



## Original Research

# The Family Medicine-Based Virtual Ward: Qualitative Description of the Implementation Process

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## ABSTRACT

**Purpose:** Numerous transitional care interventions have been proposed to improve care transitions from hospital to home and reduce avoidable hospital readmissions among chronically ill older patients. The virtual ward (VW) is an intervention that aims to reduce

this risk by providing follow-up care for patients discharged from the hospital. In 2015, a family medicine-based VW was implemented at the Jewish General Hospital, in Montreal, Canada. This intervention involves care coordination and follow-up by the multidisciplinary primary health care team. This study provides a description of the family medicine-based VW and its implementation

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to guide health care providers seeking to adapt this intervention to their own setting.

**Methods:** A retrospective qualitative study was conducted. Data was obtained from semi-structured group interviews with the VW team and health professionals from two other hospitals, and from informal discussions with members of the VW team. An inductive narrative approach was used for data analysis.

**Results:** The design of the family medicine-based VW was informed by a systematic review of transitional care interventions. The team adapted the VW to utilize existing processes and identified three distinct modules that implementers should consider: discharge planning, case management, and weekly multidisciplinary rounds. The following were identified as key factors in the implementation process: 1) funding, 2) home care, 3) communication, 4) standardization of protocols, 5) quality improvement, and 6) positive reception.

**Conclusions:** The family medicine-based VW addresses the care of frequent health system users and compensates for gaps in communication and coordination. This research may be useful in informing family medicine-based VW implementation initiatives by providing contextual detail about the family medicine-based VW, its implementation process, and factors that facilitated its implementation in a Montreal hospital.

## Introduction

It is estimated that approximately 20% of patients discharged from the hospital are readmitted within thirty days (1). The risk of readmission is increased for older patients with multiple chronic illness (2-4). A large portion of readmissions may be prevented with improved communication and continuity of care during the transition (5). Multiple post-hospitalization transitional care interventions have been proposed to address these gaps (6). One transitional care intervention that has been successful in the United Kingdom and that has recently been implemented in select hospitals in Canada and the United States is the *virtual ward* (VW) (7-10).

The VW provides transitional care to inpatients identified as being at increased risk of emergency department (ED) visits or hospital readmission (11). The VW builds on the hospital-at-home model (12) by providing care in the patients' homes for conditions that would otherwise require in-patient care. In contrast to hospital-at-home programs, which are a substitute for hospital admission, VWs provide a combination of early discharge and transitional care for admitted patients.

A recent systematic review of transitional care interventions found that the risk of complications and readmissions was reduced and patient satisfaction was increased when there was greater continuity of care, involvement of multidisciplinary teams, and closer follow-up (7). Also, further reduction in risk is expected when the VW is anchored in primary care, since family physicians would be more implicated in discharge and follow-up (9). It is therefore recommended that transitional care interventions incorporate the above elements.

The Herzl Family Practice Centre ("the Herzl"), a Montreal Family Medicine Group (FMG) affiliated with a large, urban hospital (the Jewish General Hospital – JGH), developed and piloted a family medicine-based VW. The family medicine-based VW was implemented at the JGH with the aim of reducing the number of avoidable readmissions. More specifically, the intervention was developed to 1) target older, more vulnerable patients at high risk of ED visit or hospital readmission (9, 13), 2) begin hospital discharge planning while patients are still in the acute care setting (14), 3) and provide better continuity of care by coordinating with the patients' family physician (9).

VWs are an increasingly popular way of providing patient-centered follow-up care after hospital discharge (15). Knowledge about its implementation process and how VW components may be adapted to different needs and resource availabilities is expected to help improve the success of implementation initiatives. However, existing research provides insufficient detail about the intervention, context, and implementation process to inform VWs' transferability to other settings, in Quebec and internationally. The objectives of this research were, therefore, to: 1) provide a description of the JGH family medicine-based VW, and 2) provide a description of the processes surrounding its implementation at the JGH.

