Impact of a Mental Health Training Program for General Practitioners on Practice Behaviour

By

Sarah Lupton
B.Sc., University of Victoria, 2005

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Abstract

Background: Accrual of continuing medical education credits is part of licensure in family medicine but opinions are mixed as to whether the training has an impact on clinical practice. Literature does suggest that practice change is most likely when training involves multiple interactive exposures, and when the benefit to patients is apparent.

Aim: To determine whether an interactive peer-lead educational intervention for General Practitioners in British Columbia, the Practice Support Program Mental Health Module, resulted in measureable change in clinical practice of the Vancouver Island participants.

Method: Administrative information from British Columbia Ministry of Health databases was obtained for analysis regarding physician billing and prescribing, and hospitalizations on Vancouver Island. Paired t-tests were used to compare physician-patient interactions among module participants before and after the training regarding a) initiation of antidepressants and anti-anxiety medication, and b) use of the mental health plan billing code, used to support patients who struggle with activities of daily living. In addition, mental health hospitalizations among participants' patients before and after training were used to measure its impact on patient outcomes.

Results:

One-hundred and ninety-seven General Practitioners on Vancouver Island completed the mental health module between 2009 and 2011. While no significant difference was found in the numbers of mental health patients seen during the pre- and post- periods (M=142.06, SD=97.45) and (M=144.44, SD=103.00); t(196)=-0.679, p=0.498, α=.05, the change in the proportion of new prescriptions between pre-period mean (M=0.0796, SD=.06527) and post-period means (M=.0530, SD=.03877); t(195)=6.668,

$p<0.001$ was found to be significant and indicative of a relative decrease between 31.2 and 33.4%. The change in the proportion of mental health plans was also found to be significant between pre-period ($M=0.1142$, $SD=.18598$) and post-period means ($M=.1674$, $SD=.23973$); $t(180)=-3.586$, $p<0.001$. This indicated a relative increase between 42.0 and 46.6%. No significant change in patient hospitalizations was found between the pre- and post-period means: ($M=0.039$, $SD=.0612$) and ($M=.0392$, $SD=.0978$); $t(192)=-0.055$, $p=0.956$.

Conclusion: This educational intervention appears to have resulted in significant changes in the practice patterns of the physician participants. Future research using different indicators may reveal more about the impact of physician training on patient outcomes.

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Glossary

BC – British Columbia

CBIS – Cognitive Behavioural Interpersonal Skills – an interactive approach used by GPs to educate and support patients by developing skills that help them manage their depression

CBT – Cognitive Behavioural Therapy

CME – Continuing Medical Education

CPSBC – College of Physicians and Surgeons of British Columbia

DAD – Discharge Abstract Data. Details of hospital admission and discharge, including admission and discharge dates, reason(s) for admission

DIN – Drug Identification Number – a unique number that reflects the brand and dosage of a medication

DSM – Diagnostic and Statistical Manual of Mental Disorders (published by the American Psychiatric Association) – used to categorize and diagnose MH disorders

Dte – Date

GP – General Practitioner (Family Doctor)

GP_ID – the unique identifier used for each GP in MOH administrative data sets

GP Champ – Physician peer who presents core content at PSP educational events

GPSC – General Practice Services Committee

HRQOL - Health-related Quality of Life

LS – Learning Session – the interactive meeting in which course material is delivered, and of which there are three in the module – LS1, LS2, and LS3

LS1 – the first learning session in the MH module

LS3 – the third and last learning session in the MH module

MH – Mental Health

MOH – British Columbia Ministry of Health

MSP – Medical Services Plan – the British Columbia medical plan that provides universal coverage

PHQ9 – Patient Health Questionnaire – a nine-question tool used to screen for depression

Pnet – PharmaNet – The pharmaceutical database that captures all prescriptions filled in British Columbia

PSP – Practice Support Program – the body responsible for administering a province-wide training program aimed at supporting physicians in family practice

Pt – Patient

Pt_ID – the unique identifier used for each patient in MOH administrative data sets

RST – Regional Support Team – the local arm of the PSP that supports and delivers PSP modules at the health authority level

Rx - Prescription

VIHA – Vancouver Island Health Authority

All inferences, opinions, and conclusions drawn in this manuscript are those of the author, and do not reflect the opinions or policies of the Data Stewards.

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Chapter 1 - Introduction

Background

Life-long learning is integral to the practice of medicine, viewed as an ethical obligation by physicians and a requirement to maintain licence to practice in Canada. Continuing Medical Education (CME) is an accredited system of continuing education. Its purpose is to enhance the standard of medical practice by improving physician knowledge of new developments in medicine and to narrow the gap between actual practice and evidence-based best-practice (Naylor, Gerace, & Redelmeier, 2015) (Greco & Eisenberg, 1993).

While a requirement, acquiring CME credits can be time-consuming, expensive and feel like a burdensome task. In addition, continuing education is not necessarily effective in changing clinical practice or in improving health outcomes (Ibrahim, 2015). It has been suggested that a combination of education, feedback from peers and others, financial incentives, and observing positive changes in patients' health is most likely to motivate physicians to alter their clinical practice behaviour (Greco & Eisenberg, 1993). The Practice Support Program (PSP) is a continuing education program offered to British Columbia general practitioners (GPs) that incorporates those elements in its training modules.

Practice Support Program

The PSP is a practice enhancement initiative, which provides accredited, compensated, peer-to-peer CME-accredited continuing education, with the objective of improving access to care, patient health outcomes and provider satisfaction. It was established in 2007 in response to consultations with British Columbia GPs, who expressed that they needed more support and training if they were to provide good care for their increasingly complex patients (MacCarthy, Kallstrom, Gray, Miller, & Hollander, 2009).

The PSP is a joint initiative of the British Columbia (BC) Ministry of Health (MOH), Doctors of BC, the Society of General Practitioners of BC, and the regional health authorities. A central body determines training topics and oversees the development of educational modules that are designed to meet the needs of general practitioners (GPs) in BC (MacCarthy, Kallstrom, Gray, Miller, & Hollander, 2009). The PSP program is administered provincially through this central body and delivered regionally, with each of the province's health authorities having its own local Regional Support Team (RST) to provide training and assist physicians to implement new approaches within their own practices (MacCarthy, Kallstrom, Kadlec, & Hollander, 2012).

Module Structure

PSP educational modules have been developed by medical experts from across Canada and cover a range of topics relevant to general practice. These modules are usually delivered to small groups of GPs and their Medical Office Assistants (MOAs) through three half-day in-person "learning sessions" which include both didactic and interactive learning. Core content is usually delivered by a "GP Champ", a fellow physician-trainer who has implemented the course materials in his or her own practice (MacCarthy, Weinerman, Kallstrom, Kadlec, Hollander, & Patten, 2013). In addition to the GP Champ, there is often a Specialist in the relevant subject area, who participates in one or more of the learning sessions and acts as an additional resource for participants. In, for example, the PSP Mental Health (MH) module, this Specialist is usually a Psychiatrist.

Between learning sessions are two "action periods", where participants apply the tools and content introduced during the learning sessions within their own practices. GPs participating in modules run by Island Health track and report back their use of specific tools. There are specific "completion" criteria for action period work that apply to all GPs on the Island. Other health authorities do not use this approach

and generally have more flexible criteria for action period work. The pathway for the PSP MH module is shown in Figure 1 (MacCarthy, Weinerman, Kallstrom, Kadlec, Hollander, & Patten, 2013).

The first learning session has the greatest proportion of didactic teaching, while the second and third sessions allocate increasing amounts of time to interactive discussions among participants. Discussion generally revolves around participants' experiences of applying module content within their own practices; the challenges, successes, things that worked, things that did not. This sharing of experiences is an important element in the learning process (MacCarthy, Weinerman, Kallstrom, Kadlec, Hollander, & Patten, 2013).

Figure 1: ***Overview of the PSP Adult Mental Health module pathway***

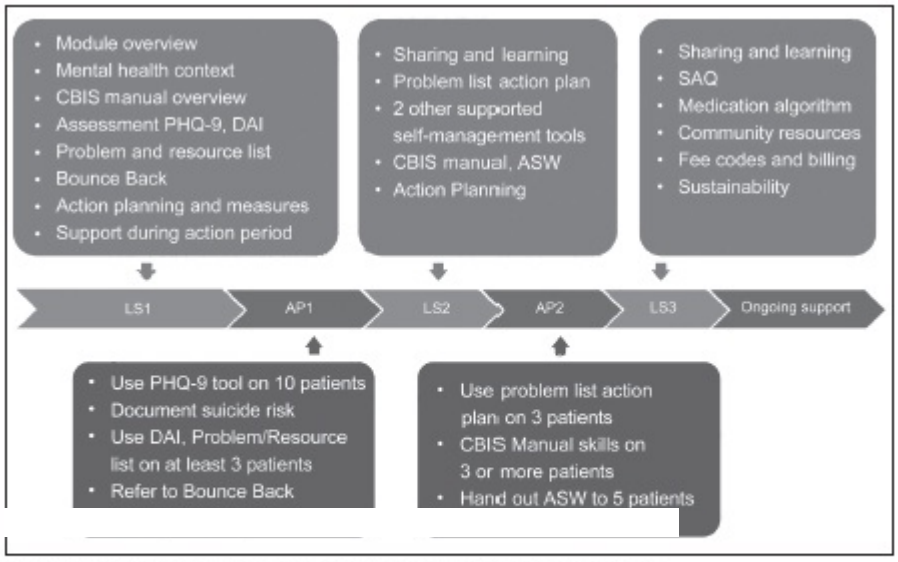


Figure 1. Overview of the adult mental health learning module.

