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**An Integrated System to Improve Data Sharing and Quick Accessibility of Patient Information within Palliative Shared-care Teams in HNHB-LHIN**

**(Hamilton Niagara Haldimand Brant - Local Health Integration Network)**

by

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A Thesis Submitted to the School of Graduate Studies

In Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE, eHealth

McMaster University

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Rosemary Nwanagu, Mohammed August 2014

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**MASTER OF SCIENCE** (2014) **McMaster University**

eHealth Hamilton ON

**TITLE:** An Integrated System to Improve Data Sharing and Quick Accessibility of Patient Information within Palliative Shared-care Teams in HNHB LHIN

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**ABSTRACT**

Delivery of palliative care to patients in a patient’s home, where they live with their family or in a retirement or nursing home, is an improved, shared-care team approach of providing quality healthcare services at the end of a patient’s life to reduce pain and stress. The palliative care shared-care teams in the Local Health Integration Network (LHIN) for Hamilton Niagara Haldimand Brant (HNHB also called LHIN4) manage patient health care through documents and trackers created and retained by providers within the circle of care, using several different systems and communication tools. These systems are not currently integrated and are unable to connect in a way that enables the preview, transfer, and receipt of data between these systems to support the needs of palliative care users.

The primary objective of this thesis is to provide a proposal to improve the user experience of palliative care users through enhancement and integration of some of the systems currently in use. These include OSCAR EMR (Open Source Clinical Application Resource Electronic Medical Record) Hospice – InfoAnywhere, CHRIS (Client Health Related Information System) and Clinical Connect. Integration of these systems will address other limitations the shared-care teams are facing, such as communication, system or organizational policies and privacy and information security concerns that stem from the sharing of patient information across the systems, to support a shared-care team’s ability to provide patient care.

During this study, an extensive requirements gathering and analysis was carried out: in-person interviews and teleconference meetings, brain storming sessions on the current systems and review of the secondary data with key stakeholders in the palliative care community. The local hospice sites were visited and extensive input was received from hands-on palliative shared-care teams and hospices across the HNHB LHIN, to ensure that the project team implemented their expressed needs into the integrated solution.

The used case and prototyping approach of gathering the requirements is then used on the initial requirements gathered by sending out an initial draft to the users and stakeholders for their review, changes and additional requirements, hence fostering communication between the business and the development teams each time the brain storming session is held to review the refined requirements, resulting in the development of a high-quality Business Requirement Document (BRD). The project manager, lead developer, software architect, and users/testers were all utilized throughout the entire delivery process to ensure they were all in sync with the documented requirements. This lays the foundation for programmers to implement a quality end product with a technical solution that will enhance and integrate the systems to improve the user’s experience at the point of care.

**DEDICATION**

I dedicate this thesis first to God Almighty who granted me the grace, strength and favour to accomplish all that concerns my pursuit of this master’s degree.

I would like to dedicate this thesis to my awesome God given husband Olufemi Mohammed and our three lovely children, Tosin, Tobi and Tolu for all their prayers, love, support and understanding.

Lastly, I would like to dedicate this thesis to all the palliative patients in the world and the HNHB LHIN palliative care teams for all their hard work, willingness and commitment to deliver quality and improved palliative care to their patients.

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I would like to acknowledge my supervisor Dr. Ned Nedialkov for his time, patience, support and guidance, as he followed me up all the way through from selecting my thesis topic, the project fieldwork and in writing, concluding and reviewing my thesis. His valuable advice is indeed appreciated. My heart filled appreciation goes to the eHealth leadership teams and instructors, especially Dr. Ann McKibbon, Dr. Norman Archer, Dr Emil Sekerinski and Dr Joseph Tan, whose valuable time, teaching and wise advise helped me to discover and succeed in this great and newly found career path. I would like to say a big thank you to the OSCAR Team for the opportunity and learning gained during the eight months eHealth internship that enabled me to put into practise all we had learned in the classrooms plus the extra three months of internship extension given, which enabled my team and I to conclude the field work of this study. My acknowledgement starts from the Executive Director - Tracey Carr, to the lead developers – Jay Gallagher and Marc Dumontier, my shared-care project manager – Madeline Dal Molin Barber, QA Analyst, Alek Mirkin, and the OSCAR EMR team of administrative, QA/QC & business analysis.

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**TABLE 1: TABLE OF ALL ABBREVIATIONS**

|  |  |
| --- | --- |
| **TERM** | **DEFINITION** |
| CC | Clinical Connect |
| CCAC | Community Care Access Centre |
| CHRIS | Client Health Related Information System |
| CPP | Clinical Patient Profile |
| EMR | Electronic Medical Record |
| HNHB | Hamilton Niagara Haldimand Brant |
| HOPE | HNHB Organization of Palliative Care Physician Services / Enhancements |
| HRM | Hospital Report Manager |
| HT | Health Tracker |
| LHIN | Local Health Integration Network |
| Meditech | Medical Information Technology |
| OCUS | OSCAR Canada Users Society |
| OLIS | Ontario Laboratory Information System |
| OSCAR | Open Source Clinical Application Resource |
| XML | EXtensible Markup Language |
|  |  |

**INTRODUCTION**

* 1. Overview

According to the World Health Organization, ““Palliative care is an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual.” (World health Organization, 2014) From meetings held with the palliative teams, a palliative care business model is one that kicks off from a referral process, in which patient with terminal disease and qualify for palliative care are referred to the palliative care team of their area via fax or telephone issued from any of the following: CCAC – Care Coordinator, Community Nurse, Hospice Volunteer, Hospital, Oncology, Nursing or Retirements Home, Family Doctor, Patient or Family Member. Figure 1 below, further illustrates this process.

The delivery of palliative care to patients can be done at the patient’s family home, retirement or nursing home, hospital or hospice by a team of healthcare providers, called the palliative shared-care team for that city and its vicinity. The palliative shared-care team as listed on the Hospice Niagara website would usually be comprised of the following: a palliative care physician, palliative nurse practitioner or clinician, clinical navigator, psycho-social spiritual clinician, bereavement advisor, community care access centre (CCAC) case manager and community palliative service providers. (**Shared care teams**.2014)

Palliative care physician inputs consult notes and prescription in OSCAR for Hamilton, Niagara West, Niagara South and Niagara North, while Branford inputs into InfoAnywhere. They also have access to view Lab results and x-rays from hospitals through Clinical Connect. Palliative Care Nurse Practitioner / Clinician inputs nursing notes in OSCAR for Niagara West, CHRIS for Niagara South and Niagara North, while Branford inputs into InfoAnywhere. CCAC Case Manager or Care Coordinator inputs patients data and referral information in CHRIS for all locations.

Clinical Navigator inputs patient demographics and appointments in OSCAR for Hamilton, Niagara West, Niagara South and Niagara North, while Branford inputs into InfoAnywhere. Psychosocial and Spiritual Clinician inputs the psychosocial and emotional need into InfoAnywhere for Brantford, Niagara South and Niagara North while Niagara West inputs into OSCAR. Bereavement Support Clinician obtains next of kin and family information and inputs bereavement de brief sessions into InfoAnywhere for Brantford, Niagara South and Niagara North and uses OSCAR for Niagara West.

The HNHB palliative care and shared-care outreach team profile as of December 2013 was received from J. Darnay, advisor, health system transformation for the HNHB LHIN, and shown in Figure 2).

## FIGURE 1: Work-Flow Process for Palliative in HNHB LHIN

**Start**

**Patient diagnosed with terminal disease**

**Patient require Palliative care?**

**Patient receives referral from CCAC for Palliative Care**

**Palliative Care team reduces Patient’s pain in his Home, Hospice, Hospital or Nursing Home**

**End**

**Palliative Care Team receives referral via fax, hand delivered or telephone**

## FIGURE 2: HNHB Palliative Care and Shared-Care Outreach Team

## 

This summary describes the various team composition of each area being served within LHIN4 with their respective resource manager and host site/hospice. The project team met and interviewed most of the operating teams listed in Figure 2 mostly at their hospice sites. Abernethy et al also state the importance of carrying the needs of the sites along. “In preparing the Palliative Care Database to become a regional resource, it was critical to acknowledge and respond to local needs of subsequent sites”. The author also mentioned that technology must accommodate the needs and exigencies of the task, site, and user. (Abernethy, Wheeler, & Bull, 2011)

* 1. Background

In the fall of 2012, the feasibility of this research was first suggested by the top management of the Hamilton Niagara Haldimand Brant (HNHB) Local Health Integration Network (LHIN), Stedman Community Hospice, whose palliative care team was using only InfoAnywhere. Also the HNHB Organization Palliative Enhancement (HOPE) palliative physicians from McNally House Center and Hospice Niagara were using the OSCAR EMR, yet they belonged to shared-care teams that had some staff accessing only Info-Anywhere while some had staff that could access both systems. There was little or no time for the palliative care teams to organize a collaborative effort of data and document exchange for different reasons. Due to insufficient IT resources and budget, the OSCAR EMR management was approached to assist in finding a solution to improve their current level of information sharing within the shared-care teams, utilizing the existing systems used by the various organizations that make up the palliative shared-care team.

The CCAC system called Client Health Related Information System (CHRIS), is used by the CCAC Nurse Practitioners or Case Managers within these shared-care teams. This also needs to be brought on board through their top management team in order to determine an integrated architectural solution that will improve the accessibility and sharing of patient data and document within each circle of care.

By the summer of 2013, through the OSCAR EMR project team in the department of family medicine of McMaster University, the palliative shared-care project was initiated by the Executive Director, Tracey Carr. She agreed that Rosemary Mohammed, an eHealth intern, should be assigned as a full-time resource to assess, study and better understand and analyse the user needs and business requirements of the palliative care teams within HNHB-LHIN, with Madeline Barber Dal Molin as the project manager.

The Palliative Care shared-care teams in LHIN4 (HNHB) manage patient health care data through documents and trackers created and retained by providers within the circle of care, using several different systems and communication tools. These systems are InfoAnywhere, CHRIS, Clinical Connect and OSCAR EMR.

OSCAR EMR is an electronic medical record used by diverse healthcare professionals, while InfoAnywhere is a hospice system mainly used by some of the palliative care clinicians to record their sessions. CCAC nurses use the CHRIS system to record and store their patient notes. Table 2 shows the systems used by the different clinicians in each palliative team. The palliative care teams are divided by the area or location covered as shown in Figure 2 and in Table 2.

**1.3 The Problem, its Importance and Difficulty**

“Ontario, a Canadian province, identified the lack of coordination, integration, and consistency of end-of-life care services as barriers to quality palliative care”. (Dudgeon et al., 2007) Also from the research and focus meetings the project teams held with various palliative care teams within LHIN4 (HNHB), the findings in the workflow process show that the team, consisting of palliative care staff from different organizations, use different information systems for documentation.

**TABLE 2:- Palliative care teams and system used by each clinician in HNHB LHIN**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PALLIATIVE CARE TEAM - ROLES** | **Brantford**  **Team** | **Hamilton**  **Team** | **Niagara West Team** | **Niagara North Team** | **Niagara South Team** |
| **Palliative Care Physician** | Info-Anywhere | OSCAR & Clinical Connect | OSCAR & Clinical Connect | OSCAR & Clinical Connect | OSCAR & Clinical Connect |
| **CCAC Support Care Case Managers** | CHRIS | CHRIS | CHRIS | CHRIS | CHRIS |
| **Palliative Care Nurse Practitioner/Clinician** | Info-Anywhere | OSCAR | OSCAR | CHRIS | CHRIS |
| **Clinical Navigator/ Coordinator** | Info-Anywhere | - | OSCAR | OSCAR & Info-Anywhere | OSCAR & Info-Anywhere |
| **Psycho-Socio Spiritual Clinician** | Info-Anywhere | - | OSCAR | Info-Anywhere | Info-Anywhere |
| **Bereavement Clinician** | Info-Anywhere | - | OSCAR |

Though this variety of systems allows shared-care teams an opportunity to use a combination of systems to best fit their needs, the systems are not integrated at this time, which creates the challenge of not being able to have quick access to real time data when updates are done in another system.

Our meetings with a number of the teams in this LHIN revealed that information silos have developed amongst teams that are using more than one system. As a result, information sharing is achieved via telephone conversation, fax, and other modes of communication, which can be time consuming, threaten patient privacy, and increase risk of error and information loss. In particular, teams that have members who use OSCAR and InfoAnywhere are experiencing fragmentation, when it comes to accessing data, as a result of the way information is shared between these systems.

The project of integrating these systems has been classified into two phases. This report focuses mainly on phase one, which covers the challenges the palliative care user community is facing as a result of OSCAR EMR and InfoAnywhere not being integrated. This is very important, as each palliative shared-care team consists of members who either use one or both of these systems as illustrated in Table 2. Hence, resolving the identified lapses in sharing and accessing patient data within these systems would fargo towards giving the shared-care teams a unified user experience. Phase two covers the challenges and integration of OSCAR EMR with the CCAC System called CHRIS.

The fact that these teams are from different organizations makes it even more difficult to come up with a solution that will be agreeable to all, taking into consideration that various systems have data policies and procedures that apply only to the different organizations. For example, CCAC top management stakeholders at the time of this project insisted on a virtual view of the data in the CHRIS System through Clinical Connect due to high-level management policy and decisions. This led to the phasing of this project integration, resulting in phase two being taken out of the scope of this study.

**1.4 Objective with Proposed Idea and Solution**

The primary objective of this project is to find a solution to the data related problems currently being experienced within the circle of care by the shared-care team, hence improving the user experience of the palliative care users through enhancement and integration of some of the systems currently in use. These include OSCAR EMR, Hospice – InfoAnywhere, CCAC-CHRIS and Clinical Connect.

To achieve this objective, the agile software development methodologies which is increasingly adopted by organization due to its focus on client’s need was selected by the project team for the requirements gathering approach. (Belsis, Koutoumanos, & Sgouropoulou, 2014) Agile delivers higher quality products, promotes collaboration through an incremental process, and optimises program budgets. It is intended to promote transparency within the development process, respond quickly to inevitable changes in business requirements, and deliver functional software as stated by PriceWaterhouseCoopers (PWC, 2014). It was confirmed that the requirement development framework involves elicitation, analysis, specification, and validation of business, user and functional requirements, (Wiegers & Beatty J., 2013). These activities, which are interwoven, incremental, and iterative, were used while collating and developing user stories from the interview and focus meetings held with the palliative care teams within the LHIN-HNHB. This is then used to analyse the data problems the teams are facing and the development of a proposed technical solution with a list of business requirement and accepted criteria that will help improve the sharing and quick access to palliative patient data at the point of care. This will lay the foundation for programmers to implement a technical solution that will enhance and integrate the systems, to improve the user’s experience at the point of care. The steps taken by OSCAR EMR to manage the requirements development are discussed in more details in Chapter 2, Section 2.3.

An architectural strategy in Figure 3 was developed to show the proposed and improved information sharing between the dominant systems being used by the palliative care shared-care teams in the HNHB LHIN. The strategy is to integrate the different systems via XML in other to improve the shared-care user experience at the point of care.