## Methods

### Study Design

This research followed a qualitative descriptive study design (16). A participatory research approach (17) was followed, consisting of a collaboration between researchers and clinician stakeholders to generate more meaningful knowledge and more readily effect change (17, 18). The research team comprised: the VW physician, VW nurse case manager, a research coordinator, and three researchers. All members contributed to defining the objectives, data collection, data analysis, and dissemination of results (19).

## Data Collection

Data collection took place between 2015 and 2017. Data was obtained from: 1) a group interview (2016) with members of the JGH VW team; 2) two group interviews (2016), each conducted with at least two members of the JGH VW as well as members of a different hospital (*Site 2* and *Site 3*) with an embedded FMG; and 3) individual informal interviews with the members of the JGH VW clinical and administrative staff. The participating members of the JGH VW team were: the VW family physician, the VW nurse manager, the VW nurse case manager, the VW medical resident, a pharmacist, a social worker, and an administrative coordinator. *Site 2* is another urban Montreal hospital, and *Site 3* is located on an Indigenous reserve, within proximity of Montreal. The participants from *Site 2* were: the Family Medicine Unit medical director, the Family Medicine Unit assistant director, the Family Medicine Unit department head, and the head of service nurse clinician assistant. The participants from *Site 3* were: the director of nursing, the home care nurse manager, and a family physician. The group interview guide was developed using the Diffusion of Innovations framework (20) with additional questions added by the research team to address conditions of implementation more relevant to the VW program. The group interviews were audio recorded and transcribed, and notes were taken by 3 researchers during the discussions. For the informal interviews, notes were taken during the discussions (over 50 hours of research team meetings between 2015 and 2017).

## Analysis

A narrative approach (21, 22) was used to analyze interview transcripts and meeting notes to develop a description of the family medicine VW and its implementation at the JGH. An inductive thematic analysis (23) was performed to draw out key conditions that facilitated its implementation. Data were coded, for preliminary themes pertaining to these facilitating conditions, in parallel by two researchers using NVivo (version 12). Disagreements between coders about how data were categorized were discussed until consensus was reached. The emergent themes were then discussed, validated, and interpreted with the research team.

## Ethics

Ethics approval was obtained from the McGill University Faculty of Medicine Institutional Review

Board. All members of the research team and all participants in the group interviews provided written consent prior to participating.

## Results

### Description of the family medicine-based virtual ward

Hospitalized patients with an elevated risk of ED visit or future hospitalization are recruited for admission to the family medicine-based VW program. The program combines community-based follow-up care with principles of hospital care, which involves an interprofessional team, regular team meetings, and a single point of contact for patients. It was conceived as an extension of an existing home care program, to which a nurse case manager was added. The core VW clinical team at the Herzl comprised: a VW family physician, a nurse manager, a VW nurse case manager, a VW nurse practitioner, a VW resident, a social worker, and a pharmacist. The entire team participated in weekly multidisciplinary rounds and home care planning. The roles of each VW team member were clearly defined. The nurse manager at the Herzl played a key role in establishing the program, refining protocols, and leading the quality improvement process. The VW nurse case manager provided care coordination among the members of the virtual-ward multidisciplinary team, the patients' usual family physicians, home care services from community health centres (*Centre local de services communautaires - CLSC*), and patients/caregivers. She also functioned as the primary point of contact for the patients and their family after discharge and monitored the patients' progress closely, mainly through telephone evaluations. The VW nurse practitioner conducted physical evaluations and adjusted treatment plans in collaboration with the VW medical resident and VW family physician. The pharmacist oversaw medication adjustments and made recommendations for optimal pharmacological management. The social worker played an important role in evaluating patients' social and family environment, ensuring that patients and caregivers have adequate resources for home recovery. The VW family physician and/or resident admitted patients to the VW, reviewed the case, performed home visits to assess the patient's recovery, regularly assessed patients' needs, provided guidance to the VW nurse case manager, and adjusted medications when needed. For instance, if a patient presented signs of acute heart failure exacerbation, the VW physician could adjust the medication accordingly



and inform the VW case manager to provide closer follow-up. Finally, an administrative coordinator provided administrative support and scheduled appointments.