AP = action period; ASW = Antidepressant Skills Workbook; CBIS = Cognitive Behavioral Interpersonal Skills; DAI = Diagnostic Assessment interview; LS = learning session; PHQ-9 = 9-item depression scale of the Patient Health Questionnaire; SAQ = self-assessment questionnaire.

(MacCarthy, Weinerman, Kallstrom, Kadlec, Hollander, & Patten, 2013)

Module Compensation

In addition to CME credits, GPs enrolled in PSP modules receive monetary compensation at the sessional rate for themselves and their MOAs to attend learning sessions, based on the number hours of in-class time. Physicians are also compensated for completion of action period work, where they apply the tools introduced during the learning sessions within their own practice, in recognition that becoming familiar with new skills may require longer-than-usual appointments.

Adult Mental Health module

While patients with MH issues frequently present to GPs, many GPs do not feel equipped to provide adequate MH care (MacCarthy, Weinerman, Kallstrom, Kadlec, Hollander, & Patten, 2013). The Adult MH module was designed to increase GPs' skills and confidence in treating their patients with Axis I MH conditions, with a focus on mild to moderate depression. During the learning sessions physicians are introduced to evidence-based MH screening and cognitive behavioural self-management tools, most of which can be completed and reviewed with a patient within the time-span of a regular appointment (Weinerman, et al., 2011).

The core MH tool is the Cognitive Behavioural Interpersonal Skills (CBIS) manual, which contains both screening tools and exercises that can be used within a normal appointment time-frame. This resource provides information about self-management cognitive behavioural techniques (CBT) so that GPs can provide "skills, not only pills" to patients with MH issues. In addition are two self-management resources for patients: the Antidepressant Skills Workbook (ASW), with exercises for patients to work on at home, and the Bounce Back Program, a community-based MH peer coaching program developed by the Canadian MH Association. MH module participants are also expected to use a validated depression screen, the PHQ9, which provides a numeric score that can be interpreted by the GP to assess whether a patient is depressed and if so how severely (Weinerman, et al., 2011) (MacCarthy, Weinerman,

Kallstrom, Kadlec, Hollander, & Patten, 2013). These tools are packaged into an electronic library, the MH algorithm, which GPs can install on any computer for convenience and easy access.

In summary, the PSP modules offer accredited, compensated, interactive, peer-lead training aimed at improving the quality of patient care and provider experience. The PSP MH module is one example of this educational approach which is aimed at supporting GPs to manage common MH issues within a normal practice setting. The MH module has been very popular, with high uptake (26%) and course completion rates (90%) among Vancouver Island GPs. This thesis sought to determine whether there were measureable and sustained changes in physician practice (behaviour) and in patient outcomes attributable to this educational intervention.

Research questions

The purpose of this study was to evaluate the following questions through quantitative analysis of MOH administrative data sets:

1) Is completion of PSP MH module training associated with changes in antidepressant prescribing?
2) Is completion of PSP MH module training associated with changes in MH Planning?
3) Is completion of PSP MH module training associated with reductions in number of MH hospitalizations of these GPs patients?

Structure of the thesis report

Following is a chapter-by-chapter overview of the contents of this thesis.

- **Chapter 2** provides the context, social and health significance of MH issues.

- **Chapter 3** contains the literature review regarding the impact of continuing education on physician behaviour and patient outcomes.
- **Chapter 4** briefly outlines the methods used to obtain the information that form the basis of the quantitative analysis. Results are presented by individual method in chapters 5, 6, and 7.
- **Chapter 5** contains the findings regarding antidepressant prescribing patterns associated with participation in the MH module.
- **Chapter 6** is a summary of the findings regarding billing of the MH planning fee among GPs who attended the MH module.
- **Chapter 7** presents the findings regarding the association between use of the MH planning fee and hospitalizations where MH is one of the admission codes.
- **Chapter 8** is structured to summarize data from chapters 5 to 7 and to answer the study questions. It contains the overall summary of findings, discussion, limitations, and research conclusions.

Choosing to study the MH module to assess the impact of continuing education on physician behaviour change served two purposes:

1) To assess whether this training approach resulted in changes in physician practice, by observing behaviours and outcomes before and after module participation.

The MH module was first introduced in 2009, and by 2011 over 200 Vancouver Island GPs had completed the module. This ensured both a meaningful sample size and the availability of BC MOH data for the observation periods.

2) To assess whether this training has had a positive impact on MH care in light of its significant role in health and social well-being.

Chapter 2 – Introduction to Mental Health

Background

The health, financial and societal costs of mental disorders are high and growing higher. The World Health Organization (WHO) ranks depression as the third leading cause of burden of disease and the most challenging global health issue of our time, due to its impact on activity, function, and quality of life. It already represents the greatest burden in North America, and it is projected to be the top health issue world-wide by 2030 (Doherty & Gaughran, 2014). According to WHO, 12% to 15% of the world's total disability is due to mental illness, higher than cardiovascular diseases and cancer; furthermore, it accounts for more than 30% of all years lived with disability (Thorncroft & Tansella, 2003) (Velehorschi, Bleau, Vermani, Furtado, & Klassen, 2014).

Cost, burden of illness in Canada

It is estimated that 6.7 million Canadians currently live with mental disorders; however, only a third of these individuals receive care (Smetanin, Stiff, Briante, Adair, Ahmad, & Khan, 2011). The Public Health Agency of Canada conducted an assessment of the costs associated with mental illness that included the use of medical resources and loss of productivity due to long and short-term disability and premature mortality, as well as the costs related to reduction in health-related quality of life (HRQOL). This study found a total economic cost of mental disorders of $51 billion (Lim, Jacobs, Ohinmaa, Schopflocher, & Dewa, 2008).

Patients who have diagnosed mental disorders use the most health care services, and have the highest rates of absenteeism and reduced rates of employment (Lim, Jacobs, Ohinmaa, Schopflocher, & Dewa, 2008). They are also at greater risk of developing physical illness and having poorer outcomes.

Conversely people with diagnoses of certain physical illnesses, especially cardiovascular disease, diabetes and cancer, have an increased risk of developing a MH problem. When both mental and physical illnesses are present, the result is increased overall rates of morbidity, healthcare utilization, and poorer quality of life. (Doherty & Gaughran, 2014)

MH is associated with increased medical expenses, lost productivity, and the social cost of human suffering, which makes it a high priority issue. The question arises how it can best be managed. While WHO recommends an integrated approach of primary care MH combined with specialty back-up (Thorncroft & Tansella, 2003), in reality, the person most likely to provide MH care is a family physician (Dumesnil, Coraredona, Verdoux, Sebbah, Paraponaris, & Verger, 2012).

Primary Care Management of Mental Health

According to WHO data from the 1990's, 90% of patients with MH disorders get all their care from primary care providers (Scott, Jennings, Standart, Ward, & Goldberg, 1999). In most industrialized nations around 80% of the population sees a GP at least once in a year, and, of these patients, approximately one-third have an identifiable mental disorder (Fleury, Bamvita, Farand, Aube, Fournier, & Lesage, 2010). One study of 60 Quebec GPs found that at least 20% of their patient visits were related to MH. Although these GPs reported that they found managing mental disorders required more effort, they also found it a very rewarding area of practice (Fleury, Imboua, Aube, Farand, & Lamber, 2012).

Supporting MH management in family practice holds a number of advantages. The GP-patient relationship is established over time. This relationship fosters trust, provides insight into both the psychosocial and biological factors affecting patients' health, and facilitates detection and treatment of MH issues (Canadian Psychiatric Association and College of Family Practitioners of Canada, 1996). Another advantage to managing MH in family practice is that it is frequently a family issue. As an

example, children with parents who have mental disorders are at higher risk of developing psychological disorders themselves than other children. Fortunately MH interventions are associated with a 40% risk reduction in these cases (Siegenthale, Munder, & Egger, 2012). Another benefit of treating MH in family practice is that patients can see their own GP, whom they know and trust, rather than someone who is specifically a "MH" clinician. In some cases, being able to go to one's regular physician may reduce fear, reluctance and stigma.

