

INTERNSHIP REPORT

Patient Analysis and Tracking System for Mental Health and Addictions Program

- Project PATS Requirement Determination

By

Navjot Singh

B00587608

nv519588@dal.ca

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Decision Support Services

IWK Health Center, Halifax Nova Scotia

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Date Submitted
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Supervisor's Acknowledgment

This is to confirm that Navjot Singh has satisfactorily met all expectations and goals of the internship.

Ken Andersen

Supervisor's Signature

Aug 13 / 2012

Date

Ken Andersen

(Supervisor's Full Name)

Acknowledgement & Endorsement

Navjot Singh has written this report in partial fulfilment of the requirements for the Master of Health Informatics Program at Dalhousie University. The report has not received any previous academic credit at Dalhousie University or any other institution.

A great number of people have contributed in assorted ways during my internship work and it is a pleasure to convey my gratitude to them in my humble acknowledgment.

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Executive Summary

Patient tracking is a key feature in efficient management of healthcare delivery process. Owing to the global impact of recession these are challenging times for hospitals in terms of not only managing the ever increasing patient demands but also with reduced capabilities of addition in physical capacity. Improving fragmented patient flow processes, incorporating cost effective technological innovations and further refining the processes with understanding of technology benefits are among the various methods employed to provide safe and efficient patient care.

Project PATS is a focused effort for IWK's Mental Health Department to track the patients' journey through its program and thereby identify areas of improvement in patient flow process with a view to reduce wait times and make it efficient.

Building such a database has its challenges that transcend people, process and technology. IWK's Mental Health Department is presently in the midst of reorganizing its services as it moves along in its Process Improvement journey. Modifying processes, updating input forms and re-defining user tasks are at various stages of development. Add to it the technology constraints of MEDITECH, such challenges call for a customized approach to problem solving with a buy in from all stakeholders.

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INTERNSHIP REPORT

Patient Analysis and Tracking System for Mental Health and Addictions Program- Project PATS

Requirement Determination

1. Introduction

According to McGraw-Hill Concise Dictionary of Modern Medicine (2002) patient tracking is defined as the process of following a patient and his/her changing medical status, laboratory studies, imaging, and other diagnostic and therapeutic interventions, especially when that patient is away from an institution, being managed by another provider.

In healthcare delivery process “patient tracking” does not just mean tracking the physical location of the patient but also includes the association of some user predefined limited level of information regarding the condition of that individual and care given, e.g. chief complaint, diagnosis, investigations, medications administered, etc..

Healthcare today is stressed, both financially and operationally. As hospitals struggle because of resource crunch, especially in a publicly administered single payer health care system like Canada, concerns are raised on escalating costs to meet the high treatment and patient safety standards. From a management perspective, optimizing patient flow has become imperative as hospitals can increase their service capacity by improving their ability to move patients efficiently through the treatment system, a measure called “throughput” (Cassidy-Smith, Baumann, & Boudreaux, 2007). Evidence suggests that always knowing where the patients are

saves hospital staff a lot of time and improves workflow, patient throughput, resource management and patient safety(Dobson, Doan, & Hung,)

Extensive healthcare reforms driven primarily by escalating healthcare costs and economic recessionary trends resulted in newer healthcare management practices. One major reform has been the trend towards some version of “managed care”(Grembowski, Cook, Patrick, & Roussel, 2002). As a result of almost universal adoption of this approach, healthcare delivery has become multi-centric & multidisciplinary, often involving various occupational groups. However, one aspect that remains unaltered is the fact that delivery of healthcare is highly dependent upon the detail and accuracy of information collected from various patient contact areas like consultation, diagnostics, laboratory, interventions, prescriptions, to name a few. As a result, many different records for the same patient are scattered among different centers and also often in different departments even within the same institution. This has made the healthcare delivery labor intensive too as more paperwork is necessary to store and chart observations, measures and data created by the numerous and increasingly complex monitoring devices. All this requires either valuable time from the clinicians’ work routine, often at the expense of care or, recruiting assistants to transcribe thereby increasing costs. This also creates ambiguities and conflicts over who is responsible and accountable for each task. In addition, limitations on remote or multi-user access, poor and illegible handwriting, ambiguous or missing data and lack of active contribution to the decision making of clinicians are among the reasons making healthcare delivery inefficient and unsafe (Vezyridis, Timmons, & Wharrad, 2011).

The successful management of the disease is achieved through the availability of ‘the right information at the right moment’ (van Steenkiste, Jacobs, Verheijen, Levelink, & Bottema, 2002). Certainly, the organizational flow of information needs to be mediated. Whether it is

person to person, intra-organizational or across several healthcare organizations, continuity of care relies on shared and integrated information.

Several tools and services are available to help hospitals with their patient flow challenges. One example is Health Information Systems. Six Sigma and Lean Management are the popular process methodologies. All of these options can drive improvements in specific ways (Vezyridis et al., 2011). The points to consider are:

1. Is the approach based in science or best practice at other hospitals? Approaches with a scientific basis are universally applicable but if the approach is based on experiences of other hospitals, its applicability may not be generalizable. For example, the flow of care for patients in a cancer care hospital will be lot more different than the care provided by Mental healthcare provider. So, although the system may work well within cancer care hospital but would not be as efficient in healthcare delivery by Mental health care provider.
2. Is the methodology based on system-wide thinking or applied to a specific department? If applied to a limited area, improvement in one area may lead to problems in other areas. Single department solutions, may create or worsen bottlenecks in other areas (Samuel, June 2004). For example lets us consider the issue of wait times. Just by correcting the process at the registration section will not reduce wait times if the time taken for each consult by the clinician is not taken into consideration. It will just reduce bottleneck from registration desk and transfer it to the clinician's office. The approach must be system wide.

3. Will the approach provide you with lasting improvements that your staff can sustain going forward? Change management issues are big and need to be addressed. The best of process designs may not deliver unless there is staff buy-in.

According to (Vezyridis et al., 2011) the hospital requirements to meet the economic challenges of modern era can be enumerated as following:

- Manage increasing patient demand without adding physical capacity.
- Maximize capacity of existing services.
- Improve a fragmented patient flow process.
- Automate communications across constituents
- Provide transparency / visibility of patient flow information.
- Encourage accountability.
- Automate patient flow processes / understand workflow.
- Measure, set the bar, re-measure, re-set the bar.
- Implement cost-effective process and technology.
- Refine process with understanding of technology benefits.

1.1 Role of Health Information Systems.

Although all other aspects of our lives have been deeply impacted by information systems, health care has been a late adopter of the same. (Vezyridis et al., 2011) list the contribution of information systems in healthcare;

1. From a patient-centred aspect they contribute to high-quality and efficient patient care, and thus to improve treatment, outcomes, and public health. Their contribution is not solely to clinical practice but also administrative and managerial tasks that support the delivery of care.

2. They play a big part in decision making by facilitating in research, evaluation, and training and planning of healthcare delivery.
3. They are also considered as reliable means of communication among health care professionals and institutions since they are capable of providing a platform for shared, multidisciplinary and continuous care.

However, merely by incorporating technological innovations into the healthcare system cannot solve the problems of healthcare delivery process. To have real benefits of technology, the hospital must carefully review and rectify its work flows and processes. Implanting technology on these non-coordinated processes will only magnify the problems rather than solving them. At the same time, the use of technology can be very helpful in process redesign, especially in patient tracking systems, where it can provide useful information on the timestamps, queuing models, etc that can help a healthcare manager to eliminate bottlenecks (Drazen & Rhoads, 2011).

Regardless of the technology chosen, (Drazen & Rhoads, 2011) recommend best practices for improving patient flow with technology include:

- a. View patient flow as a dynamic system-wide phenomenon requiring system-wide attention.
- b. Introduce technology *after* you have reviewed your processes and fixed any broken or outdated workflows.
- c. Select a system based on the accuracy and precision you need.
- d. Set goals and parameters for the processes you track.
- e. Use a multidisciplinary team to identify opportunities to improve patient flow.
- f. Reassure staff that tracking is to improve care , not to monitor productivity; and,
- g. Closely examine the variation in your process and in patient volume.

1.2 Benefits of Patient Tracking

There is hardly any aspect of healthcare delivery process that is not impacted by the benefits of patient tracking. Utilization management, resource planning, patient safety, financial management etc. are some of them. (Vezyridis et al., 2011) conclude that the benefits of patient tracking, although intertwined, may be conveniently divided into direct and indirect. Table 1 below summarize them.

DIRECT BENEFITS	INDIRECT BENEFITS
Decreased length of stay	Improved understanding of the processes and visit progression
Improved utilization of resources and reduced inventory costs	Improved staff morale and lower employee turnover
Nursing time saved looking up information and looking for equipment	Automatically generated interaction reports and increased accountability
Physician time saved looking up information	Improved performance with accreditation agencies and quality measures
Registration personnel time saved	Better record keeping and decreased potential liability
Better charge capture and faster revenue generation	Increased patient safety
Fewer ambulance diversions and increased patient referrals	Increased patient satisfaction
Improved claims and denial management (through greater accuracy); and	Improved patient education(e.g.; through use of waiting areas, etc)
Reduced costs associated with preprinted paper forms and templates.	

Table 1 Benefits of Patient Tracking

2. Description of the Organization

The IWK Health Centre, named after Izaak Walton Killam, is a prestigious healthcare provider located in Halifax, Nova Scotia. It provides high quality healthcare services to the women, children, youth and families of the Atlantic part of Canada spanning from Nova Scotia to New Brunswick and to Prince Edward Islands.