The family medicine-based VW program comprised three distinct modules: 1) selection process and discharge planning; 2) case management and close monitoring after discharge; and 3) weekly multidisciplinary rounds.

### *Module 1: Selection Process and Discharge planning*

The VW nurse case manager conducted daily rounds of the hospital family medicine units to identify potential candidates for the program. She evaluated the patient's risk of ED visit and readmission using the LACE index (13), which generated an ED visit and readmission risk score through a combination of the following variables: length of stay, acuteness of their condition, comorbidity, and ED visits in the last 6 months. Eligible patients satisfied the following criteria: 1) registered to a family physician practicing in the FMG; 2) planned for discharge to their home or to a semi-autonomous residence in the coming days; and 3) achieved a LACE score of 10 or greater, indicating a high risk of ED visit or readmission. The most common conditions of patients admitted to the VW included heart failure, chronic obstructive pulmonary disease, gastro-intestinal bleeding, dementia, and diabetes complications (type 1 or type 2).

Potential candidates were provided with an explanation of the program and consent for admission was obtained. Patients discharged to convalescence or rehabilitation, palliative care, residential centres, or long-term care were not admitted under the program. However, patients discharged to an interim centre were advised to contact the VW upon returning home for potential admission to the program.

Upon discharge of the patient, the VW nurse case manager also verified the presence of a medication reconciliation, notified the patient's usual primary care physician of his/her program enrollment, and verified that the patient has scheduled follow-up appointments with his/her usual family physician.

### *Module 2: Case management*

The second module comprised: the work of the VW nurse case manager leading up to and following patients' discharge from the hospital. The nurse case manager provided comprehensive discharge planning and coordination, ensuring that adequate community resources were in place for the patient at discharge and potential gaps in the transition were eliminated. She provided direct

follow-up with patients/caregivers to provide greater continuity throughout the transition period, in addition to typical case management.

After patient discharge, the nurse case manager continued to provide monitoring, support, and information regarding self-care to patients/caregivers, mainly through regular telephone contacts. More precisely, a first telephone contact occurred within the first 48 to 72 hours post-discharge to provide a general patient assessment (i.e. symptoms, quality of life, the quality of healthcare services they receive, etc.). In addition, discharge instructions, future medical appointments, and treatments were reviewed.

During the first month, the VW nurse case manager made daily to weekly phone calls to reassess the patient, adjust medications as needed, and educate optimal management of the patient's condition. These contacts allowed the nurse to identify and manage minor problems, potentially preventing an ED visit. The VW nurse case manager kept the VW family physician/resident informed of the patient's health status and asked for their input into the patient's care plan. The patient's condition was also regularly discussed during weekly multidisciplinary meetings (see below).

Two follow-up, face-to-face visits were scheduled with a health care professional (the VW physician/resident or the VW nurse case manager), at home or in clinic, according to the patient's mobility. The first of these follow-ups was scheduled within the first 7 days following discharge (a 45 to 60-minute consultation), and the second about a month after discharge. Additional follow-ups were scheduled as needed, depending on the patient's condition.

### *Module 3: Multidisciplinary rounds*

The third module consisted of weekly multidisciplinary meetings conducted by the VW team to discuss the enrolled patients. These meetings involved the VW physician and resident, the VW nurse case manager, pharmacist, social worker, nurse practitioner, and (when possible, via telephone) the patient's family physician and a home care services (CLSC) representative. The team discussed concerns affecting the patient's health and well-being, from the perspective of their respective disciplines. They discussed changes in diagnosis or treatment, and the VW nurse case manager then notified the patient/caregiver, the usual family doctor, community pharmacy and home care services. After a minimum of six weeks, if the patient was deemed stable, the team organized the patient's discharge to regular care.

## Implementation process

The VW team explained that, at the JGH, as with most hospitals in Quebec, family physicians and primary health care (PHC) teams are not typically notified when their patients are hospitalized or discharged, despite often being able to provide vital input about the patients' medical histories and appropriate post-discharge care. Typically, upon discharge, patient care may be transferred to CLSC home care services, or, in many cases, patients return home without a clear care plan. Thus, patients are responsible for reaching out to their family physician and transmitting information themselves. Given this gap in communication, the Herzl sought an intervention to better detect avoidable readmissions and ED visits, especially among frail, elderly frequent health system users, and provide proactive follow-up home care to reduce readmission rates.