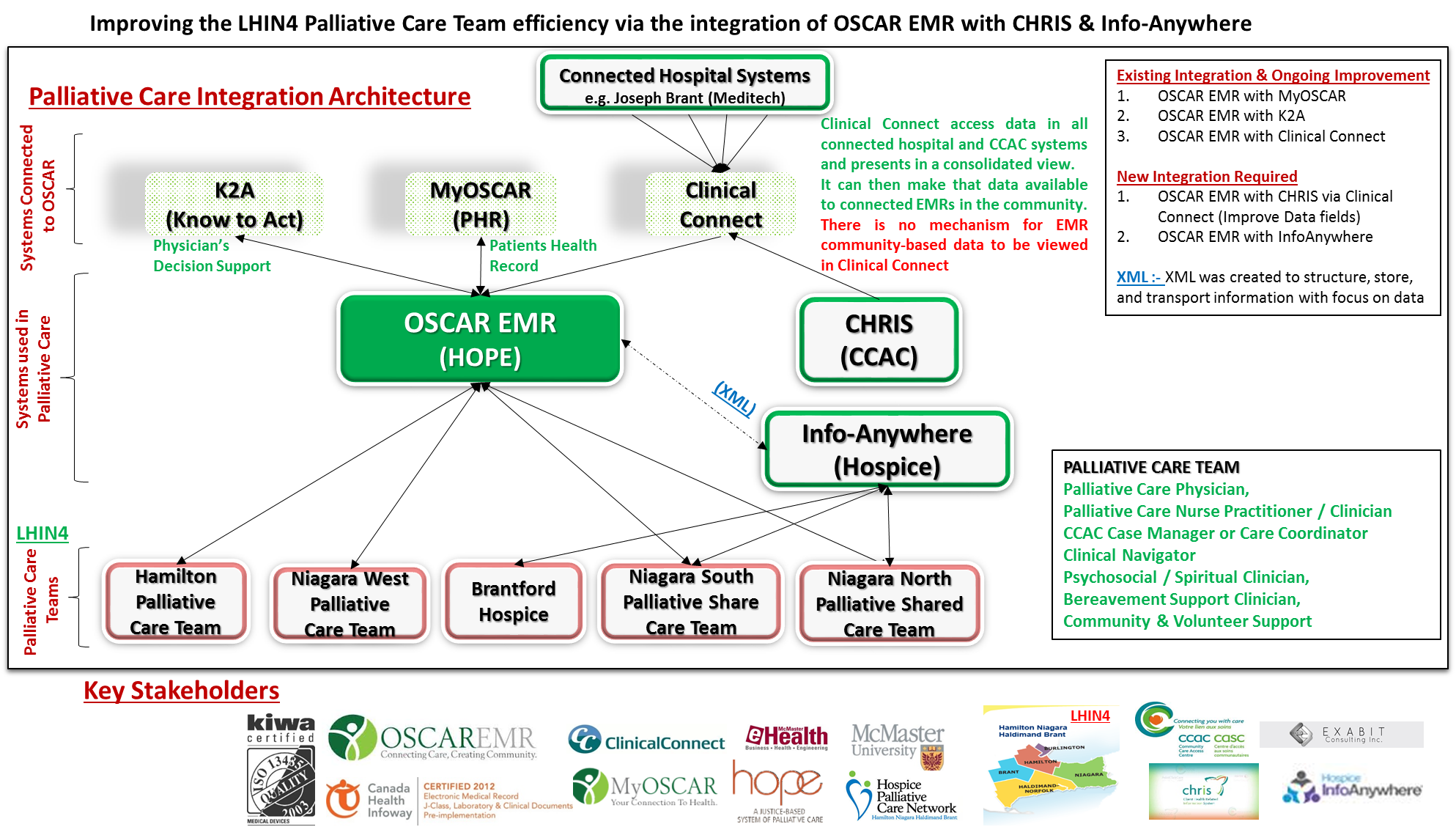
**1.5 Thesis Outline**

Chapter 2 describes the research approach, with the literature review done on the communication barriers and lack of integration including the evidence-based strategies to improve communication and data and system integration in palliative care. The research methodology with the requirement development framework used for data collection, user stories, and research results are also discussed.

Chapter 3 gives a brief description of the systems used for palliative care within HNHB-LHIN (i.e. OSCAR EMR, infoAnywhere, CHRIS and Clinical Connect). A brief description of the OSCAR EMR shared-care project team is narrated, along with the proposed solution for system integration. The project deliverables, project schedule and project cost for the first phase of this project, as covered in this study, are discussed as regards the integration of OSCAR EMR and InfoAnywhere. The research limitations are also covered.

Chapter 4 is the concluding chapter of the study, giving the project’s current state in terms of the real live project. Project limitations with future enhancements and recommendations are discussed briefly

**FIGURE 3: Integrated Solution to Improve Data Sharing and Quick Accessibility of Patient Information**



**2 RESEARCH AND REQUIREMENT ANALYSIS**

**2.1 Approach**

A systematic review was conducted with peer-reviewed literature on integrated palliative care systems and teams within Ontario, Alberta and outside. A Quantitative research approach is initially adopted with online questionnaire sent to the users of the various systems to quantify data and generalize the results and also to measure the incidence of user’s views and opinion of the current systems in use. Extensive user stories, and business requirements were then collated during the qualitative approach later introduced into the study to gain more insight into the prevalent user opinion of the systems and their need to have to the systems integrated. The analysis was carried out through in-person and teleconference interviews/meetings, brain storming sessions and review of secondary data with stakeholders in the palliative care community. The latter included extensive input from several Palliative Care Shared-care Teams and Hospices across the HNHB LHIN.

High-level meetings were also conducted with key stakeholders and top management authorities to determine an approach for addressing the root causes of the obstacles the palliative care provider community is encountering.

In gathering some of the user needs, issues and in developing the business requirements listed in this document, site visits were conducted at three hospices - Brantford, Grimsby and St. Catherine’s. The project team held a focus group meeting with five groups of Palliative Shared-care Teams in LHIN4 (Hamilton, Brant, Niagara West, Niagara North and Niagara South). Other project meetings, interviews and brain storming sessions were also held with stakeholders, and more information gathered from the Ontario Association CCAC requirements for CHRIS integration with EMRs.

**2.2 Literature Review**

The literature review in this section has been grouped into two sections: communication barriers with lack of integration in palliative care teams, and system and evidence based strategies to improve communication, data and system integration in palliative care.

**2.2.1 Communication barriers and lack of integration in palliative care teams and systems used**

A review was aimed at getting the perception of physicians, residents and nurses in a hospital in Toronto, Ontario, on the barriers to communication in the end-of-life care using a focus group discussion. The results showed that after the highest rating of patient barriers, the system barrier emerged as the second most frequently discussed, followed by the healthcare providers and the nature of the dialogue related barriers. These first two categories were found to be the major sources of barriers to communication in palliative care and may impact the effectiveness of quality-improvement initiatives in end-of-life care (Anselm, 2005).

In Ontario, Canada it was found that though palliative patients typically receive services from almost every sector of the health care system, there is a lack of integration between the multiple healthcare sectors and palliative care service providers. Also, the system lacked coordination, integration and consistency in the available end of life care services (Dudgeon et al., 2007).

As of 1993 in the Edmonton, Alberta region, the access to palliative care services was inconsistent and poorly coordinated with lack of integration, and stated that it results in late referrals to care, unnecessary delays for treatment and symptom control, delays in transfers to appropriate settings of care, and unnecessary suffering and cost. R. Wiles’s study carried out in the south-east of England also confirmed this result (Fainsinger, Brenneis, & Fassbender, 2007; Wiles, Payne, & Jarrett, 1999).

B.A. Anderson describes how the condition of the dying person changes rapidly and can cause distress to the person and their carer, especially when it occurs out of hours when access to health services is limited (Anderson BA, 2008). Hence, it is important that carers have the ability to quickly access patient information to administer required medications in the home to provide relief and comfort.

**2.2.2 Evidence based strategies to improve communication, data and system integration in palliative care**

In 2004 the Ontario government invested in planning for an End-of-Life Care Strategy, and in 2005 committed USD115.5 million over three years toward this strategy. Central to the strategy was the establishment of End-of-Life Care Networks within each health care planning region (Dudgeon et al., 2007). One of these networks is the HPC Network that was created for the HNHB LHIN region. Its president was present in three of the project focus meetings held with the key top management stakeholders in the various organizations for this project.

During the course of this study, while accessing the website history section of the HNHB Palliative Care (HPC), the D. Dudgeon statement above was confirmed. It was stated that, “part of the Ministry of Health and Long-Term Care’s 2004 Health Care Transformation Agenda, End-of-Life Care Strategy was identified as one of the top priorities”.   The fourteen Hospice Palliative Care Networks created across Ontario assisted the Ministry of Health and Long-Term Care in their general goal of achieving comprehensive, consistent and high quality end-of-life care across the province (HNHB, 2007). The HPC Network and LHIN4 top management were very helpful in this study as they assisted the project team in connecting and coordinating meetings with CCAC top management officials and the Hospice coordinators within the HNHB. The project team submitted a proposal at their request to generate funding for the first phase of the integration project (involving OSCAR and infoAnywhere).

In Alberta, it was mentioned that representatives from various institutions and organizations, as they relate to palliative care, were brought together to develop an integrated, coordinated approach to palliative care service delivery in the Capital Health (Edmonton and area) region, which received final approval in February 1995. The first external evaluation of the program, completed in May 1996, suggested widespread satisfaction with implementation of the program (Fainsinger et al., 2007).

In a study done on palliative care at home in Australia, Anderson in her statement agrees that a team approach requires collaboration between the shared-care teams inclusive of the clients, medical practitioners, nurses, pharmacists, families and other significant clinicians to minimize negative reactions and optimize therapeutic outcomes for those treated with medications. It was important to the carers interviewed that they felt supported by the health care team to undertake the caring role (Anderson BA, 2008). In hospice and palliative care, healthcare information technology based data collection/management has the potential to generate better understanding of populations and outcomes, support quality assessment/quality improvement, and prepare sites to participate in research (Abernethy et al., 2011). This supports the need expressed by one of the HNHB LHIN top management team for the integration of the palliative systems to be such that data collected can be auto populated to give the network various statistics of the palliative patients and their outcomes.

The essence of this study is to recommend that the palliative care teams and their top organizational management were strategically engaged in developing an integrated solution by collating their needs and coordinating their management groups as partners. The business requirement document (BRD) has been prepared for developers to utilize in the development of the integrated system through the enhancement of the existing palliative systems, hence giving the users and the palliative care team a unified experience. A web-based software product, Tell Us! was developed, in partnership with palliative care and hospice providers, which permits patients to enter data on a scheduled basis and providers to view cumulative patient data and receive programmable automated e-mail notifications (Dy et al., 2011). OSCAR is currently integrated with MyOSCAR, a patient-controlled personal health record (PHR) that allows patients to share data electronically with anyone they wish, including health care professionals, to schedule appointments on-line in OSCAR, and to communicate with their circle of care using the PHR’s secure messaging function. This will be beneficial to all when the systems are integrated. In the spring of 2006, management in Central Georgia decided to develop a conceptual model for a department-specific information system that would go beyond the data archiving being done in Microsoft Access and complement the existing EMR infrastructure. This system is called Footprint Information System, and during the development process, considerable attention was given to issues such as security, usability, and adoptability. There are plans to extend aspects of the Footprints system and experience into the future beyond the palliative domain to other patient populations, where communication is critical (Tsavatewa, Musa, & Ramsingh, 2012).

**2.3 Requirement Gathering Methods**

A combination of various techniques was put in place to gather the requirements. This includes the one to one interview, group interview, prototyping, used cases and brainstorming. Agile propose an iterative and incremental approach to software development, which helps deliver working software at regular intervals. The rationale behind these agile methods and practices is to accommodate change. Also, agile methods are lightweight and the focus is on the people rather than the process. (Soundararajan & Arthur, 2009) A user-directed approach is used with major involvement of end users where the requirements are documented. A study design comprising the elements listed below is used in gathering the requirements:

* Identification of palliative care organizations/providers and the electronic systems used in the delivery of palliative care for patients. Also, the identification of existing care teams with their area of coverage within HNHB LHIN.
* Collection of documentation relating to palliative shared-care organizations, services and systems identified.
* Collection of data on shared-care services and system use over the previous one-year period. Online survey and questionnaire was utitized
* Interviews with key stakeholders and development teams involved in providing palliative care services and systems in HNHB LHIN to identify perceived inadequacies and gaps in the delivery of services and system accessibility.
* Hospice site visits and focus group meetings with palliative care teams to identify user interface and system functionality issues and needs.
* Develop key business requirement documentation to be used by the development team to build a solution system for the palliative care team.

The purpose of identifying the palliative care organizations/providers was to map out their range of available services and their coverage areas within LHIN4. The HOPE coordinator helped to introduce the project team to the various palliative care teams via email, which lead to contacts being established and interview meetings scheduled. Online questionnaires were emailed to these contacts to help identify their specific roles with the electronic system(s) that were accessible and used by each palliative shared-care team member. The questionnaire sent by the project team is in Table 3a, while the responses from the palliative care team members within HNHB LHIN can be found in Appendix D. Focus group meetings were also held with each team to further confirm the results received from the research and questionnaires. Brain storming sessions were also held with top management of the various organizations to help with the additional aim of exploring the views of key stakeholders within these organizations about gaps in the system for palliative care delivery, and potential improvements required for the system to enable the staff deliver improved quality services to patients. The stakeholders identified comprised of top management roles and those providing hand-on palliative care. Palliative care organizations included, HOPE, HNHB LHIN, HPC network, CCAC and hospice centres. The palliative care systems identified include OSCAR EMR, InfoAnywhere, Clinical Connect and CHRIS.

Site visits were made to some of the hospices in the HNHB LHIN, where it was easier for the palliative care teams to meet our project team members. Focus group meetings held with the palliative care teams helped to identify user interface and system functionality issues and needs from the user’s perspectives, which led us to the gathering of user stories and requirements. The agile approach used in this study allowed the project to maintain the requirements in the form of user stories, with the product owners and teams reaching agreement on what stories will be developed in the next iteration based on their priority and their team’s productivity.

In order for me to develop a business requirement document, I worked closely with the users face-to-face for online interviews, or meeting to elicit and review requirements in the form of user stories and other models such as the workflow process and tables. OSCAR EMR has a template for writing a business requirement documents and it was agreed that this template be adopted for this project, like other completed OSCAR EMR projects. Progressive refinement of detail is a key operating phrase for requirement development (Wiegers & Beatty J., 2013).

**FIGURE 4: Requirement Development Framework**

z

\*Ask questions

\*Listen to response

\*Watch stakeholder and users present

\*Process the information

\*Understand information

\*Classify into Categories

* \*Relate needs to software requirements
* \*GO BACK and CLARIFY Requirements

\*Structure User's Inputs

\*Write Requirement Statements and diagrams

\*Close knowledge gaps

\*GO BACK and do additional analysis

Ask Stakeholders to confirm:

\*Accuracy of requirements

\*Completeness of Requirements

\*Correction of any Errors

\*GO BACK to re-write unclear requirements

\*GO BACK to re-visit some analysis activities

\*GO BACK to perform additional elicitation

**Elicitation**

**Specification**

**Validation**

**Analysis**

The diagram in Figure 4 above illustrates the requirement development framework used in this study. This shows an iterative process that performs the task as listed within each process, and it continues all through the requirement development, confirming what K.E. Wiegers (2013) stated: an agile project possibly continues throughout the full project duration (Liu, Peyton, & Kuziemsky, 2009; Wiegers & Beatty J., 2013).

**2.3.1 Requirement Development Framework**

The following top stakeholders were selected for interviews and focus group meetings: Executive Director – OSCAR EMR, Coordinator - HNHB Organization of Palliative Care Physician Services / Enhancements (HOPE), Executive Director - Stedman Community Hospice, Medical Director – McNally House Hospice, Advisor, Health System Transformation – HNHB Local Health Integration Network (LHIN), President – HNHB Palliative Care (HPC) Network, Director, Client Services - Hamilton Niagara Haldimand Brant Community Care Access Centre (HNHB CCAC), Director, Information Systems, Technology, and Facilities - HNHB CCAC, Lead Software Architect – OSCAR EMR and Lead developer –OSCAR EMR and Chief Consultant – InfoAnywhere Hospice. Those providing hands on palliative care services that were also interviewed or gathered for various focus meetings were HNHB Palliative Care Physicians, Palliative Nurse Clinician, Outreach Administrator, Clinical Navigator and Client Service Coordinators, Psycho-Social and Bereavement Clinician. Their individual responses can be found in the appendix. The requirement development framework used for this study is further illustrated below.

