencing ACS, assessment of the patient's vital risk, need for transfer to a hospital, and urgent care measures.^{3,4} In mountain and remote areas, the average transport is longer compared to urban areas,⁵ which puts the patient at higher risk of fatal coronary events.⁶ An early ACS diagnosis with an ECG and/or treatment by an ALS provider onsite can improve the rescue chain. Furthermore, automated external defibrillator (AED)-equipped rescue teams and automated external defibrillators located in ski resorts and mountain huts could optimize outcome. In addition, the introduction of standard operation procedures for refractory cardiac arrest and use of mechanical chest compression devices in selected cases could be beneficial, allowing early transport to a hospital with ongoing cardiopulmonary resuscitation.⁷ We suggest that in mountain and remote areas, onsite medical diagnostics and treatment according to guidelines⁴ should be provided by integrating mountain rescue service and ALS-staffed EMS and helicopter EMS.

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In Reply to Dr Soteras et al

To the Editor:

We thank Soteras et al¹ for their interest in our recently published article on cardiac events in mountain rescues,² and we acknowledge their previous contribution in the field.³ We are truly grateful for the opportunity to clarify certain points that could have been potentially misunderstood.

All of the patients diagnosed with an acute coronary syndrome in our study were adequately transferred to the hospital. When we asserted that 58% were transferred to the hospital in an advanced life support (ALS) staffed vehicle, helicopter emergency medical service (HEMS), or emergency medical service (EMS), we did not mean to imply that the other 42% were not transferred escorted by a medical team. In fact, these patients were transferred in the physician-staffed rescue helicopter according to the current operation procedures in Aragón (Spain). Risk assessment and prehospital triage was performed, and a 12-lead electrocardiogram was obtained in the first medical contact as recommended by the European Society of Cardiology guidelines.⁴ Not a single patient was transferred to the hospital without an ALS provider. Thus, we consider

our patients to have been properly treated, and certainly in accordance with all international guidelines.

In general terms, as Soteras et al¹ point out, rapid recognition of symptoms and on-site evaluation by an ALS team are factors that undoubtedly contribute to improve the global outcome and the survival chain. Therefore, we strongly endorse the call to include physicians in rescue teams and adhere to the opinion of many experts who support and promote the joint work of mountain rescue services and EMS.^{5,6} In the Spanish region of Aragón in particular, the standard operations system has successfully managed to integrate an ALS provider in all mountain rescue services for the last 2 decades. The following paragraphs explain how this system works in Aragón.

On one hand, there are search and rescue helicopters with no electromedical devices previously installed. These helicopters may carry a physician/nurse on call if needed, and their equipment is chosen according to the type of rescue (modular medical backpack with pharmacotherapy such as initial antiplatelet therapy, monitor-defibrillator, respiratory kit, or trauma kit). Health providers can medicalize the onsite assistance of the victim. The selection of the equipment carried is of paramount importance. It should be resistant, small, and modular for adequate performance.⁷

On the other hand, there are ALS-staffed EMS (ambulances) and 1 ALS-staffed HEMS. They are staffed with both physician and nurse and permanent electromedical devices. They are not involved in search and rescue operations. In addition, they can provide adjunct fibrinolytic therapy to the initial pharmacotherapy when it is considered the best reperfusion strategy.

In mountain rescues, the most common procedure is to transfer the patient in a search and rescue helicopter with a physician/nurse to the nearest local hospital. Notwithstanding, in cardiac events (and other complex pathologies), the transfer of patients has been optimized through infarction code protocols to avoid any EMS delay; when needed, the transfer can proceed directly to the hub-reference hospital with hemodynamic services.

The transfer of patients, as a hub-and-spoke system, makes use of the most suitable resources available at the time of the event, considering external factors such as weather conditions and distances and evidently taking into account the best treatment strategy for each patient (primary percutaneous coronary intervention vs fibrinolytic therapy).

Finally, we would like to address the points made by Soteras et al¹ about new technologies. Undoubtedly, current technologies allowing electrocardiogram transmission or “second opinion” consultation aid in early diagnosis and reduce treatment time. Telemedicine ensures catheterization lab activation, eliminating any emergency department delay.⁸ Hence, when related to point-of-care ultrasound (POCUS), tele-echocardiography may guide

treatment. During cardiac arrest, POCUS demonstrated feasibility and high positive predictive value (97%) when assessed by physicians; however, when POCUS was performed by paramedics during pulse checks, it led to prolonged pauses in compressions.⁹ In situations where high-quality compressions cannot be safely delivered (ongoing cardiopulmonary resuscitation in ambulance transport or difficult locations), the use of a mechanical device is a reasonable approach and may provide a useful adjunct to standard treatment. Yet mechanical chest compression devices showed no improvement in outcome.¹⁰ Therefore, health providers involved in rescue operations may have to decide for themselves whether to carry these devices, considering their human resources and the potential extra load.

