

Predicting Fat and Protein content in donor milk using machine learning

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Engineering



Background

Donor milk is the standard of care for hospitalized very-low-birth-weight infants when mother's milk is unavailable.

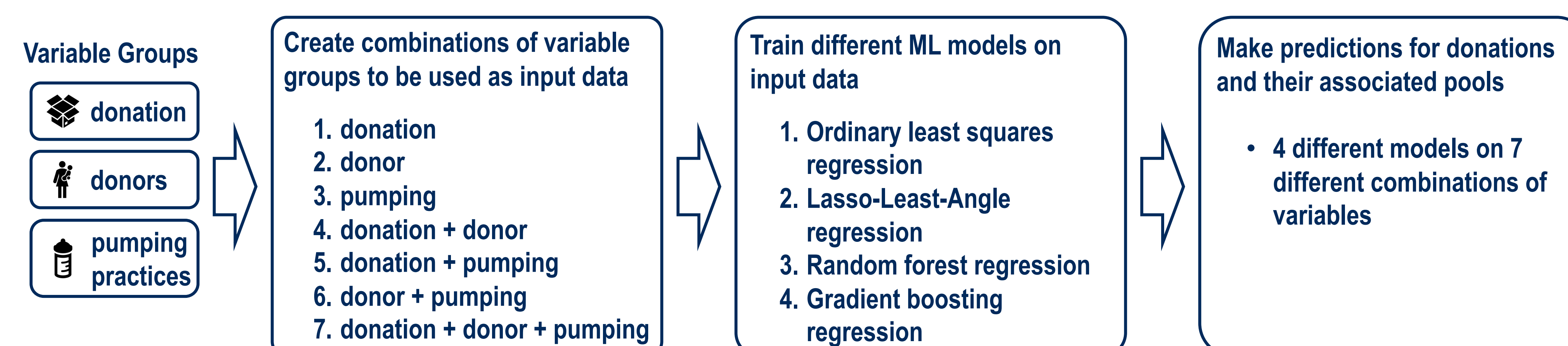
Testing every milk donation for nutrient composition is costly and labour-intensive.

Nutrient variability in donated milk complicates the production of a uniform pooled product by milk banks and thus the provision of adequate nutrition to promote optimal growth of infants.

Methodology

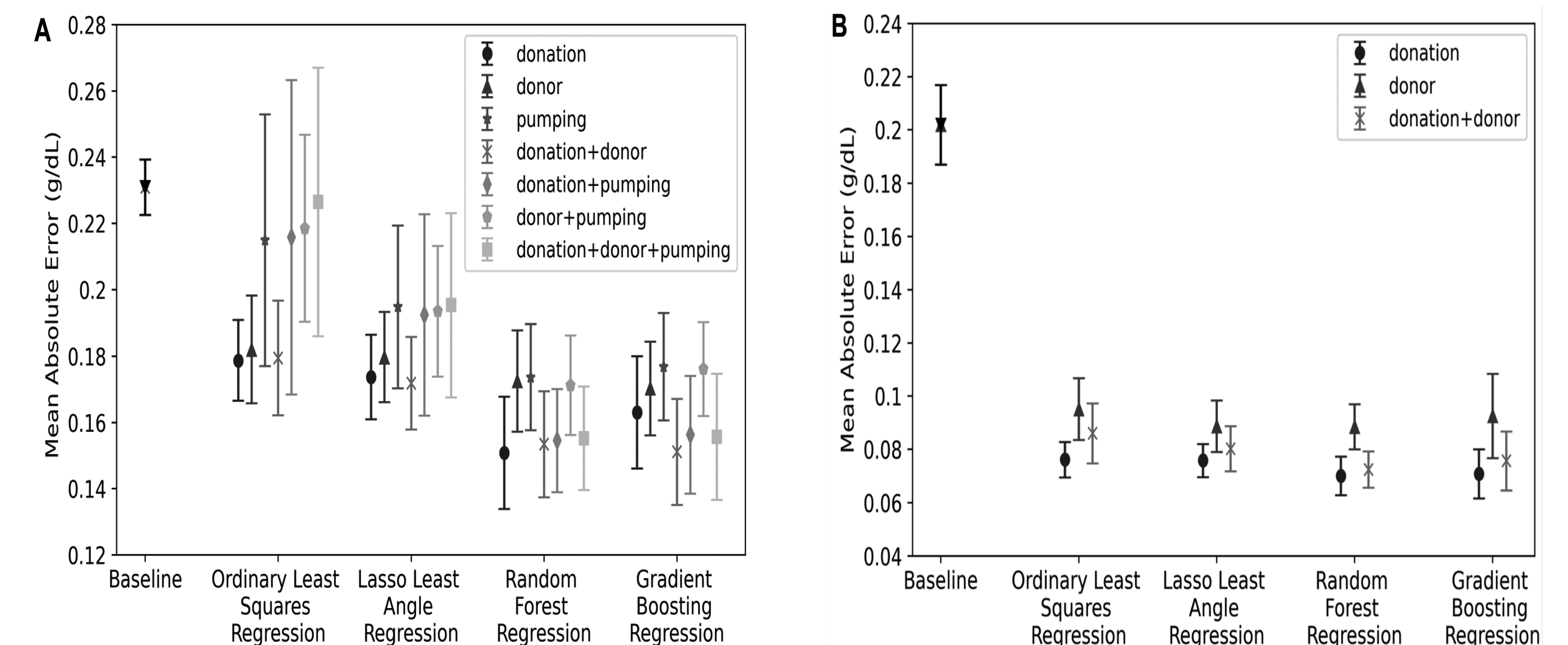
Machine Learning (ML) models for predicting donor milk macronutrient content, focused on fat and protein.

Samples of donor milk were from the Rogers Hixon Ontario Human Milk Bank. A baseline model was established using lactation stage and infant gestational status.



Results

ML models were much more accurate than baseline at both the individual-donation and pool-level. This allows for optimizing which donations should be placed together in donor milk pools.



A trial of a two-step predict-optimize model is underway at the Rogers Hixon Ontario Human Milk Bank.

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