**2.3.1.1 Requirement Elicitation (**Data Collection)

The HNHB LHIN Palliative Care top management require an integration of their current system; hence the need to ask the users of these systems for their user interface issues and user requirements. The functional requirements are derived from the user and business requirements. The project vision and project scope containing the product’s business requirement is defined at this stage. The vision statement for this project is the integration of the palliative care systems to improve data sharing and quick access to patient information. The scope of the project is to integrate OSCAR EMR with InfoAnywhere and CHRIS and to allow users to access Clinical Connect through the OSCAR EMR.

Similar to the Wiles et al approach and method, stakeholders were contacted to inform them about the project. This was followed up with telephone calls to arrange a suitable time and venue for interviews and meetings (Wiles et al., 1999). All the stakeholders listed above were contacted, and they all agreed to an interview or to participate in focus group meetings. A schedule of questions was constructed for collecting information from hands-on palliative shared-care teams of care providers so that the information collected would be consistent (See Table 3a).

Interviews with stakeholders were mainly carried out face-to-face, while teleconference lines were made available for others to join. A few interviews where done on telephone. A follow-up for any clarification on information provided was done via phone and Skype meetings, email, or telephone. The interviews ranged in length from 20 to 30 min, the average length being 25 min, while the focus group meetings ranged from 60 to 90 min.

After holding an interview and meeting with the different HNHB LHIN palliative care teams at their locations, the input received was analysed and used to create a table consisting of the respective teams with the job titles and system(s) accessible to each clinician (see Table 2). The user classes and their characteristics were identified, and this was communicated to users for clarification and then to top management for validation. However, still going by our design for the requirement development framework, an online questionnaire was sent to all the palliative (shared) care team members to capture and have a documented copy of each member’s data (see Table 3a). The results from this questionnaire were analysed and used to develop a list of requirements that was emailed to all concerned for their review and correction where necessary. The business analyst then updated the document with the required changes after the key stakeholders and top management of the various organizations validated the list of requirements.

**TABLE 3a: Online Questionnaire sent to each palliative (share) care team member**

|  |  |
| --- | --- |
| No. | ****Questions (Phase 1 & 2 Project)**** |
| 1. | What palliative care or shared-care team do you belong within the HNHB-LHIN?   |  |  | | --- | --- | | Niagara South | Burlington | | Niagara North | Brantford | | Niagara West | Haldimand | | Hamilton East | Norfolk | | Hamilton Central | Six Nations | | Other (Please specify) |  | |
| 2. | What is your job role in this palliative care /shared-care team?  CCAC Case Coordinator (Case Manager)  Palliative Care Physician  CCAC Nurse Practitioner  CCAC Nurse Clinician  Non-CCAC Nurse Clinician  Clinical Navigator/Coordinator  Bereavement Clinician  Pycho-Socio Spiritual Clinician  Other (Please specify) |
| 3. | Rank the roles within your circle of palliative care or shared-care team that you likely need to receive or share information (communicate) with most often. (1 for Most likely and 8 for Least likely or N/A for not applicable) Ranking (1 - 8)   |  |  | | --- | --- | | CCAC Case Coordinator/Manager |  | | Palliative Care Physician |  | | CCAC Nurse Practitioner |  | | CCAC Nurse Clinician |  | | Non-CCAC Nurse Clinician |  | | Clinical Navigator/Coordinator |  | | Bereavement Clinician |  | | Pycho-Socio Spiritual Clinician |  | | Others (please specify) |  | |  |  | |
| 4. | Which of the palliative care system do you have access to?  OSCAR EMR  InfoAnywhere  Clinical Connect  CHRIS  Other (Please specify) |
| 5. | Which of these systems is/are the primary or main one you document on  OSCAR EMR  InfoAnywhere  Clinical Connect  CHRIS  Other (Please specify) |
| 6. | Tick under the appropriate system, the modules, functional features or information that you mainly access or utilize to perform your job.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Modules, Features, Document or Data utilized or accessed | OSCAR EMR | Info-Anywhere | CHRIS | Clinical Connect | Manual -  Phone/  Fax/Paper | | Referral Information |  |  |  |  |  | | Appointment Scheduling/Date |  |  |  |  |  | | Demographic |  |  |  |  |  | | Physician Consultation Notes |  |  |  |  |  | | Nursing Notes |  |  |  |  |  | | Medication/Prescription |  |  |  |  |  | | Clinical Sessions and documentation |  |  |  |  |  | | Task |  |  |  |  |  | | Messaging |  |  |  |  |  | | Labs, X-ray & Diagnostics |  |  |  |  |  | | Others (please specify) |  |  |  |  |  | |
| 7. | |  |  |  | | --- | --- | --- | | In what way will the integration of these systems affect your job? | YES | NO | | a) Will it improve work performance? |  |  | | b) Will it allow quicker access to information? |  |  | | c) Will it improve communication within the circle of care |  |  | | d) Will it reduce information error |  |  | | e) Will it save Patient’s Time |  |  | |
| 8. | Do you have any other comments, questions, or concerns? |

As is mentioned earlier, due to the CHRIS system not being available for data integration at this time, the project was divided into phase one and phase two. The release of phase one discusses the integratation of OSCAR with InfoAnywhere, while the release of phase two will discuss the integration of OSCAR with CHRIS. Due to the phasing of the project, the scope of this study had to be limited to phase one. The project team had to select a product champion for each user class, and the palliative shared-care teams in Hospice Niagara was selected for the first phase of this project, since this was the only team that had clinicians with access to both systems (i.e. OSCAR and InfoAnywhere). A list of more detailed questions was then prepared and sent via email to the clinical navigator using both systems in the South shared-care team since a new resource for the North shared-care team was being sourced at the time of this study. Table 3b lists the questions while the answers are in the appendix.

**TABLE 3b: List of question for OSCAR & InfoAnywhere users for integration**

|  |  |
| --- | --- |
| **No.** | **Questions (Phase 1 Project)** |
| 1. | Is InfoAnywhere used by any of the team members to prescribe medication? If YES, what is this individual’s role in the shared-care team? |
| We would like to better understand who is documenting in OSCAR and who in InfoAnywhere, as well as what they are documenting in each respective system to allow us to design a way for a user to launch from OSCAR into InfoAnywhere with patient context and vice versa. | |
| 2. | Please confirm if the following description accurately captures which team members, by role, use OSCAR and InfoAnywhere:   1. Physicians document their encounter notes, prescribe medications etc. using OSCAR. 2. Psychosocial/Bereavement Clinician perform documentation using InfoAnywhere 3. Clinical Navigators and Client Coordinators document in both InfoAnywhere and OSCAR |
| 3. | Please confirm which system (OSCAR or InfoAnywhere) the Clinical Navigator would first use for documentation. Would they document using both systems? |
| 4. | Are there any functional features that only OSCAR offers? |
| 5. | Are there any functional features that only InfoAnywhere offers? |
| 6. | Is there any information that can only be documented in OSCAR? Which role uses OSCAR to capture this? |
| 7. | Is there any information that can only be documented in InfoAnywhere? Which role uses InfoAnywhere to capture this? |
| 8. | What is documented in both systems? Is there any overlap, between InoAnywhere and OSCAR that would require a user to retype or cut and paste from one system to the other? |
| 9. | How are tasks managed within teams using InfoAnywhere? Is Info Anywhere used to manage  “tasks” amongst shared-care teams, or is OSCAR solely used to assign and manage tasks across the team? Please confirm if there is there a need to manage tasks jointly across systems. |
| 10. | Does InfoAnywhere have built in messaging functionality, similar to OSCAR messenger, which is being used by the team? |
| 11. | Are there any team members using InfoAnywhere to prescribe medications? If YES, which role is he/she performing? |

Elicitation Interviews and focus group meetings were conducted with typical users and stakeholders. They were asked first for factual information about their organizational involvement and services, as regards palliative care in HNHB and then questioned about perceived gaps in services/systems and areas for improvements to services/systems. All interviewees expressed views on communication gaps within the systems that could result in lapses in service delivery. Those providing hands-on palliative care services raised a number of issues that are listed in Table 4. These issues were used to develop user stories that could be utilized for possible improvements to bridge the gaps. The face-to-face interviews were not tape recorded, but notes were taken and used in creating the business requirement document. Various versions of the document were sent out at various stages for interviewees to review and make amendments as needed.

**Table 4: User’s stories or issues raised by clinicians during the focus meetings held within HNHB LHIN palliative care teams.**

|  |  |  |
| --- | --- | --- |
| **ID** | **User’s Stories & Issues during Focus Groups Meeting** | **User’s Role** |
| **U1** | **“Nurses have no access to notes from the physicians, this includes their consults, prescriptions etc.** | **Nurse practitioner** |
| **U2** | **“I would like to endorse the prescriptions electronically”** | **Palliative Care Physician** |
| **U3** | **“We physicians have no access to the nurses’ notes when we go and visit a patient they have seen because these are entered into the CCAC system – CHRIS which is not currently accessible to us”** | **Palliative Care Physician** |
| **U4** | **“There is no way for our physician or nurses to collect electronic statistics from the systems – OSCAR, InfoAnywhere nor CHRIS** | **Clinical Navigator** |
| **U5** | **“I had to develop a small database using MS Access and Excel to keep track of our care teams statistic and other data for palliative care reporting to LHIN4 that cannot be currently stored in OSCAR”** | **Clinical Navigator** |
| **U6** | **“ I want to be able to print out the caseload for the rounds for different period, location, patients etc.”** | **Clinical Navigator** |
| **U7** | **“Extremely poor communication between team members. In other to communicate, all notes have to be printed off the system into a paper chart.”** | **Nurse Clinician & Palliative Care Physician** |
| **U8** | **“Need to print off prescriptions and fax to CCAC intake. This gets channeled through 2-3 care coordinators then faxed to the nursing agency”** | **Clinical Navigator** |
| **U9** | **“Community Nurses do not have access to any electronic information nor immediate updates done on patients”** | **Nurse Clinician** |
| **U10** | **“Even though I have access to both OSCAR and InfoAnywere, I have to manually input each patient’s personal information one system after other as seen in Clinical Connect for other team members to access and consult with patient”** | **Clinical Navigator** |
| **U11** | **“I want to be able to add scanned prescription notes from the nurses as an attachment within the prescription screen, for easy viewing with other medication”** | **Clinical Navigator** |
| **U12** | **“I want to be notified once any of my patient passes away and be able to see an updated status information in OSCAR”** | **Palliative Care Physician** |
| **U13** | **“I want OSCAR to able** to synchronize, or provide consolidate view of all information on deceased family member (instead of having to dig for information)” | **Bereavement Clinician** |
| **U14** | **“I manually prepare letters outside OSCAR to each family member when they lost their loved one. I want it to be able to automatically generate it for the relations registered in OSCAR”** | **Bereavement Clinician** |

Some of the users were observed performing business tasks with their systems after the group focus meetings to further illustrate their user stories. During the study, all stakeholders involved in palliative care for HNHB LHIN were contacted for the interviews and focus group meetings at various levels and stages of the project. “Involvement of the full range of stakeholders in system design and development was critical to user “buy in” and to the system’s operational integration” (Abernethy et al., 2011).

**2.3.1.2 Requirements Analysis**

User stories and responses from the questions sent to the five groups of Palliative Shared-Care Teams in LHIN4 (Hamilton, Brantford, Niagara West, Niagara North and Niagara South) were processed and the information clarified via telephone follow-up calls. Other project meetings and brain storming sessions were also held with top management stakeholders and lead developers of the systems. More information was also gathered from journals, websites, and other related literature. The Ontario Association CCAC requirements for CHRIS integration with EMRs provided integration guidelines used during one of the brain storming session on how to integrate; we were told that would not be possible at this time. However, the brain storming sessions that the project team held individually with chief consultant and lead developer of the InfoAnywhere hospice systems resulted in the business analyst being given temporary user access to the hospice system (InfoAnywhere) test server. The clinical navigator for the South palliative shared-care team conducted a brief hands-on walk-through on how the system is being administered via telephone and Skype. After evaluating the collected data to better understand the palliative care workflow, business needs and information gaps between the systems being used, the project team developed an architectural strategy. This will serve as a draft solution to enable the sharing of information between the dominant systems being used by the palliative care shared-care teams in the HNHB LHIN (see Figure 3).

An information session was organized by the OSCAR project team to model the application and how it would fit into its environments. The top management within the HOPE team was shown how the new OSCAR EMR is envisaged to integrate with MyOSCAR, Know2Act (K2A), Clinical Connect, CHRIS and InfoAnywhere. Hospice site visit were conducted to meet with the palliative care teams in Brantford – Stedman Community Hospice, Grimsby – McNally House Hospice (Niagara West Palliative Team), and St. Catharines – The Stabler’s Centre (Niagara North & South Palliative Shared-care Team). A telconference was also held for the Hamilton - Dr. Bob Kemp Hospice.

A working group was created with top management representatives from key stakeholder organizations: HOPE, HNHB LHIN, HPC Network, Palliative Care Shared-care Teams and OSCAR EMR to discuss and evaluate the feasibility of this solution initiative. Recognizing that readiness and feasibility to proceed with integration initiatives varies among the involved systems, it was agreed to proceed with an initial phase focused on OSCAR and InfoAnywhere. This would move forward in line with a longer-term strategy to develop an ecosystem of integrated palliative care systems that truly works for providers, patients, and others involved in the end-of-life journey.

Not every member of a shared-care team will have access to the same systems. For example, one team was using OSCAR for their nurses and physicians, while the psycho/social clinician used only InfoAnywhere. However, their clinical navigator uses both systems. The lack of integration between systems has been linked to poor data continuity and a failure to efficiently share information that is so important to the care of patients. For instance, we learned that some important care details are shared through telephone conversations, fax, and other modes of communication, which may threaten patient privacy, can be time consuming, and could lead to an increased risk of errors and loss of information. Sometimes data must be entered manually into both systems, which leads some clinicians to use the “copy and paste” feature to easily transfer data. Not only is this prone to error, but it also demands the time-wasting double entry of data.