Barriers to Mental Health in Primary Care

Although there are distinct benefits, there are also a number of barriers to MH management in primary practice. Some of these are scheduling the longer visits needed for MH issues (where to fit these appointments to create the least disruption), individual GP interest, confidence, and training in tackling MH issues, the emotional drain, and limited access to psychiatric support for patients and as resources for the GPs themselves (MaGPIe Research Group, 2005).

Thus while GPs are frequently presented with MH issues and want to support their patients, they may face obstacles in providing adequate care. Traditionally, there was little MH training offered in medical school, and GPs obtained their MH education either through self-study or formal learning events. The PSP MH module was developed to support GPs to manage common MH disorders in a normal practice setting. The question is, whether an educational intervention can actually bring about practice change and improve patient outcomes.

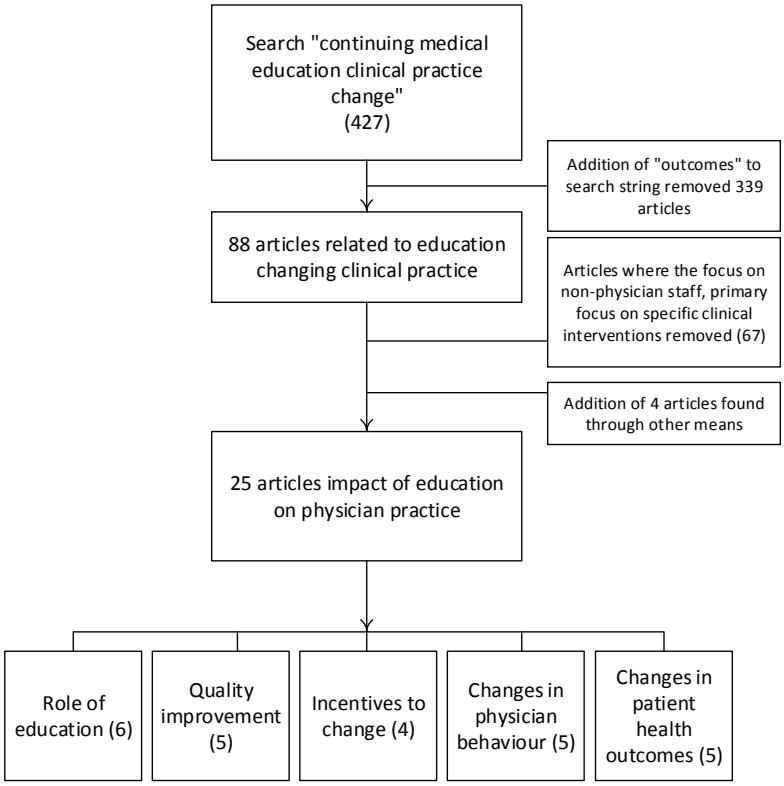
Chapter 3 - Literature Review

Background

Physicians are required to participate in on-going education to maintain their licence to practice, which takes place in the form of college-accredited events. How great an impact this education has on practice behaviour appears to vary, depending on a number of factors. A literature review was conducted to identify those elements associated with effecting practice change.

A search using Medline EBSCO (full text) was made to locate literature relating to physician education, quality improvement, incentives to change, and changes in practice and patient outcomes related to CME events. The search string used was “continuing medical education clinical practice change” which produced 427 “hits”. Addition of “outcomes” to the search-string further reduced the number of articles to 88. Articles with an emphasis on specific clinical interventions were excluded, as were those dealing with clinical teams and non-physician staff, as our research group are family physicians (Figure 2).

Figure 2: Flow diagram of inclusion and exclusion criteria for literature review (Medline EBSCO)



A summary of the 25 articles found relating to education, quality improvement, incentives to change, changes in physician practice and changes in patient outcomes follows.

Role of Education

CME serves a critical function in accreditation and maintenance of professional standards. In addition CME learning events can help physicians adapt to changes in health care delivery and increasing demand for services. There is recognition that educational activities need to encourage evidence-based medicine and should emphasize both the acquisition of knowledge and support physicians to improve their clinical decision-making based on that knowledge. CME is found to be most effective when 1) based on established needs with specific outcome goals, and 2) provided in a group to encourage problem-based

learning, interaction, and collaboration (Abrahamson, et al., 1999). However, a systematic review of studies in 1998 seeking to find evidence regarding the best methods of delivering continuing education found there was limited evidence that CME had any impact on physician behaviour (Smith F, 1998).

By contrast the paper "Does CME work?" (also from the 1990's) provided another review of randomized controlled trials regarding effectiveness of CME and a variety of other educational methods on physician performance and patient outcomes. This study reported that 70% of studies resulted in a change in physician behaviour and 48% resulted in a change in health outcomes. They concluded that approaches that enable or reinforce new behaviours are successful in changing physician performance or health care outcomes (Davis, Does CME work? An analysis of the effect of educational activities on physician performance or health care outcomes, 1998). This finding was supported by another review of the effect formal CME interventions on performance, which found that interactive CME sessions where participants can interact and practice new skills can result in changed behaviour and also, to a lesser degree, health care outcomes. Didactic sessions in contrast were found not to be effective in changing physician behaviour (Davis D, 1999). More recently, a review of 81 studies of physician education interventions involving more than 11,000 health professionals found the disappointing result that although interactive workshops show better results than didactic sessions in terms of professional practice and healthcare outcomes, the effect is generally small (Forsetlund, et al., 2009).

A slightly more encouraging result was found in a review of 15 studies developed by The Johns Hopkins Evidence-based Practice Centre for the Agency for Healthcare Research and Quality. The intent of this study was to assess what forms of CME result in enhanced application of knowledge and skills, physician change, and patient care. Although this study was unable to make specific recommendations regarding the best methods to deliver CME, it did find that CME was effective in improving physician practice, and

recommended “Multiple exposures and longer durations… to optimize educational outcomes” (O'Neil & Addrizzo-Harris, 2009).

Quality Improvement

The question arises regarding how best to implement guidelines into clinical practice and overcome obstacles to applying clinical practice guidelines to actual clinical practice. A systematic review of 256 studies published between January 1998 and March 2007 was conducted in an effort to identify and understand barriers to practice change. It yielded 33 different themes related to the individual health care professional, the guideline, the scientific evidence, the patient, or the health system. Researchers found there are complex factors involved in behavior and system barriers to shifting knowledge-to-action that require further examination (Cochrane, Olson, Murray, Dupuis, Tooman, & Hayes, 2007).

One Finnish study sent questionnaires to every other physician who graduated between 1982 and 1991 regarding their access to quality improvement support, first in 1998 and then in 2003, to see if a change had occurred over that time period. Improvements were found in adherence to guidelines, quality improvement guides, opportunities to consult with colleagues, and computer reporting that allowed them to monitor their own work, which demonstrated that quality improvement in clinical care is an achievable goal (Sumanen, et al., 2008).

A systematic review of reviews sought to identify effective methods of implementing clinical research findings and clinical guidelines to change physician practice patterns, in surgical and general practice. A wide range of interventions were included in the review, including audit and feedback, computerized decision support systems, continuing medical education, financial incentives, and others. It found that the greatest positive change resulted from active educational exposure and multifaceted interventions (Mostofian F, 2015). Another successful method of reinforcing CME learning and measuring outcomes in

practice is "self-reported commitment to change". In this method, physicians select three "commitments" from a predefined list at the time of the CME event regarding how they will change their practice (Domino, 2011).

Incorporating quality improvement principles in the development of material and faculty teaching skills is also a critical component in achieving good educational outcomes. Some of the benefits of good programs are greater educational involvement and development of collegial networks. Programs that make use of experiential learning, provide feedback, support peer and colleague relationships, and are well-designed are found to be the most effective and are appreciated by participants. An area for development is building in the capacity to measure whether changes can be maintained over time (Steinert, Mann, Centeno, Dolmans, Spencer, & Prideaux, 2006).

Incentives to change

What motivates a physician to change the way he or she practices? Establishing a guideline is no guarantee that it will be used in clinical practice. It is important to understand the realities of clinical work and how evidence may be used to inform and influence clinical practice. Economic, administrative, professional and personal incentives, as well as the incentive provided by the research evidence itself, can motivate physicians to work through initial difficulties and adopt new practice methods (Eve, Golton, Hodgkin, Munro, & Musson, 1996).

A New Zealand study examining the impact of mandatory CME on practice found that change tends to be incremental, the result of information gained from a variety of sources rather than from a single event, such as a conference. It also found that time represents the greatest obstacle or disincentive to engagement in CME and practice change (Goodyear-Smith, Whitehorn, & McCormick, 2003).

