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## **Biosignatures of Opioid Addiction Treatment Success (BOATS)**

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We aim to develop a data science platform for learning BOATS and to translate these into clinical validation. We selected six randomized clinical trials (RCTs) of opioid use disorder treatment from the NIDA datashare database based on trial design and data availability. The RCTs compare buprenorphine formulations, doses and placebo effects on abstinence (negative urinalysis). From over 20,000 variables, we selected variables in eight baseline variable domains for harmonization. We completed harmonization across six trials, 582 variables, and 4,853 recruited participants. We also harmonized daily dosage and illicit opioid use (either self-reported or urinalysis) as well as additional covariates that may influence this relationship. Two linked trials were merged resulting in five trials, 3,216 individuals randomized to treatment, and 481,874 dosage timepoints for analysis. Our biosignature modeling strategy for analysis of the influence of dosage on use of illicit opioids was based on: a) general linear mixed model with logistic link; b) fixed and random effects across and within subject; c) Bayesian model analysis with conditional probabilities for effects and variance; d) meta-analysis of individual trial results. Meta-analysis results included significant covariates (direction with lapse): buprenorphine dose (-), clinical adjustment of dose (-), time on trial (-), and the dose-by-time interaction (+) variables. Results suggest potential prediction strata related to dosage and retention and risk of lapse. Future analyses will include analysis of baseline variable domains, incorporation of additional treatment trials, and additional data types, e.g., genotype and epigenetic data.