**Based on the user stories collected from the hands-on palliative care system users, the issues that relate to OSCAR EMR and InfoAnywhere users have been used to develop the user needs analysis. This was then employed for further brain storming discussion with the development teams on how the systems integration could occur for phase one of the project (OSCAR EMR & InfoAnywhere Integration).**

***User Stories***

## **Clinical Navigator using both InfoAnywhere and OSCAR**

***“There is no way for our physicians or nurses to collect electronic statistics from the systems – OSCAR, InfoAnywhere”.***

**Jane is a clinical navigator who works on a team that uses both OSCAR and InfoAnywhere. The physicians and nurses use OSCAR, while Jane uses InfoAnywhere and OSCAR. Jane uses InfoAnywhere to record and collect statistics that she needs to report to the LHIN on a recurring basis. Jane also needs to collect statistics from OSCAR for this report and does this by logging into OSCAR separately and then manually inputs the data into InfoAnywhere. Jane needs to be able to login to OSCAR via single sign-on from InfoAnywhere to view the relevant statistical information with the patient context.**

## **2. Psycho/Social Clinician using InfoAnywhere**

**Ken is a psycho/social clinician who uses InfoAnywhere to document his patient encounters. Ken needs to be able to share the statistical data he captures in InfoAnywhere with the physicians and nurses on his team, who only use OSCAR. Therefore, the nurses and physicians on his team need to be able to login to InfoAnywhere via single sign-on from OSCAR to view a patient context specific launch of the relevant recorded health data.**

**3. Physician and Nurse using OSCAR**

**Ashley, a physician, and Alex, a nurse, are both part of a shared-care team that uses both OSCAR and InfoAnywhere. Ashley and Alex use OSCAR primarily. They both need to be able to login to InfoAnywhere and have a patient context launch via single sign-on from OSCAR of the relevant statistical information their clinical navigator has prepared for reporting and the health data their psycho/social clinician has documented in InfoAnywhere.**

## **4. Clinical Navigator using OSCAR and InfoAnywhere**

***“I want to be able to print out the caseload for the rounds for different periods, locations, patients etc”.***

**Jane, a clinical navigator, needs to print off the caseload view for rounds. She uses both OSCAR and InfoAnywhere to capture and print out this information for her shared-care team. She needs to be able to open the caseload view in OSCAR, filter to refine and print out the caseload view for rounds from the system. Jane also needs to be able to access the caseload for her teammates that use InfoAnywhere via a launch into InfoAnywhere from OSCAR. From this launch into InfoAnywhere, once in this system, Jane needs to see the caseload view and must be able to consolidate both caseloads (one from OSCAR and one from InfoAnywhere) into a single view that includes the whole shared-care team as inputted in both systems. Jane then needs to be able to print off this consolidated caseload view from OSCAR.**

**5. Physician and Nurse using OSCAR**

**Presently there is “extremely poor communication between team members”. “In order to communicate, all notes have to be printed off the systems into a paper chart”. *“We do not always have time to provide a verbal report”***

**Ashley, a physician, and Alex, a nurse, are both on a shared-care team that use both OSCAR and InfoAnywhere. Ashley and Alex use OSCAR primarily. They need to share the notes and medications they have documented in OSCAR, along with other vital information, with their other team members that use InfoAnywhere and do not have access to OSCAR.**

**6. Psycho/Social Clinician & Clinical Navigator using InfoAnywhere**

***“Any notes written in InfoAnywhere by the psychosocial advisor or clinical navigator must be printed and given to both the physician and the nurse because they do not have access to InfoAnywhere”***

**Ken, a psycho/social clinician, and Jane, a clinical navigator, both use InfoAnywhere to document their patient encounters. While Ken only has access to InfoAnywhere, Jane has access to both OSCAR and InfoAnywhere. However, Jane does not have the permissions to add comments or notes in OSCAR, and can only view what the physician and nurses on her team have already documented into the system.**

**Ken needs to be able to view the notes and other important details his team mates have documented in OSCAR in order to care for the patients they share. In particular, he requires access to the notes the Physician and Nurses have taken during their rounds in consultation with their patients. He currently receives this information in printed out hardcopy.**

**Both Ken and Jane must also be able add to and comment on notes documented in OSCAR based on their encounters with the same patients via a patient context launch from InfoAnywhere into the desired patient’s Patient Record in OSCAR.**

**7. Physician and Nurse using OSCAR**

**Ashely (a physician) and Alex (a nurse) are both OSCAR users that do not have access to InfoAnywhere. They need to be able to view the notes the clinical navigator and Psycho/Social Clinician on their team have documented in InfoAnywhere for the patients on their team. Therefore, they need to be able to view the comments and notes captured in InfoAnywhere via a patient context launch from OSCAR.**

**8. Community Nurses without access to either OSCAR or InfoAnywhere**

***“Community nurses do not have access to any electronic information nor immediate updates done on patients”***

**Ruth, a community nurse, attends to patients that are also seen by other clinicians who are on her palliative care shared-care team. Ruth uses the CCAC’s CHRIS system to document her encounters. However, her team members use both OSCAR and InfoAnywhere.**

**The nurses and physician on her team use OSCAR. While her psycho/social clinician uses InfoAnywhere, and the clinical navigator on her team uses both OSCAR and InfoAnywhere. Ruth does not have access to either system. She sometimes may receive hardcopy print outs of the notes in OSCAR from the doctors and nurses and the comments and data from clinicians using InfoAnywhere.**

**Ruth needs to view this information electronically from OSCAR at the point of care to ensure information privacy and security of the patient is maintained. Ability to add comments or notes will be needed rather than the manual scripting currently used.**

**9. Clinical Navigator using both InfoAnywhere and OSCAR**

***“Even though I have access to both OSCAR and InfoAnywhere, I have to manually input each patient’s personal information one system after the other as seen in Clinical Connect for other team members to access and consult with patient”***

**Jane is a clinical navigator who works on a team that uses both OSCAR and InfoAnywhere. The physicians’ uses OSCAR and ClinicalConnect, while Jane uses InfoAnywhere and OSCAR. The physician makes the personal and medical information of the patient in the ClinicalConnect system available to the clinical navigator to enable her to manually type the information into OSCAR and then into InfoAnywhere. Jane needs an electronic download of the information from ClinicalConnect that will automatically populate the patient’s data into the respective fields in OSCAR and have it also available for all the shared-care team using InfoAnywhere via their patient’s context launch into OSCAR. However the demographic record can be automated into InfoAnywhere on the data level via its integration with** OSCAR.

**10. Physician using OSCAR**

***“I want to be notified once any of my patients pass away and be able to see updated status information in OSCAR”***

**Ashely, a physician in the palliative care team, uses only the OSCAR EMR hence can only see the status of the patient or current location as last updated in OSCAR. She does not have access to infoAnywhere, hence when a patient passes away and the status is changed from active to deceased, or the location changes from home to hospice in InfoAnywhere, Ashely is not informed by OSCAR nor made aware in a timely manner. Ashely needs to get a message in her inbox informing her of the change in status and location, and also have these fields auto populated with the current information, once it is updated differently in either system.**

**2.3.1.3 Requirements Specifications**

The different types of requirements are documented in Table 8 and 9 to show how the system will be accessed, including the user interface and related functionalities. There were other forms outside the palliative care systems that were specified as being used when staff were attending to patients. The shared-care teams interviewed during the time of this study stated that “the Palliative Performance Scale (PPS) and the Edmonton Symptom Assessment System (ESAS-R) tools are currently used routinely in palliative care to determine the progression of the disease, and it is a great communication tool between health providers to inform them of the condition of a patient. When we receive a referral for a patient, the first thing we look at is the PPS. This will tell us how sick the patient is and the urgency for the physician to get out to see them”. Figures 6a and 6b in Appendix A show samples of the ESAS-R and PPS respectively. This is similar to one of J.E. Gilbert (2012)’s results. This showed that most of the interviewees agreed that the greatest improvements in quality resulting from the PPCIP project stemmed from the introduction of common tools and a common language for health care providers to use when working together to help patients manage their symptoms. (Gilbert et al., 2012) In the result for the User Satisfaction Survey, 70% of patients indicated a preference for the kiosk/Internet version of ESAS over the paper-based tool, whereas 15% indicated a preference for the paper-based tool. The remaining 15% indicated no preference (Gilbert et al., 2012). The paper-based tool is currently in use in the HNHB LHIN.

The OSCAR EMR BRD template was adopted and each requirement was uniquely labelled. Non-functional requirements were also specified along with external interface requirements, design and implementation constraints.

The OSCAR requirement in Table 8 (see Appendix C) captures the needs of palliative care users using the OSCAR EMR and defines the required integration points, when integrating OSCAR with InfoAnywhere. The table summarizes the key information OSCAR palliative care users need to have access to and from within InfoAnywhere to ensure they have a full patient record. This captures “What” specific data elements are required, “Where” the data from InfoAnywhere needs to come from and where it needs to be present in OSCAR and “How” the information is to be presented. For example, the question of “How” will answer if the data are “view only”, with OSCAR only providing a patient context launch into InfoAnywhere so that the user can view any relevant data in InfoAnywhere in order to see a complete picture of the patient’s medical record. Alternatively, “How” could mean some data elements can be shared between the two systems.

The InfoAnywhere requirements in Table 9 (see Appendix C) captures the needs of palliative care users using InfoAnywhere and defines the required integration points, when integrating InfoAnywhere with OSCAR. Table 9 summarizes the key information InfoAnywhere palliative care users need to have access to and from within OSCAR to ensure they have a full patient record (the parts they need to see to accomplish their work). This captures “What” specific data elements are required, “Where” the data from OSCAR needs to come from, and where it needs to be present in InfoAnywhere and “How” the information is to be presented.

The key concepts from the various software development meetings held with the development teams for OSCAR EMR and InfoAnywhere regarding how the integration of the two systems could be of most use in hospice care, include easy interaction through one system into another i.e. a patient’s context launch from OSCAR into InfoAnywhere and vice versa through single sign-on. Table 3b gives a list of the questions sent to the shared-care teams using both systems and the response received from the Niagara Shared-care Team can be seen in Appendix E. This gave the project team detailed information on the key functionalities and data communication tools currently used in each system by the clinicians who are using both systems.

**2.3.1.4 Requirement Validation**

The list of requirements was emailed to all the users and top management to review and validate. The shared-care project team also held a peer review of each requirement. A shared-care project meeting was then scheduled to brainstorm with the OSCAR development team’s project coordinator to carefully examine the written requirements. Corrections were made and acceptable criteria were defined. Some of these were obtained from how the users described their expectation of what the new system integration will deliver to them. The project team then met with the software architects of both systems to discuss which of the requirements are of greatest priority and the deliverables that would need to be developed to accomplish the desired solution. During one of the weekly Tuesday project meetings held at McMaster Innovation Park, the deliverables for the first phase of the project were required as part of the proposal for funding to be submitted to the HNHB-LHIN and HNHB Palliative Care Network. This required the presence of the OSCAR EMR executive director. As the main decision maker for the project’s requirements, her presence enabled the project team to finalize the proposed integration deliverables for OSCAR and InfoAnywhere. The risk of integrating certain features of the OSCAR EMR proposed deliverables was then shared with the InfoAnywhere development team, who were fully in agreement. However, they provided further clarifications via email to ensure that the expectations of both teams concerning the InfoAnywhere and OSCAR configuration and integration were the same. The phase one project milestones and deliverables were then developed (see Table 5).

The stakeholders want to know how long it is going to take to develop the requirements, now grouped into milestones for the deliverables. The project team had to get each system’s lead developer to give the total time frame required for each deliverable and the number of weeks that should be assigned to each milestone, considering the fact that other projects are also on-going. An estimation of the duration required for each deliverable for the InfoAnywhere team was stated with its cost, and this was added to the duration and cost estimation submitted by the OSCAR EMR development team.

**TABLE 5: Project deliverables (Phase 1)**

|  |  |
| --- | --- |
| **No.** | **Deliverable for OSCAR & InfoAnywhere Integration** |
| 1 | Patient context launch into InfoAnywhere from OSCAR and vice versa |
| 2 | OSCAR as the sole source for: medications, allergies, labs and demographics. |
| 3 | Expanded OSCAR Master Demographic page to include full scope of palliative care demographic in InfoAnywhere |
| 4 | Automated analysis of the difference between the demographic record at the data level between OSCAR and InfoAnywhere with reconciliation of differences being available via manual selection, which will be required to align conflicting data elements. |
| 5 | All lab information will be accessed from InfoAnywhere via patient context launch into OSCAR. Lab information in OSCAR will be delivered via existing connections to OLIS, Community Labs and the EMR delivery download from ClinicalConnect. |
| 6 | OSCAR messaging platform will be available to InfoAnywhere users via a launch into OSCAR messaging from a messaging icon on the InfoAnywhere interface. |
| 7 | OSCAR Tickler feature will be available to InfoAnywhere users via a launch into OSCAR Ticklers from a Tickler icon on the InfoAnywhere interface. |
| 8 | With this integration, notes and documentation of vitals generated by team members using InfoAnywhere will be documented in OSCAR via a patient context launch into OSCAR. |
| 9 | Integration menu bar available in InfoAnywhere to facilitate easy access to specific functions in OSCAR (menu options include: messaging, Ticklers, Patient Summary which includes meds allergies, labs and notes) |
| 10 | Palliative Care Program referral eForm available in OSCAR that is based on existing paper referral form |
| 11 | Consults are generated and managed within OSCAR and will be available in InfoAnywhere through patient context launch |
| 12 | Out of scope but recommended for future consideration: automating electronic referral into OSCAR, to InfoAnywhere, via patient context launch |

Hence the phase one project schedule and cost estimation was developed (see Tables 6 and 7). Costs were accumulated on the project deliverables as work continues throughout the project, and the whole requirement development framework of elicitation, analysis, specification and validation continues for each deliverable. Hence each deliverable can be referred to as a scrum (Vlaanderen, Jansen, Brinkkemper, & Jaspers, 2011). As stated in the PriceWaterhouseCooper publication on adopting agile methodology, the objective of using an agile approach is that it simply delivers higher quality products, promotes collaboration through an incremental process, and optimizes program budgets. It promoted transparency in the requirements and development process of this project, and it was easy to respond quickly to inevitable changes in business requirements, as well as being able to deliver functional software (Wiegers & Beatty J., 2013; Wikipedia, 2014).

**2.4 Research Limitations**

In the process of implementing an integrated palliative care model, it is good to obtain support at higher or senior levels of management according to the Canadian hospice palliative care association. This reference further states that to invest enough in people and money will help sustain the partnerships of the shared-care teams (Janet, 2013).

The strategy for palliative care is to support patients as long as possible to stay in their preferred place of care. The limitation on the proposed system includes the sharing of patient data by other shared-care team members that had seen the patients earlier but use a different system to store data.

The project team wanted this research to be completed over a period of six months. However since this timeframe was short, and with the limitation in funding to proceed with development, it was necessary to pause the implementation of this project to seek more funding from the HNHB Palliative Care Network and the LHIN. The time constraints imposed on this study meant that there are a number of limitations to the findings.However, it is envisaged that after the integration of these systems and rollout, users may identify areas for improvement or issues that may require enhancement to the systems; hence the need to carry out further research work after the implementation of each project phase. R. L. Fainsinger confirms that in 1999, although a family physician survey in Edmonton, Canada identified overall satisfaction with a palliative care program, there were issues with the ease of accessing referrals. However, in 2000, a single access number for all types of palliative care services was implemented, and a regional database was developed early. This was managed by a data manager, and maintained with data from all the participating components of the program, including both relevant patient demographics and assessment information. The program’s annual report was then developed from the extensive use of the database balanced scorecard, and quality initiatives (Fainsinger et al., 2007). Similar to the study, the most recurrent theme in the interviews and focus groups was collaboration prompted by the project, both within the organizations and between the various sectors. This was cited as a positive outcome of this initiative (Gilbert et al., 2012).

