THE IMPACT OF UNDERREPORTING AND BIAS IN SPONTANEOUS REPORTING SYSTEMS ON THE ASSESSMENT OF DRUG-EVENT ASSOCIATIONS AND DRUG-DRUG INTERACTIONS

D.C. Parks[†], X. Lin, K.R. Lee

GlaxoSmithKline Pharmaceuticals R&D, Collegeville, USA

[†] E-mail: *daniel_c_park@gsk.com*

The Spontaneous Reporting System (SRS) is used to collect reports of adverse drug reactions (ADRs) during a drug′s post-marketing phase. Regulatory agencies and the pharmaceutical industry actively analyze SRS data to detect signals that may indicate a potential drug safety issue. However, there is an inherent limitation of the SRS: it experiences a high level of underreporting, with FDA estimates of only 1 to 10 percent of all ADRs being reported. The extent of underreporting can be varied. In some cases, event reporting may be a random process. In other cases, such as treatments with an anticipated ADR (e.g. hair loss from chemotherapy), the frequency of reporting may be suppressed, whereas for high-profile drugs (e.g. Viagra), the frequency of reporting is relatively enhanced. In addition, ADRs may not be detected or reported if it mimics a patients underlying condition (e.g. arrhythmia). Regardless of its nature, the underreporting problem can lead to significantly flawed understanding of drug-adverse event associations and problematic drug-drug interactions. However, the extent of this impact is unknown. In this study, we investigate the impact of underreporting through simulations of various scenarios and calculating relative ratios using the Empirical Bayes method, the Proportional Reporting Ratio, and the Bayesian confidence propagation neural network. We also utilize the loglinear model to study the effect of underreporting on understanding drug-drug interactions.