

## Reproducible Research in Public Health

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Despite rapid quantitative expansion of health-related publications, reproducibility of the study is sometimes argues. Inappropriate use of statistical methods is not a rare cause underlying the lack of replications across studies, but the importance of it is usually underestimated[2]. For most health researchers who learned and applied the statistical methods properly had spent long time for learning statistics. Additionally, statistical methods are ever evolving and updating their knowledge and analytic skills will require the most precious resources the time. In this study, we aimed to construct pipelines of reproducible statistical analysis in health research. The development of pipelines in this study consists of 1) automatic suggestions of a summary table describing the general characteristics of the study, 2) univariate analysis of both explanatory and outcome variables of a study, 3) graphical presentations of summary and univariate analyses, 4) automatic analysis and tabulations of main results based on frequently used analytical methods in the health research area (e.g., multiple regression, logistic regression, survival analysis, multilevel analysis, genome-wide association study(GWAS)). For example, researchers can obtain tables and figures if they select data set and dependent variables of interest, and define the nature of each variables (e.g. continuous, binomial, count), explanatory variables, and group variable (e.g., sex, region, or unit of random effects). Using R package **knitr**, L<sup>A</sup>T<sub>E</sub>X and **tex4ht** package in L<sup>A</sup>T<sub>E</sub>X with various statistical packages in R, we developed a automatic words describing the result tables and figures with PDF or opendocument format directly[1, 3]. This automated statistical pipeline tools will help individual researcher in health-related or broader arena to help to reduce their analytical burdens, as well as to conduct appropriate statistical analysis much faster and reliable manner.

### References

- [1] Andrew, A., A. Zvoleff, B. Diggs, C. Pereira, H. Wickham, H. Jeon, J. Arnold, J. Stephens, J. Hester, J. Cheng, J. Keane, J. Allaire, J. Toloe, K. Takahashi, M. Kuhlmann, N. Caballero, N. Salkowski, N. Ross, R. Vaidyanathan, R. Cotton, R. Francois, S. Brouwer, S. de Bernard, T. Wei, T. Lamadon, T. Torsney-Weir, T. Davis, W. Zhu, W. Wu, and Y. Xie (2013). *knitr: A general-purpose package for dynamic report generation in R*. R package version 1.5.
- [2] Baker, D., K. Lidster, A. Sottomayor, and S. Amor (2012). Research-reporting standards fall short. *Nature* 491, 672.
- [3] Cliffe, E. (2012). Methods to produce flexible and accessible learning resources in mathematics: overview document.