**3 PROPOSED INTEGRATED SOLUTION**

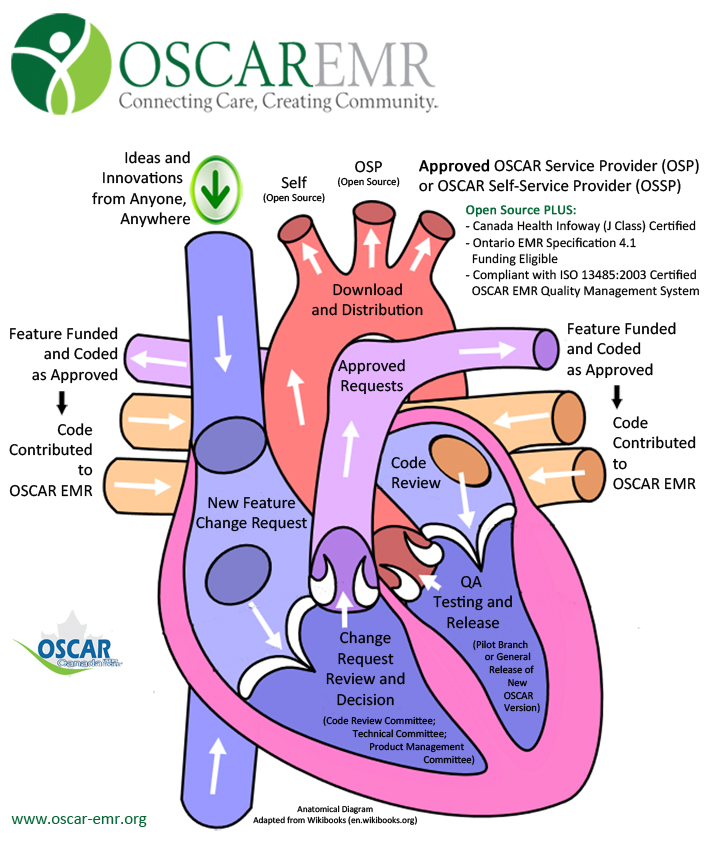
**3.1 Palliative Care Systems used in HNHB-LHIN**

**3.1.1 OSCAR EMR**

The OSCAR Canada Users Society website states that the Department of Family Medicine at McMaster University started the OSCAR project in year 2000, and officially released it under the [GNU GPL](http://www.gnu.org/copyleft/gpl.html) licence to the world on November 17, 2002 at the UCLA campus during the OSHCA conference. Now the same team continues to maintain and develop OSCAR EMR (O. E. OCUS, 2014).

OSCAR is defined under the OSCAR product suites in the OSCAR EMR webpage as an Electronic Medical Record (EMR) system containing health care information with full billing capabilities, chronic disease management tools, prescription module, scheduling and many other features. It can run locally in an office setting or be accessed over the Internet. OSCAR is a comprehensive clinical management system with many sophisticated features and high levels of security. The system is flexible, intuitive to use and cost effective (OSCAR, 2010).

OSCAR EMR is the not-for-profit, ISO 13485:2003 certified organization that governs and manages the OSCAR software that is currently in use by various clinics. It is constantly undergoing development by the OSCAR EMR Project team and larger open source community of OSCAR users to meet the needs of clinics being supported by the approved OSCAR Service Providers (OSP) and approved OSCAR Self-Service Providers (OSSP). OSCAR EMR is at the heart of OSCAR (see figure 5). OSCAR’s strength lies in open, transparent collaboration and sharing among all OSCAR users, OSCAR Service Providers and open-source developers. OSCAR’s open-source license directly supports this ethos (O. P. OCUS, 2010).

 **FIGURE 5: OSCAR EMR is at the Heart of OSCAR**

Most of the palliative care physicians involved with hands-on palliative care within the HNHB LHIN are part of the HOPE team and currently using the OSCAR EMR as their primary system to deliver quality palliative care effectively to end of life patients. The OSCAR EMR currently links to patient data in Hospital Information System (HIS) in the LHIN through Clinical Connect (CC), which also does electronic downloads of lab data to OSCAR EMR installations.

Clinical Connect has the capability to export transcribed notes & discrete lab results in standard HL7 format for import into any physician EMRs such as OSCAR.

**3.1.2 InfoAnywhere Hospice System**

InfoAnywhere is a "Case Management System" that helps to organize and manage palliative care information. The InfoAnywhere website gives the following information on how the system organizes the way clinicians work into a consistent, simple flow, reminds and notifies the care team of significant events, and prepares detailed and real-time reporting. The system also records client information, manages case notes, stores volunteer information, manages client/volunteer relationships, tracks volunteer hours, records care plans, generates reminders, enables fast accessibility to information, logs all changes keeping all relevant parties informed, manages donations and marks clients with their status. All data transfers are encrypted at the same high level of 128bit SSL encryption that is used by military and financial institutions worldwide, ensuring that nobody other than the intended recipient can read any client information. (Exabit, 2014)

The training section of the website states that, for Residential Hospices it has a unique way of training front-line residential staff through a partnership with the Stedman Hospice in Brantford, Ontario. Regardless of the method of initial training chosen, a palliative care nurse from Stedman Hospice can come to the hospice to work alongside front line staff during implementation (Exabit, 2014). Stedman Hospice is one of the HNHB LHIN hospices that was visited during the course of this study by the project team, and a brief presentation of their system was provided by the outreach administrator.

**3.1.3 CHRIS (Client Health Related Information System)**

The Client Health and Related Information System (CHRIS) is a web-based patient management system for Ontario's CCACs that plays an integral role in enabling CCACs to provide quality care to patients. CHRIS gives CCAC staff access to patient information and care plan details from wherever they are working. Hence the HNHB CCAC palliative nurse practitioners and clinicians have access to CHRIS and use it for storing their patient’s notes. However, other clinicians in their team, including the palliative physician cannot access these notes.

The OACCAC innovation section of the website also mentioned that CHRIS is integrated with a number of supporting applications, providing CCAC staff with seamless access through a link from the CHRIS patient record to patient assessments, document library, bed board management (BBM) and health partner gateway (HPG). All these tools together allow CCAC intake staff to assess the needs of new patients, refer patients to community services, and initiate CCAC care plans for them in a timely manner, consistent with the urgency of their needs. The health partner gateway (HPG) as stated in the HGP reference guide provides a single solution to securely exchange health information between a CCAC and its partners. It was built to interoperate with longer-term e-Health initiatives and to enable health partner access to client health information held within CCAC systems such as the Client Health and Related Information System (CHRIS) which is also linked to Clinical Connect. It provides CCAC client demographics, personal and medical contacts, placement, and services details as well as information related to the patient’s in‐home CCAC services and long‐term care placement (OA, 2013).

**3.1.4 ClinicalConnect**

ClinicalConnect is defined as a web based “One Stop Shop” Portal that aggregates data from disparate systems and data sources including Meditech, GE PACS, Sovera Document Imaging, St Joes Lab and CCAC (CHRIS). It was adopted by HNHB LHIN to integrate all LHIN hospitals in order to reduce repeated diagnostic tests and medical errors with improved outcomes that include patient, physician and staff time savings. It also requires less manual processing, hence reduces phone calls within the shared-care teams to get access to results (Anderson, 2009). The Hamilton Health Sciences homepage defines ClinicalConnect as a secure web portal delivering an integrated Electronic Health Record (EHR) from regional hospitals, CCAC and oncology centres to thousands of physicians and healthcare professionals across the Hamilton Niagara Haldimand Brant (HNHB) and Waterloo Wellington (WW LHIN) LHINs. Whether on computers or mobile devices, providers can view real-time consolidated information, in seconds, from 31 regional hospitals, CCACs and oncology institutions for patients and their circles of care, resulting in quicker diagnosis, treatment, and improved patient care and safety. The website also confirms that the physicians in HNHB LHIN can electronically transfer lab results and reports securely via the integrated Hospital Result/Report Manager process into any OSCAR EMR. Mobile access is also available to give providers better and more convenient access to their patient’s records for ongoing care (ClinicalConnect™, 2014).

**3.2 OSCAR EMR Shared-care Project Team**

This study was a joint effort of a team, primarily comprised of OSCAR project staff of the Department of Family Medicine at McMaster University. It has members with combined skills and expertise in project management, system development, business and quality analysis. The OSCAR EMR shared-care project team has been exploring how to better meet the needs of the palliative care users in the OSCAR community and have been engaged in discussions with the HNHB LHIN about our proposed solution to meet these needs, through the integration of OSCAR with CHRIS and InfoAnywhere. The shared-care palliative care teams we are seeking to better serve are comprised of clinicians from different organizations using different information systems.  Our goal is to offer them a unified experience, while preserving and meeting the data needs of the existing information systems.  In this light, we envision OSCAR becoming the primary interface that the palliative care physicians and other clinicians (from the CCAC) could use for documentation; OSCAR would then populate any required data directly into CHRIS to keep the record whole. Our proposed solution is based on the feedback and business requirements we’ve received from the various shared-care teams we have met with. However while working to understand CCAC’s data requirements for CHRIS, some health organizational policy barriers were encountered during meetings with top management as regards the direct data integration of the OSCAR EMR with CHRIS.

L. DeMiglio and A. Williams (2012) in Ontario, Canada stated that, on the basis of the perspectives of team members and key informants, the palliative care team can experience socio-political barriers in an effort to establish shared-care in the community setting. Hence for HNHB Palliative Care, since it is an inter-professional organization where restrictions are placed on how data sharing and implementation of data and record integration can occur, the solution had to be based on organizational policy (DeMiglio & Williams, 2012).

**3.3 Proposed Solution for System Integration**

The proposed solution to integrate the various systems used by clinicians in the HNHB LHIN to deliver palliative care was divided into two phases, with the first phase (Phase 1) being the integration of the OSCAR EMR with InfoAnywhere, while the second phase (Phase 2) being the integration of the OSCAR EMR with CHRIS. The integration of OSCAR EMR with Clinical Connect already exists, with improvement plans in place for an upcoming enhancement in the OSCAR 2014 version. For the purpose of this study, only the phase one aspect of proposal is covered.

**3.3.1 OSCAR & InfoAnywhere Integration (Phase 1)**

Our proposed solution for phase one of this project is to build an integration pathway that enables the OSCAR EMR to work seamlessly with InfoAnywhere such thatpalliative care physicians can use OSCAR EMR as their primary tool for documentation and clinical management. At the same time it is necessary to ensure that all required data is provided to InfoAnywhere to enable the other clinicians in the team to utilize required data, and fulfill all necessary data tracking and reporting functions.Clinicians using OSCAR EMR or InfoAnywhere as their primary tool can, through a patient-context-specific launch into InfoAnywhere or OSCAR EMR, respectively, to view and/or document as appropriate in that system for patients under their care. However, in any hospice, it is necessary to ensure that hospice personnel have access to all patient information required for effective hospice care.

This approach has been informed by the feedback that the OSCAR EMR shared-care team received from members of palliative care (shared-care) teams in the various meetings held with them. These meetings enabled the development of the user stories discussed previously, and the business requirements listed in Appendix C.

**3.3.2 Data Management with OSCAR & InfoAnywhere Integration**

The key data element for each team was collated with the field name and type computed. A table of the identified key element was then populated to include the team members that require such data for the job and the originating source (see Appendix B). To facilitate the deliverables above, the following is involved for the integration solution to have effect. It will be coded in a way such that, if OSCAR wants to push users directly to the clients address book, main profile page, referral/assessment pages, this is possible by changing a passed parameter in the API call.

Example (a):

Patient Jane is entered into InfoAnywhere and OSCAR independently.   Jane changes her telephone number and notifies her physician (who updates OSCAR) but neglects to notify her Hospice outreach team co-ordinator (Bob).

Bob logs into InfoAnywhere the next day, and sees a message that pops up noting that the data are inconsistent between OSCAR/ InfoAnywhere.   He sees that the value in OSCAR was updated yesterday.    He clicks a button in InfoAnywhere to accept the change, and nothing is changed on the OSCAR file but the data is updated in InfoAnywhere.

Without this optional change, Bob would need to log into InfoAnywhere, and manually update the phone number of the client.  With this optional change, at the time when he clears the notification in InfoAnywhere, behind-the-scenes, OSCAR would automatically contact InfoAnywhere and update the phone number to the new value.

**3.4 HNHB-LHIN Palliative Shared-care Project Proposal**

By March 2014, during the meetings held between the OSCAR EMR shared-care project teams with top management of the HNHB LHIN and the HPC Network, it was agreed that the project should submit a proposal for this first phase of the project to enable the sourcing of funds to support the integration of the major systems used by the HNHB LHIN palliative shared-care teams. The OSCAR EMR shared-care team then came up with the following project plan.

**3.4.1 Project Assumption (Phase 1)**

This proposal was written for the purposes of teams that are using both OSCAR and InfoAnywhere. The assumption in this context is that OSCAR will be:

1. The solution that supports the full scope of care and accountability, or reporting, and facilitates engagement with the patient and family through the Personal Health Record (PHR). This is already integrated with OSCAR EMR as MyOSCAR.
2. The OSCAR messaging function will be leveraged in a way that augments the experience of InfoAnywhere users.
3. By signing on to InfoAnywhere, a user will also be logged in to OSCAR automatically via single sign-on.
4. By signing on to OSCAR, a user will also be logged in to InfoAnywhere simultaneously via single sign-on.
5. For matching demographic records, for now, the association type will be based on the OHIP/Health Information Number (HIN) or based on some acceptable combination of first name, last name, gender, date of birth, and health insurance number with margins for error.
6. Quality Assurance testing on the revised features will be done by each organization, who will also provide test systems for QA purposes (i.e. the OSCAR EMR team will test OSCAR system features, and vice versa).

**3.4.2 Project Deliverables**

Table 5 captures the full list of required phase one project milestones and deliverables. These will enable a shared-care team member who is using the InfoAnywhere system as their primary care management tool to have a seamless experience of working with other team members who are using OSCAR as their primary system and vice versa. These deliverables have also been incorporated into the list of business requirements in Appendix C.

**3.4.3 Project Integration Schedule (Phase 1)**

The outcome of the project deliverables will be the integration of OSCAR EMR with InfoAnywhere, However it was necessary to confirm with the infoAnywhere top management and development team that they are supportive of this direction. Hence the project team sent an email to Ian Farr, founder and lead developer of Hospice InfoAnywhere with a list of deliverables, and followed up later to ensure the email was received and responded to. The next step was to proceed with estimating the required duration (weeks) and cost (CAD) to accomplish the deliverables listed above.

The project team grouped these deliverables into major milestones, and contacted both the OSCAR EMR and InfoAnywhere development teams for their estimated duration and cost to deliver each major task. These can be seen in Tables 6 & 7 below.

The project management and quality assurance and testing for the phase one (1) project is scheduled to run all through the development period for each system. While sixteen (16) weeks is planned for OSCAR, ten (10) weeks is planned for InfoAnywhere. This includes the business analysis and documentation during the development cycle.

Each milestone will be tested by using one of the palliative care site as a test site inother to fix any bug that may arise during the scheduled period as development is still in progress until the final product of the phase one (1) is achieved without bugs.

**TABLE 6: Project Integration Schedule for Phase 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Deliverable** | **Responsible** | **WKS** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** |
| **Development:** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Patient context launch into InfoAnywhere from OSCAR | OSCAR | 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Expanded OSCAR Master Demographic page | OSCAR | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Automated analysis of the difference between the demographic record at the data level between OSCAR and InfoAnywhere | OSCAR | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Palliative Care referral eForm | OSCAR | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Patient context launch into OSCAR from InfoAnywhere | InfoAnywhere | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Integration menu bar in InfoAnywhere | InfoAnywhere | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Project Mgt. & QA Testing** | OSCAR | 16 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Project Mgt. & QA Testing** | InfoAnywhere | 12 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**3.4.4 Project Integration Cost (Phase 1)**

The project team collated the manhour duration per deliverable and the cost was calculated using the rate of $125/hr.