The family medicine-based VW was initiated by the director of the Herzl after learning that the VW model demonstrated promise in the United Kingdom. The FMG director asked a family physician and nurse manager if they would champion the adaptation of this program to the JGH/Herzl context. In the development of their program, the Herzl team identified a hospital-based VW program in Toronto (9) and consulted its team to better understand how the program was managed and deployed. Unlike the VW implemented in Toronto (9), however, the director sought to anchor it in family medicine, to achieve greater involvement of primary care practitioners. He conceived the family medicine-based VW as a way of reducing avoidable readmissions by establishing a communications network linking the hospital, patient/caregiver, PHC team, and CLSC home care services, and by providing timely home-based follow-up.

Implementation began in 2015 with an examination of existing interventions, with the support of researchers from McGill's Department of Family Medicine; the research team conducted a systematic review of transitional care models with the aim of identifying and understanding key features that render such programs more effective (6). The systematic review found that transitional care interventions tended to be more successful, in terms of health outcomes and satisfaction, when there was greater continuity of care and communication with patients/caregivers, involvement of multidisciplinary teams, and closer follow-up.

The Herzl team then examined and documented existing discharge practices at the JGH. In particular, they noted that discharge summaries were sent to home care

services at the CLSC, often via fax machine. Rarely was there a bi-directional exchange between the discharging ward and home care services; these also included no indication that discharge instructions were followed. Furthermore, CLSC home care services did not systematically provide the hospital ward nor the family medicine group written documentation indicating any changes in the patient's status, results of examinations, or changes to their medications.

Following this examination of existing practices, the Herzl adapted their existing home care program, which involved home visits by family physicians and residents, to provide home care for a small sample of patients recently discharged from the hospital. The program was developed in stages: the Herzl team developed initial clinical protocols, applied them at a small scale, met regularly to discuss, and refined them with input from the McGill University Family Medicine department researchers. The program was first tested using patients from the VW family physician's roster, then expanded to include all Herzl patients. Throughout the first year since its initial implementation (2015 to 2016), over one hundred patients were received for care in the VW. Once processes were sufficiently refined, the ward could handle a concurrent load of around 20 patients.

## Facilitating Factors

The following were identified, in group and individual interviews, as key conditions that contributed to the VW's successful implementation at the Herzl: 1) funding, 2) home care, 3) communication, 4) standardization of protocols, 5) continuous quality improvement, and 6) positive reception.

### *Funding*

The FMG director granted initial funding for a full-time nurse case manager for two years and allocated resources and personnel to pilot the program, given its potential to reduce ED visits. After two years, the regional health network, recognizing the program's potential to reduce healthcare costs, agreed to take over the funding of the nurse case manager.

### *Established home care*

The family medicine-based VW was built around an existing home care program at the Herzl. Prior to the implementation of the program, the VW physician, the nurse manager, and VW coordinator conducted a pilot study examining the discharge process at the JGH to

analyze how patients were being admitted and discharged, as well as to identify gaps that could be addressed. They began initially by integrating patients who had been recently discharged from the hospital into their home care program.

As a home care program was already established, the VW procedures were built on pre-existing home visit procedures. The team was already familiar with the CLSCs of the region. The team members had experience working together, their roles were well-established, and they had human, material, and financial resources at their disposal. The establishment of home care protocols for patients transitioning from hospital to home care, however, involved significant initial information gathering as well as gradual development of communication channels with family physicians and CLSCs; these served to establish and define the network structure. As the program evolved, the team members' roles were negotiated and refined.

