

# Mobile application for communication increases the efficiency of organ procurement and transplantation

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## OBJECTIVE

Measure the impact of a user designed mobile application to streamline the communication and coordination burden during the deceased donor organ procurement and transplantation process.

## INTRODUCTION

One limitation on organ transplantation is the simultaneous coordination and communication involved among various organ procurement and transplant clinical and support teams. Nearly **30%** of discarded organs are wasted due to reasons related to improper coordination and communication (e.g. too long on ice, lost/left behind organs, and no recipients found). Our work focuses on an intervention that leverages mobile application software technology and provides a real-time, secure, team-based communication method. We hypothesize that the use of the mobile app improves the deceased donor organ procurement and transplantation process.

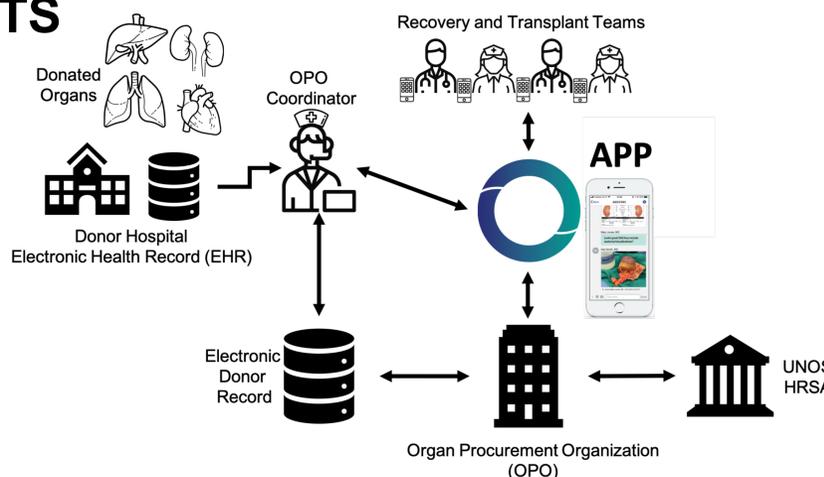
## METHODOLOGY

1. Design, and develop the mobile app with input from clinical users and stakeholders at industry conferences (e.g. AOPO, NATCO, UNOS TMF).
2. Perform Relational Coordination Analytics (RCA) methods (e.g. user surveys).<sup>3</sup>
3. Implement the mobile app for live clinical use with procurement and transplant for a period of one year.
4. Measure the relational coordination (RC) scores and analyze the report of organ offers (ROO) data.
5. Report key metrics for procurement and transplant process; RC TeamScore®, redundant phone calls, clinical productivity, availability of relevant information, mobile app failures, case time from offer notification to transplant, and total number of organs transplanted.

Based on the design and development input gathering cycles, the mobile app needed the following; HIPAA compliance, biometric login, real-time and team-based chats, custom notifications, and detailed read receipts.

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## RESULTS



The intervention cohort consisted of a total of 57 users; 8 surgeons, 16 TC coordinators, 15 OPO coordinators, 4 HLA techs, and additional support staff. They used the mobile app from July `17-`18 on 815 organ offers. The cohort sent more than 8,500 messages and the average read-time was 25 seconds.

RCA surveyed 109 staff from OPOs and TCs among the controls and intervention cohorts. Fifty-four of the 109 responded. Work roles represented were OPO nurses (n=42), TC nurses (n=7), HLA technicians (n=3), and Surgeons (n=2). RCA measured a significant improvement in RC TeamScore® in the intervention cohort compared to controls at separate institutions in similar regions.

Users in the intervention group responded that they experienced significant reductions in redundant phone calls, increases in clinical productivity, and increases in awareness (feeling up to date with accurate info). Users reported zero failures associated with the mobile app.

	Mean	Min	Max	N
Intervention	4.01	3.76	4.29	14
Control 1	3.80	3.53	4.43	10
Control 2	3.37	3.10	3.93	30

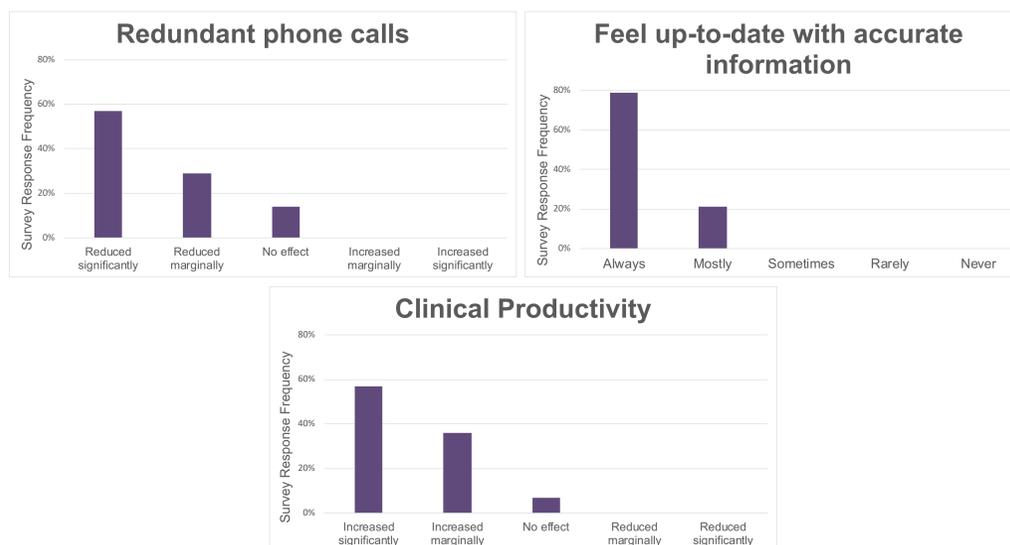


TABLE 1

Comparing the historical controls with the intervention time period, we measured shorter case times (initial offer through transplantation) and an increase in the number of organs transplanted.

Cohort	Case Time (avg, hours)	Organs Transplanted	Full Number Transplanted*
Control 1	16	11	33
Control 2	21	19	57
Intervention	10	22	66

\*According to the Intervention cohort, a total of 66 organs had been transplanted during the study period, however, the ROO data only reported 22.

## DISCUSSION

Mobile- and user- first design methodologies are frequently used in the development of popular communication and social applications. These same design principles allowed for the development of a clinically productive and value-adding mobile app that alleviates a significant limitation on organ procurement and transplantation. The company, OmniLife,<sup>2</sup> deploys mobile apps equipped with real-time machine learning tools used for clinical decision support purposes in organ procurement and transplantation. This research and the company are supported by the NIH.

## CONCLUSIONS

1. The mobile app significantly improved the communication and coordination involved with organ procurement and transplantation.
2. The mobile app was a real-time, effective, primary communication tool for a variety of different work roles among procurement and transplant teams.
3. The mobile app increased team cohesiveness and relational coordination metrics among team members.
4. The mobile app contributed to fewer interruptions, increased clinical productivity, and case awareness simultaneously.
5. The mobile app enhanced the review of the ROO report by adding additional documentation (e.g. declines).
6. The mobile app contributed to a significantly shorter case times and more organs transplanted, up to 21 more organs in a single year (based on historical data).