

**Background:** After the first shocks of the earthquake in Amatrice and Accumuli (August 24, 2016), the national Civil Protection activated the national disaster response and rescue teams of CNSAS and reached the affected areas under a national coordination. Expert teams on hostile and confined environments were recruited, search dogs and medical teams were recruited as well.

**Methods:** The immediate response (because of the deep diffusion of the Alpine Corp resources in this area) was realized by local and regional teams. A second wave of rescue teams arrived a few hours later. The teams were deployed in Amatrice, Accumoli, and 38 small villages in the province of Rieti. A helipad in Amatrice was used for Medevac operations. The farthest areas and villages were reached only with military helicopters support. Two main scenarios were faced: 1) inside the “red area”: supporting the rescue operation missions together with firefighters and police; 2) out of the “red area”: checking people with minor injuries and vulnerable categories. All the data was transmitted to the Crisis Unit in Amatrice and to the Command Control Chain of Civil protection.

**Results:** The experience showed the importance of:

- stockpiles and technological support;
- information and training on disaster medicine and basic procedures (triage and tracking tools);
- knowledge on tactical approach and tactical medicine;
- knowledge of the Command and Control Chain and of the Civil Protection disaster response.

**Conclusion:** The medical teams of the CNSAS are an essential resource to support, search and rescue missions after earthquakes. Their own role can be precious in the check and monitoring of the health needs of the people affected, inside the Civil Protection disaster response.

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**Lessons from the French Society of Disaster Medicine, Stratadviser Ltd and the West African Health Organization Collaborative Group during the 2014-2016 Ebola Outbreak**  
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**Study/Objective:** Ex-post evaluation of Relevance, Efficiency, Effectiveness, Impact, and Sustainability of recommendations elicited by the collaborative group during this period.

**Background:** Unlike more common epidemics in the three affected countries, such as malaria (over 2,650,000 cases/year) or tuberculosis (close to 32,000 cases/year), the Ebola outbreak (around 24,000 cases/2 years) paradoxically undermined the conditions of cohesion, integrity, security, functioning, and existence of health systems and beyond the economies of the Economic Community of West African States (ECOWAS). Therefore, the collaborative group disaster medicine experts analyzed socio-economic and historical insights, and epidemiological data and field practice

observations to come up with specific recommendations on the design of Humanitarian, Health, and Economic Corridors (H2EC). This is intended to limit the spread of a virus that contaminates and disseminates progressively thanks to population movements, while promoting the movement of this population.

**Methods:** Due to the international nature of potential applications of the H2EC concept and design, the collaborative group followed the methodology for Center of Excellence (CoE) project evaluation, used by the European Commission, namely the Logical Framework Approach (LFA).

**Results/Conclusion:** The positive post-evaluation of the economic corridors design teaches broad lessons applicable to other disaster medicine situations.

<b>To date</b>	
Relevance and quality of design:	Comprehensive, regarding geographical environment, socioeconomic constraints, population natural behavior, and public health requirements.
Efficiency of implementation:	Scaled to local/regional scarce health care workers/assets resources.
Effectiveness:	Actually limit population displacement while allowing nearly normal socioeconomic activity.
Impact prospects:	Positively bear upon population resilience.
Potential sustainability:	Could be easily reactivated, but will still require external support to some extent.

**Table 1.** Assessment of Humanitarian, Health and Economic Corridors according to the Logical Framework Approach.

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**Emerging Issues of Withdrawing the DMAT Headquarters, Kumamoto Earthquakes of 2016**

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**Study/Objective:** Clarify the issues of withdrawing the Disaster Medical Assistance Team (DMAT) headquarters.

**Background:** It is essential that DMATs have to hand over management to the right organizations at the right time. That is why DMATs Headquarters must be withdrawn smoothly. Kumamoto earthquakes 2016 in Japan, DMATs were dispatched on April 14 to the stricken area and concluded activities by April 23. Our team had orders to manage the biggest local headquarters and to close it down. However, withdrawing was so tough on the front line due to newly emerging issues; there has been little experience in withdrawing the big headquarters.

**Methods:** Five emerging issues were extracted as follows: (1) Confusion on determination how and when the DMATs hand over management to other organizations. (2) Difficulties on choice of DMATs staying behind until the very end. (3) Impediment by the remaining equipment that DMATs

brought in. (4) Lack of coordination with the chief administrator. And (5) Troublesome tasks to dispose waste and litter that DMATs produced. We have considered and resolved these emerging issues.