A Cochrane review of the effect of educational interventions for primary care providers on dementia treatment found those that required active participation were associated with improved detection of dementia; however, education did not increase adherence to guideline care. It concluded that in order to change physician management of dementia, education would likely need to be combined with reimbursement as incentive (Perry, Drašković, Lucassen, Vernooij-Dassen, van Achterberg, & Rikkert, 2011).

Despite 30 years of quality improvement evolution, it has not been possible to identify a single best method to encourage shifting knowledge into action. Multiple methods exist for performance improvement, and ultimately what needs to be considered is whether measures used actually improve patients' lives (Hartig & Allison, 2007).

Changes in physician behaviour

One of the main objectives of CME is to improve clinical practice to achieve better health outcomes. Although physicians regularly attend CME, most accredited CME does not specifically target clinical behaviour change. As a result, change in clinical behaviour that improves patient care is seldom seen. (Légaré, et al., 2015). This was especially true in the past, when CME tended to be entirely didactic. A twenty-year-old literature review of education aimed at health outcomes found that CME, such as conferences, that lacked content clearly aimed at practice-based change, had very little impact on physician behaviour (Davis, Thomson, Oxman, & Haynes, 1995). However, a review of randomized trials and well-designed quasi-experimental trials found that while didactic presentations were unlikely to have a statistically significant effect on behaviour, interactive sessions had a relatively high impact on physician behaviour (Thomson O'Brien, Freemantle, Oxman, Wolf, Davis, & Herrin, 2001).

There is evidence that educational interventions geared towards practice-based learning models and problem-based curricula can result in changes in both physician practice and patient care. One paper suggests learning sessions where physicians can discuss and reflect upon their experiences with patients within a group of their peers improves physicians' clinical judgement (Cervero R. , 2003). An approach that was found to be quite effective was use of half-day, highly interactive CME events that included a case-based didactic element. Physicians who participated were found to have gained greater knowledge, changed their practice to use guideline care, and improved patient care (Drexel, 2011).

Changes in patient health outcomes

In theory, changes in physician behaviour that lead to improved adherence to guideline care should result in better patient outcomes; however, studies show mixed results. A literature review of randomized controlled trials of physician educational interventions for hypertension treatment found that these interventions, although improving adherence to guidelines, had no impact on patient outcomes (Tu & Davis, 2002). Another study looked at changes in diabetes management associated with attendance a specific CME event on practice improvement and found through chart review that six out of eight diabetes measures were significantly improved (Bird, Marian, & Bagley, 2013). The effects of a MH training program for GPs on patient outcomes were evaluated using patient interviews before and after the intervention (with various patient cohorts) to assess GP performance. This study found that performance was significantly improved following the training and that patients benefited clinically (Morriss, Downes-Grainger, Thompson, & Goldberg, 1999). Encouraging results were found in a synthesis of systematic reviews regarding the impact of CME, which showed evidence that CME can indeed influence both physician performance and patient outcomes (Cervero & Gaines, 2015).

According to the literature reviewed the educational components most associated with success in motivating practice change appear to include multiple exposures, interactive, practice-based learning modules, multifaceted interventions, development of collegial networks, review and feedback, and seeing patient benefits.

The continuing education provided by PSP modules incorporates the elements identified through this literature review as most likely to lead to positive practice change and better patient outcomes: the three learning sessions provide multiple exposures; the program involves applying techniques in physicians' own practice (practice-based); it involves mentorship from a GP Champ and peer-to-peer learning, review and feedback; and financial incentives through sessional compensation for their time in class, in addition to both CME credits and action period compensation to try the changes in their practices. Thus, in theory, this educational program should be well-placed to demonstrate associated, observable changes in physician practice and patient outcomes.

Chapter 4 – Methodology Used in Analyses in Chapters 5, 6 and 7

A similar analytical methodology was used in each of the following chapters (5 to 7) to assess whether there was a change associated with the MH training regarding new prescriptions, number of MH plans, and patient hospitalizations.

Background

In Canada, all medical services provided by physicians under public insurance are captured in administrative databases, and these data provide a reasonably reliable source of health and prevalence information regarding mental disorders (Tannenbaum, Lexchin, Tamblyn, & Romans, 2009) (Steele, Glazier, Lin, & Evans, 2004). In BC, these billed medical service interactions are captured in the Medical Services Plan (MSP) database. In addition, all prescriptions filled in outpatient and community pharmacies are captured in the PharmaNet (Pnet) database, and the Discharge Abstract Database (DAD) contains the details of hospitalizations around the province. For this research, administrative data from these databases provided the basis for an analysis of physician behaviour before and after completion of MH module training.

The billing numbers and dates of module attendance were provided to the MOH to identify GPs in the MH module (no names). The MOH then created a dataset containing all active Vancouver Island GPs with anonymized GP identifier, age group and gender information, and the corresponding dates of attendance for those GPs who took the module. Administrative data relating to MH were obtained from physician billing, hospital admissions, and physician prescribing information available from MOH databases for the study period January 1st, 2007 to December 31st, 2012. The criteria used for data extraction are provided in Appendices A, B, and C. These datasets were then analysed using IBM SPSS Statistics 23 software.

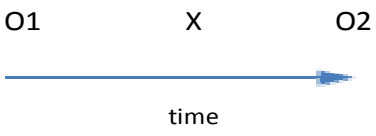
No names of physicians or patients appeared in any dataset; anonymized patient and GP numbers were used throughout. The terms "GP identifier" and "patient identifier" will refer to these anonymized numbers.

Study Design

This was a quasi-experimental study (Figure 3) designed to retrospectively observe practice behaviours of a group before and following exposure to the PSP MH module, which allowed the inclusion of cohorts over multiple time-points and in multiple regions. These GPs acted as their own "controls", and observational measurements were made regarding their behaviour prior to the training to compare with those made following training.

Observations were based on data sets obtained from anonymized secondary data provided by the MOH. The study population was all Vancouver Island GPs who attended the MH module and the patients they treated.

Figure 3: The 1-group pretest-posttest quasi-experimental design (Harris, 2004)



O1 = pre-intervention observational measurement, X=Intervention under study, O2=post-intervention observational measurement

Ethics

The research project was reviewed by the Joint University of Victoria Island Health Research Committee (File number J2014-056, Appendix D). Data provided by the MOH was considered a minimal risk as it did not contain any information that could be linked to specific individuals. A formal data request was made

to the MOH, and both an information-sharing plan agreement between MOH and Island Health and ethics approval were obtained in December 2014. Additionally, approval from the College of Physicians and Surgeons was obtained to provide physician gender and age-group information and the final data set was obtained from the MOH on August 25th, 2015.

Study Purpose

The objective of the study was to evaluate the study questions, which tested the effect of the MH module on GP behaviour and patient outcomes based on secondary administrative data. These questions were:

1) Is completion of PSP MH module training associated with changes in antidepressant prescribing?
2) Is completion of PSP MH module training associated with changes in MH Planning?
3) Is completion of PSP MH module training associated with reductions in number of MH hospitalizations of these GPs' patients?

Study Subjects

One-hundred and ninety-seven (197) GPs completed the MH module between 2009 and 2011 and their billing numbers were available. These module participants were selected as subjects for this study.

MH visit and prescribing interactions between GPs and patients were captured for those patients 19 years-of-age or older as of January 1st, 2007. Interactions were excluded where the patient had any of the "exclude" diagnosis codes prior to December 31st, 2011. Patient include and exclude criteria are provided in Appendix E.

Information was requested regarding MH visits, medications, and hospitalizations on Vancouver Island between January 2007 and December 2011. GPs who took part in the MH module were identified to the MOH by their billing numbers along with their dates of module attendance[1]. The MOH provided demographic information (age-group and gender) for a total of 856 Island Health GPs. The 197 who completed the MH modules were distinguishable on this list, as in addition to age and gender information, their records included attendance date information.

A few data summaries in this paper include the entire dataset to provide some context regarding the wide spectrum of MH management in general practice; however, the study analyses did not include all GPs on Vancouver Island and were instead restricted to those who participated in the training. Because the amount of MH training attended by GPs who did not enroll in the MH module was unknown, they could not be case-matched to study subjects for a comparison between these groups, and for that reason the study focused on the behaviour of the GPs who completed the training.

Data Sources

In 2015, the MOH provided the Pnet, medical services plan, hospital discharge, and GP data sets requested by the Regional Support Program in order to evaluate the MH module (Figure 4).