The IWK services are structured around the Program Based Care Model by which it provides primary, secondary and tertiary care services through 3 programs, namely, Children's Health, Mental Health & Addictions and Women & New Born health (*IWK Health Centre: About Us.*). Apart from providing healthcare services, IWK Health Centre is also actively associated with research and teaching activities. As a teaching hospital, it is affiliated to Dalhousie University, Halifax and serves as a primary clinical source for pediatric and obstetric teaching of a broad range of health professions including medicine, nursing, other healthcare services and child life (*IWK Health Centre: About Us.*).

The magnanimity of its operations can be gauged from the following statistics (*IWK Health Centre.2012*);

- Approximately 5000 babies are delivered at the IWK Health Centre each year.
- There are more than 3,200 employees at the IWK Health Centre.
- Approximately 29,170 patient visits to the emergency department each year.
- Approximately 1,298,717 tests are completed in laboratories at the IWK Health Centre each year.
- Approximately \$20 million of funded research was underway at the IWK Health Centre in 2010.

2.1 Mental Health and Addictions Program

IWK Health Centre's Mental Health and Addictions Program is dedicated to provide compassionate mental healthcare to the women, children, youth and families of the Maritime Provinces. The program began in 1995 with the merger of Nova Scotia's Hospital Child and Addictions Mental Health, Atlantic Child Guidance Centre and the IWK Mental Health program. Since its inception, it has continued to grow to include Youth Forensic Services, Intensive Care Based Treatment, Shared Care, four inpatient (one acute and 3 community) programs. Women's Reproductive Mental Health is the latest addition in 2007 to help women and families deal with issues related to this area (*IWK Health Centre: Mental Health and Addictions*).

However, of the late, to inculcate more efficiency in health care delivery process and also driven by budgetary constraints, the MHA program is being revamped with merger of some of its services as well as dedicated efforts to track the patients with a view to reduce wait times. Project PATS is aimed at that.

3. Description of the work performed at the organization.

In order to improve the efficiency and quality of healthcare delivery, IWK's Mental Health Department is currently reviewing its processes. PROJECT PATS is a focussed effort to track the patient's journey through the Mental Health & Addictions program.

The author was employed as a Health Informatics intern to gather requirements about the proposed database. The objectives of the project were:

- Collect information about what is needed.
- Identify the challenges in building such a database.
- Identify the necessary solutions.
- Estimate the cost for completion and maintenance of Project PATS.
- Construct a simple database for each CMHC to temporarily collect rudimentary data for Choice and Partnership appointments.

Figure 1 is the transcript received by the author at the beginning of the work placement.

The patient information which this database intends to track is listed below;

1. DEMOGRAPHICS
2. DESCRIPTION OF PROBLEM
3. DIAGNOSIS (ICD-10)
4. INTERVENTIONS

Apart from the above, it was also planned for the database to considering collecting the necessary information which is to be mandatorily submitted to Canadian Institute for Health Information (CIHI).

To meet the intended objectives it was apparent that a thorough understanding of the patient flow in MHA program be understood. The author set upon the path with the following aims;

***IWK HEALTH AND ADDICTIONS
(MH/A) PROGRAM
Patient Analysis and Tracking System
(Project PATS)
Masters Student Placement
Summary-08/04/12
K. PAJER, MD., MPH***

General Description of the Project;
The purpose of the Project PATS is to build a database that stores patient information from point of referral to the MH/A system through all Choice and Partnership appointments for the MH/A Community Mental Health Centers. Data will be entered by the administrative staff from a coded form filled out by clinicians at the end of their appointments.*

Description of Student Task;
The student will collect information about what is needed, identify challenges in building such a database, identify the necessary solutions, and estimate the cost for completion and maintenance of Project PATS. It would be very helpful if the student could construct a simple database for each CMHC to temporarily collect rudimentary data for Choice and Partnership appointments while we plan for Project PATS.

Figure 1: Description of Student Placement

- Understand the whole patient journey and effectively map the process from entry to exit.
- Understand the communication needs and the flow of information between all the stakeholders and departments internal and external to the MHA program.
- To evaluate the technical feasibility of this database with particular emphasis on the constraints component.
- To propose Health Informatics solutions to the problems in the process.

3.1 Patient and Information flow in MHA Program

3.1.1 Current Process

To help the reader understand the complexity of the referral process, an overview of the MHA referral process is necessary. A very high level macroscopic view of the process is exhibited in Figure 2.

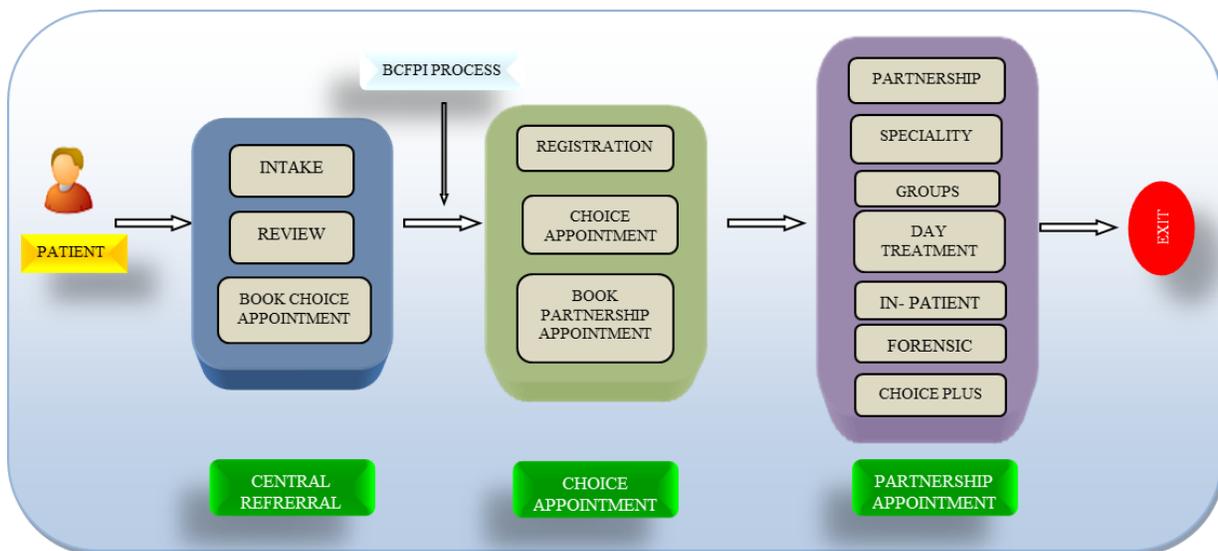


Figure 2 General Overview of the process

The current referral process begins with either of the following sources;

- Phone call by the patient himself or the guardian.
- Faxed information from a General Practitioner (GP) or school or other provincial clinics.
- Referral documents received by mail.

Once the referral is received at the Central Referral (CR), the data is entered manually into paper based page 1 of yellow referral form by the Central Referral Assistants. The information is gathered by phone. At this point an identifier, called the Central Referral Number (CRN), is assigned to the referral and is also logged manually into a log book. The information gathered at this step is mostly the demographics of the patient as per fields in the form. The filled referral form is then kept in the outgoing tray to be picked up by the clinicians. At this time, if the patient warrants an emergency intervention, s/he is instructed to access the emergency services at the IWK. In conditions where the referral form received by fax or mail clearly indicates the patient be referred to Autism/Eating Disorders /Forensics or CHOICES (for addictions) they are directly booked by the CR assistants to these clinics through the outlook calendar. At a convenient point later, the relevant data is entered in an MS Access database maintained by one of the CR assistants.

Table 2 Time Schedules Based on Priority

The clinicians at the CR review the filled information and call up the patient to know more about the condition. The information collected is then entered into the page 3 of the

PRIORITY	TIME LINE
EMERGENT	Processed and seen within 24 hours
URGENT	Processed daily and seen within 7 days
SEMI URGENT	Processed within 10 working days
REGULAR	Processed within 10 working days.

referral form (again manually). Based on the evaluation at this stage, the patients are triaged and

then given a CHOICE appointment. The patient is triaged as Emergent, Urgent, Semi Urgent, and Regular. These appointments, barring those requiring emergency services, are booked into the outlook calendar of the Community Mental Health Clinics (CMHC). This is termed as “disposition” and as per the Department of Health regulations, the criteria for dispositions time schedule is mentioned in Table 1. The emergent priority referrals are referred to the IWK emergency department.

Currently the CMHC are located at Halifax, Dartmouth and Sackville. The referral form is also faxed to CMHC where the appointment has been booked and additionally the Strongest Families Inc. are notified to conduct the Brief Child and Family Phone Interview (BCFPI). The BCFPI, which is a diagnostic tool used by the Mental Health department, is done by an outside entity called Strongest Families Inc. It is conducted before the CHOICE appointment and the report is faxed to the CMHC either directly or via CR.

At the CMHC the front office staffs pends the appointment into Community Wide Scheduling (CWS) which is the module of MEDITECH for appointments. They also mail a confirmation of appointment to the patient and make a reminder telephone call 24-48 hours prior to the appointment. On the day of the CHOICE appointment, when the patient arrives, the front office assistant registers the patient into MEDITECH (if the patient is new, it becomes a new registration and an IWK Health Centre identifier called “K” no. is assigned to the file). The patient file along with a print out of BCFPI report and the received fax of referral form is sent to the clinician. The clinician reviews the file and discusses further about the clinical condition of the patient and depending upon the condition books a PARTNERSHIP appointment at the appropriate CMHC, Day care treatment center, in patient or other centers. If appropriate decision cannot be made at the CHOICE appointment or care plan warrants another appointment it is

called the CHOICE PLUS appointment. A complete list of the locations is provided in Appendix F. This appointment is also booked via the outlook calendar and the procedure is repeated by the front office staff as before for the CHOICE appointment.

