Working title: The Storage Impact and Economics of Donor Interval Policies

Esa Turkulainen
esa.turkulainen@veripalvelu.fi

February 13, 2020

Abstract

Storage sustainability is important. Donor health is important. There are important economics to consider in changing donor interval policies.

1 Introduction

Introduce the subject matter. In practice, talk about the importance (and possibly the history) of storage sustainability in blood service and the current practices of maintaining the sustainability. Tie into the voluntary nature of blood donations in Finland, why that is precious and how storage sustainability relates to assuring the value of donations (we do not waster donors' blood) and bridge this into the motivation to better design donation intervals. Make a note of how the storage sustainability analysis translates into economics as units of deferrals avoided and marketing costs increased/decreased.

Explain the structure of the report: we will first consider the factors relating to storage sustainability and what kind of analysis we're aiming at. Describe the data. Describe the methods (models, maths, concepts).

Sum up results and make a remark about how the discussion section will expand on it.

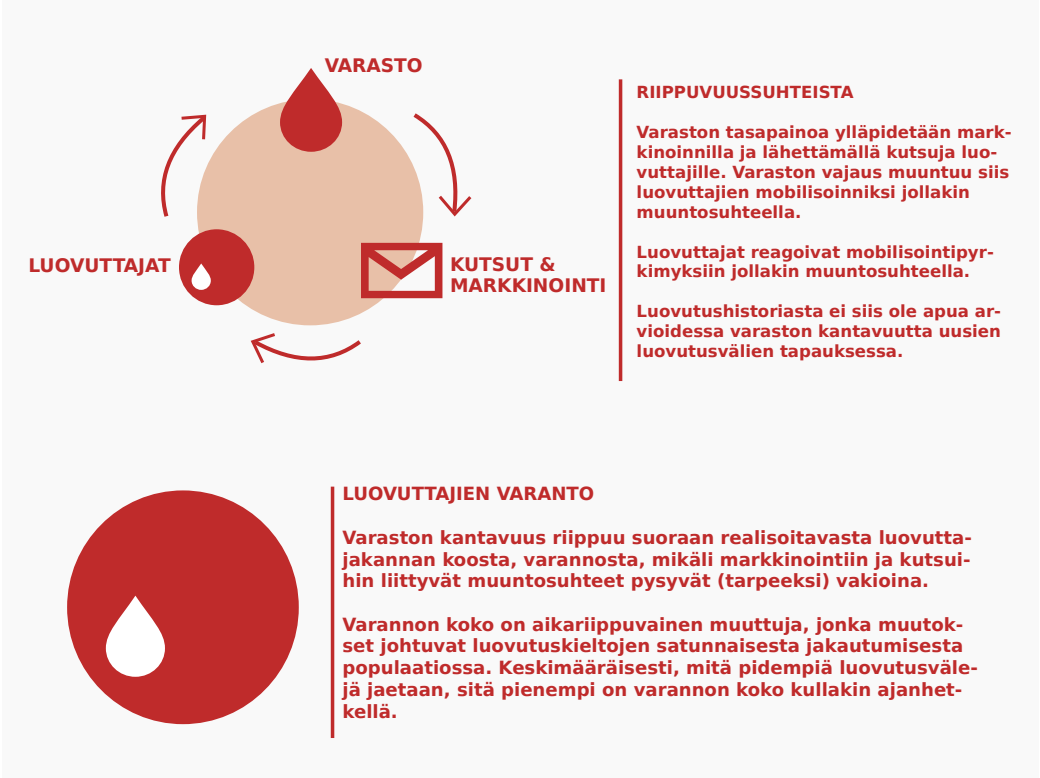

Figure 1: Concepts.

2 Concepts

2.1 Storage

$$S_t = \mathrm{Do}_t - \mathrm{De}_t$$

As a time series:

$$S = \{S_{t_0}, S_{t_1}, S_{t_2}, \ldots, S_{t_n}\}.$$

Storage level is sustained by mobilising donors to donate while trying to minimize wastage. Marketing decisions are made on a weekly basis as I understand, so most sensible time frame for the analysis is most likely a single week. Nevertheless, if storage levels are maintained by sustained marketing as a response to projected demand, we cannot infer storage sustainability from donor influx alone.

2.2 Donor pool

Because storage is maintained by inviting donors to donate, the focus of sustainability is reduced into the question of "Who can we mobilize?". By considering the entire Finnish population and excluding people by donation eligibility, we arrive at the concept of the **donor pool**. Coarsely, the donor pool consists of all eligible donors that might be or might not be regular donors, first timers or who might respond well or poorly to marketing or invites. The donor pool is also a time varying variable, as regular donors get assigned donation intervals and as the distribution of first-timers over time might not be uniform. If the donor pool decreases significantly due to altered donation intervals (assuming extreme extensions to interval lengths) or due to the donation intervals coinciding unfavourably, the storage level might no longer be sustainable with current levels of mobilization.