**TABLE 7: Project Integration Cost for Phase 1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Deliverable** | **Responsible** | **Duration (Hrs.)** | **Schedule (Wks.)** | **Cost**  **(CAD)** | **HST**  **(CAD)** | **Total Cost (Inc. HST)** |
| **Development:** |  |  |  |  |  |  |
| Patient context launch into InfoAnywhere from OSCAR | OSCAR | 160 | 6 | $20,000.00 | $2,600.00 | **$22,600.00** |
| Expanded OSCAR Master Demographic page | OSCAR | 40 | 3 | $5,000.00 | $650.00 | **$5,650.00** |
| Automated analysis of the difference between demographic record at the data level between OSCAR and InfoAnywhere | OSCAR | 80 | 3 | $10,000.00 | $1,300.00 | **$11,300.00** |
| Palliative Care Program referral eForm | OSCAR | 40 | 3 | $5,000.00 | $650.00 | **$5,650.00** |
| Patient context launch into OSCAR from InfoAnywhere | InfoAnywhere | 80 | 5 | $10,000.00 | $1,300.00 | **$11,300.00** |
| Integration menu bar in InfoAnywhere | InfoAnywhere | 80 | 5 | $10,000.00 | $1,300.00 | **$11,300.00** |
| **OSCAR Project Mgt. & QA Testing** | OSCAR | 80 | 16 | $10,000.00 | $1,300.00 | $11,300.00 |
| **InfoAnywhere Project Mgt. & QA Testing** | InfoAnywhere | 40 | 10 | $5,000.00 | $650.00 | $5,650.00 |
| **OSCAR Estimated Total** | **OSCAR** | **400** | **16** | **$50,000.00** | **$6,500.00** | **$56,500.00** |
| **InfoAnywhere Estimated Total** | **InfoAnywhere** | **200** | **12** | **$25,000.00** | **$3,250.00** | **$28,250.00** |
| **GRAND TOTAL** |  | **600** | **3** | **$75,000.00** | **$9,750.00** | **$84,750.00** |

**3.5 Benefits & Value Added**

This project will achieve the vision of a patient context launch from OSCAR into InfoAnywhere and a patient context launch into the OSCAR patient summary page from the InfoAnywhere application. The advantages are:

- Improved data communication tools that reduce the risk of data error

- Reduced risk of exposing patient privacy

- Integrated messaging & tickler (Alerts & Reminders) between systems.

- Quick and easy access to view patient data in other systems at the point of care

- Automated systems that ensure data continuity and nullify loss or duplication of patient data

- Facilitated efficient entry and sharing of health data for the purpose of improving patient care.

- Integrated tasks delivered to the shared-care teams

- All patient, system and organizational policies are well respected in the integration, with each user signing an agreement to comply.

**3.6 Contributions to eHealth**

This study made some contribution to eHelath through the user gathered from the surveys and information from series of focus group meetings and brain storming sessions held with the palliative care teams and top managements of the various organizations in HNHB. The user data collated will add to the wealth of information for HNHB-LHIN region within and outside the Ontario province for future reference on HNHB palliative shared care and their access to eHealth systems for the delivery of palliative care. The questionnaire and clarification of data, information and knowledge achieved from the various palliative groups in the HNHB-LHIN has been expanded to include wisdom, information systems and support for eHealth practice benefits.

The business requirements developed for the integration of an electronic medical record OSCAR and a hospice system, InfoAnywhere was introduced. The study contributes to eHealth by pointing out the core user issues and requirements for improved data sharing and quick accessibility of patient’s information and demonstrates how collaboration within the team through an integrated system will improve the delivery of palliative care. Achievements in developing the user and functional requirements are significant contributors to guide developers accordingly in developing the system integration and top health management in the region to continually reference during the project lifecycle phases to ensure that the deliverables from the project meet the approved requirements.

The conference meetings and discussions that were held at top management levels in the HNHB-LHIN office with OSCAR EMR, CCAC, HNHB Palliative Care Network as a result of this study has significantly contributed in taking the eHealth of these various organizations a step forward towards having an improved eHelath system in place through the deliberations and decisions made for better integration of these palliative systems currently in use. The outcome of this study in developing a list of business and user requirements led to the request for proposal by HNHB-LHIN to OSCAR EMR for the development of phase one of the project which is to integrate OSCAR and InfoAnywhere. This has been officially submitted and is a contribution for implementing an improved to eHealth environment in HNHB-LHIN region.

In conclusion, though this study, more awareness of the current and future capability of the various systems including unused functionalities by the circle of palliative care were realised and the areas of improvement to better integrate the systems and give each user a unified experience at the point of care were achieved. Hence contributing to eHealth through efficient and effective delivery of palliative care going forward in the HNHB LHIN and other eHelath organizations.

**4 CONCLUSIONS**

**4.1 Current State & Limitations.**

This project is currently at the state of sourcing funds to carry out the first phase of the project. It focuses on improving the experience of palliative care users through the integration of two of these systems, OSCAR EMR and InfoAnywhere. This is an important first step in realizing the overarching vision of enabling the shared-care teams to have a unified experience of information flow across all involved information systems to support more cohesive, efficient, effective, and safe care. OSCAR EMR and InfoAnywhere teams share a commitment to this vision and, to that end, have prepared a proposal for consideration by the Palliative Care Shared-care Teams and the Hamilton Niagara Haldimand Brant (HNHB) LHIN.

This proposal was informed through consultation with key stakeholders in the palliative care community, including extensive input from several Palliative Care Shared-care Teams and Hospices across the HNHB LHIN.

**4.2 Future Enhancements**

Integration with other palliative care systems is not within the scope of this project report. The parts of the overall vision that remain to be realised once this first phase of the project is complete are:

1. Integration of the OSCAR EMR with CHRIS
2. Enhancement of the OSCAR EMR connection to Clinical Connect
3. Implementation of the Personal Health Record

**4.3 Recommendations**

It is recommended that an adequate user training plan be rolled out to involve all the various palliative care team members in the HNHB LHIN in learning about the systems and procedures involved in palliative care.

Training videos and manuals for users and system administrator guides should be developed. It is also highly recommended that hands-on classroom training should be available for both current users and for staff that subsequently joins the teams.

More research and top management level meetings are required that focus on system integration with respect to CHRIS and to ensure that CCAC nurses document information via OSCAR and infoAnywhere once the first phase of the project is completed.

Research is also needed into the possibility of receiving EMR downloads of data from Clinical Connect to CHRIS.

**4.4 Concluding Remarks with Lessons Learned**

The main activity of this project, which was gathering the majority of the information in this thesis, involved extensive face-to-face interviews and brain storming sessions held with different user and focus groups. The author learned a lot about palliative care and the significance of the various systems used to support it. Most importantly, she learned how data could be managed and shared through the integration of the several systems being used by different providers. However, key parameter for matching the data must exist for each record for easy matching and mapping across the systems.

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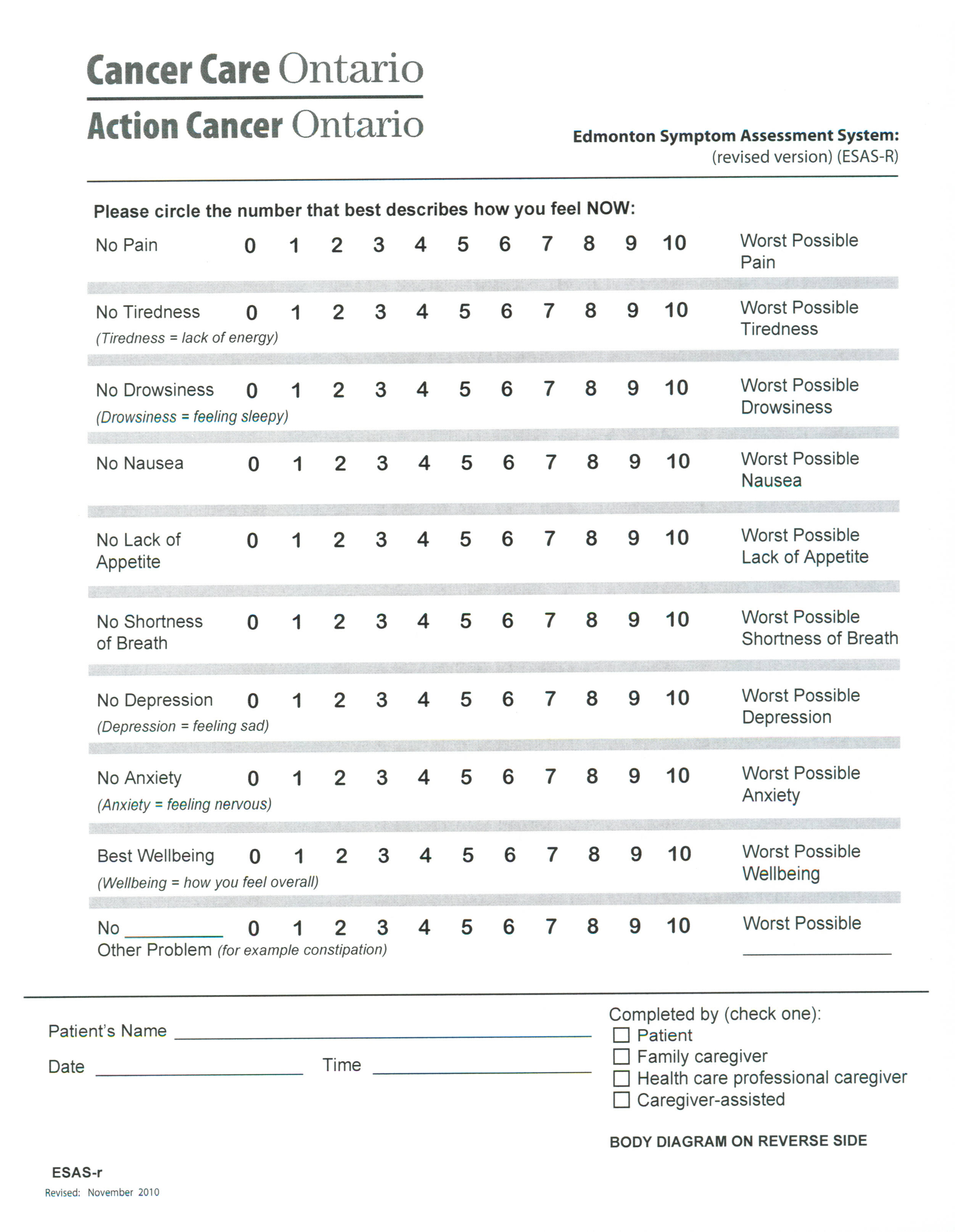
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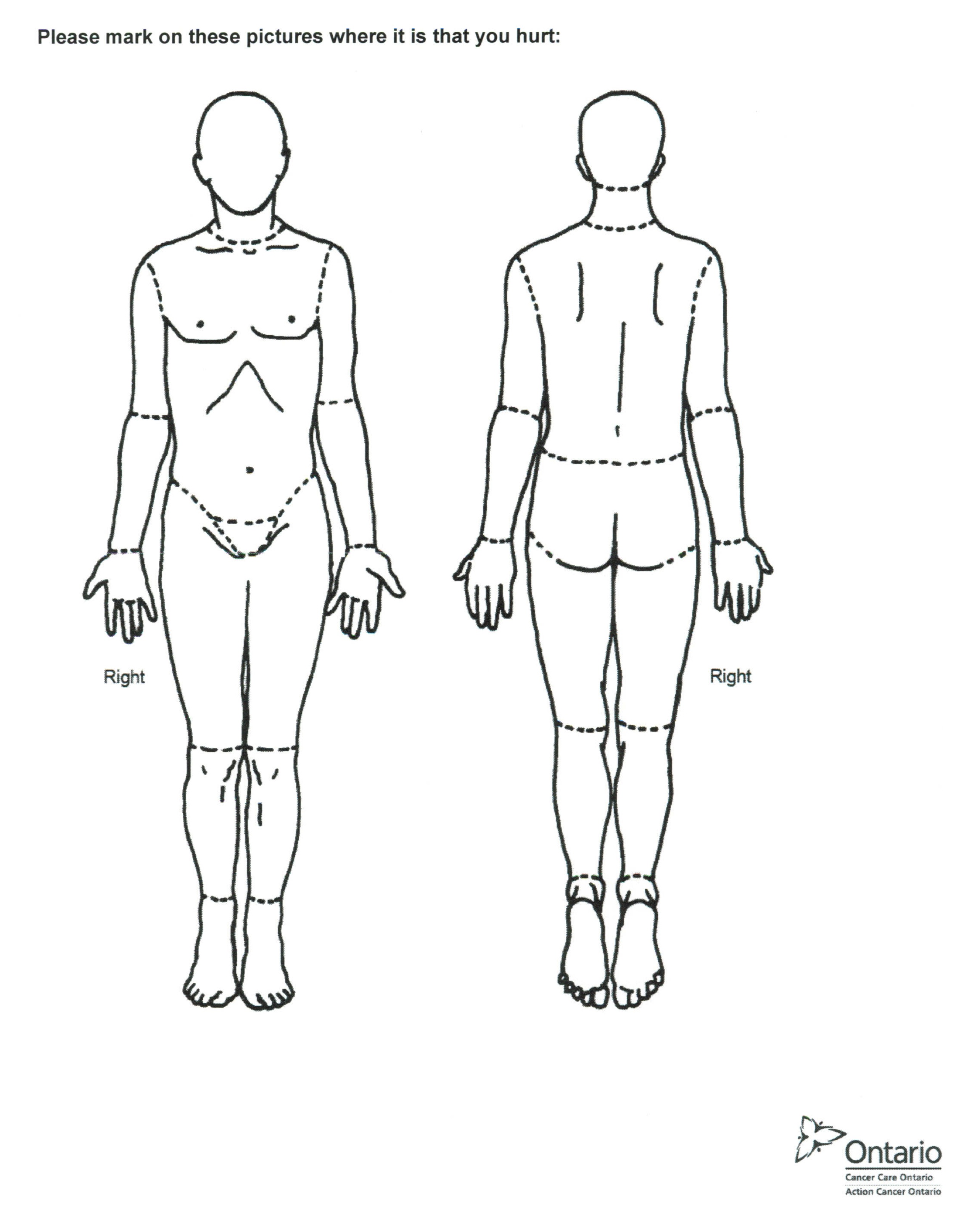
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**APPENDIX A**

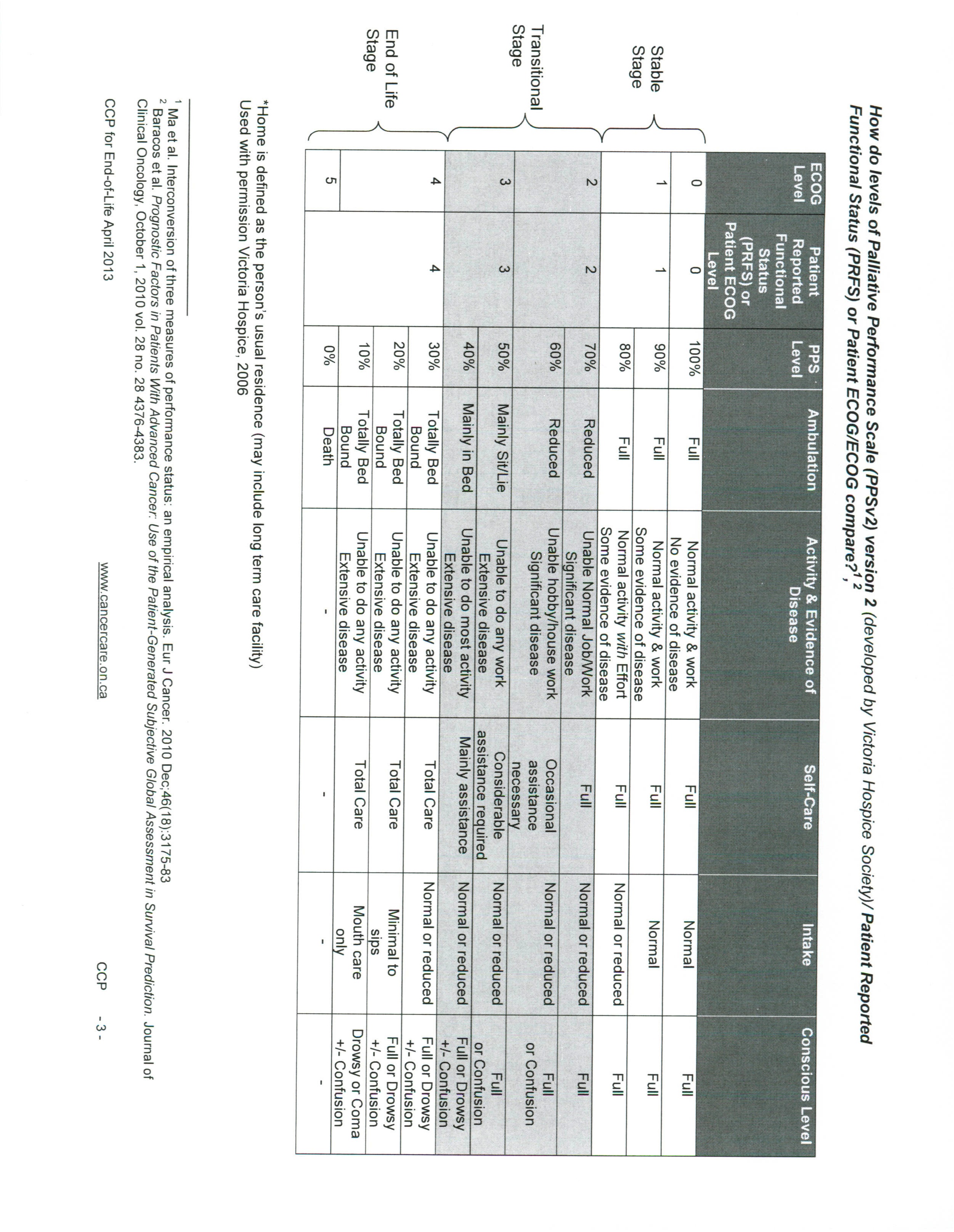
**FIGURE 6a: Edmonton Sympton Assessment System (ESAS-R) – page 1**