At the PARTNESHIP appointment, the patient is treated and if need arises, is transferred to other clinic by filling out a transfer form.

So, judging by the above, the development of patient tracking system will involve a healthy interaction between

meeting the needs of one

or more of these

stakeholders (Figure 3).

As a system the MHA

program has various

integration points which

are located not only at the

IWK Health Centre but

also traverse across Nova Scotia

at Dartmouth, Halifax, Sackville, etc.

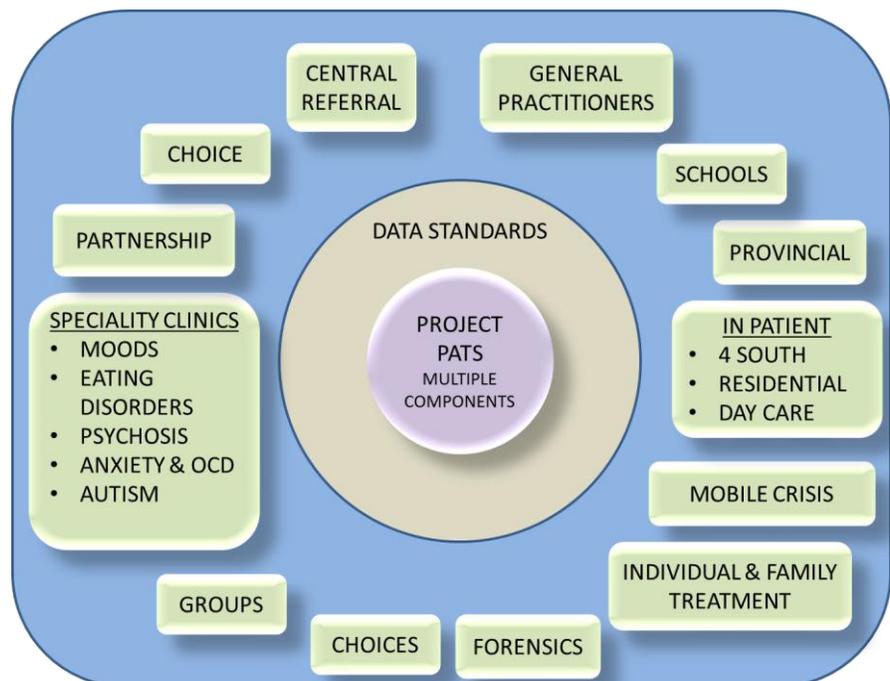


Figure 3 Project PATS- Integration Points

3.1.2 Planned Process Modifications

As mentioned above the patient flow and information flow process at the MHA program is being modified. The salient changes are as follows:

1. Introduction of ELGIBIITY Criteria.

This is an effort to screen the patients before they are accepted into the MHA program given the scope of services provided. As depicted in Fig 4 this is being planned to be executed at the initial point of entry and will be done by CR administrative assistants. This will help in removing the bottleneck at this step by filtering the patient population. Although till the time of writing this manuscript, the exact Eligibility criteria form was not available but the algorithm for eligibility criteria was finalized (Appendix C).

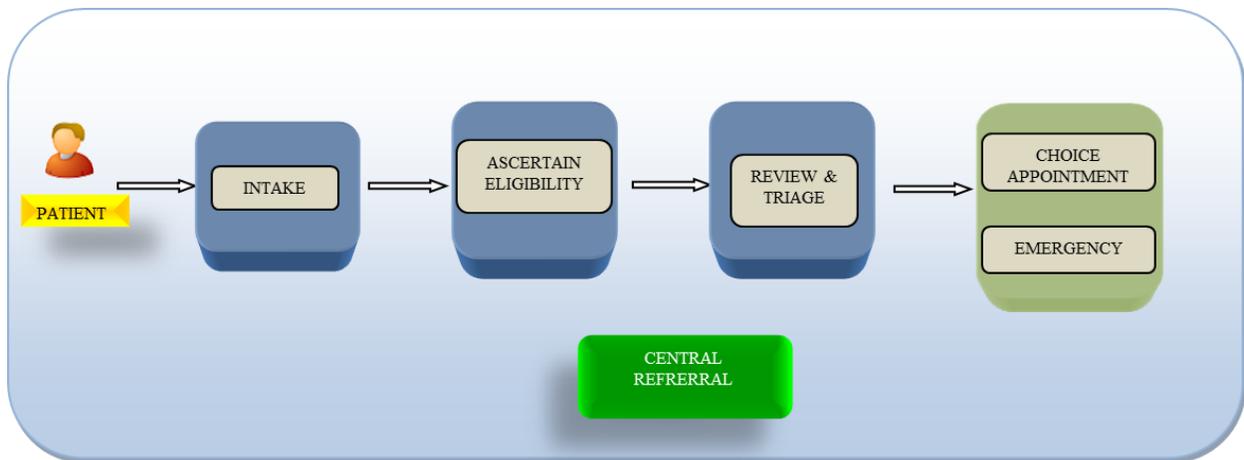


Figure 4 Introduction of Eligibility Criteria at CR

2. Replacement of BCFPI with Strengths and Difficulty Questionnaire.

BCFPI is a tool used by clinicians in patient assessment. This is being done by Strongest families

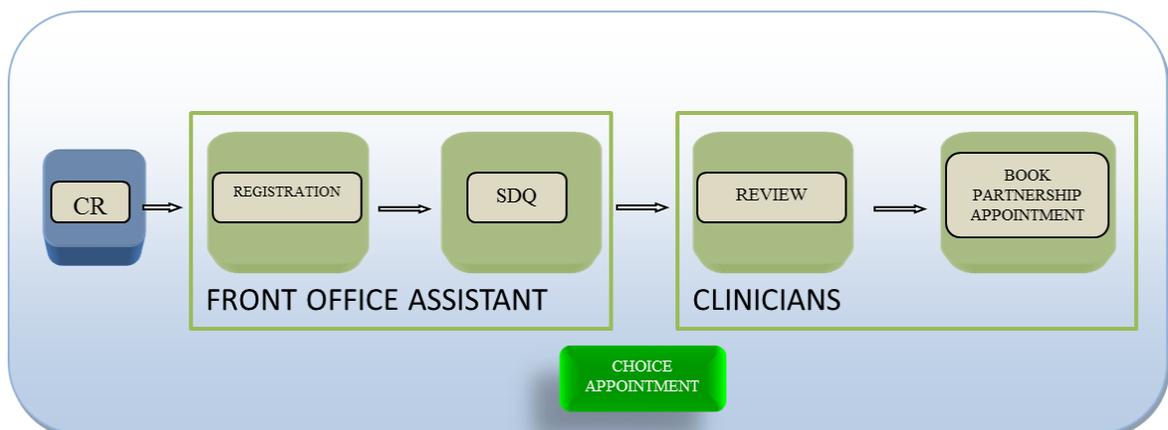


Figure 5 Replacement of BCFPI with SDQ

before the first CHOICE appointment. This process is being replaced by Strength & Difficulty Questionnaire and will be conducted at the front office of the CMH at the time of scheduled appointment. The patients will be asked to report early for their appointment to accommodate this step. At this point it is not certain if it is going to be a manual process or electronic although discussions are on to have a dedicated kiosk or computer tablets for the same. This process is scheduled to start by September 2012.

3. Capturing Clinical Information

To track the patient's journey in the system, it a limited amount of clinical information is planned to be associated along with. The information decided upon includes the following components;

- Brief presentation of the problem.
- Diagnosis in ICD -10 codes. This will include provisional diagnosis obtained from SDQ report. The primary and secondary diagnosis will be made at either the CHOICE or PARTNERSHIP appointments.
- Interventions done as part of plan of care.

These are to be captured by entering the information in the proposed Clinical Information Form. The details of this, at the time of writing this manuscript, are still under consideration.

3.2 User Group List

Based on the above mentioned MHA program, following users (Table 3) with their associated roles and responsibilities were identified.

Table 3 User List at MHA Program

S No.	Users	Roles/Responsibilities
1	Director, MHA	Overall management of all MHA services
2	MHA Managers	Supervision of MHA portfolios
3	Program Manager, Strategic Plan	MHA Strategic Planning
4	CMH Manager	Supervision of Central Referral and CMH clinic
5	Chief, Psychiatry	Responsible for Department of Psychiatry (clinical and administrative)
6	Central Referral Administrative Assistants	Provide administrative support to Central Referral
7	Community Mental Health Administrative Assistant (Dartmouth, Sackville, Halifax)	Provide administrative support to clinicians in each of the three CMH Clinics
8	Administrative Manager, Department of Psychiatry	Supervises administrative assistants who directly support psychiatrists

Furthermore to understand the user needs these were conveniently divided into user groups each performing their respective tasks at the patient contact points of CR, CHOICE, and PARTNERSHIP process of the MHA program. Table 4 below summarises these requirements.

