

# Physician Assistant Integrated Monitoring System using a Mobile App to Support Patients at Home after Colorectal Surgery

## Introduction

- Colorectal surgery patients are particularly vulnerable during their transition from hospital to home due to changes in bowel function/diet, complex wound, stoma and drain care<sup>1,2</sup>
- Rates of unplanned readmission following colorectal surgery range from 11% to 27%<sup>3</sup>
- Up to 20% of readmissions are for dehydration, stoma-related complications and surgical site infections which may be preventable<sup>3</sup>
- Feedback from rectal cancer patients revealed a desire for an interactive, transitional care intervention for support following discharge, such as a mobile application<sup>4</sup>

## Objective

- To develop and pilot test an integrated monitoring system using a mobile app, facilitated by Physician Assistants (PAs) to support patients at home following discharge after colorectal surgery

## Methods

### Phase 1 Mobile App development with SeamlessMD

- A clinical team (3 colorectal surgeons and 2 PAs) worked with SeamlessMD and used content from our previous PA led discharge intervention<sup>5</sup> to develop a custom colorectal mobile app
- We created the "Daily Health Check"; a questionnaire assessing specific patient progress indicators based on the validated Quality of Recovery-15 scale<sup>6</sup>

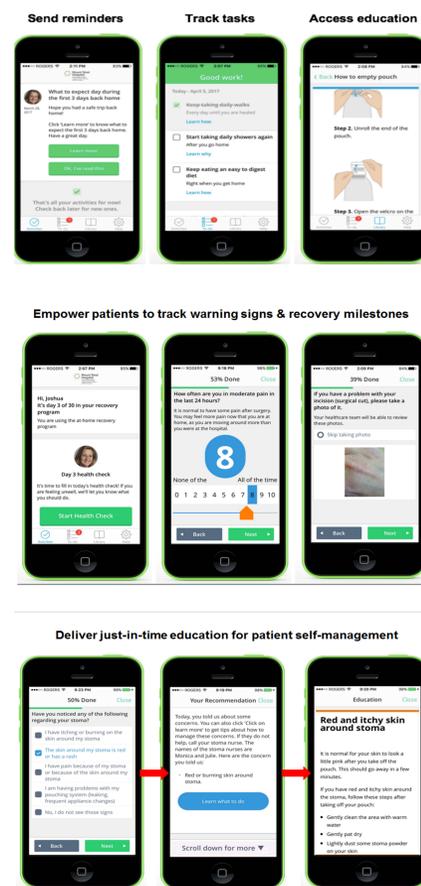
### Phase 2 Pilot test App at Mount Sinai Hospital

- Inclusion criteria: elective colorectal surgery patients, >18 years, understood English and had a smartphone/tablet/desktop computer
- PAs helped inpatients download, and provided instructions about using the app post-discharge
- Patients were sent the "Daily Health Check" via email/text starting the day of their discharge daily until post-discharge day 14; and then on day 21 and 28
- Patients had an option to upload photos of their incision and/or stoma on the app

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- Depending on the responses to the "Daily Health Check", patients received a summary and one of the following recommendations:
  - Your progress is on track
  - Suggestions for educational modules
  - Expect a call from your PA in the next 24 hours
  - Call your surgeon's office today
  - Go to the nearest emergency room

Figure 1. Examples of App interface



- PAs monitored patients' progress post-discharge via a secure web monitoring portal (Fig 2.) on business days between 8 AM-2 PM

Figure 2. Alerts and real-time dashboards to identify patients at risk



- Red flags prompted the PAs to conduct a follow-up phone call; an early clinic visit, ER visit and or hospital admission was facilitated (if needed)

## Phase 3 Patient Evaluation

- Patients completed a *satisfaction survey* about the app at 30 days post-discharge

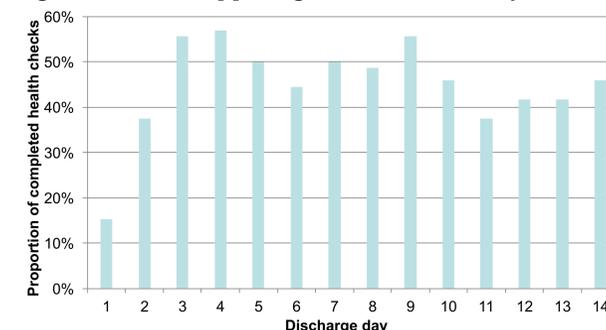
## Results

- Between November 2016 and April 2017, 132 patients were invited to participate in the study, 106 patients consented to use the app
- 92/106 patients used the app following discharge from hospital for a participation rate of 86.8%
- 81 patients (76.5%) logged in and used the app consistently for 14 days post-discharge

Table 1. Patient Demographics (n=81)

Variable	n (%)
Age (years)	Range:33-55
Sex	
Male	45 (55.6)
Female	36 (44.4)
Diagnosis	
Neoplasm/malignancy	19 (23.5)
Inflammatory Bowel Disease	51 (63.0)
Other	11 (13.6)
Stoma	
Ileostomy	36 (44.4)
Colostomy	2 (2.5)

Figure 3. Mobile app usage in the first 14 days at home



- The mean number of app entries per participant was 7.2; highest usage was between post-discharge days 2 to 8
- Responses prompted on average 2.0 callbacks per participant from a PA
- Each PA spent on average 1.9 hours per week monitoring app responses

Table 2: Outcomes for patients who used the app

Outcome	n(%) n=81
ER visits	15 (18.5)
PA facilitated 30-day readmission/ER visits avoided	3 (3.7)
Total 30-day Readmissions	5 (6.2)
Family MD visits	20 (20.47)

Figure 4. *Satisfaction survey* responses (n=20 (23.5%))

Overall Experience using the app: Good or Excellent >80%	Did the app help you feel more confident at home? Strongly Agree 100%
PA Callback feature: Very Useful >90%	Would recommend the app to someone else? Strongly Agree 100%

## Discussion

- The mobile app is viewed positively by patients; indicated by the high participation rate of 86.6% and favourable *satisfaction survey* responses
- The mobile app is a feasible means of monitoring patients post-colorectal surgery
- Use of the mobile app reduced 30-day readmission rates to 6.2% compared to published series ranging from 10-20%<sup>7</sup>
- The mobile app is efficient, user friendly and sustainable since each PA spent 1.9 hours/week to support a large cohort of colorectal patients post-discharge

## Conclusion

- This pilot project provides compelling data to suggest that the mobile app was feasible, highly valued by patients and may lead to a decrease in 30-day readmission rates
- Next steps will be to perform a randomized controlled trial to evaluate the effect of the mobile app on 30 day re-admission rate as well as overall patient satisfaction

References

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