**Open Science in Emergency Medicine Research**

Within the last decade, advances in health information technology (and widespread adoption of the electronic health record have transformed our practice of emergency medicine and led to an explosion of health data. [1] Growing sources of data including genomic and social network linkages create unique opportunities for innovative, efficient, and cost-effective research to inform clinical decision-making, health services planning, and public health initiatives. [2] These advances have also posed challenges to the quality and responsible conduct of research including incomplete or inadequate reporting on data collection, storage, and processing and limited reproducibility. [3] Open science is a movement promoting data and code sharing in order to facilitate reproducibility and interpretability of research. [4] Here, we sought to critically assess the how emergency medicine research conforms with open science principles.

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. 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 eight modular domains, across three tiers of increasing publication stringency.

Within the specified timeframe, on initial Ovid search there were 1426 articles, of which 643 met inclusion criteria for further review (i.e. full-length journal articles of original research).  Upon review 54 (8.4%) articles were derived from publicly available data sets, 13 (2%) other articles 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 the Ovid search, labeling of each article and analysis, [https://github.com/rAndrewTaylor/ed-repoducibility](https://nam05.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2FrAndrewTaylor%2Fed-repoducibility&data=02%7C01%7Crichard.taylor%40yale.edu%7Cff0f162f4f6f40d4e92908d7d152c672%7Cdd8cbebb21394df8b4114e3e87abeb5c%7C0%7C0%7C637208025871534796&sdata=giCfcNLaKydDiYrJuEYPYWJLITqaVktKXLU3wWfw8F0%3D&reserved=0)). 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 practices.  We believe both researchers and journals in emergency medicine must strive to create better systems and practices to enhance future reproducibility.

References:

1. [Schneeweiss S. Learning from big health care data. *N Engl J Med*. 2014;370(23):2161-2163.](http://paperpile.com/b/feNNvC/xmLz)

2. [Denaxas S, Direk K, Gonzalez-Izquierdo A, et al. Methods for enhancing the reproducibility of biomedical research findings using electronic health records. *BioData Min*. 2017;10:31.](http://paperpile.com/b/feNNvC/gC4V)

3. [Wilson G, Aruliah DA, Brown CT, et al. Best practices for scientific computing. *PLoS Biol*. 2014;12(1):e1001745.](http://paperpile.com/b/feNNvC/RTAs)

4. [Wilson G, Bryan J, Cranston K, Kitzes J, Nederbragt L, Teal TK. Good enough practices in scientific computing. *PLoS Comput Biol*. 2017;13(6):e1005510.](http://paperpile.com/b/feNNvC/8ZXX)

5. [Nosek BA, Alter G, Banks GC, et al. Promoting an open research culture. *Science*. 2015;348(6242):1422-1425. doi:](http://paperpile.com/b/feNNvC/yoH2)[10.1126/science.aab2374](http://dx.doi.org/10.1126/science.aab2374)