Letters

Implementing machine learning in paramedicine

We laud the authors of a recent *CMAJ* article for their usable framework for the development and adoption of machine-learned solutions[1] and propose that this will be useful to guide the use of machine learning in paramedicine. Paramedic clinical decision-making is well positioned to benefit from machine learning, given the prevalence of large paramedic data repositories in Canada. These data repositories are not just large, but are rich in structured patient data features (i.e., clinical, nonclinical, administrative), such as primary complaint, medications, detailed physical assessments, vital signs (including cardiac monitoring), physiologic scores, paramedic interventions and time stamps to encode a sequence of events. These are ideal conditions to construct accurate prediction models. Given that paramedics need to make accurate clinical decisions when patient presentations are complex, machine learning algorithms could inform point-of-care treatment and more appropriate transport destinations besides emergency departments (EDs). To test the accuracy of machine learning algorithms in predicting future patient outcomes while in the prehospital field, the integration of paramedic and hospital ED data is required. Assembling and housing integrated data are barriers, but could be overcome if paramedic services partner with data scientists and data centres.

For example, machine learning could play a fundamental role in developing and implementing new care models for paramedics. In April 2021, the Ontario government launched and instituted new pilot projects to expand paramedic practice to transport patients appropriately to non-ED health centres or, for patients in specific cohorts (e.g., patients needing palliative care, or those with COVID-19), to treat in the community and refer without transport. The implementation of these models is crucial — the use of 911 services for nonemergent conditions has increased substantially over the past decade, and will likely continue to rise with the aging population. Algorithmic deep learning models have the capacity to address the most crucial, but difficult, steps in cultivating non-ED transport protocols, patient risk identification and classification in the community. Converting millions of patient transport records into an intelligent and accurate prediction set of algorithms that identify patients with a very low probability of needing scarce ED resources would support the development of redirection protocols from objective machine learning evidence.

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References

1. Verma AA, Murray J, Greiner R, et al. Implementing machine learning in medicine. *CMAJ* 2021; 193:E1351-7.

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