2.3 Marketing

Marketing (invites, billboards) are the main source of donors besides regular visitors that come without invites or marketing (if they exist). It is not yet known (to me) what is the response to marketing (I hear it's "good"), that is, how many people respond positively to invites (come to donate) and how many people react to billboards (i.e. does a displayed deficit in a blood type

create a greater influx of those types of donors?). Knowing these is essential in determining if we can secure sustainability by increasing marketing or create savings by decreasing it.

2.4 Costs

In addition to storage sustainability, we want to estimate the cost effects of any interval policy changes. The pricing within the blood production chain is complicated and vary between locations, so the best measure is just to consider donations gained and lost by altering the donation intervals. The marketing costs (and possible changes in them) are a part of the storage sustainability analysis and should be considered as a possible addendum to the convertible unit costs of donation event deltas. The unit costs in marketing are also not known: we do not know the efficacies of the different means of marketing.

3 Analyses

3.1 First time donors

How large portion of the weekly donors are first time donors? Figure 2 suggests that each week there are around 500 donors that are donating for the first time ever. This should be the majority of weekly donations.

4 Results

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

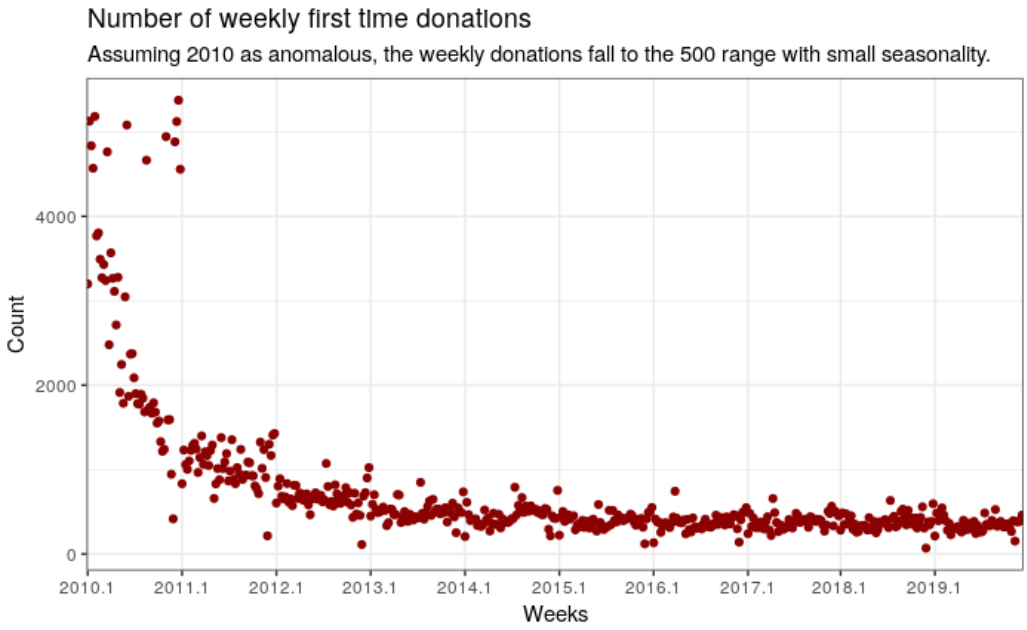

Figure 2: First time donations as a weekly time series.

5 Discussion

Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio. Sed vehicula hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus. Something to be cited.[**?**] Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque

cursus luctus mauris.

5.1 Validation

Morbi luctus, wisi viverra faucibus pretium, nibh est placerat odio, nec commodo wisi enim eget quam. Quisque libero justo, consectetuer a, feugiat vitae, porttitor eu, libero. Suspendisse sed mauris vitae elit sollicitudin malesuada. Maecenas ultricies eros sit amet ante. Ut venenatis velit. Maecenas sed mi eget dui varius euismod. Phasellus aliquet volutpat odio. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Pellentesque sit amet pede ac sem eleifend consectetuer. Nullam elementum, urna vel imperdiet sodales, elit ipsum pharetra ligula, ac pretium ante justo a nulla. Curabitur tristique arcu eu metus. Vestibulum lectus. Proin mauris. Proin eu nunc eu urna hendrerit faucibus. Aliquam auctor, pede consequat laoreet varius, eros tellus scelerisque quam, pellentesque hendrerit ipsum dolor sed augue. Nulla nec lacus.

6 Conclusion

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui. Morbi ultrices rutrum lorem. Nam elementum ullamcorper leo. Morbi dui. Aliquam sagittis. Nunc placerat. Pellentesque tristique sodales est. Maecenas imperdiet lacinia velit. Cras non urna. Morbi eros pede, suscipit ac, varius vel, egestas non, eros. Praesent malesuada, diam id pretium elementum, eros sem dictum tortor, vel consectetuer odio sem sed wisi.

Acknowledgements

I thank the A for working with me as a lab partner. I thank B for letting me use their equipment and providing access to various research tools, and I thank C and D for discussion and comments on this manuscript.

References

[1] "Github: FRCBS interval-sims"