

# Leveraging Technology to Advance Patient Engagement in a Mental Health Care Setting

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**Abstract—** In 2010, Ontario Shores implemented a fully integrated electronic medical record (EMR) with the aim of enhancing patient safety and quality of care. The implementation of the EMR has created opportunities to leverage health IT to make further improvements to the quality of care we provide to our patients, including improving patient engagement through improved access to personal health information and enabling alternative care delivery models. This paper will provide an overview of the strategies Ontario Shores has employed to foster patient adoption and ongoing engagement including the launch of an EMR-integrated patient portal that enables patient and proxy access to clinical data, implementation of a mobile (mHealth) experience for patients to manage their care with actionable interventions through a secure mobile cloud technology platform, and the piloting of a virtual clinic, which will utilize e-therapy that will maximize access and utilization of evidence informed virtual treatments.

**Keywords-** *mental health; patient engagement; patient portal; mobile health; virtual health.*

## I. INTRODUCTION

The National Alliance on Mental Illness (NAMI) reports that approximately 1 in 5 adults in the U.S., 1 in 5 youth (aged 13–18) and 13% of children (aged 8–15) experience a severe mental disorder at some point during their life [1]. Yet, only about 40% of adults and 50% of children with a mental health condition received mental health services in the past year [1]. In the Canadian context, over 650,000 children in Ontario alone suffer from a mental health disorder, and suicide is cited as the second leading cause of death among youth aged 10-19 years, according to the Mental Health Commission of Canada [2].

Ontario Shores Centre for Mental Health Sciences (Ontario Shores), the first Healthcare Information and Management Systems Society (HIMSS) Davies Enterprise Award recipient in Canada and the first HIMSS EMRAM Stage 7 organization in behavioural health worldwide [3], is a recognized leader in the assessment and treatment of those living with complex and serious mental illness. Ontario Shores supports the belief that it is essential to both the health of individuals and their communities to more fully engage patients in their mental health care [4]. Studies have shown that those suffering from mental illness experience

better outcomes and improved quality of life when they become self-empowered participants in their care [5]. Understanding this, Ontario Shores continuously pursues new and innovative ways to promote, measure, and improve patient engagement.

This paper will provide an overview of three strategies Ontario Shores is employing to advance patient engagement, including the launch of an EMR-integrated patient portal, implementation of an offline mobile (mHealth) experience for patients to manage their care (with actionable interventions through a secure mobile cloud technology platform), and the piloting of a virtual clinic, which will utilize e-therapy.

In section II, we outline the approaches that were employed to address patient engagement within a mental health setting. In section III, we highlight some of the challenges that we experienced with the implementation of these health IT solutions. Sections IV and V discuss some of the outcomes and conclusions that have been achieved to date as a result of implementation of these eHealth solutions including increased patient satisfaction, improved treatment/clinical outcomes, improved patient engagement and savings realized as a result of administrative efficiencies.

## II. THE APPROACH/METHODOLOGY

In early 2014, Ontario Shores launched the HealthCheck Patient Portal. The implementation of the portal was aimed at enhancing patient access to their personal health information, bridging the existing gaps related to active engagement and partnership between patients, families and health care providers, evolving current practices and culture from having the provider as the “keeper of the information” to one where the provider and the patients are partners in care. It supports the paradigm shift towards patient-driven care.

Inpatients, outpatients and proxy users are able to access the portal from any device with an internet connection and can view, print or share personal health information found within the portal with other providers in the circle of care [6]. Functionality within the HealthCheck patient portal (Figure 1) includes E-views of reports, discharge summaries, allergies, and ambulatory medication, E-visits whereby secure messages can be sent to the patient’s clinician, and E-requests for prescription renewals (Figure 2) [6].