[1] Cohorts with fewer than 10 participants were combined with the cohort with the closest date to ensure anonymity

Figure 4: Ministry of Health Data Extract – data sources and data fields

GP Information	Medical Services Plan Data (MH billing)	PharmaNet Data (MH prescriptions)	Discharge Abstract Database Data (MH hospitalizations)
• GP_ID • Gender • Age-Group • MH Module start and end dates	• GP_ID • Pt_ID • Visit dates • Service codes • Diagnostic codes	• GP_ID • Pt_ID • Prescription DIN • Drug Name • Dispensing date	• Pt_ID • Hospitalization dates • Hospitalization diagnostic codes

GP Data

Demographic data was requested for Vancouver Island GPs who were in active practice during the study period. The MOH provided a list of anonymized GP identifiers and, with permission from the BC College of Physicians and Surgeons, gender and age category information for all Vancouver Island GPs to allow normalization of GP data. GPs who attended the module had in addition the start and end dates of their module participation (197 GPs in MH module, total of 856 GP records).

PharmaNet Data

The Pnet database captures the details of all prescriptions filled at BC pharmacies. MOH provided dispensing information on antidepressant and anti-anxiety prescriptions per data request (Appendix C). The result was 5,688,819 prescribing records within the six-year study period, containing both GP and patient identifiers, medication DIN and drug generic name, and dispensing date (British Columbia Ministry of Health, 2011).

Medical Services Plan Data

Physicians are paid to provide insured services on a fee-for-service basis through the province's Medical Services Plan (MSP), and province-wide billing information is captured in the MSP database. Billing

claims include a billing code to specify the type of visit and a diagnosis code to specify the underlying cause. Visit encounter information was provided based on insured service billings to specific fee and diagnostic codes associated with mental disorders (Appendix A). This data set held 792,533 records of MH visits billed by Vancouver Island GPs. These data included GP and patient identifiers, fee and diagnosis codes, and date of service. These data were used to establish GP-patient pairings and observe use of a specific MH fee code (British Columbia Ministry of Health, 2011).

Hospital Discharge Abstract Data

The Discharge Abstract Database (DAD) contains hospital admissions and discharge information. Information was requested for all hospitalizations on Vancouver Island with an admission code that indicated a MH issue (Appendix B). These data included a patient identifier, admission codes and dates of service, but no GP identifier (Canadian Institute of Health Informatics, 2011). The GP-patient pairings established via the MSP billing and Pnet data were used to link GPs to hospitalized patients.

Mental Health Patients

The preceding data sources referenced a total of 197,131 unique patients, some of whom were seen or prescribed for once or twice. Although the entire data set is used in some of the contextual information presented, the decision was made to limit the patients included in the study analyses to those who appear to have a clinical MH diagnosis. The algorithm used to make this determination was a) any hospitalization, b) two visits to a physician coded to MH within a one-year period, c) three or more prescriptions within a one-year period (Alaghebhbandan, MacDonald, Barrett, Collins, & Chen, 2012), and/or d) a visit coded to a MH Plan (which requires a DSM diagnosis) (GP Services Committee, 2015). Application of these criteria to the patient data resulted in a total of 134,600 unique patients with a probable MH diagnosis.

Data Preparation: Determination of "N" and "n"

The administrative data in the MSP and Pnet data sets were used to establish GP-patient pairings related to MH that were used as the denominator(N), from which counts of the number of events of interest (n) were determined. These values were used for both the contingency tables and for paired t-test calculations.

Although some patients were attached to more than one physician during the study period, this was thought acceptable as the focus of this study was the influence of training on the choices made by individual GPs as reflected by their patient interactions. Duplicate patients are discussed in chapters 5 to 7.

Denominators (N) – Population

Unique GP-patient pairs were examined to determine whether there was an interaction between them (a visit or a prescription) that took place place during the one-year period before and after the MH module as a test of attachment during that period. In other words, if there was a GP-patient encounter (visit or prescription) within a year of the first module "learning session" (LS1), the pair was added to the pre-period ("control") N. If there was a visit or prescription within a year of the third and final learning session (LS3), the pair was added to the post-period ("exposed") N.

A count of the unique GP-patient pairs that were attached during the one-year prior to the training and the year following the training were used as the "control" (pre-exposure) and "exposed" denominators (N) respectively.

Numerators (n) - Count

A count of GP-patient pairs with events of interest, e.g., new MH prescriptions, MH hospitalizations, MH plans, that took place either during the pre- or the post-module measurement time-frames, provided pre- and post-period "n" values (Figure 5).

Proportional weighting

How physicians practice may be influenced by age and gender. Since the GPs in the MH module self-selected to attend, the proportion of GPs in each age and gender stratum was not identical to that of the wider population of GPs, which could introduce confounding. In the case of this study, a higher proportion of women and fewer men participated in the module than are seen in the total number of GPs on Vancouver Island (Table 1).

Table 1: Age and Gender of GPs on Vancouver Island and of GPs in the MH Module

Gender	Age	All GPs on Vancouver Island	GPs in MH Module
Males	*< 40*	82 (9%)	7 (4%)
	40 to 49	128 (15%)	32 (16%)
	50 to 59	213 (25%)	51 (26%)
	60+ years	110 (13%)	15 (8%)
	All Males	533 (62%)	105 (53%)
Females	*<40*	109 (13%)	22 (11%)
	40 to 49	126 (15%)	42 (21%)
	50 to 59	74 (9%)	25 (13%)
	60+ years	15 (2%)	3 (2%)
	All Females	324 (38%)	92 (47%)
Total GPs		857	197

To reduce the effect of this source of confounding, weights were established based on the age and gender information of all Vancouver Island GPs provided in the MOH GP dataset. Study results are reported for the analyses both with and without weighting.

The proportional weight was calculated for each stratum of GP participants based on the number of all GPs on Vancouver Island in each of the corresponding strata (Equation 1). This proportional weight was used as a multiplier for the results.

Equation 1: (% of stratum within population) / (% of stratum within the sample)

$$\pi j = (Nj/N)/(nj/n)$$

where:

πj =proportional weight

j levels of covariate – corresponding to the strata of age-gender

n = number of GPs in the Age-gender category in all Vancouver Island

N = number of GPs on Vancouver Island

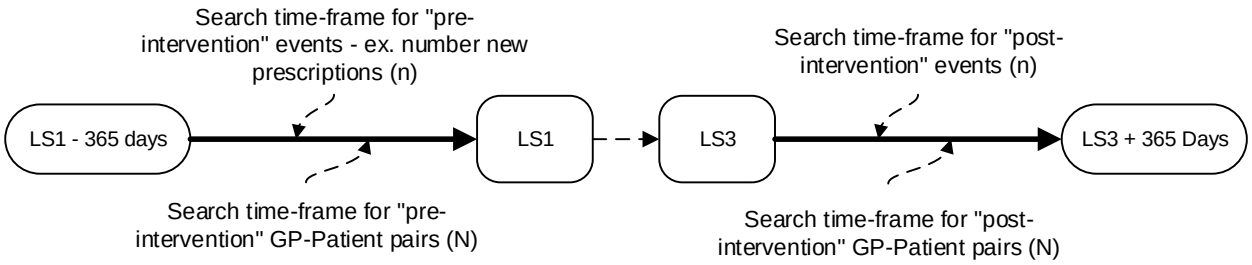
nj = number of GPs in the Age-gender category in the MH module

Nj = number of GPs in the MH module

π= % of stratum in population

When the stratum j is represented in the sample in the same proportion as it is in the total population, πj = 1. πj <1 means the stratum is over-represented, and its proportion in the sample is larger than its proportion in the population. πj >1 means the group was under-represented, and its proportion in the sample is smaller than its proportion in the population. The proportional weights are used as multipliers to inflate under-sampled cases, and deflate the over-sampled ones. (Maletta, 2007)

Figure 5: Pre- and Post-Module Measurement Time-frames



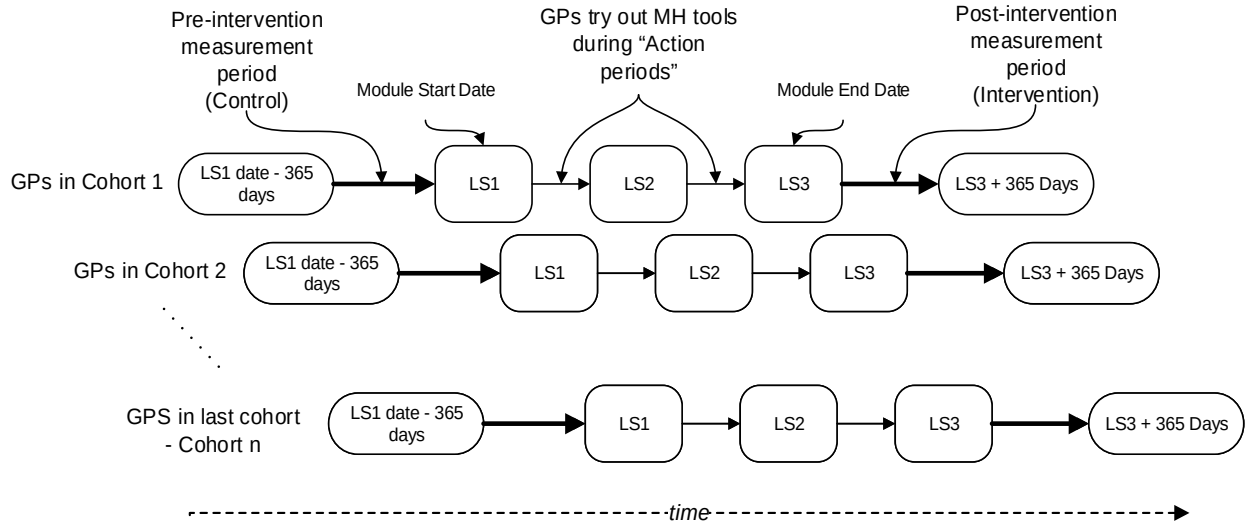
Study Arms - "Exposed" and "Control"

The resulting count and context data during the "control" pre-training period and "exposed" post-training period provided the basis for the analysis, using paired t-tests.