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Table 4 Requirements by User Groups

S No.	USER GROUP	TASKS	REQUIREMENTS	REPORTS REQUIRED
CRD				
1.	Central Referral Administrative Assistants	1. Receive or make calls for referral	Working Phone	<u>CR CLINICIANS:</u> - Demographics to identify patient - Eligibility criteria report
		2. Establish Eligibility	Eligibility criteria form fields	<u>MANAGERS:</u> 1. Intake time and date 2. By whom 3. Time period between intake beginning and pass on to CR clinician for review 4. Number of intakes 5. Number of intakes location wise 6. Calls made to patients but not answered
		3. Enter or update Demographics	Established rules for eligibility assessment	
		4. Assimilate the above information and pass it on to CR clinician	Demographic form and fields	
		5. Book for Autism/ Eating disorders/Forensics/Choices clinics (based on referrals received by fax and mail which clearly mention the need of these services.)	Access to outlook calendars	
		6. Send letter of confirmation for the appointments to the patients.	Contents of letter of confirmation	
2	Central Referral Clinicians	1. Receive intakes from CR administrative assistants	List of intakes	<u>MANAGERS</u> 1. Number of dispositions 2. Beginning time of disposition 3. Ending time of disposition 4. Duration of each disposition 5. By whom 6. Where disposition 7. Pending disposition
		2. Call intakes(patient)	Working phone	
		3. Log unanswered calls	Page 3 fields	
		4. Review the case by filling page 3	Established rules for acuity assessment	
		5. Ascertain acuity	Access to appointment	

			calendars	8. Log of unanswered calls 9. Which cases were disposition (identified by name, CR No. , K No.) 10. Classify dispositions by risk acuity (Emergent, Urgent, Regular)	
		6. Book appointment - CHOICE - Autism - Eating Disorders	Working fax		
		7. Refer to Emergency			
		8. Fax referral form to the appointment centre			
CHOICE APPOINTMENT					
3	Front Office Administrative Assistants	Book the appointments given by CR clinicians into CWS	Access to CWS	<u>CHOICE CLINICIANS:</u> -SDQ report -Filled referral form	
		Send appointment reminders to patients by mail (2 weeks before appointment)	Text of appointment reminders	<u>MANAGERS:</u> 1. How many bookings in CWS 2. How many appointment reminder letters sent 3. How many patient appointments were confirmed on phone 4. How many appointments were not confirmed by phone/unanswered call log 5. How many appointments turned up 6. How many no shows/cancelled 7. How many patients got registered—new/old 8. How many SDQ reports were generated - For which patients - For which clinician	
		Make appointment reminder calls to patients(24-48 hours before appointment)	Working phone		
		Register patients	Access to MEDITECH		
		Conduct SDQ	SDQ contents (fields)		
		Prepare SDQ report	SDQ Reporting structure document		
		Complete patient file and pass it to CHOICE clinicians	Access to patient records		
4.	CHOICE Clinicians	Review Referral form	Access to Referral form		<u>CLINICIAN:</u> -Presenting problem + Diagnosis + Plan of care
		Review SDQ report	Access to SDQ report		<u>MANAGER;</u> 1. How many patients seen by each clinician
		Examine patients	Patient examination form		

			fields.	<ol style="list-style-type: none"> 2. Time and date for above 3. Classify patients diagnosis wise 4. Time spent on each visit 5. Frequency of each patients visits. 6. Where patients referred 7. Presenting problem + Diagnosis + Plan of care
		Ascertain diagnosis	ICD 10 format	
		Plan management	Plan of care form/fields	
		Book next appointment - Regular - PARTNERSHIPS	Access to outlook calendars	
PARTNERSHIP APPOINTMENTS				
5.	Front Office Assistants	Book appointments given by CHOICE clinicians into CWS	Access to CWS	<u>PARTNERSHIP CLINICIANS:</u> Previous visit record(s)
		Send appointment reminders to patients by mail (2 weeks before appointment)	Text of appointment reminders	<u>MANAGERS:</u> <ol style="list-style-type: none"> 1. How many bookings in CWS 2. How many appointment reminder letters sent 3. How many patient appointments were confirmed on phone 4. How many appointments were not confirmed by phone/unanswered call log 5. How many appointments turned up 6. How many no shows/cancelled
		Make appointment reminder calls to patients(24-48 hours before appointment)	Working phone	
		Register patients	Access to MEDITECH	
		Pull patient file and pass it to PARTNERSHIP clinician	Access to patient records	
7.	PARTNERSHIP clinicians	Review file	Access to patient visit records	<u>CLINICIAN:</u> -Previous visit records
		Continue patient management		<u>MANAGER;</u> <ol style="list-style-type: none"> 1. How many patients seen by each clinician 2. Time n date for above 3. Classify patients diagnosis wise 4. Time spent on each visit 5. Frequency of each patients visits. 6. Where patients transferred or referred 7. How many case closures were made 8. By whom 9. Number of PARTNERSHIP appointments
		Transfer patient	Transfer form fields	
		Case closure	Case closure form fields	

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4. Challenges in Building Database

Winds of change are blowing through the Mental Health Department. To be more efficient healthcare providers, there has been downsizing in various departments and the workflow is being redesigned. The challenges that the author found in building database for Project PATS are as follows:

- **Process Modifications.**

Currently some of the work flow processes are being redesigned. Introduction of Eligibility Criteria, replacement of BCFPI process by SDQ process, introduction of clinical information form will have an impact on the work flow. However at this stage all these forms are under discussion stages and the fields to be put into them are being debated. So a clear picture of the actual requirements for the database will only emerge once these are finalised.

Additionally, in the event of planned changes as mentioned above, the role and responsibilities of some of the user groups are likely to change. This will have an impact on the database when it comes to providing functionalities to the user groups.

- **Technical Constraints**

In the current scheme of things, it has been decided that there will be only one information system that will meet the information needs of the hospital and it will be MEDITECH. So the new database which has to be built for Project PATS must interface with MEDITECH. This actually is a constrained because MEDITECH is a very old system and does not interface with any modern databases. It does not import anything into it from an external source, but has the capability of exporting selected fields into NACRS database. NACRS database is

used for external reporting to Canadian Institute for Health Information. So it has been planned that the new database will actually be a hybrid system with components of CWS (Community Wide Scheduling), MEDITECH and NACRS. The CWS component can incorporate as many screens as are required and can generate corresponding reports in each of these predefined screens, called Custom Defined Screens (CDS), we can have only 7 rows and no derived attributes can be included. Additionally, the formatting of the screen is also not changeable. Another option would be if to consider a plug-in which can interface a modern database with MEDITECH. The detailed technicalities are yet to be understood till the time of writing this manuscript.

- **Change management**

People issues are also quite evident as the author continued his work in gathering requirements. The users are not particularly satisfied with the user interface design of the MEDITECH and CWS as it takes them more time and cumbersome procedures to complete their tasks. Given the technical constraints mentioned above, considerable staff buy in will be required. The need for extensive staff training has also been identified.

4.1 Cost Estimate

At the time of writing this manuscript, it is still not clear as to what the fields in various forms are and what are the variables to be reported that the Mental Health Program requires, as they are under discussion stages. Accordingly, the cost estimation cannot be accomplished. However the areas which will impact the cost include (not limited to);

- a. Number of screens to be built
- b. Number of licenses to be purchased(NACRS component)
- c. Hardware required

- d. Installation, testing and implementation cost
- e. Training costs
- f. Maintenance costs
- g. Requirements to hire new staff.
- h. Vendor supplied database costing (in case buy rather than build option is considered)

So, essentially it is still a work in progress.

5. Relationship to Health Informatics

The learning from the courses in Masters in Health Informatics program formed the backbone of my internship work. My work involved gathering requirements to build a database by understanding and analysing the needs of the various users of the IWK's Mental Health and Addiction program.

The skills acquired in the HINF 6110 (Health Information Systems and Issues) course were utilised in the requirements gathering stage. The learning's of System Development Life Cycle (SDLC) in this course was in fact the pivot of my internship work. Technical evaluation of the Project PATS database was based on the learning from HINF 6220 (Networks and Web for HI) and was helpful in understanding the various aspects of database planning. This also helped me to consider gathering requirements from the users, who were mostly non-technical, without getting off on a tangent to the objectives of the project. Understanding the communication needs and the flow of information between all the stakeholders and departments internal and external to the MHA program were built upon the HINF 6101 (Health Information Flow and Use). The critical evaluation of the patient's complete journey and effectively mapping the process from

entry to exit was captured in BPMN diagram learnt from the HINF 6102 (Health information Flow and Standards). The diagrams were designed using swim lanes for easy identification of the tasks associated with a process.

To connect all these dots together, the concepts learnt in PMGT course came in very handy. I clearly remembered the quote from my IT Project Management HINF 6300 course that “if all the projects had all the resources and all the time in the world, no project would fail.” In the not so perfect world, prioritization and meeting deadlines is the key and it was a good learning experience.

In all, without mentioning a specific course, the program as a whole was useful and added to my knowledge. Although I am well aware that the journey has just begun...

6. Health Informatics Problem and Solution

Patient tracking is an important aspect of efficient healthcare delivery. The process is information intensive and depends highly on the availability of right information at the right time to the right user.

In the healthcare delivery process of the MHA program, the author has identified certain processes which can be made efficient using a health informatics approach.

1. Beginning of Referral Process

The beginning of referral process has following tasks associated with it.

- Issuing a CR number using the manual sequencing in a log book

There is one log book shared by two CR assistants. In case there are two simultaneous phone- in referrals, then one person has to wait before the other has logged the number and then the log

book has to be carried over to the other person's desk. For tracking purposes, it is not possible to find who did the intake and at what time. In fact, the time of intake is never noted. This creates serious issues regarding accountability.

- Entering information first on the paper based page 1 of CR form and then duplicating the same on the MS Access database.

