**Open Science in Emergency Medicine Research**

Medicine is increasingly becoming an information science.[1] Within the last decade, advances in health information technology (HIT) and widespread adoption of the electronic health record (EHR) have transformed our practice of emergency medicine and led to an explosion of health data. Health data are also becoming increasingly interconnected, with expanding linkages to genomic and population/social network data.[2] These growing sources of data and interconnectedness create unique opportunities for innovative, efficient, and cost-effective research to inform clinical decision-making, health services planning, and public health initiatives. They also, however, pose challenges to the quality and responsible conduct of research. Incomplete or inadequate reporting on data collection, storage, and processing make it challenging to identify the strengths, limitations, and biases associated with individual datasets and analytic methods and thus diminish our capacity to reliably reproduce results.[3] Open science, a movement that promotes sharing of both primary data and source code, is a promising initiative to enhance reproducibility. Part of the open science movement is the recognition that data management and analytic decisions have critical implications for interpretation and that computing workflows need to follow the same practices as lab projects and notebooks, with organized data, and documented steps.[4]

To highlight the current status of open science practices within emergency medicine research, we reviewed all original research journal articles from 1/1/2018 to the 1/1/2019 within several widely-cited emergency medicine journals (*Annals of Emergency Medicine*, *Academic Emergency Medicine*, *American Journal of Emergency* *Medicine*, J*ournal of Emergency Medicine*, and *Emergency Medicine Journal*) and determined the proportion of articles where statistical code and/or data was made available either as supplementary material, upon contacting the author, or through a public repository.

Within the specified timeframe, on initial Ovid search there were 1426 articles, of which 643 meet inclusion criteria for further review. Upon review 60 (9.3%) articles were derived from publicly available data sets, 13 (2%) stated that the data was available on request, and 2(0.3%) provided the data within supplementary files. Only 1 (0.2%) paper mentioned the availability of code and no articles included code within supplementary files. There was no disagreement (kappa=1) between the two reviewers for a subset of the articles (n=20). (see supplementary file and executable document for labeling of each article and analysis, <https://github.com/rAndrewTaylor/ed-repoducibility>). In addition to the article-level analysis, we reviewed to what extent the journals follow the Transparency and Openness Promotion (TOP) Committee standards for open science and reproducibility. [5] TOP standards exist among 8 modular domains, across three tiers of increasing publication stringency. All journals were at Level I or lower for every promotion standard except for “Design and Analysis Transparency” and “Study Preregistration”.

These results highlight the paucity of studies and journals in emergency medicine strictly adhering to open science principles. We believe both researchers and journals in emergency medicine must strive to create better systems and practices to enhance future reproducibility.

References:

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