**FIGURE 6b: Edmonton Sympton Assessment System (ESAS-R) – page 2**



**FIGURE 7: Palliative Performance Scale version 2 (PPSv2)**



**APPENDIX B : Identified Key Data Fields for Palliative Care**



**Identified Key Data Fields for Palliative Care (Contd.)**



**APPENDIX C**

### TABLE 8: ****Business Requirements for OSCAR EMR Users****

|  |  |  |
| --- | --- | --- |
| **BR#** | **Requirement Statement** | **Acceptance Criteria** |
| **Accessibility** | | |
| R1 | Access other integrated palliative care systems, in the form of Apps, from the “Apps” tab located in the Patient Record navigation menu in OSCAR EMR (Version 14). | InfoAnywhere is an “App” in OSCAR EMR – OSCAR users can do a patient-specific launch from patient’s chart in OSCAR into InfoAnywhere to view and/or document.  ClinicalConnect is an “App” in OSCAR EMR – any data provided from CHRIS to ClinicalConnect is available to view in a patient-context-specific launch from patient’s open chart in OSCAR EMR. |
| R1.1 | Ability to launch patient-context-specific view in palliative care system link from patient’s open screen in InfoAnywhere | Selecting the following Pallitaitve Care systems Apps: InfoAnyhwere and ClincialConnect, from the Apps tab located in the patient navigation menu will launch the desired App in the “Apps” tab window (with option to pop-out App tab window if desired) |
| **User Interface** | | |
| R2 | Create a dynamic Patient Information Registry to identify, match and retrieve information easily cross reference of patient-ID proper forwarding of files | Identification matching presented using OHIP # and patient’s name as primary identifier their Date of Birth and Gender as secondary identifier |
| R3 | Provide the users with the option to “pop out” App tab that is featuring each selected App | Presented the different systems in separate window when “pop out option is selected, giving clinicians an overview of the matched patient’s information from the various systems at a glance |

|  |  |  |
| --- | --- | --- |
| **BR#** | **Requirement Statement** | **Acceptance Criteria** |
| **User Interface (contd.)** | | |
| R4 | OSCAR Palliative Care System to maintain a detailed demographic and CPP Information that constitute the Patient OHIP #, Last Name, First Name, Date of Birth and Gender. | System will not allow null value in these patient’s basic demographic fields i.e. Patient OHIP #, Last Name, First Name, Date of Birth and Gender. |
| R5 | Display the patient’s demographic information on the top of each system screen to allow for identification of the patient | Displays patient’s demographics at the top of each system’s screen to allow identification of patient from any of the systems. Presenting patient`s:   1. OHIP Number 2. Last name, First name 3. Date of Birth (Age)   Gender (M/F) |
| R6 | Expanded OSCAR Master Demographic page to include full scope of palliative care demographic in InfoAnywhere |  |
| R7 | Automate analysis of the difference between the demographic record at the data level between OSCAR and InfoAnywhere with reconciliation of differences being available via manual selection which will be required to align conflicting data elements. |  |
| **Functionality** | | |
| R8 | Ability to use the combination of Patient and Provider ID to augment the transmission of information from one system to the other |  |
| **BR#** | **Requirement Statement** | **Acceptance Criteria** |
| **Functionaity (contd.)** | | |
| R9 | Allow any receiving system to match Patient and Provider from other system into their system |  |
| R10 | Make the option to allow a push of information from one system to another a manual or automated process and system dependant |  |
| R11 | Ability for OSCAR to ensure that access to each patient’s file and information is only accessible and shared within the circle of palliative care team of that patient |  |
| R12 | Enable the addition of new fields in the patient`s relationship folder | These are presented and made available in the Demographic screen for family input |
| R13 | Ability to create new demographic for a relation that does not already exist | “Create New Demographic” appears even when a look-up list is presented in case, relation does not exist in the list |
| R14 | Allow admin privileges to be assigned to the clinicians to update patient`s address information (Home, Hospice, Hospital, Mortuary etc.) and Status | Presents up-to-date information of patient’s current address and status if active i.e. alive or deceased. |
| R15 | Ability to upload and attach scanned documents from hospice files. | Uploaded scanned documents into appropriate clinician’s inbox, reconciling these items with appropriate patient |

|  |  |  |
| --- | --- | --- |
| **BR#** | **Requirement Statement** | **Acceptance Criteria** |
| **Functionality (contd.)** | | |
| R16 | Allow Bereavement Clinicians access to edit and update Patient’s relations database prior to Patient’s death to ensure important data is collected. e.g. relationship, next of kin, availability of will, date of death etc. | Bereavement Clinician checks and manages the relation’s database to ensure all data contacts information required are up-to-date |
| R17 | Ability for the Bereavement Support and Psyco-Social Clinician to access and view all information on deceased family member documented in the other systems (instead of having to dig for information) |  |
| R18 | Ability to generate and create letters e.g. condolence, notifications etc. to the relations of a deceased patient from within OSCAR | Opened a letter template within the deceased patient’s profile with the name of each relation auto-populated within a list selected though a drop-box |
| R19 | Activate a reminder within OSCAR to notify the care team, case manager/clinician when a patient passes away. There is need to draft and send letters to the relations of the deceased patient | The change of patient status from active to deceased triggers a tickler message to the care teams for their information and for bereavement clinician to send letters to the relations of the deceased |
| R20 | Allow Patient`s relations to be easily converted into an actual OSCAR Patient when the need arises | Auto populates demographic details of a relation into a New Patient’s demographic when conversion option is selected |

|  |  |  |
| --- | --- | --- |
| **BR#** | **Requirement Statement** | **Acceptance Criteria** |
| **Functionality (contd.)** | | |
| R21 | Allow the clinicians to schedule relations to attend the required bereavement sessions from the appointment screen as a separate category | Presents daily appointment reports of only scheduled relations without patients on appointment |
| R22 | Ability to create statistical templates and reports for management, LHIN, CCAC etc. |  |
| R23 | Ability to filter and refine required caseload data for printing for rounds |  |
| R24 | Ability for shared-care teams to document notes and vitals generated in OSCAR through the integrator via a patient context launch into OSCAR. |  |
| R25 | Lab information in OSCAR will be delivered via existing connections to OLIS, Community Labs and the EMR delivery download from ClinicalConnect |  |
| R26 | Consults are generated and managed within OSCAR and will be available through patient context launch |  |
| R27 | Out of scope but recommended for future consideration: Automate the electronic referral from OSCAR to InfoAnywhere via patient context launch |  |

### TABLE 9 ****Business Requirements for InfoAnywhere Users****

|  |  |  |
| --- | --- | --- |
| **BR#** | **Requirement Statement** | **Acceptance Criteria** |
| **Accessibility** | | |
| R1 | Access other integrated palliative care systems, in the form of Apps, from the “Apps” tab located in the Patient Record navigation menu in OSCAR EMR (Version 14). | OSCAR is a link in InfoAnywhere – InfoAnywhere users can do a patient-specific launch from patient’s screen in InfoAnywhere into OSCAR to view Patient’s information.  ClinicalConnect is an “App” in OSCAR EMR – any data provided from CHRIS to ClinicalConnect is available to view in a patient-context-specific launch from patient’s open chart in OSCAR EMR. |
| R1.1 | Ability to launch patient-context-specific view in palliative care system App from patient’s open chart in OSCAR EMR | Selecting the OSCAR EMR link located in the patient navigation menu will launch OSCAR EMR. Then while inside OSCAR, the ClinicalConnect App from the Apps tab located in the patient navigation menu can then be selected and launched in the “Apps” tab window (with option to pop-out App tab window if desired) |
| R2 | Create an OSCAR link in Infoanywhere that will enable InfoAnywhere users to access matched Patient IDs in OSCAR via a remote call from Info-anywhere | Info-anywhere consultants will create an OSACR EMR link that grants InfoAnywhere users the access into OSCAR to view documentations in OSCAR and ability to launch clinical connect via OSCAR EMR |
| **User Interface** | | |
| R3 | Create a dynamic Patient Information Registry to identify, match and retrieve information easily across reference of patient-ID proper forwarding of files | Identification matching presented using OHIP # and patient’s name as primary identifier their Date of Birth and Gender as secondary identifier |

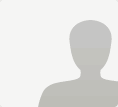
|  |  |  |
| --- | --- | --- |
| **BR#** | **Requirement Statement** | **Acceptance Criteria** |
| **User Interface (contd)** | | |
| R4 | Info-anywhere Palliative Care System to maintain a detailed demographic and CPP Information that constitute the Patient OHIP #, Last Name, First Name, Date of Birth and Gender. | System will not allow null value in these patient’s basic demographic fields i.e. Patient OHIP #, Last Name, First Name, Date of Birth and Gender. |
| R5 | Display the patient’s demographic information on the top of each system screen to allow for identification of the patient | Displays patient’s demographics at the top of each system’s screen to allow identification of patient from any of the systems. Presenting patient`s:   1. OHIP Number 2. Last name, First name 3. Date of Birth (Age) 4. Gender (M/F) |
| R6 | Expanded OSCAR Master Demographic page to include full scope of palliative care demographic in InfoAnywhere |  |
| R7 | Automate analysis of the difference between the demographic record at the data level between OSCAR and InfoAnywhere with reconciliation of differences being available via manual selection, which will be required to align conflicting data elements. |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BR#** | | **Requirement Statement** | | **Acceptance Criteria** |
| **Functionality** | | | | |
| R8.1 | Create OSCAR Integration menu bar in InfoAnywhere Interface to facilitate easy access to specific OSCAR functions from within InfoAnywhere. (menu options include: messaging, Ticklers, Patient Summary which includes meds allergies and notes) | | | OSCAR Menu bar available in InfoAnywhere with the menu options to launch OSCAR functionalities within InfoAnywhere single sign on. |
| R8.2 | Palliative Care Program Referral eForm | | |  |
| R9 | Ability to use the combination of Patient and Provider ID to augment the transmission of information from one system to the other | | |  |
| R10 | Allow any receiving system to match Patient and Provider from other system into their system | | |  |
| R11 | | | Make the option to allow a push of information from one system to another a manual or automated process and system dependant |  |
| R12 | | | Ability for InfoAnywhere to ensure that access to each patient’s file and information is only accessible and shared within the circle of palliative care team of that patient |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BR#** | **Requirement Statement** | | | **Acceptance Criteria** | | |
| **Functionality (contd.)** | | | | | | |
| R13 | | | Ability to upload and attach scanned documents from hospice files. | | | Uploaded scanned documents into appropriate clinician’s inbox, reconciling these items with appropriate patient |
| R14 | | | Ability to launch the full OSCAR Messaging functionality when this menu option is selected to enable the shared-care teams communicate and share electronic documents | | | The Message icon indicates the number of new messages available as a superscript and opens the User’s InBox when launched to list a view of these messages which opens on selection and automatically changes the no of unread messages on the message icon in the menu bar |
| R15 | | Ability to launch the full OSCAR Tickler functionality when this menu option is selected to enable the shared-care teams communicate and receive electronic alerts and reminders | | | The Tickler icon indicates the number of new alert or reminders awaiting to be opened. It appears in red as a superscript and opens the List of Alerts when launched for users to open and read the alerts or reminders. On opening a selected alert, it automatically changes the no of unread ticklers on the Tickler icon in the menu bar | |
| R16 | | Ability to launch the full OSCAR Patient’s Summary functionality when this menu option is selected to enable the shared-care teams launch the patient-context-specific view from InfoAnywhere Interface | | | Launches the patient-context-specific view of the Patient summary chart in OSCAR which include medication, allergies, notes and labs | |
| R17 | | Ability to launch the full OSCAR Palliative Care Program Referral eForm when this menu option is selected to enable the shared-care teams view and populate data fields | | | Opens the Palliative Care Program Referral eForm when option I selected. Users can view and update eForm which populates data accordingly | |

**APPENDIX D**

Online Individual Survey Responses from HNHB Care Members

#1

Q1: Which of these palliative care or shared care team do you belong to within the HNHB-LHIN?

Other (please specify)  Brant, Norfolk, Six Nations, New Credit, Haldimand

Q2: What is your job role in this palliative care or shared care team?

Other (please specify)  Executive director of hospice

Q3: Rank the roles within your circle of palliative care or shared care team that you likely need to receive or share information (communicate) with most often. (1 for Most likely and 8 for Least likely)

* Palliative Care Physician  5
* CCAC Nurse Practioneer  8
* CCAC Nurse Clinician  4
* Non-CCAC Nurse Clinician  2
* Clinical Navigator/Coordinator  1
* Bereavement Clinician  7
* PychoSocio Spiritual Clinician  6

Q4: Which of the palliative care system do you have access to use?

* InfoAnywhere
* Clinical Connect

Q5: Which of these systems is the primary or main one you use for documentation or data entry?

* InfoAnywhere

Q6: Tick under the appropriate system, the modules, functional features or information that you mainly access or utilize to perform your job.

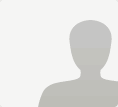
* Referral Information  InfoAnywhere
* Appointment Scheduling/Date  InfoAnywhere
* Demographic  InfoAnywhere
* Physician Consultation Notes  InfoAnywhere
* Nursing Notes  InfoAnywhere
* Medication/Prescription  InfoAnywhere
* Clinical Sessions and documentation  InfoAnywhere
* Messaging  InfoAnywhere
* Labs, X-ray & Diagnostics  Clinical Connect

Q7: In what way will the integration of these systems affect your job?

* a) Will it improve work performance?  YES
* b) Will it allow quicker access to information?  YES
* c) Will it improve communication within the circle of care  YES
* d) Will it reduce information error  YES
* e) Will it save staff time  YES
* f) Will it save patient’s time  YES

Q8: Do you have any other comments, questions, or concerns?

*Respondent skipped this question*

#2

Q1: Which of these palliative care or shared care team do you belong to within the HNHB-LHIN?

* Niagara South

Q2: What is your job role in this palliative care or shared care team?

* CCAC Nurse Practionee

Q3: Rank the roles within your circle of palliative care or shared care team that you likely need to receive or share information (communicate) with most often. (1 for Most likely and 8 for Least likely)

* Palliative Care Physician  1
* CCAC Nurse Clinician  N/A
* Clinical Navigator/Coordinator  2
* PychoSocio Spiritual Clinician  3

Q4: Which of the palliative care system do you have access to use?