There is redundancy in the process as the data is first written in the form and then later entered into the database. This entry is done by only one of the assistants and at a later point of time, depending upon the condition if there is no other intake being done. This creates a bottleneck as updated data is not available for reporting and subsequent tracking as the information will always be delayed. This delay can span any time from a day to weeks.

Proposed Solution

The solution to make the above tasks efficient lies in using an informatics approach to the problem. The process would begin by login step by each CR assistant and when the intake starts, the data is directly entered into the electronic version of the page 1 of the CR form. This will solve the issue of accountability as there will be a system generated date and time along with the digital signature of the user. Upon filling all the fields, the data gets stored in the database for further use by other users instantly. This removes the bottleneck as it eliminates redundancy making the process efficient.

2. Disposition Inefficiencies

The process of reviewing a referral and booking an appointment to move the patient further in the MHA program is referred to a disposition. This is done by the CR clinicians. They call up the patient and enter the relevant information manually in page 3 of the CR form. Additionally, at this stage they book the patient's appointment in the outlook calendar of the CMHC's. This filled

referral form is then faxed to the respective CMHC to be added to the patient record. Health information is sensitive and this process has issues compromising the privacy and security of the information. Fax is an open means of communication and is accessible to many people in the CMHC including a host of those who need not view it at all. Such faxes are prone to being lost and if not, then add up to the paper pile of the centre. Being a paper record, it has issues regarding legibility and sharing constraints, among others. Also there is an additional task of sending, receiving, and filling these papers into the patient file making the process labour intensive. From patient tracking purposes, it is not possible to track who made the disposition, when, and to which centre.

Proposed Solution

As mentioned earlier, the author recommends a health informatics approach to incorporate efficiency in the process. To begin with, the clinician can enter the data in the electronic version of the page 3 of the CR form. On saving this in the database, the information will be available to users with privileges to access it helping in privacy and security of the information. Additionally being electronic, this information can be shared by multiple users. At a managerial level, disposition times, and by whom and where can be tracked adding to the accountability aspect of the process.

Although such solutions have been recommended by researchers in the relevant literature but attention should be paid to the constraint factors too. In IWK Health Centre the biggest constraint is to interface this database with MEDITECH so that the above objectives can be met. Apart from technical challenges, there are issues related to change management, financial management, and stakeholder buy- in, staff training

7. Conclusions

The internship at the IWK Health Centre's Mental Health and Addictions department provided the author with valuable firsthand experience of working in Canadian healthcare sector. It correlated well with the learning experiences of the Masters in Health Informatics program of Dalhousie University. Although it is still work in progress, some of the preliminary conclusions drawn from the experience are:

- Patient tracking is a key ingredient for efficient and safe healthcare delivery process.
- Requirements gathering for a database require in-depth understanding of the scope of services and business processes of the organisation in general and department in particular.
- Documenting information and workflow of an organisation is an iterative process and requires effective coordination with various user groups.
- Implanting technology on unclear processes limits the technological benefits.
- People, process, technology and information challenges must be accounted for when planning a database.

8. Recommendations

IWK's Mental Health department's focus on patient tracking is a very positive step in its process improvement journey. Knowing where a patient is at a particular time in the program will help the decision makers in planning and developing services by appropriately channeling scarce resources towards the same. Understanding obtained from discussions with various stakeholders of the MHA program indicate that both short term and long terms goals can be identified.

Short term:

- Conducting an in-depth review of the scope of services within the MHA program.
Accepting only that group of patients that can be served by MHA program will reduce the wait times. Introduction of Eligibility criteria is a crucial step in this process.
- Review the business processes of the program and conduct process redesign if necessary.
A pilot testing may be conducted before making the process fully operational. The introduction of a new transfer form that will replace the numerous other transfer forms is presently being pilot tested in Halifax CMHC.
- Define a set of information requirements for intake so that information collected at each point of contact with the patient contributes towards improved understanding of patient's health status and facilitates safe healthcare delivery.
- Reassign roles and responsibilities according to redesigned processes to optimally utilize available human resources.
- Once the information needs are finalised, the input forms need to be made electronic to reduce the extra tasks in information flow process. This will eliminate bottle necks and help reduce wait times.
- Educate, educate, educate is the mantra. Ensure that all staff that requires access to information has access to it and are trained to appropriately use it.

Long term:

In the long term, the effort must to build upon the gains achieved through meeting short term goals and expanding the horizon.

- Recruitment and training of staff with appropriate skill set. Human resources are an important component of the success of healthcare delivery process and wise investment in it pays rich dividends in long term.
- Continue the efforts to obtain support and cooperation from all stakeholders.
- Ensure that the new database supports a wide variety of functions and allows for future scalability.
- Incorporate increased quality assurance in healthcare delivery by automating repetitive processes to eliminate human error. Inclusion of clinical practice guidelines and clinical pathways along with decision support must be planned systematically.

9. References

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10. Appendix A MHA Process Flow