There were 18 cohorts that started between June 24th, 2009 and April 14th, 2011, with all cohorts ending by October 27th, 2011. The module was offered in nine communities around Vancouver Island, with class-sizes ranging from 3-18 GP participants (average 12.6). Because there were multiple cohorts with different start-dates, the pre- and post- time-periods varied by cohort.

The GPs "exposed" to MH training acted as their own "controls", using the year prior to their participation in the training as the “before” or pre-intervention period, and the year following their "exposure" to training as the “after” or post-intervention period (Figure 6).

Figure 6: Measurement Periods for GPs in Mental Health Module Cohorts



Hypothesis Testing– Paired t-tests

This study used paired t-tests on individual GP results using SPSS software to test the null hypotheses that exposure to the MH module would not result in changes in GPs behaviours nor in patient outcomes.

SPSS paired t-tests were performed on tables that contained the events of interest (e.g. number of new prescriptions, number of GP-patient pairs with MH Plans, number hospitalizations) for each GP who completed the module, and the t-test output are included in Appendices F, G, and H. The t-test statistic assumes normality, which was confirmed using Kolmogorov-Smirnov in SPSS.

Chapter 4 Summary

The preceding methodology formed the basis of the analyses in the following chapters which were used to evaluate the impact of the MH training program on GP behaviours and patient outcomes. Aadministrative data regarding MH billing (MSP dataset), prescribing (Pnet dataset) and hospitalizations (DAD dataset) provided the basis of the analyses used in this study. These data were used to create a

dataset containing patient identifiers of those likely to have clinical MH illness based on the number of prescriptions, MH visits, MH plans and hospitalizations. Datasets combined with information regarding GP gender and age-groups, and dates of MH training, were used to assess changes between pre- and post-training practice behaviour and patient outcomes. Chapter 5 examines prescribing patterns, which was the primary study objective, chapter 6 assesses use of the MH plan to support patients with more acute MH issues, and chapter 7 examines hospitalizations with a MH diagnosis among patients of MH module participants.

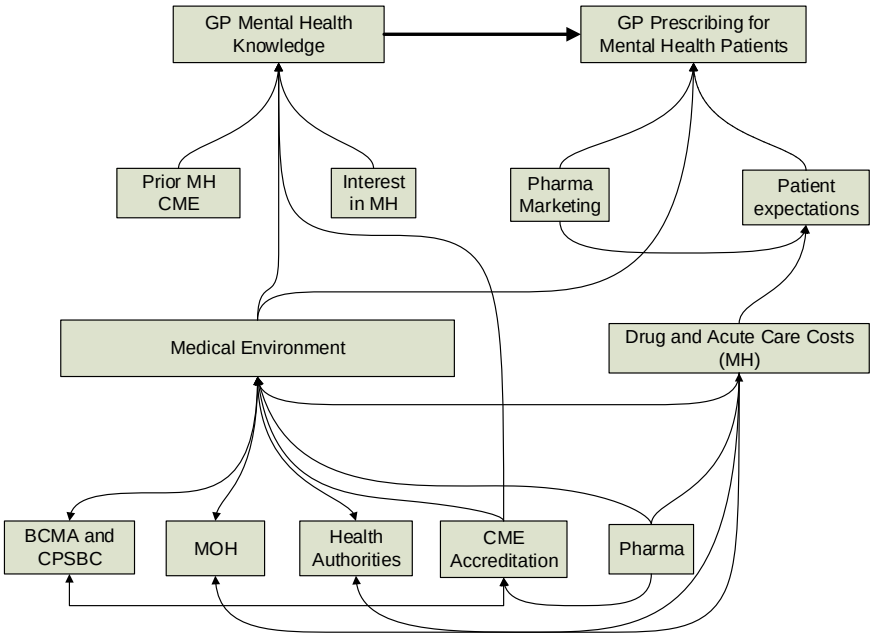
Chapter 5 –Practice Behaviour Change in Prescribing Patterns

Background

Prescribing is a significant clinical "behaviour" in general practice and an important tool in primary care. There are multiple factors that influence GP management of MH and prescribing behaviour (Figure 7), including patient expectations and other external factors (Tsiantou, et al., 2013).

The primary study objective was to determine whether there was a significant and measurable change in the number of "new" prescriptions for antidepressant and anti-anxiety medications among patients managed for MH following participation in the MH module. "New" was defined as no previous prescription for these medications during the six-year study time-frame.

Figure 7: Prescribing Influences – The Health Envelope in Mental Health Care Practice



Most GPs have limited training in psychotherapy and, when faced with a patient with a MH disorder, may reach for the prescription pad as their first reaction out of feeling the need to 'do something'

(Morrison, et al., 2007). In fact, an article in the British Medical Journal reported that antidepressant use had doubled between 2003 and 2013, and ranked consumption in Canada as the third highest amongst the world's wealthiest nations (after Iceland and Australia). This increase is thought to be the result both of longer and more intense treatment and more frequent prescribing for mild forms of anxiety, depression, and social phobias (McCarthy, 2013).

Although antidepressant pharmacotherapy is the usual first line of treatment for new cases of depression, the side-effects can be quite unpleasant and it is not always effective. One paper reported that up to 50% of patients prescribed antidepressants do not get adequate relief and 67% do not achieve full remission (Epstein, Szpindel, & Katzman, 2014).

An alternative treatment approach, Cognitive Behavioural Therapy (CBT), appears to be both an effective and inexpensive option for many patients, even for patients with serious mental illness. One of its key benefits is that patients acquire skills that become part of their own internal resources to deal with stress and other issues (American Psychological Association, 2012).

Data analysis

The MH module introduces GPs to CBT techniques, found in both the CBIS manual and the DWD workbook, which they can use with their patients within the time-span of a normal office visit. The question arose whether having an alternative to medication, such as the CBIS tools, could result in a behaviour change that would be reflected by the number of new prescriptions written for antidepressant or anti-anxiety medications.

To answer this, Pnet prescribing information for Vancouver Island was requested regarding 25 commonly-used antidepressant and anti-anxiety (MH) medications (Appendix C). Accounting for various

brands and dosages, this amounted to 848 distinct drug identification numbers (DIN). The drug list was determined in advance, and no additional drugs were added over the course of the study. However, on advice all Zopiclone prescriptions were removed from the Pnet dataset prior to analysis, as this medication is used as a sleep aid and no references to its "off-label" use as an antidepressant or anti-anxiety medication could be located (Barnett, 2016).

Pnet data were used to determine the first date within the dataset (i.e. between January 2007 and December 2012) that a Vancouver Island patient received a MH medication from any physician and whether that first prescription was written by a GP who attended the MH module either during the one-year period "pre" or "post" module attendance.

General Observations

A review of the entire set of MSP and Pnet data, which included all Vancouver Island patients and GPs, produced some interesting findings. Of note were a) the number of prescriptions filled in comparison to the number of MSP visits on Vancouver Island coded to MH (2,957, 731 prescriptions versus 792,533 MH office visits), and b) the number of patients prescribed more than one medication by a GP, yet having no corresponding MH office visit with that GP (43,881 GP-patient pairs). What these data highlighted was the high degree of variability in how GPs manage MH in their practices (Tables 2 and 3).