* Clinical Connect
* CHRIS
* Q5: Which of these systems is the primary or main one you use for documentation or data entry?
* CHRIS

Q6: Tick under the appropriate system, the modules, functional features or information that you mainly access or utilize to perform your job.

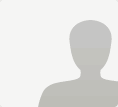
* Referral Information  Clinical Connect
* Appointment Scheduling/Date  Manual – Phone, Fax, Email or Paper
* Demographic  CHRIS
* Physician Consultation Notes  Clinical Connect
* Nursing Notes  CHRIS
* Medication/Prescription  Manual – Phone, Fax, Email or Paper
* Clinical Sessions and documentation  Manual – Phone, Fax, Email or Paper
* Messaging  Manual – Phone, Fax, Email or Paper
* Labs, X-ray & Diagnostics  Clinical Connect

Q7: In what way will the integration of these systems affect your job?

* a) Will it improve work performance?  YES
* b) Will it allow quicker access to information?  YES
* c) Will it improve communication within the circle of care  YES
* d) Will it reduce information error  YES
* e) Will it save staff time  YES
* f) Will it save patient’s time  YES

Q8: Do you have any other comments, questions, or concerns?

*Respondent skipped this question*

#3

Q1: Which of these palliative care or shared care team do you belong to within the HNHB-LHIN?

* Niagara South

Q2: What is your job role in this palliative care or shared care team?

* PychoSocio Spiritual Clinician

Q3: Rank the roles within your circle of palliative care or shared care team that you likely need to receive or share information (communicate) with most often. (1 for Most likely and 8 for Least likely)

* Palliative Care Physician  3
* CCAC Nurse Practioneer  2
* Clinical Navigator/Coordinator  1
* Bereavement Clinician  5
* PychoSocio Spiritual Clinician  4

Q4: Which of the palliative care system do you have access to use?

* InfoAnywhere

Q5: Which of these systems is the primary or main one you use for documentation or data entry?

* InfoAnywhere

Q6: Tick under the appropriate system, the modules, functional features or information that you mainly access or utilize to perform your job.

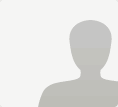
* Referral Information  InfoAnywhere
* Appointment Scheduling/Date  InfoAnywhere
* Demographic  InfoAnywhere
* Physician Consultation Notes  Manual – Phone, Fax, Email or Paper
* Nursing Notes  Manual – Phone, Fax, Email or Paper
* Medication/Prescription  Manual – Phone, Fax, Email or Paper
* Clinical Sessions and documentation  InfoAnywhere
* Task  InfoAnywhere
* Messaging  Manual – Phone, Fax, Email or Paper
* Labs, X-ray & Diagnostics  Manual – Phone, Fax, Email or Paper

Q7: In what way will the integration of these systems affect your job?

* a) Will it improve work performance?  YES
* b) Will it allow quicker access to information?  YES
* c) Will it improve communication within the circle of care  YES
* d) Will it reduce information error  YES
* e) Will it save staff time  YES
* f) Will it save patient’s time  YES

Q8: Do you have any other comments, questions, or concerns?

*Respondent skipped this question*

#4

Q1: Which of these palliative care or shared care team do you belong to within the HNHB-LHIN?

* Other (please specify)  Niagara Falls

Q2: What is your job role in this palliative care or shared care team?

* CCAC Nurse Practioneer

Q3: Rank the roles within your circle of palliative care or shared care team that you likely need to receive or share information (communicate) with most often. (1 for Most likely and 8 for Least likely)

* Palliative Care Physician  1
* CCAC Nurse Practioneer  5
* CCAC Nurse Clinician  6
* Non-CCAC Nurse Clinician  7
* Clinical Navigator/Coordinator  2
* Bereavement Clinician  4
* PychoSocio Spiritual Clinician  3

Q4: Which of the palliative care system do you have access to use?

* Clinical Connect
* CHRIS

Q5: Which of these systems is the primary or main one you use for documentation or data entry?

* CHRIS

Q6: Tick under the appropriate system, the modules, functional features or information that you mainly access or utilize to perform your job.

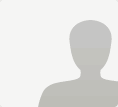
* Referral Information  Clinical Connect, CHRIS, Manual – Phone, Fax, Email or Paper
* Demographic  CHRIS
* Physician Consultation Notes  Clinical Connect
* Medication/Prescription  Clinical Connect, CHRIS
* Clinical Sessions and documentation  CHRIS
* Task  CHRIS
* Messaging  CHRIS, Manual – Phone, Fax, Email or Paper
* Labs, X-ray & Diagnostics  Clinical Connect

Q7: In what way will the integration of these systems affect your job?

* a) Will it improve work performance?  YES
* b) Will it allow quicker access to information?  YES
* c) Will it improve communication within the circle of care  YES
* d) Will it reduce information error  YES
* e) Will it save staff time  YES
* f) Will it save patient’s time  YES

Q8: Do you have any other comments, questions, or concerns?

Very much looking forward to an integrated health record/documentation/communication system. thank you

#5

Q1: Which of these palliative care or shared care team do you belong to within the HNHB-LHIN?

* Niagara West

Q2: What is your job role in this palliative care or shared care team?

* Clinical Navigator/Coordinator

Q3: Rank the roles within your circle of palliative care or shared care team that you likely need to receive or share information (communicate) with most often. (1 for Most likely and 8 for Least likely)

* Palliative Care Physician  2
* CCAC Nurse Practioneer  N/A
* Non-CCAC Nurse Clinician  1
* Bereavement Clinician  4
* PychoSocio Spiritual Clinician  3
* Other  5

Q4: Which of the palliative care system do you have access to use?

* OSCAR EMR
* Clinical Connect
* Other (please specify)  MS Access/excel, Meditech

Q5: Which of these systems is the primary or main one you use for documentation or data entry?

* Other (please specify)  MS Access/excel

Q6: Tick under the appropriate system, the modules, functional features or information that you mainly access or utilize to perform your job.

* Referral Information  Manual – Phone, Fax, Email or Paper
* Appointment Scheduling/Date  Manual – Phone, Fax, Email or Paper
* Demographic  OSCAR EMR, Clinical Connect, Manual – Phone, Fax, Email or Paper
* Physician Consultation Notes  OSCAR EMR, Clinical Connect, Manual – Phone, Fax, Email or Paper
* Nursing Notes  OSCAR EMR, Clinical Connect, Manual – Phone, Fax, Email or Paper
* Medication/Prescription  Manual – Phone, Fax, Email or Paper
* Clinical Sessions and documentation  OSCAR EMR, Clinical Connect, Manual – Phone, Fax, Email or Paper
* Task  Manual – Phone, Fax, Email or Paper
* Messaging  Manual – Phone, Fax, Email or Paper
* Labs, X-ray & Diagnostics  Clinical Connect, Manual – Phone, Fax, Email or Paper
* Other (please specify)  Meditech

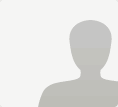
Q7: In what way will the integration of these systems affect your job?

* a) Will it improve work performance?  YES
* b) Will it allow quicker access to information?  YES
* c) Will it improve communication within the circle of care  YES
* d) Will it reduce information error  YES
* e) Will it save staff time  YES
* f) Will it save patient’s time  YES

Q8: Do you have any other comments, questions, or concerns?

#3 question I marked non-CCAC nurse clinician, I think I checked the correct option, our nurse clinician is funded by WLMH & CCAC (majority WLMH). Also,

#3 you ask for ranking: they are all considered top ranking #1, and the CCAC Care Coordinator (case manager) should be included in it, as I speak with her multiple times daily, ranked #1

#6 

Q1: Which of these palliative care or shared care team do you belong to within the HNHB-LHIN?

* Other (please specify)  hamilton family health team

Q2: What is your job role in this palliative care or shared care team?

* Other (please specify)  clinical nurse specialist

Q3: Rank the roles within your circle of palliative care or shared care team that you likely need to receive or share information (communicate) with most often. (1 for Most likely and 8 for Least likely)

* CCAC Case Coordinator (Case Manager)  1
* Palliative Care Physician  4
* CCAC Nurse Practioneer  6
* CCAC Nurse Clinician  7
* Non-CCAC Nurse Clinician  3
* Clinical Navigator/Coordinator  2
* Bereavement Clinician  8
* PychoSocio Spiritual Clinician  5

Q4: Which of the palliative care system do you have access to use?

* OSCAR EMR
* Clinical Connect

Q5: Which of these systems is the primary or main one you use for documentation or data entry?

* OSCAR EMR

Q6: Tick under the appropriate system, the modules, functional features or information that you mainly access or utilize to perform your job.

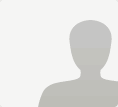
* Referral Information  OSCAR EMR, InfoAnywhere, Clinical Connect, Manual – Phone, Fax, Email or Paper
* Physician Consultation Notes  OSCAR EMR, InfoAnywhere, Clinical Connect
* Nursing Notes  OSCAR EMR, InfoAnywhere, Clinical Connect
* Medication/Prescription  OSCAR EMR, InfoAnywhere, Clinical Connect
* Clinical Sessions and documentation  OSCAR EMR, InfoAnywhere, Clinical Connect, Manual – Phone, Fax, Email or Paper

Q7: In what way will the integration of these systems affect your job?

* a) Will it improve work performance?  YES
* b) Will it allow quicker access to information?  YES
* c) Will it improve communication within the circle of care  YES
* d) Will it reduce information error  YES
* e) Will it save staff time  YES
* f) Will it save patient’s time  YES

Q8: Do you have any other comments, questions, or concerns?

*Respondent skipped this question*

#7

Q1: Which of these palliative care or shared care team do you belong to within the HNHB-LHIN?

* Niagara West

Q2: What is your job role in this palliative care or shared care team?

* CCAC Case Coordinator (Case Manager)

Q3: Rank the roles within your circle of palliative care or shared care team that you likely need to receive or share information (communicate) with most often. (1 for Most likely and 8 for Least likely)

* CCAC Case Coordinator (Case Manager)  7
* Palliative Care Physician  3
* CCAC Nurse Practioneer  5
* CCAC Nurse Clinician  8
* Non-CCAC Nurse Clinician  2
* Clinical Navigator/Coordinator  1
* Bereavement Clinician  6
* PychoSocio Spiritual Clinician  4

Q4: Which of the palliative care system do you have access to use?

* Clinical Connect
* CHRIS

Q5: Which of these systems is the primary or main one you use for documentation or data entry?

* CHRIS

Q6: Tick under the appropriate system, the modules, functional features or information that you mainly access or utilize to perform your job.

* Referral Information  Clinical Connect, CHRIS, Manual – Phone, Fax, Email or Paper
* Appointment Scheduling/Date  Manual – Phone, Fax, Email or Paper
* Demographic  CHRIS
* Physician Consultation Notes  Clinical Connect
* Nursing Notes  CHRIS
* Medication/Prescription  CHRIS
* Clinical Sessions and documentation  Clinical Connect
* Task  CHRIS, Manual – Phone, Fax, Email or Paper
* Messaging  CHRIS, Manual – Phone, Fax, Email or Paper
* Labs, X-ray & Diagnostics  Clinical Connect

Q7: In what way will the integration of these systems affect your job?

* a) Will it improve work performance?  YES
* b) Will it allow quicker access to information?  YES
* c) Will it improve communication within the circle of care  YES
* d) Will it reduce information error  YES
* e) Will it save staff time  YES
* f) Will it save patient’s time  YES

Q8: Do you have any other comments, questions, or concerns?

I also am involved with Niagara South team for the Fonthill area.

**APPENDIX E**

**Response received from HNHB Shared-care Team on questions from Project Team**

Please find our questions, which we hope will create further discussion below.

**1. Is InfoAnywhere used by any team members to prescribe medication? If YES, what is this individual’s role in the shared-care team?**

*NO*

**2. Please confirm if the following description accurately captures which team members, by role, use OSCAR and InfoAnywhere?**

**i.            Physicians in both teams, Niagara North and Niagara South, document their encounter notes, prescribe medications etc. using OSCAR**

*YES, CORRECT!*

**ii.            Psychosocial/bereavement clinician perform documentation using InfoAnywhere.**

*YES*

**iii.            Clinical navigators and client coordinators for Niagara South document in both InfoAnywhere and OSCAR. (Note: the north team was in the process of bringing on a clinical navigator)**

*YES, FOR BOTH NORTH AND SOUTH TEAMS*

\*\*We would like to better understand who is documenting in OSCAR and who in InfoAnywhere, as well as what they are documenting in each respective system to allow us to design a way for a user to launch from OSCAR into InfoAnywhere with patient context and vice versa.\*\*

**3.      Please confirm which system (OSCAR or InfoAnywhere) the Niagara North Clinical Navigator would use for documentation. Would they document use both systems, similar to the Niagara South Clinical Navigator?**

*YES*

**4.      Are there any functional features that only OSCAR offers?**

*YES, the writing  and printing of prescriptions and the printing of medical notes created by the physician.  Creating and printing labels that include all pertinent patient information, such as DOB, HIN Etc... To my knowledge, these functions are not available in InfoAnywhere.*

**5.      Are there any functional features that only InfoAnywhere offers?**

*Yes, recording statistical information.*

**6.      Is there any information that can only be documented in OSCAR? Which role uses OSCAR to capture this.**

*YES, list of medications prescribed by the physician and medical notes written by the physician.*

**7.      Is there any information that can only be documented in InfoAnywhere? Which role uses InfoAnywhere to capture this?**

*YES, the length of time spent on one particular patient (on the telephone, in person, by fax etc...) This is used only by the Clinical Navigator and the Psychosocial/ Spiritual Advisor.*

**8.      What is documented in both systems? Is there any overlap, between InoAnywhere and OSCAR that would require  a user to retype or cut and paste from one system to the other?**

*All information that is received on the initial referral and all information gathered from Clinical Connect must be typed into OSCAR in order to have the information available to the physician and in order to have the medical labels that are to be used for all reports.  The same information must be typed into InfoAnywhere.  It would be ideal to input the information into one and have it automatically transfer to the other.  It would save a lot of time!*

**9.      How are tasks managed within teams using InfoAnywhere? Is Info Anywhere used to manage  “tasks” amongst shared-care teams, or is OSCAR solely used to assign and manage tasks across the team? Please confirm if there is there a need to manage tasks jointly across systems.**

*The South team does not currently use either of these systems to manage tasks.  There has never been any training offered on either OSCAR or InfoAnywhere, perhaps if we knew how to use these features, such as "tasks", we would probably use them.*

**10.  Does InfoAnywhere have built in messaging functionality, similar to OSCAR messenger, which is being used by the team?**

*Only the Clinical Navigator and the psychosocial Advisor can send messages within info anywhere to each other.  I was not aware that there is a messaging system available through OSCAR because, again, we have had no training.*

**11.  Are there any team members using InfoAnywhere to prescribe medications? If YES, which role is performing this.**

*NO, the physician prescribes medications though OSCAR only.*

*It is important to note that the South team consists of a Palliative Care Physician and a Palliative Care Nurse Practitioner.  The physician works only with OSCAR and the nurse only works with CHRIS.  These systems do not talk to each other.  Any notes that are recorded by the nurse practitioner in CHRIS are printed and the Clinical Navigator must scan and upload into OSCAR so that the physician will have access to the notes.  Any notes that are written by the physician in OSCAR must be printed and given to the nurse practitioner to read. Any notes written in InfoAnywhere by the Psychosocial Advisor or Clinical Navigator must be printed and given to both the physician and the nurse because they do not have access to InfoAnywhere,*

*It is very IMPORTANT for all four of these systems, OSCAR, InfoAnywhere, CHRIS and Clinical Connect be  integrated so that all information is shared equally by all members of the team in order to work effectively and for the safety of the patient to insure nothing is missed and errors are not made.*