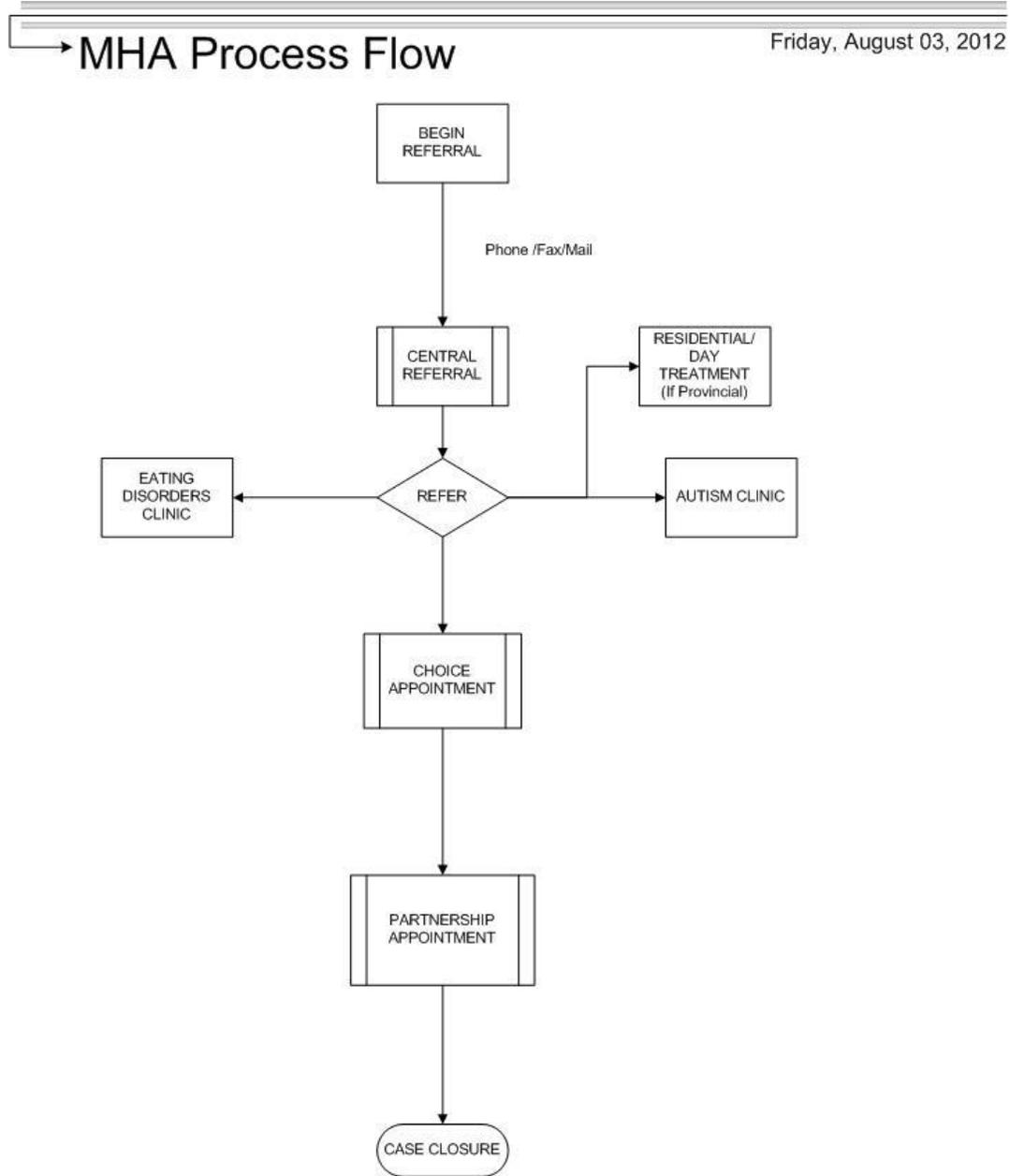


Figure 6 MHA Process- General Overview

CENTRAL REFERRAL

Thursday, August 09, 2012

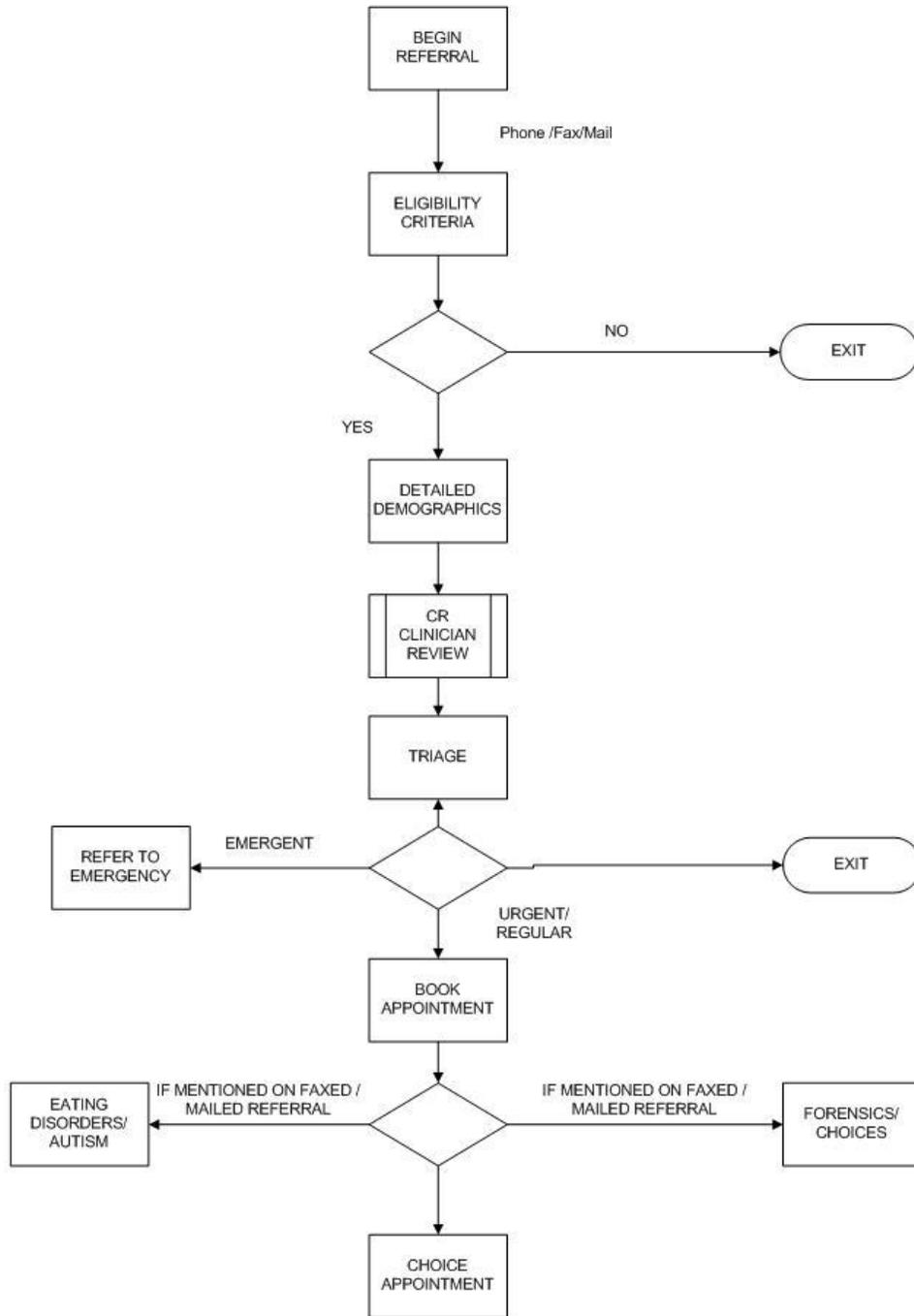


Figure 7 MHA Process- CR

CHOICE APPOINTMENT

Thursday, August 09, 2012

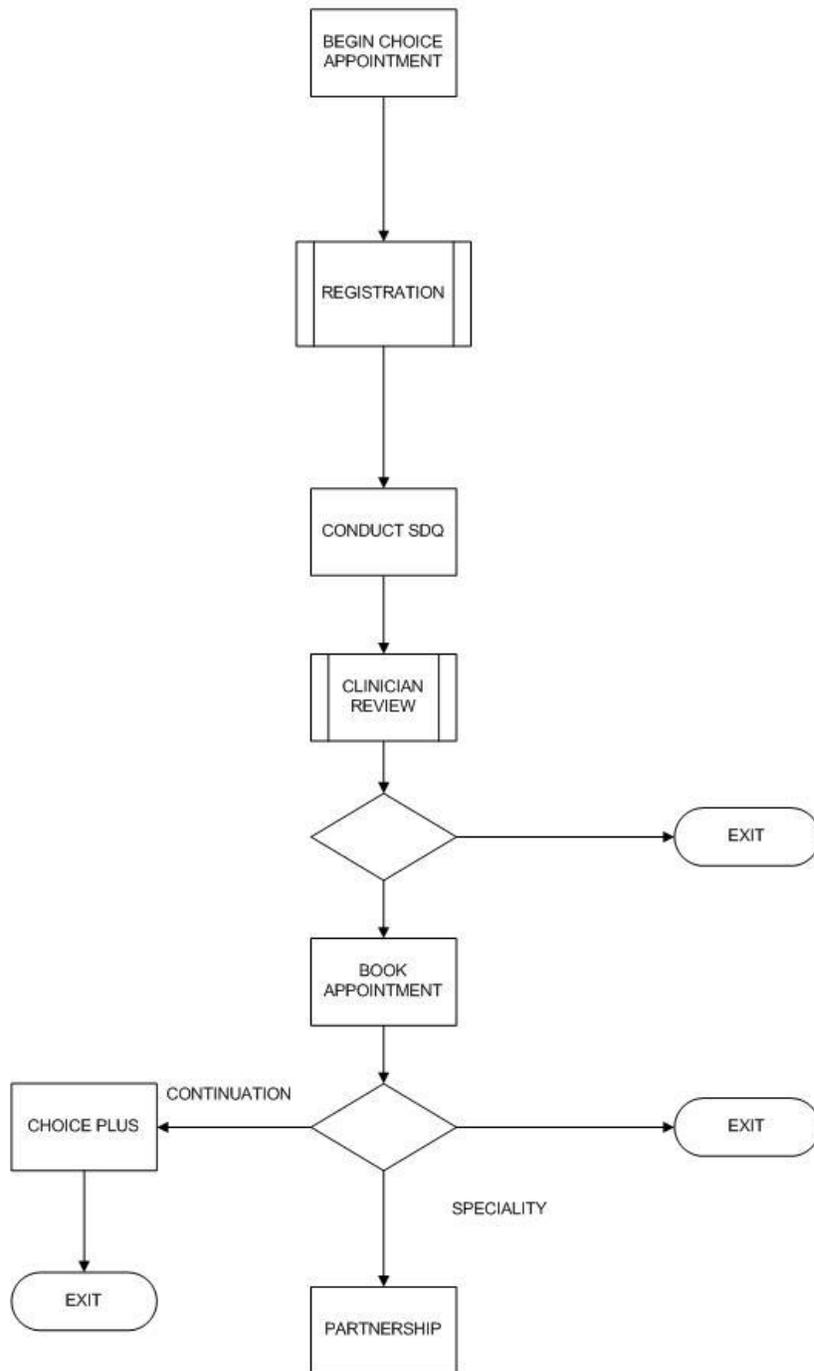


Figure 8 MHA Process- CHOICE Appointment

PARTNERSHIP STRUCTURE

Thursday, August 09, 2012

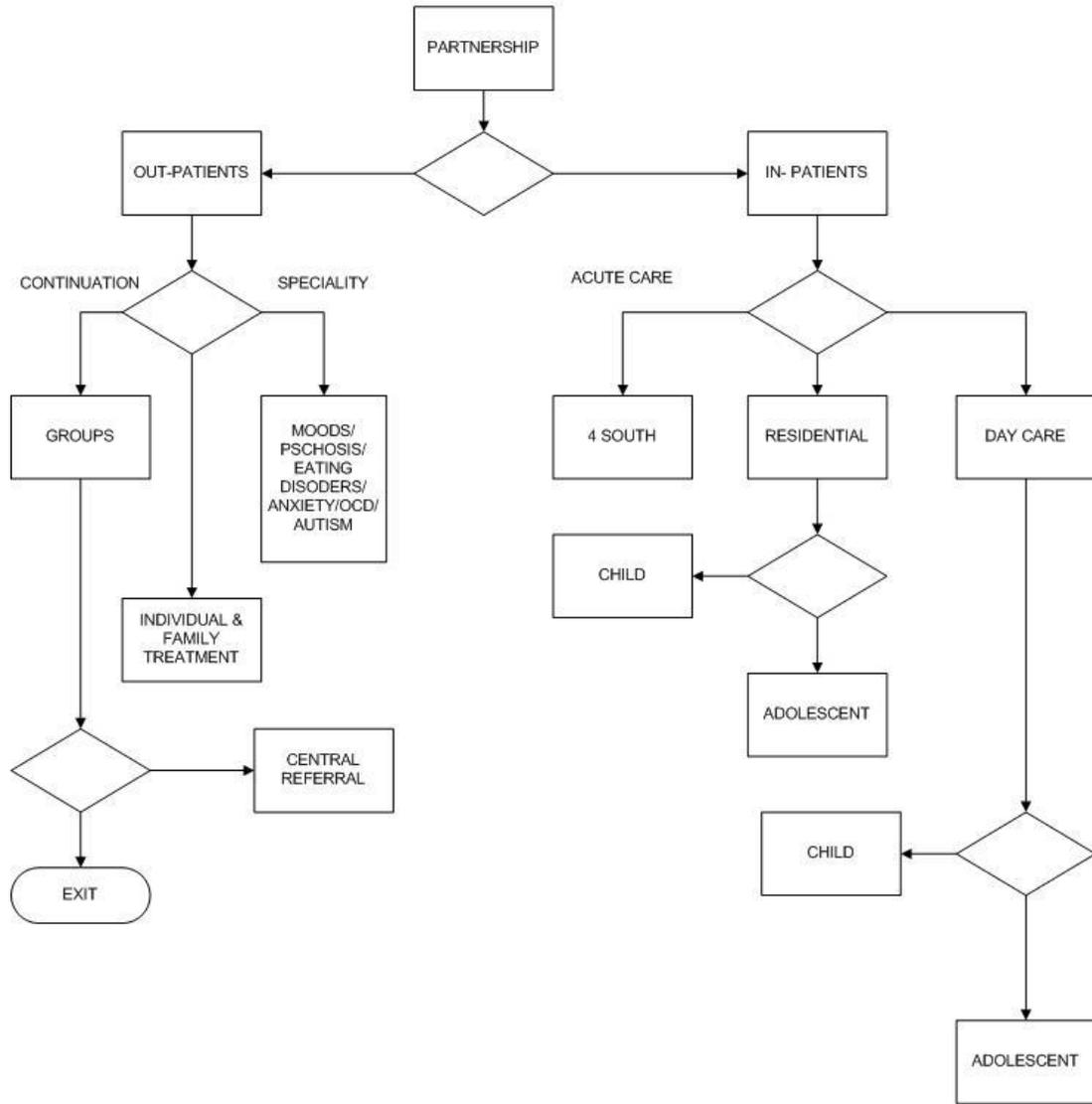


Figure 9 MHA Process- PARTNERSHIP Structure