Figure 1. Healthcheck patient portal main page tabs and functionality

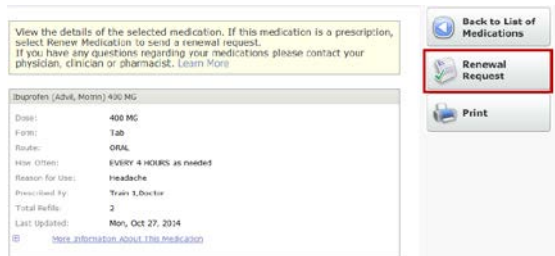


Figure 2. View of e-request prescription renewal in Healthcheck Patient Portal

Leveraging this engagement solution, Ontario Shores has continued to drive patient engagement forward by partnering with a technology based company that offers secure mobile and cloud technology platforms that will integrate with the EMR. It will enable a mobile remote-patient-monitoring health application that delivers personalized interventions to individuals in support of their care plans, thus supporting patients through interactive strategies. Not only will this solution enable patients to be actively engaged in their care through the completion of various behaviour assessment scales, meal assessments, and thought/behaviour trackers, it will also support predictive analytics capabilities, enabling clinicians to more proactively monitor patients and respond to changes in behaviours and assist with identifying patterns and triggers that could prompt early clinical interventions, the development of effective coping strategies, and possibly avoid hospital admissions. Figure 3 illustrates Ontario Shores' mobile health technology solution.

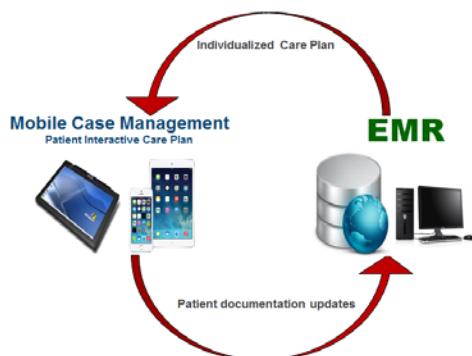


Figure 3. Ontario shores' mobile health technology patient engagement solution

Ontario Shores is also designing and implementing a virtual clinic as an adjunct to the current ambulatory Traumatic Stress Clinic following a stepped-care approach. The virtual clinic is aimed at bridging the long wait times for this clinic with the goal of maximizing patient access to care, utilizing evidence-informed virtual treatments, while more efficiently utilizing clinical resources. The virtual clinic has the potential to target improved population health, to optimize the patient experience and increase value for money.

### III. CHALLENGES/BARRIERS

Transparency is an essential component for a healthcare organization interested in achieving improved patient engagement. One of the many benefits of patient portals is that they promote transparency. With this increased transparency, however, effectively integrating change management strategies to support clinicians with the transition to the use of a patient portal is paramount to how clinicians perceive the implementation of the portal. Recall that this is a paradigm shift for both patients and clinicians, and patient access to records can be a sensitivity for clinicians who feel that their practice may be called into question. At Ontario Shores, clinicians required education and support with shifting their documentation practices to ensure that it supported the transition from documentation that focused solely on sharing information with the treatment team and/or community partners to one which is aimed at achieving a partnership in care with patients via transparent and meaningful personal health information.

In addition, limitations related to functionality are also at play, which can impact adoption by patients and endorsement by clinicians. Currently, the portal system does not provide access to the full EMR (progress notes are currently not viewable, for example) and therefore portal users may still be required to submit a request for information to view components of their EMR that are not currently viewable.

Additional barriers and risks include patient access and adoption of technology (internet access, mobile tablets or phones, Personal Computers (PCs), language barrier, visual and auditory disabilities). Patients with complex health needs may also experience difficulty in learning or using the mobile applications. These risks can be managed by providing training and guidance on content as well as ensuring a comprehensive accessibility plan.

It is also important to note the role that device selection plays in adoption. Planning for the availability of devices for the implementation is integral to the process. Engaging end users, both patients and clinicians, in device selection is also essential to successful adoption. Devices that are cumbersome to use will have a negative impact on patient adoption and clinician endorsement.

