

Many thanks for your interest in our work! Our preprint is currently in preparation. In the meantime, please find below our submitted conference abstract. Please get in touch with yw645@cam.ac.uk if you would like to receive periodic updates on the progress of this work.

Impact of stratified collection volumes on donor adverse events and blood supplies in England: a simulation study

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Background

As the blood donor pool in England diversifies, individualised collection processes may help NHSBT address inequalities in donor and patient outcomes. For example, stratifying collection volumes according to donor estimated blood volume (EBV) could prevent adverse events such as vasovagal reactions (VVRs) in smaller (e.g., younger) donors while optimising collection from larger (e.g., Black heritage) donors. However, though stratified volumes have been implemented by multiple global blood services, sparse evidence is available on their effectiveness. Therefore, our study aimed to evaluate the potential impact of stratified volumes on donor safety and blood supplies in England.

Methods

We compared policies that collected one of multiple blood volume options between 405 and 495 mL from eligible donors with the current NHSBT policy of collecting 475 mL from all donors. Using data from 12 thousand participants of the STRIDES post-donation testing study in England, we adapted published sex-specific discrete event simulation models to estimate total blood volume collected and numbers of adverse events (i.e., VVRs and attendances with under-threshold haemoglobin) under each policy over 18 months.

Results

Among male donors, evaluated policies were simulated to result in up to 3.4-4.0% more total blood volume collected and 0.9-10% more adverse events than the current policy. In this group, no policies achieved increases in volume collected without accompanying increases in adverse events. Among female donors, evaluated policies were simulated to result in between 26% less and 4% more volume collected and between 36% fewer and 4% more adverse events. Notably, one policy assigning donors to give between 405 and 495 mL (in 1-mL increments) while restricting blood loss to $\leq 13\%$ of EBV was predicted to result in 2% fewer adverse events and a similar total collected volume among female donors.

Discussion

Stratified volume policies may increase blood collection yield from male donors in England while placing a greater number of these donors at risk of adverse events. However, a highly stratified collection volume policy may prevent adverse events among female donors while

sustaining blood collection from these donors. Stakeholder engagement and pilot testing is required to understand these policies' feasibility, accessibility, and real-world effectiveness.