11. Appendix B BPMN Diagram

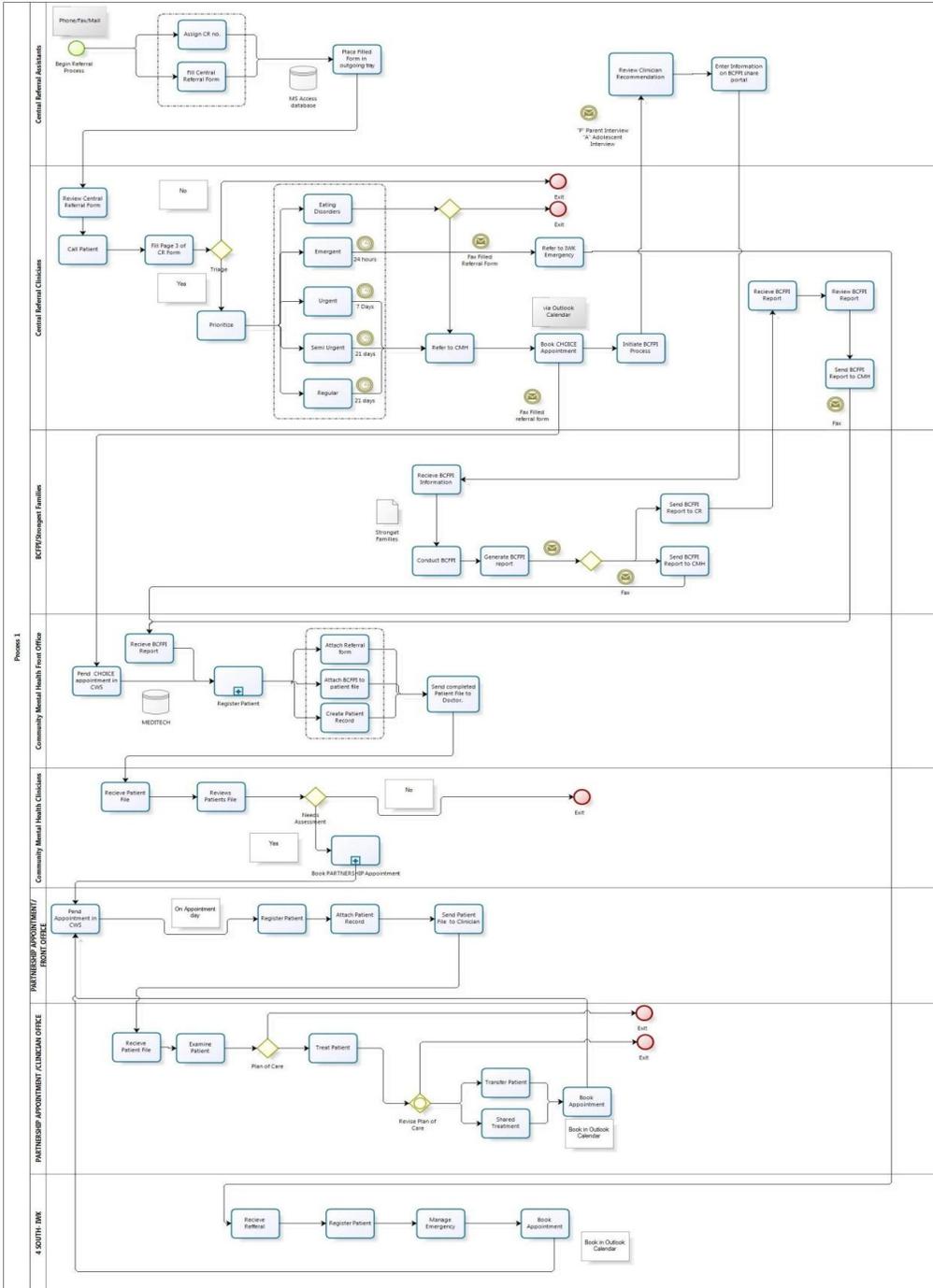


Figure 10 Current Referral Process\

12. Appendix C Eligibility Criteria Algorithm

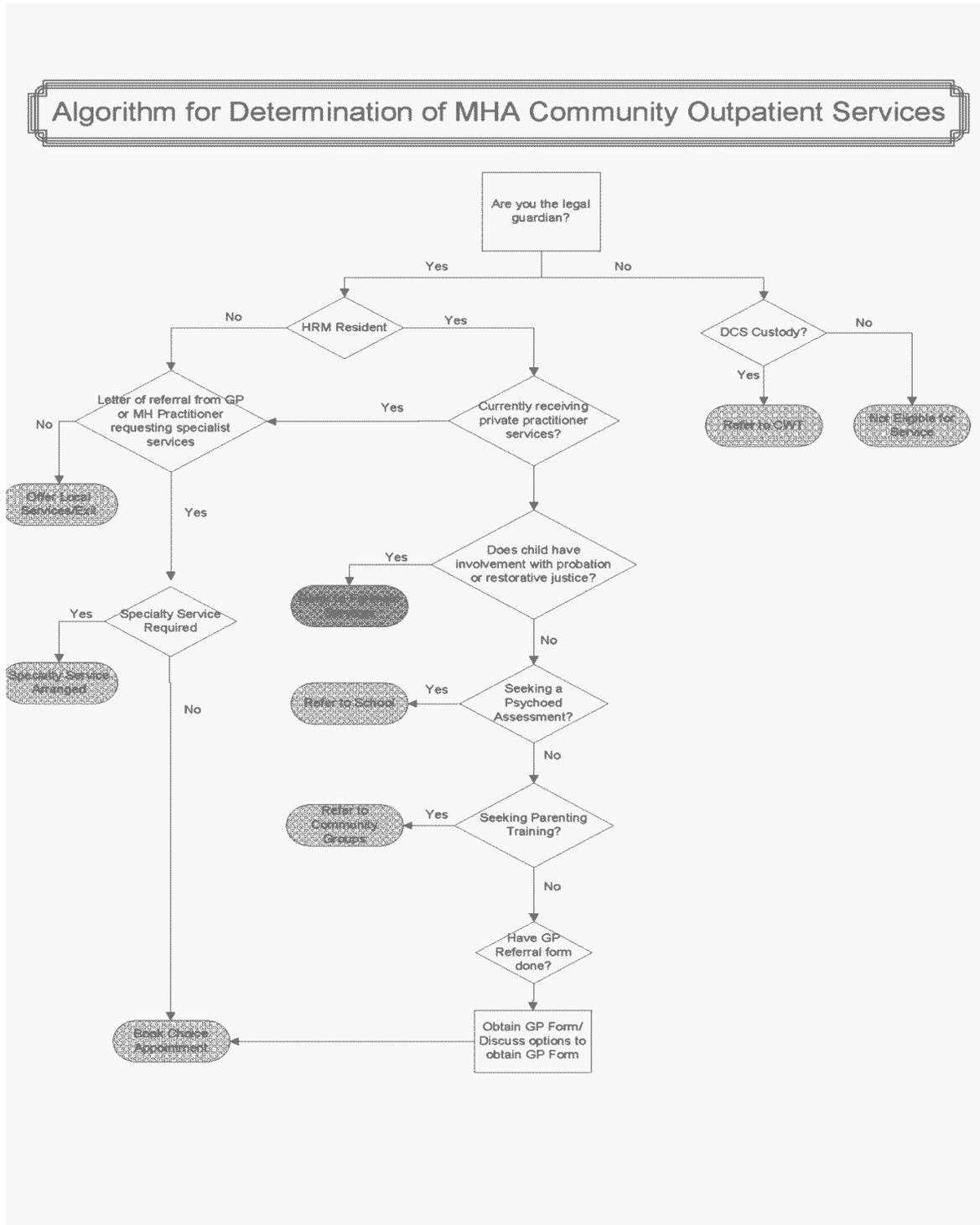


Figure 11 Eligibility Criteria Algorithm

13. Appendix D Current Central Referral Form



**Mental Health and Addictions Program
Central Referral Service**

Suite 1001
6080 Young Street
Halifax, NS B3K 5L2
Phone: (902) 464-4110
Fax: (902) 464-3008