**Results:** During a large-scale disaster, the agency that presides over various organizations discussion of policies is required. Handover of duties should be determined by such an agency. The point of time of ending the activities should be defined at an earlier time. If existing DMATs are exhausted, headquarters has to request the government to send reinforcements. Equipment that DMATs did not use, and the waste and litter that DMAT made, should be carried back, basically because it is awkward to handle the unwanted material in the stricken area. In addition, they may cause unnecessary confusion. Over-dependence on the Internet consumed time to directly communicate with, and hindered opportunities to, understand the strategy of chief administrator.

**Conclusion:** There are some important points for DMATs to take into consideration when the headquarters is closed.

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### The 2013 Santiago de Compostela Train Crash: High-Speed Derailment, Medical Trauma, and Psychological Aftermath

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**Study/Objective:** Present a disaster complexity case study from multiple complementary perspectives.

**Background:** The July 24, 2013 high-speed train derailment outside Santiago de Compostela Spain was the second deadliest in Spanish history. All 13 cars derailed and 100% of the train's 224 occupants were either killed (80) or injured (144). The crash analysis focused sequentially on identifying the hazard dynamics in the Santiago de Compostela train crash, linking these train crash hazards to the medical trauma sustained, and translating Potentially Traumatizing Exposures (PTEs) into patterns of psychological distress and disorder.

**Methods:** An analysis of the derailment was conducted drawing upon an interdisciplinary team of experts in mechanical engineering (international authority on train wrecks), disaster psychology (internationally renowned Spanish psychologist who provided consultation and care on-scene), medical crash trauma, biomechanics, disaster health, and public health. Each expert contributed a discipline-specific account of the crash. A synthesis of key components of the event was developed by blending direct on-scene response experience, with in-depth review of investigative reports, news stories, and websites of Spanish agencies involved in disaster response and railway safety. Analysis included the construction of a hazard profile and a matrix of psychological stressors in relation to intensity and severity of exposure, informed by the Population Exposure Model.

**Results:** For this non-intentional, human-generated, technological/transportation disaster, distinguishing features included: human causation of a preventable event, excessive velocity,

absence of safety engineering to slow the speeding train, extreme wreckage, 36% fatality rate among train occupants, life-changing severity of medical trauma for injured survivors, psychological impact on rescue personnel, and extensive exposure of the Spanish population to prolonged graphic media coverage.

**Conclusion:** The Santiago de Compostela train derailment was notable as a human-caused preventable event that precipitated exceptional damage, death, and injury, leading to significant psychological trauma and demonstrating that psychological consequences are exacerbated when human causation is implicated.

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### Incendie dans un bar. Particularités de prise en charge de victimes multiples en arrêt cardiaque (AC) sur intoxication aux fumées d'incendie.

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**Study/Objective:** La prise en charge de victimes multiples en AC sur une intoxication aux fumées d'incendie expose les équipes préhospitalières à des difficultés logistiques et organisationnelles. Dans la nuit du 6 août 2016, 14 jeunes ont trouvé la mort dans l'incendie d'un bar situé à Rouen (France) par intoxication aux fumées d'incendie suite à la combustion de matériaux d'isolation phonique.

**Background:** La prise en charge des victimes, dans ce contexte, nécessite diaspopies aux manoeuvres de réanimation cardiaque habituelles l'administration précoce d'hydroxocobalamine afin de lever l'inhibition de la cytochrome oxydase mitochondriale par les dérivés cyanés.

**Methods:** Une équipe médicale du SAMU composée d'un médecin, d'une infirmière et d'un ambulancier et des équipes de pompiers ont été immédiatement envoyées sur les lieux dès le premier appel par les témoins. Dès leur arrivée, ils ont pris en charge 5 victimes légèrement intoxiquées et brûlées et une autre en AC, avec la notion d'une quinzaine de victimes bloquées dans la cave de l'établissement.

**Results:** Dès la notion de victimes multiples, le plan blanc du Centre Hospitalier Universitaire (CHU) a été déclenché. Trois victimes en AC et une victime inconsciente en état de choc ont été pris en charge par la première équipe avec rapidement des difficultés d'abord des voies aériennes (oedèmes) et vasculaires nécessitant l'utilisation de mandrins d'Eischman et de dispositifs intraosseux pour l'injection d'hydroxocobalamine. La répartition des tâches était primordiale entre les intervenants. La victime inconsciente a été évacuée sans délai et non médicalisée vers le CHU. Elle est décédée un mois après. Les équipes médicales de renfort ont pris en charge 2 autres victimes. Les 8 autres victimes ont été déclarées décédées. Toutes les victimes sorties du lieu de l'incendie en AC sont finalement décédées.

**Conclusion:** La prise en charge de victimes multiples d'intoxication aux fumées d'incendie nécessite de disposer rapidement d'hydroxocobalamine et de dispositifs d'abord intraosseux.

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