In any case, first responders' actions have unquestionably been proven to significantly affect outcome. Thus, we encourage proper training for first responders and the creation of an integrated net of automated external defibrillators in remote locations (mountain huts or ski resorts). To improve the quality of the chain of survival in any location, time delays and patient outcomes should be periodically assessed.

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In Response to Impact of Half Dome Cable Permitting by Spano et al

To the Editor:

We are writing this letter in response to an article published in *Wilderness & Environmental Medicine* entitled “Impact of a Half Dome Cable Permitting Process on Search and Rescue Activity, Hiker Mortality Rates, and Operational Costs Above Little Yosemite Valley” (referred to hereafter as “the article”).¹ We served as the principal investigators on the research conducted in Yosemite National Park to help inform the Half Dome Stewardship Plan and Half Dome cables permitting process.^{2–5} The purpose of our letter is to provide context that is missing from the article and reveals important issues in the research design, analysis, and conclusions presented. Our points are as follows:

1. The research presented in the article is based on the premise that the purpose of the Half Dome permit system is to “protect visitors in the wilderness” and, in turn, reduce the number and operational costs of search and rescue (SAR) incidents above the area of Yosemite National Park known as Little Yosemite Valley. In fact, the intent of the Half Dome permit system, with respect to safety, is simply to provide visitors with the opportunity to manage their own risk, specifically in the case of storm events where a rapid descent of the Half Dome cables might be necessary to avoid a lightning strike or wet conditions on the rock surface.⁶ Before the permit system, crowding during busy periods on the Half Dome cables and summit impeded visitors’ ability to descend the cables freely.² The National Park Service is clear in its public information regarding the Half Dome permit system and indicates that the permit system in no way guarantees visitors will be safe.⁷ In fact, the National Park Service

clearly states in the Half Dome Stewardship Plan that challenge, risk, injury, and even death are inherent elements of wilderness. Consequently, the premise of the research and the corresponding statistical tests in the article are fundamentally misaligned with the intent and purpose of the Half Dome permit system. A suitable framework for evaluating the efficacy of the Half Dome permit system, with respect to its safety-related objectives, would be to compare the number of mass evacuations from the Half Dome summit and cables during storm events before and after the implementation of the permit system—or, similarly, to compare the number of people per event evacuated from the Half Dome summit and cables during storm events before and after the permit system went into effect. In either case, there would be significant limits to any statistical comparisons owing to the rare and stochastic occurrence of these events.

2. Relatedly, the analyses presented in the article include SAR incidents involving nausea and vomiting, lower extremity injuries, heat and dehydration, and snakebites. In fact, it is reported in the article that the top causes of SAR incidents in the study area (ie, above Little Yosemite Valley) during the pre- and postpermit analysis periods were medical illnesses, lower extremity injuries, lost persons, and vomiting. As noted, however, the intent of the Half Dome permit system, with respect to safety, is to reduce the number and scale of mass evacuations from Half Dome by eliminating the constraints of overcrowding on ability to self-evacuate during storm events and similar circumstances. The permit system was not designed to reduce the number of cases of vomiting, broken bones, or similar types of medical incidents. As such, the study design does not provide a suitable basis to assess the efficacy of the Half Dome permit system, with respect to its safety-related intent and purposes. The closest the study comes to the intent of the permit system is in the summary of 2 evacuations of multiple stranded visitors on the Half Dome summit and cables; only the case that occurred before the permit system had the characteristics of an event the Half Dome permit system was intended to address (41 witnesses to a fatal fall during a hailstorm were evacuated from Half Dome in 2009). In the evacuation event that occurred after the permit system was implemented, visitors were actually directed up to Half Dome as something of a safe haven and an evacuation point from a wildfire below Half Dome.
3. Similarly, the Half Dome permit system is narrowly scoped to manage the number of people only on the 146 m (480 ft) cables route and Half Dome summit. Yet, the analysis presented in the article is based on SAR incident data for all of the area of the park above Little Yosemite Valley, which is the most popular area in the Yosemite wilderness, is at the head of one of the