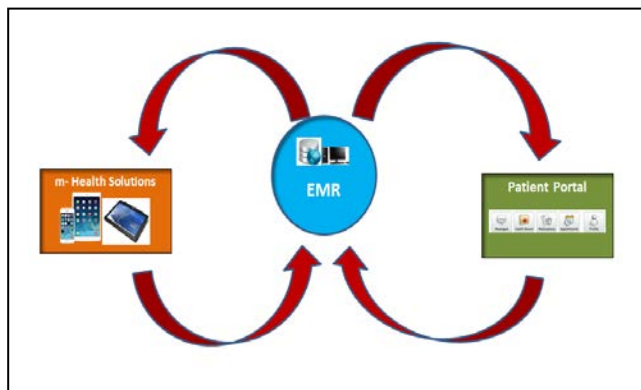


Figure 4. Complexity associated with integrating PHI with the EMR and mHealth solutions

Finally, overcoming interoperability challenges is central to a successful implementation. The complexity of integrating patient health information with the EMR and mHealth solutions must be well understood. Figure 4 demonstrates the flow of information that needs to occur in order to interface the eHealth solutions with the EMR.

IV. OUTCOMES ACHIEVED TO DATE

Following implementation of the patient portal, a rigorous benefits evaluation research study was conducted to assess the impact of the portal on patient engagement, satisfaction, and health outcomes. The results of this evaluation provide implications for enabling active patient participation in their care through transparent access to their Personal Health Information (PHI). They also point to increased patient activation, improved organizational productivity, and greater administrative efficiency.

Using the Mental Health Recovery Measure (MHRM), a robust self-reporting instrument designed to comprehensively assess the recovery process for patients with serious mental illness, along with other system-generated reports to evaluate the impact of the patient portal implementation, Ontario Shores saw a nearly 10% decrease in missed appointments for portal users, an 86% reduction in portal users' release of information requests (Figure 5), and an administrative time savings of between 10.5 and 40 hours per portal user. In addition, statistically significant improvements were seen in portal users in six domains of the MHRM scores following six months of portal access including basic functioning, overall well-being, spirituality and advocacy/ enrichment (Figure 6).

2014 Total ROI Requests Made	2015 Total ROI Requests Made	Total ROI Percentage Decrease
23	3	86%

Figure 5. Portal users total frequency of requests of information (ROI)

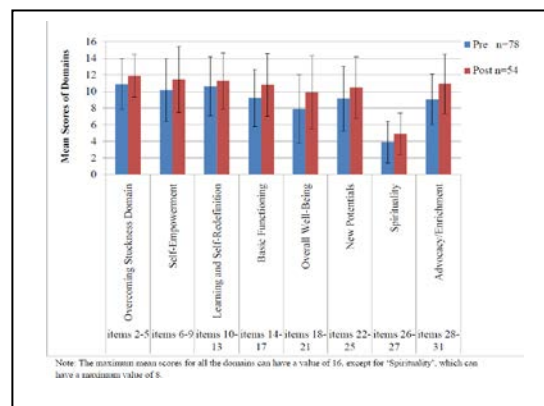


Figure 6. Mean scores of domains on the Mental Health Recovery Measure (MHRM) at pre and post-enrolment to the Healthcheck Patient Portal

The implementation of our mobile technology solution, currently underway, has the potential to advance and support areas of patient engagement that do not currently exist at Ontario Shores, such as tailoring engagement to each patient's unique learning style, continued care and therapy using asynchronous methods that do not rely on traditional face-to-face interactions, creating a feedback loop to clinicians that enables predictive monitoring, meeting the unique needs related to patient instructions, discharge education needs, and supporting a seamless transfer of care.