Emergency
 Priority
 R1
 R2
 R3
 Consult
 New Referral
 Re-Referral
 Transfer

Faxed to _____

Date _____

Central referral # _____

Date of intake _____

CR clinician _____

Total time this case _____

Clinic referral # _____

FRF sent letter to family _____

Clinic chart number _____

IWK Unit # K _____

Identifying Information	Name (Last) _____ (First) _____ (Middle) _____ Date of Birth (dd/mm/yy) _____ Age _____ Sex: <input type="checkbox"/> M <input type="checkbox"/> F Address _____ Client's Phone _____ _____ Postal Code _____ School Name _____ Grade _____
Family Information	(Stepmother/Foster/Adopted) Mother: (Last) _____ (First) _____ Phone (h) _____ (w) _____ Cell _____ (Stepfather/Foster/Adopted) Father: (Last) _____ (First) _____ Phone (h) _____ (w) _____ Cell _____ Marital Status _____ Occupation: Mother _____ Father _____ Siblings: 1. _____ Age _____ 3. _____ Age _____ 5. _____ Age _____ 2. _____ Age _____ 4. _____ Age _____ 6. _____ Age _____ Siblings Currently in Therapy: <input type="checkbox"/> Yes <input type="checkbox"/> No With Whom _____
Referral Source	Referral Source _____ Phone _____ Relation to Client _____ (Custodial Parent? <input type="checkbox"/> Yes <input type="checkbox"/> No) Address (if different from above) _____ _____ Postal Code _____
Additional Information	Health Card Number _____ Expiry Date _____ Family Physician _____ Phone _____ Address _____ May we advise your Family Physician of appointment date? <input type="checkbox"/> Yes <input type="checkbox"/> No Department of Community Services: <input type="checkbox"/> Now <input type="checkbox"/> In the Past <input type="checkbox"/> Never Worker _____ Children's Aid Society: <input type="checkbox"/> Now <input type="checkbox"/> In the Past <input type="checkbox"/> Never Worker _____ Mental Health Services: <input type="checkbox"/> Now <input type="checkbox"/> In the Past <input type="checkbox"/> Never Mental Health Therapist (Name) _____ Phone _____ Dates Seen _____
Case Assignment	Case Assignment to (Name) _____ Date _____ Initial Appt. _____ _____ File: <input type="checkbox"/> Closed Reason _____

Form # 3201 05/07 Page 1 of 3

PERMANENT RECORD

Central Referral Service

Figure 12 Page 1



**Mental Health and Addictions Program
Central Referral Service**

Messages Left	Time	Date	With Whom	Initials
	1.			
	2.			
	3.			
	4.			
	5.			
	6.			

PLEASE NOTE:

A case will be closed provided **ALL** the following conditions apply:

1. At least 3 attempts (one per day) have been made to make contact (leaving messages when able)
2. The case has been open for at least five working days.
3. The referral source (where applicable) has been notified of pending closure by letter.

Continued on Page 3

Signature /Status	Print Name	Initial

Figure 13 Page 2

 **Mental Health and Addictions Program
Central Referral Service**

Client's Name _____ Date _____

Client's current medication _____

Medications prescribed in the past (include birth control pills, over the counter's, vitamins and herbals) _____

Has a psycho-educational assessment been completed? Yes No If Yes, Please Attach.

Current mental health diagnosis, if any _____

Previous mental health diagnosis, if any _____

Has client been referred elsewhere in the Mental Health and Addictions Program? Yes No
If so, where? _____

Telephone numbers provided for Crisis Team and Mental Health Mobile Crisis Team Yes No

Family mental health history _____

Is there a significant medical history? Yes No Describe _____

List any allergies _____

What service is being requested? Consultation/Assessment Only Assessment and Treatment
 Other (specify) _____

Are there any other community supports in place? (i.e. Parent Resource Centre, Community Services, Family Help, Other IWK Services)

Additional Information _____

Attached: Brief Child and Family Phone Interview (BCFPI): Teacher form Youth form Parent form

Referral NOT ACCEPTED Note _____

Completed by: _____

Form #3201 05/07 Page 3 of 3 PERMANENT RECORD Central Referral Service

Figure 14 Page 3

14. Appendix E CR Reports

a. INTAKE STATS

SITE	REGULAR	SEMI – URGENT	URGENT	EMERGENT	TOTAL
Dartmouth					
ESCU					
Halifax					
Sackville					
MOP					
TOTAL CMH					
OTHER					
NOT PROCESSED					
Total Referrals					

b. DISPOSITION STATS

SITE	REGULAR	SEMI – URGENT	URGENT	EMERGENT	TOTAL
Dartmouth					
ESCU					
Halifax					
Sackville					
MOP					
Autism Team					
Inpatient					
Day Treatment					
ICBTT					
ACT					
Compass					
Family Help					
Shared Care					
Choices					
Crisis team					
MHMCT					
Total Referrals					
Screen Outs					
Letters-No contact					
Total					

c. DISPOSITION PERCENTAGES

SITE	PERCENTAGES
Dartmouth	
ESCU	
Halifax	
Sackville	
MOP	
Autism Team	
Inpatient	
Day Treatment	
ICBTT	
ACT	
Compass	
Family Help	
Shared Care	
Choices	
Crisis team	
MHMCT	
Total	

	PERCENTAGES
REGULAR	
SEMI-URGENT	
URGENT	
EMERGENT	
TOTAL	

	PERCENTAGES
REFERRALS	
SCREEN OUTS	
LETTERS	
TOTAL	

d. TRANSFER STATS

	Dartmouth	Eastern Shore	Halifax	Sackville	MOP	TOTAL
REFERRALS FOR MONTH						
TRANSFERRED TO SITE						
TRANSFERRED FROM SITE						

e. RE-REFERRAL STATS

SITE	REGULAR	SEMI – URGENT	URGENT	TOTAL
Dartmouth				
ESCU				
Halifax				
Sackville				
MOP				
Autism Team				
Inpatient				
Day Treatment				
ICBTT				
ACT				
Compass				
Family Help				
Shared Care				
Choices				
Total Referrals				

g. DHA STATS

DHA#	REFERRALS	SCREEN OUTS	LETTER- NO CONTACT	TOTAL	PERCENTAGE
1					
2					
3					
4					
5					
6					
7					
8					
9					
0					
TOTAL					

h. CLINICIAN NUMBER AND TIME SPENT

	CLINICIAN 1	CLINICIAN 2	CLINICIAN 3	TOTAL
# OF DAYS WORKED				
# OF REFERRALS COMPLETED				
Average referrals per day				

i. DISPERSAL TIME STATS

Average Dispersal Time (Business days)	
% of cases > 5 days	
% of Referrals Accepted for service	

j. URGENT REFERRALS

CR #	INTAKE DATE	DISPOSITION	DATE COMPLETED	CLINICIAN

15. Appendix F Mental Health and Addictions Program off Site Addresses**Adolescent Centre for Treatment (ACT)**

VIA Station, 3rd Floor
1161 Hollis Street
Halifax, NS B3H 2P6
Phone: 491-2993
Fax: 491-2335

Intensive Community Based Treatment Centre (ICBTT)

VIA Station, 2nd Floor
1161 Hollis Street
Halifax, NS B3H 2P6
Phone: 491-2362
Fax: 491-2997

Child and Family Day Treatment & Adolescent Day Treatment

7071 Bayer's Road, Suite 300
Halifax, NS B3L 2C2
Phone: 491-2336
Fax: 455-8517

Central Referral Service

6080 Young Street, Ste 1001
Halifax, NS B3K 5L2
Phone: 464-4110
Fax: 464-3008

CHOICES

1 Craigmere Drive
Halifax, NS B3N 1M3
Phone 491-2401
Fax 491-2750

COMPASS (formerly Children's Response Program or CRP)

4th Floor APSEA
5940 South Street
Halifax, NS B3H 1S6
Phone: 470-7923
Fax: 470-8068

Maritime Outpatient Psychiatry

Charter Place Offices, 3rd Floor
1465 Brenton Street
Halifax, NS B3J 3T3
Phone: 470-8375
Fax: 470-8937

Mobile Crisis

Mailing Address:

PO Box 1004

Dartmouth, NS B2Y 3Z6

If couriering please call Susan MacKay 454-0661

Youth Justice Services

1 Craigmere Drive

Halifax, NS B3N 1M3

Phone: 491-2444

Fax: 491-2455

Waterville Mental Health Team

Nova Scotia Youth Centre

1442 Country Home Road, PO Box 100,

Waterville B0P 1V0

Phone: 538-5658

Fax: 538-4161

Community Mental Health Clinics:

Dartmouth Community Mental Health

99 Wyse Road, Suite 1420

Dartmouth, NS B3A 4S5

Phone: 469-8170

Fax: 461-0939

Halifax Community Mental Health

6080 Young Street, Ste 1001

Halifax, NS B3K 5L2

Phone: 422-1611

Fax: 425-1413

Sackville Community Mental Health

Cobequid Community Health Centre

40 Freer Lane

Lower Sackville, NS B4C 0A2

Phone: 864-8668

Fax: 865-8966

Notes:

The Acute Inpatient Unit (4 South) is located on the main pediatric site of the IWK

The MHA Crisis team is located at IWK Emergency

The Reproductive Mental Health team is located on the main floor of the Women's Site

The Child Welfare team is located at the Sackville Community Mental Health location

Shared Care and Complex Case are located at the Halifax Community Mental Health Location