Table 2: Comparison of MH Prescriptions written and Mental Health Visits on Vancouver Island (All GPs)

Number of MH Prescriptions written by all Vancouver Island GPs between January 2007 and December 2012	2,957,731
Number GPs writing MH prescriptions (out of 856 GPs)	838 (98%) Min per GP= 1, Max= 50,255 Average = 3,530

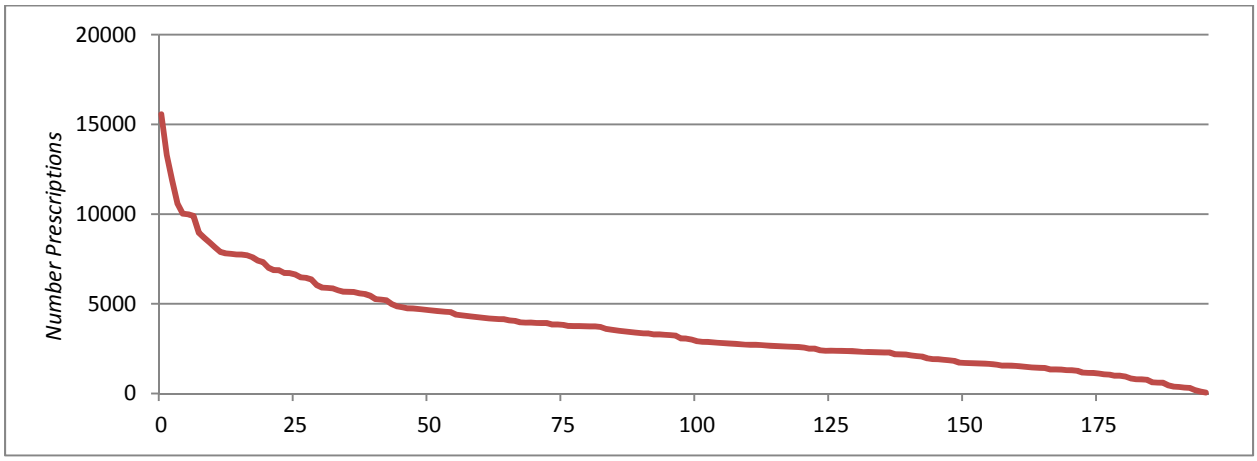
Number of Patients receiving MH Rx	127,060
Average MH Rx per Pt over 6-year period	**23.3** Min per Patient =1, Max= 7,236
Number MH Visits to Vancouver Island GPs	792,533
Number Patients with a MH Visit	175,398
Average MH Visits per Pt over 6-year period	**4.5**

Table 3: Vancouver Island GP-Patient MH Prescribing Pairs (All GPs)

Number Patients with Minimum 2 Rx within 1 Calendar Year	95,107
Number of GP-Patient prescribing pairs	106,220
Number duplicates (note: this does not seem unreasonable given the 6-year time-period)	11,113 (10.5%)
Number Patient-GP prescribing pairs where Pt has Minimum 2 Rx within 1 Calendar year with NO MH Visit	43,881
Number of these pairs with 1000 to 5,457 Rx and no corresponding MH Visit	55

Of 2,957,731 prescriptions for MH medications written on Vancouver Island between the beginning of 2007 and end of 2012, 718,801 were prescribed by GPs in the module. From these data it was evident that there was a great deal of variability in the number of prescriptions written by MH module attendees, which ranged from a minimum of 54 over this period up to 15,561 prescriptions (median=3,063, average=3,667) (Figure 8).

Figure 8: Graph of the number of MH prescriptions written between 2007 to 2012 by GPs in the MH Module training program in order of GPs with the highest to lowest number prescriptions [max=15,561, min=54]



The number of MH patients seen by GPs also reflected considerable variability, ranging from four GPs with fewer than 100 MH patients seen over the course of the study to eight GPs who saw between 1,000 and 1,500 patients during that time (Figure 9). Most GPs saw between 250 and 750 unique patients over the course of the six-year study period. There was also considerable variability in the number of encounters (representing visits and prescriptions) between GPs and MH patients during that period, ranging from one GP with fewer than 100 MH encounters up to a GP who had over 18,000, with most GPs having had between 2,500 and 5,000 encounters (Figure 10).

Figure 9: *Number General Practitioners by Size of their Mental Health Patient Panel*

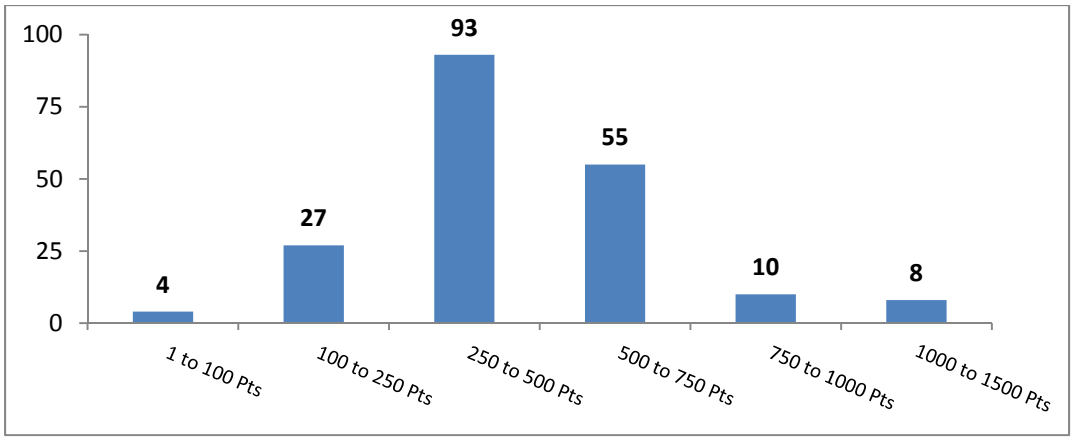
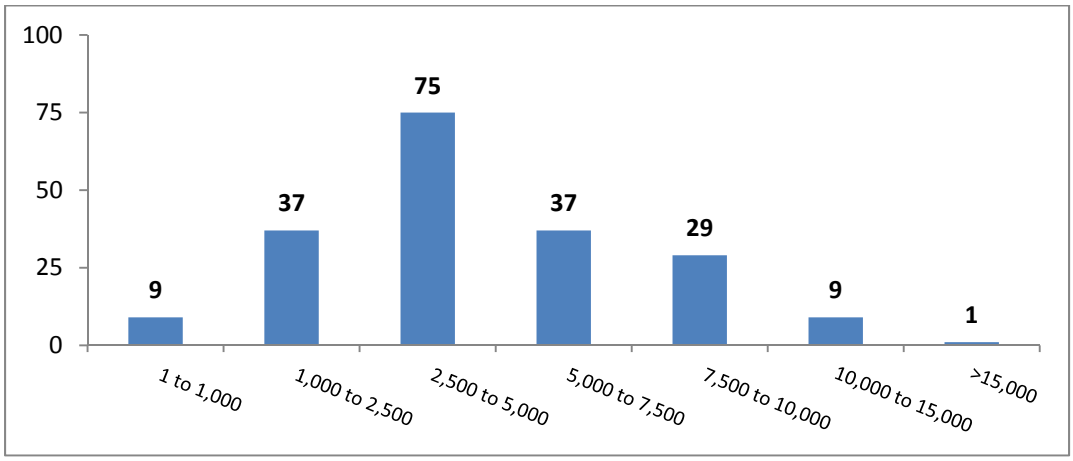


Figure 10: *Number General Practitioners by Number Mental Health Encounters (MH Visit and Prescriptions)*



These differences in prescribing and patient encounters suggest variation in both GP practice and patient acuity. GP billing codes do not indicate the severity of illness, so cannot be used to distinguish seriousness per se. Further analysis of the administrative data might be a useful undertaking in discerning the degree of seriousness of patients' illness, beyond those who required hospitalization and large numbers of medications; however, that is beyond the scope of this thesis, as chart review would be required to validate the accuracy of those assessments.

Preparation of Prescribing Data

New Prescriptions (n)

Pnet data were used to identify the first date a patient was prescribed medication by any physician, and this information was attached to each patient. This original prescription date was used to ensure that on-going use of antidepressants would not be captured as "new" when renewed for the patient by another GP. The data was then analysed to find the first prescription date between GP-patient pairs.

If a patient's first prescription date matched the first date in the GP-patient prescribing pair, it was deemed that this GP wrote the first prescription for this patient and “started" the patient on

medication. If that medication start date fell within either of the two data collection periods (pre- and post-intervention), it was added to the relevant "new" prescription count. The total number of new MH medication starts during the 365 days prior to GPs' beginning the MH training and the 365 days following the training provided the pre- and post-intervention "n".

Amongst 55,787 unique prescribing pairs, there were a total of 2,204 new prescriptions in the "pre" period, and 1,530 in the "post" period.