### *Communication*

Communication was considered critical to the program's success. The nurse manager's experience in communication and program management was considered an important asset. Implementation of the VW at the Herzl first involved ensuring that the family medicine unit administrators allocate the necessary resources. Communication channels and procedures for coordination with the hospital (e.g. flagging VW patients at the ED) and CLSCs also needed to be established, as well as procedures for including CLSCs and family physicians in rounds. In addition, successful implementation depends on the quality of communication with patients/caregivers, regarding recruitment and follow-up.

### *Standardization of protocols*

Throughout the initial examination of the discharge process, and throughout the VW program, the team met regularly, discussed emergent issues, and devised plans to address them. Over time, increasingly standardized protocols were developed for identifying and notifying the patient's family doctor upon ED visit or hospital admission, identifying eligible patients, ensuring post-discharge follow-up. Protocols were also developed and standardized for communicating with family physicians, home care services, and patients/caregivers.

Protocols first developed on a smaller scale were subsequently expanded, refined, and standardized. For instance, only patients covered by CLSCs nearest to the hospital were initially targeted. Eventually, after protocols

were established with these CLSCs, the program expanded to include patients covered under other CLSCs.

### *Continuous quality improvement*

The family medicine-based VW team devoted time during weekly multidisciplinary meetings to discuss not only the patients admitted to the VW but also the processes relating to the program itself. The VW team also took part in evaluating the research examining the program's processes and impact on readmission rates and length of stay (24). This involvement in research provided additional impetus to reflect on practices, standardize protocols, and collect indicators. Whenever issues or gaps in care were identified (e.g. establishing a fixed meeting time with CLSC staff, including family physicians in rounds), they discussed how these should be overcome and who should be responsible. These measures led to the standardization of protocols specifically adapted to the JGH and the network of CLSCs and family physicians.

### *Positive reception*

The program was well-received at the outset by health care providers and patients/caregivers alike, and this reception was considered to have greatly facilitated its support from stakeholders (administrators, clinicians and patients/caregivers) and uptake at the JGH. The VW explained that patients and providers at the JGH value the provision of home care for elderly patients. Patients and their families relayed to the VW team that they appreciated receiving close follow-up; they also reported feeling better supported and oriented throughout the transition period, which patients often consider complex and confusing otherwise (25). Health care providers at the JGH reported being pleased that their more complex patients received closer follow-up by multidisciplinary teams during this transition. They also reported that the risk of complications may have been subsequently reduced, since these patients occupy a significant portion of their time and workload. Additionally, since the Herzl is a teaching unit, this program was beneficial for residents as they learn about the trajectory of patients from hospital to home and gain a better appreciation of the value of home care and multidisciplinary.

## **Discussion**

The family medicine-based VW is an innovative transitional care intervention that utilizes the routines, staff, and resources of an FMG, rather than those of the hospital. It combines comprehensive discharge planning,

case management, and multidisciplinary follow-up and home care. This program addresses an important gap identified by patients who often report a lack of communication and follow-up following discharge (25). It can also provide improved quality of life for older patients, who tend to prefer recovering at home and avoiding visits to the ED (6). This patient-centered program ensures that patients and caregivers are well informed, and that close follow-up is provided, with the aim of reducing avoidable ED visits and readmissions. Furthermore, it has the potential to reduce health system costs by lightening the ED burden and freeing hospital beds. Six components were deemed essential to the success of the program's implementation at the Herzl: 1) funding, 2) home care, 3) communication, 4) standardization of protocols, 5) continuous quality improvement, and 6) positive reception. The knowledge generated from this research is expected to help administrators and health professions successfully implement a similar transitional care intervention in their own settings.

The family medicine-based VW was designed to address needs expressed by healthcare providers at the JGH, some of which are specific to institutional and provincial context. It was designed to compensate for gaps in communication and coordination between the hospital, family physician, home care services, and the patient and caregivers. Family physicians in Quebec do not systematically receive formal notification when their patients are hospitalized or present to the ER. While most family physicians in Quebec do not have direct access to hospital documentation systems, family physicians at the Herzl have an advantage in that they can access the JGH clinical information system to view a patient's hospitalization record. However, this information is currently not routinely transmitted to family physicians, and hospital staff are unable to access the Herzl's electronic medical record. Furthermore, in many contexts, faxes are still commonly used as the primary mode of communication for transmitting discharge summaries to CLSC home care services. To overcome these communication barriers through the family medicine-based VW, the nurse case manager coordinated directly with CLSCs to establish a back-and-forth communication channel, serving as the link between the hospital, FMG, and CLSCs. Therefore, the VW team needed to develop clinical and administrative protocols to ensure communication and continuity of care for patients at greater risk of ED visits or readmission who were discharged to their homes or to long-term care.