Expected outcomes include improved treatment and medication adherence, decreased missed appointments as a result of appointment reminders, and improvement in the quality of care plans that support an increased understanding of the triggers that lead to behavioural or emotional difficulty. Additionally, we expect to see improvement in Recovery Assessment Scale-Revised (RAS-R) Scores, which measures a patient's sense of recovery in five domains- (1)personal self-confidence and hope, (2) willingness to ask for help, (3) goal and success orientation, (4) reliance on others, and (5) life view beyond their symptoms [7]. The tool is used to facilitate collaborative, recovery-oriented practice and measure recovery-focused outcomes over time that will enable clinicians to make data-driven decisions to support care planning and assist patients in formulating recovery-oriented goals [7]. Figure 7 shows the percentage of patients that have had an RAS-R score increase by greater than 5 pre-implementation on the pilot units/programs.

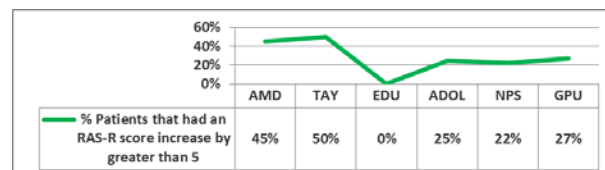


Figure 7. Pre-implementation % of patients that had an RAS-R score increase by greater than 5

Likewise, our virtual clinic is also in the implementation phase and the evaluation will form the basis for recommendations to expand virtual care delivery. Ultimately, the aim of this model is to address the growing

number of patients on the waitlist (currently 247), which will improve patient flow and access to services as well as decrease the average wait time for treatment, currently 391 days. Outcome indicators that will be tracked include a clinically significant change in Post-Traumatic Stress Disorder (PTSD) Severity, which will be assessed using the 20-item PTSD Checklist (PCL-5) scale which will assess the 20 DSM-V symptoms of PTSD, a change in depression severity which will be assessed using the Patient Health Questionnaire 9 (PHQ-9), and in-person services avoided (i.e., increased efficiency) based on the percentage of patients that will not require formal, in-person services because they experienced improvement by using the virtual clinic.

## V. CONCLUSION

Ontario Shores has made substantive strides towards improving patient satisfaction. One early adopter of the portal indicated “[j]ust having my own access has given me freedom as a patient.” This type of qualitative feedback is indicative of patients feeling increased autonomy as a result of having access to their PHI. Additionally, users indicated that “[t]his system is very helpful for appointment reminders”, which is supported by the downward trend in overall missed appointment percentages post-portal implementation. Missed appointments among portal users decreased by 9% in comparison to non-users who decreased by 6%. In 2015, users accounted for 26% of 4948 total missed appointments compared to non-users who accounted for 74%. In addition, users accounted for 958.5 hours planned for appointments that were not fulfilled or 0.5 full-time equivalent (FTE), while non-users accounted for 2752.5 hours planned for appointments or 1.4 FTE.

In terms of the impacts that these strategies have had on improved patient outcomes, statistically significant improvements were seen in portal users within the following six domains of the MHRM scores following six months of portal access: overcoming stuckness, basic functioning, overall well-being, new potentials, spirituality, and advocacy/enrichment. These results add to the body of knowledge and literature, as there are currently very limited studies focusing on the impacts of patient portals on users among the mental health population.

Given the vital role that predictive analytics can play in the area of mental health, the collection of application usage data, self-reported assessments and behavior tracking through the mHealth app, clinicians can track patient behaviors, identify triggers and can proactively implement preventative interventions to avoid hospital admissions and emergency room visits.

Additionally, patients can be directed and prompted with adaptive behaviours to improve self-care using the app. Patients can participate in manualized therapies at their convenience through their mobile device anytime and anywhere. By incorporating this type of technology into patient care, we are realizing goals around enhancing access to quality mental health care.

In terms of additional value for money post portal implementation, the organization saw a decrease of 86% in the frequency of ROIs compared to non-users who saw a decrease of 57%. Users contributed to an organizational time savings from managing requests of between 10.5-40.0 hours.

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