**Medication Communication Practices between Providers in Cardiology**

David Ouyang MD1, Rebecca Tisdale MD2, Paul Cheng MD PhD1, Jeffrey Chi MD2, Jonathan H. Chen MD PhD2, Euan Ashley MBBS PhD1,

1Department of Internal Medicine, Division of Cardiovascular Medicine, Stanford University School of Medicine, Stanford, CA USA

2Department of Internal Medicine, Division of Hospital Medicine, Stanford University School of Medicine, Stanford, CA USA

Word Count: 478

**Author Contributions:** Dr. Ouyang had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

*Study concept and design*: Ouyang.

*Acquisition of data*: Ouyang, Chi, Chen.

*Analysis and interpretation of data*: Ouyang, Tisdale, Ashley, Chi, Chen.

*Drafting of the manuscript*: Ouyang, Tisdale.

*Critical revision of the manuscript for important intellectual content*: Ouyang, Tisdale, Ashley, Chi, Chen.

*Statistical analysis*: Ouyang, Tisdale, Chen.

Corresponding author:

David Ouyang, MD  
Stanford University Falk Cardiovascular Research Center,   
870 Quarry Rd Ext, Palo Alto, CA 94304   
ouyangd@stanford.edu

Background

New medication classes such as non-vitamin K oral anticoagulants and angiotensin receptor neprilysin inhibitors have been recently introduced into cardiology practice. With the introduction of new medications, there is often a push towards using trade names when providers are still unfamiliar with the medications. The use of trade names for drugs in clinical practice raises awareness of these brand-names and has been shown to increase their use1. Academic medical centers have made a concerted attempt to teach generic medication names and discourage the use of trade names to reduce bias and contain costs, howeverusage of trade names persists1-4. We sought to characterize the relative use of trade and generic drug names across multiple cardiology subspecialties, and associate their naming patterns with name and medication characteristics.

Methods:

We analyzed 1,048,576 text pages to housestaff between June 1, 2013 and April 24, 2017 at a large academic university hospital. Mentions of medications frequently used in cardiology were identified and tallied. When explicitly mentioned in the body of the text page, the occupation of the sender was established. Estimated daily cost and drug approval date were extracted from datasets from the Food and Drug Administration and publically available databases5-6. Text pages were algorithmically processed using Python and multivariate analysis was performed in R. This study was approved by the Stanford University IRB.

Results:

We identified 102,243 pages regarding medications, of which 34,489 (33.7%) pages were from nurses and 20,446 (20.0%) pages were from pharmacists. Forty-seven commonly used cardiac medications were mentioned a total of 26,463 times. There was significant variation in the preferential use of brand names vs. generic names (Figure 1). The most common classes of medications were anti-arrhythmics (14.6%), angiotensin-converting-enzyme inhibitors (14.6%), and beta blockers (12.5%). Nurses were more likely to use trade names than pharmacists (p = 0.02). On multivariate analysis, increased use of trade names over generic names was associated with more frequent mentions, recent FDA approval, increased generic cost, being on patent, and an increased number of syllables in the generic name (Table 1). There was no association with medication class or indication.

Comment:

Text paging behaviors provide a reflection of real-world provider-to-provider communication outside of formal documentation. Applying a high-throughput method of assessing medication naming sentiment, we show that there is significant variability in preference of brand name versus generic name usage for common cardiology drugs. The influence of pharmaceutical companies can be seen with increased use of trade names in more recently FDA approved medications, medications still on patent, and more expensive medications. This variation is independent of medication name length and was consistent across multiple cardiology subspecialties and medication classes. Further analysis should be done to assess whether naming practices also influence prescribing practices.

Bibliography

1. Mott DA, Cline RR. Exploring generic drug use behavior: the role of prescribers and pharmacists in the opportunity for generic drug use and generic substitution. *Med Care*. 2002;40(8):662-674. doi:10.1097/01.MLR.0000020926.85284.8E.

2. Sierles FS, Brodkey AC, Cleary LM, et al. Medical students’ exposure to and attitudes about drug company interactions: a national survey. *JAMA*. 2005;294(9):1034-1042. doi:10.1001/jama.294.9.1034.

3. Austad KE, Avorn J, Franklin JM, Campbell EG, Kesselheim AS. Association of marketing interactions with medical trainees’ knowledge about evidence-based prescribing: results from a national survey. *JAMA Intern Med*. 2014;174(8):1283-1290. doi:10.1001/jamainternmed.2014.2202.

4. Steinman MA, Chren M-M, Landefeld CS. What’s in a Name? Use of Brand versus Generic Drug Names in United States Outpatient Practice. *J Gen Intern Med*. 2007;22(5):645-648. doi:10.1007/s11606-006-0074-3.

5. Snapshot. https://www.fda.gov/drugs/informationondrugs/ucm129689.htm. Accessed November 17, 2017.

6. rxpricequotes.com - Drug Price Search. https://www.rxpricequotes.com/. Accessed November 17, 2017.