These protocols may not need to be as elaborate in settings with existing channels of bi-directional communication or interoperable EMRs. Other settings may not have the same needs, priorities, resources, and processes. The transferability of this intervention to other health care settings, therefore, implies adaptation of its constituent elements. This program was conceived in a modular fashion, with flexible components that can be adopted and adapted as needed in other contexts. While discharge planning, case management and multidisciplinary follow-up are considered key components of the family medicine-based VW; the ways in which these might be addressed may differ from context to context.

## Trustworthiness

One important consideration regarding the trustworthiness of qualitative research is the credibility of the results (26, 27). The description of the family medicine-based VW, its implementation process, and the interpretation of the contextual factors that facilitated this process were synthesized from conversations involving members of the VW team. We consider that the VW descriptions and their interpretation reflect the VW team's understanding, since team members participated in all phases of the research process. In addition, the interview guide was collaboratively developed by researchers and the VW team members. The triangulation of data further contributed to the credibility of the findings. Group interviews were conducted with care teams from the JGH and two other hospitals (a large urban hospital with an affiliated family medicine unit, similar to the JGH, and one sub-urban hospital serving an Indigenous community). In addition, members of the JGH VW participated in the interviews with these other hospitals. This provided points of contrast that enabled a deeper understanding of the relationship between the JGH VW and its institutional and provincial contexts.

Another key consideration is the transferability of the findings to other settings (27). We therefore employed several measures to support this aim. First, contextual detail at the provincial and institutional levels was provided to support readers' adaptation of the VW to their own contexts. Second, the program was conceived and presented in a modular fashion, to support practitioners of different contexts devising a tailored approach according to their priorities, needs, and resources. Finally, the triangulation of data from interviews with the VW team and staff from two other hospitals helped ensure that our understanding of the program and implementation process



was framed in contrast to different settings. The findings of this research may not be exhaustive, since interviews were conducted with members of three healthcare institutions. Interviews with healthcare providers from other sites may shed more light on potential challenges or facilitating factors that were not explored here. However, we expect that the present account of the JGH VW team's experiences in implementing this program are pertinent to a variety of health settings and that sufficient detail was provided to inform future VW implementation initiatives, in Quebec and internationally.

## Future directions

The family medicine-based VW represents an extension of the home care program at the Herzl clinic and provides protocols for improved communication between health care providers at different points of care. At the JGH, the VW served to lay important ground work for the development of a virtual hospital-at-home, which uses telemedicine to connect providers with patients, facilitating home-based access to specific treatments (e.g. intra-venous infusions).

An evaluation of the impact of the family medicine-based VW on readmission rates suggests that this intervention is associated with a significantly shorter length of stay for patients readmitted to the hospital, compared to a control group (24). This program could result in significant cost savings for frequent health system users, with the reduction in readmissions and ED visits that this program is expected to achieve (28). Comprehensive cost analysis is required to determine the extent of cost saving by reallocating resources from acute care to post-discharge home care. While the cost-effectiveness of VWs are currently unknown (12), the program has the potential for significant savings, given the costs associated with even one ED visit (28, 29).

## Conclusion

This innovative, family medicine-based transitional care program followed patients in their transition from hospital to home and provided coordinated home care with the aim of reducing avoidable readmissions and ED visits. It addressed the care of complex patients who are among the most frequent health system users and compensates for gaps in communication and coordination between hospitals, family physicians, home care services, and patients and caregivers. This intervention seemed to appeal to patients, health care providers, and health system administrators alike. This research provides insight into

how the family medicine-based VW may be adapted to other health care settings.

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