



RESEARCH TOPIC DASMEN7

New models for patient management in the Emergency Department: looking for improvement of efficiency and quality

Curriculum DASMEN Standard

Laboratory name and address

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Abstract

Emergency department (ED) overcrowding has become a significant public health problem worldwide; it determines a threat to patient safety by increasing morbidity and mortality, and by having negative effects on clinicians' workload.

The general aim of this proposal is to develop an innovative model to stratify and manage patients that refer to the ED, with the final goal of improving both efficiency and quality of care. We aim to design a fast-track model that will allow to identify patients with liver diseases requiring prompt identification and timely therapy and patients with high rate of hospital admission and high diagnostic load that do not require time-dependent treatment. Secondly, we will develop predictive modelling, based on Electronic Health Records (EHR) data, to analyze the evolution of hospitalized versus non hospitalized patient over time. Finally, we aim to build up dissemination and monitoring system of quality and patient's satisfaction using a device-based application.

Main technical approaches

The PhD candidate will learn supervised and unsupervised machine learning models (XGBoost, Deep Q-learning, Long short-term memory) and advanced statistical modeling approaches (i.e. regularized regression, joint modeling of longitudinal and survival data). Particular attention will be dedicated to assessing the performance of the developed prediction tools and to validate the results (both using cross-validation techniques and on external data sources).

Scientific references

- Arroyo V, Moreau R, Jalan R. Acute-on-chronic liver failure. N Engl J Med 2020;382:2137-2145.
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- Taylor T, Wheatley M. Jaundice in the emergency department: meeting the challenges of diagnosis and treatment. *Emerg Med Pract.* 2018 Apr;20(4):1-24. Epub 2018 Apr 1.
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- Siddique SM, Lane-Fall M, McConnell MJ, et al. Exploring opportunities to prevent cirrhosis admissions in the emergency department: A multicenter multidisciplinary survey. *Hepatol Commun.* 2018 Jan 26;2(3):237-244. doi: 10.1002/hep4.1141.

Type of contract

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