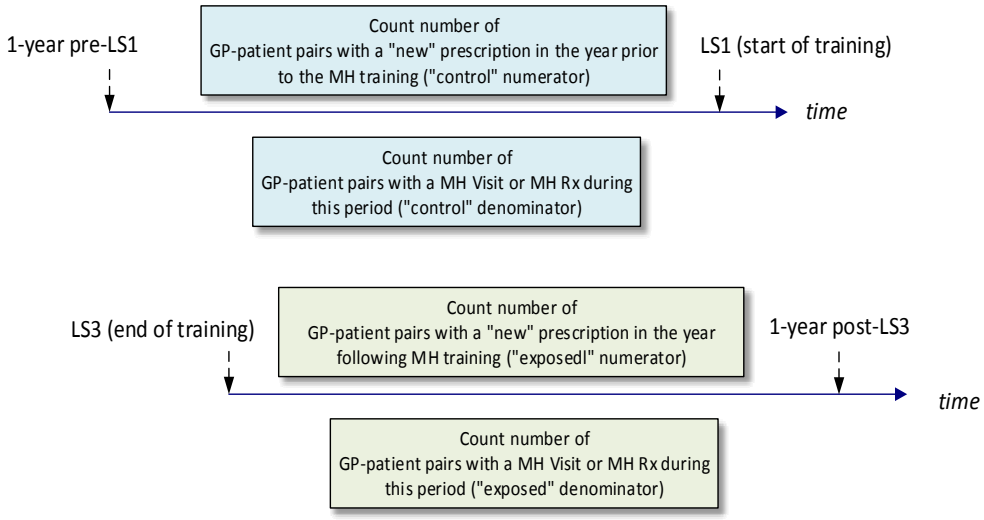
Context Population (N)

The context population was the total number of GP-MH patient pairs where a MH encounter, either a MH visit or a MH medication or both, took place during the pre- and post-module study time-frames. The MH patients were identified as described in Chapter 4, and used to query the MSP and Pnet datasets to create GP-patient pairs, with the first and last dates a GP saw or prescribed for a specific patient. These sets were then combined to obtain a complete set of all unique GP-patient pairs. This resultant set included pairs that involved a) prescriptions only, b) MH visits only, and c) both prescription and MH visit.

Results: Number of New Prescriptions for MH Medications

The event of interest regarding antidepressant use was the number of "new" MH prescriptions written by Vancouver Island GPs who participated in the MH module during the study time-periods, e.g., the year prior to and the year following participation in the MH module (Figure 11).

Figure 11 –Measurement time-points - "Control" and "Exposed"



The number of new prescriptions (n), number of GP-patient pairs (N), and proportion of new prescriptions (n/N) were calculated before and following the training. Results were then adjusted proportionally to match age and gender distribution of all GPs on Vancouver Island.

To quantify whether there was a change in prescribing practice following module attendance, a paired-samples t-test was performed on the results for each of the 197 GPs before and following training. Normality was confirmed using the one-sample Kolmogorov-Smirnov test in SPSS. The number of patients, new prescriptions, and proportion of new prescriptions associated with each GP was analyzed, both with and without adjustment for GP age and gender to determine whether there was a measureable change in prescribing between the two time periods.

The paired sample t-test results found no significant difference in the number of GP-patient pairs (N) between the pre-intervention (M=141.60, SD=68.17) and post-intervention periods (M=142.43, SD=65.32); $t(196)=-0.344$, $p=0.731$, $\alpha=.05$. With adjustment for age and gender, these results were quite

similar although the SD was higher, with (M=142.06, SD=97.45) and (M=144.44, SD=103.00); t(196)=-0.679, p=0.498, α=.05.

On the other hand, there was a significant difference found in the number of new prescriptions for MH medications (M=11.24, SD=7.57) and (M=7.81, SD=5.91) in the pre-and post-intervention periods; t(195)=8.557, p<0.001, α=.05. When adjusted for age and gender, again the results were quite similar for pre- and post-intervention means and standard deviation (SD) (M=11.47, SD=10.2) and (M=7.75, SD=6.34); t(195)=7.351, p<0.001, α=.05.

In addition, the change in proportion of new prescriptions between the pre- and post-period was also found to be significant (M=0.0775, SD=0.03812 and M=0.0533, SD=.03167); t(195)=8.45, p<0.001. With adjustment for age and gender, the change between pre-period mean (M=0.0796, SD=.06527) and post-period mean (M=.0530, SD=.03877); t(195)=6.668, p<0.001 was also found to be significant. A summary of these results is found in Table 4.

Table 4: Summary of Findings regarding New Prescriptions

	Pre-period Mean	*Post-period Mean*	*Pre-period Standard Deviation*	*Post-period Standard Deviation*	*Relative Change (%)*	*Degrees of Freedom*	*T-value*	*p-value*
Number MH patients								
Without Adjustment	141.6	142.43	68.17	65.32	-0.6	196	-0.344	0.731
With Adjustment	142.06	144.44	97.45	103	-1.7	196	-0.679	0.498
Number New Prescriptions								
Without Adjustment	11.24	7.81	7.57	5.91	30.5	195	8.557	<0.001
With Adjustment	11.47	7.75	10.2	6.34	32.4	195	7.351	<0.001

Proportion New Prescriptions								
Without Adjustment	0.0775	0.0533	0.03812	0.03167	31.2	195	8.45	<0.001
With Adjustment	0.0796	0.0530	0.06527	0.03877	33.4	195	6.668	<0.001

The results demonstrate that the number of patients with MH issues GPs saw before and following their participation in the MH module was relatively stable, and that they wrote fewer new prescriptions following participation in the module than they wrote prior to the module.

The MH module introduces GPs to a number of CBT techniques they can teach to their patients, and in many cases these techniques can ease the suffering of their patients as well as or better than medication alone (Høifødt, Strøm, Kolstrup, Eisemann, & Waterloo, 2011). The decrease in new prescriptions written for patients following the MH training might suggest that after participating in the module, GPs were slightly less likely to prescribe new medications. The results from this analysis show a small but significant reduction in the number of new prescriptions for MH medications following participation in the MH module that was unlikely to be due to chance alone. These results also suggest that the module may indeed have influenced this area of GP practice.

Chapter 5 Summary

This chapter summarized the study findings regarding prescribing patterns, which suggested that there was a small but significant decrease in the use of medications following MH training. The next chapter looks at the impact of MH training on use of the MH planning fee code, which was introduced in 2008 for the management of patients who struggle with mental illness.

Chapter 6 –Use of Mental Health Planning Fee (MSP data) – Patterns of Practice

Background

A number of MH fee codes have been created in recognition of the important role GPs play in supporting MH patients and the significant commitment of time and effort this requires. Patients may experience additional risk factors such as addictions, poverty, and other non-medical components of their "whole" picture which add to the complexity of providing care. In 2008, a new billing code was introduced in British Columbia that would allow GPs to conduct a longer and more extensive assessment of their patients with more serious MH issues, the MH Planning Fee. (GP Services Committee, 2015)

The intent of MH Plans is to support high-risk patients who struggle with the activities of daily living required to remain safely in the community. The MH Plan involves review, assessment, planning and documentation that become part of the patient's chart. In order to bill this fee, the GP must make a detailed review of the patient's history and document his or her MH status and a provisional diagnosis, use and record a validated assessment tool, confirm an axis I diagnosis, summarize the condition and make a specific plan for the patient's care, outline the expected outcomes and linkages with other health care professionals, set up a time-frame for re-evaluation, and communicate the plan to the patient and/or patient's representative. In addition, it requires a face-to-face visit with the patient of at least 30 minutes (GP Services Committee, 2015).

The intent of the MH module was to provide training to support GPs to manage their patients with mild to moderate MH conditions, while the MH plan is a means to manage more severely ill patients. However, it was felt that the actual number of plans billed would be an interesting outcome to assess, as these plans represent a significant commitment of time, use of skills, and perhaps even a suggestion of confidence in managing MH.

Data Analysis

During the MH module GPs are introduced to a number of MH assessment tools and CBT techniques that can be applied to a variety of patients along the MH spectrum. Although the focus of the module is patients with mild to moderate MH issues, it was thought that participation in the module could increase GPs' comfort in dealing with more severe cases, and that this might be reflected in an increase in use of the MH Plan following training.

To answer this, MSP data was analysed to find the fee code associated with use of the MH plan by GPs who participated in the MH module, and this information was used to determine the number of times each GP in the module billed that fee code prior to and following training. The number of GP-patient pairs derived in chapter 5 was used as pre- and post-period "N" for this analysis, and SPSS was used to determine the number of patients with MH plans for each GP in the pre- and post-period (n).

General Observations

As in the previous chapter, the MSP dataset was reviewed in its entirety and some of these finding are presented in Table 5, broken down by all GPs on Vancouver Island, and by GPs who did and did not take the MH module.

Table 5: Use of the MH Planning Fee code G14043 between 2008 and 2012

	All GPs	*MH Participants*	*Non-participants*
Number of MH Planning Fees billed (between January 2008 and December 2012)	*52,277*	*16,985*	*35,292*
Number Patients with MH Plan (out of 175,398 Patients with MH-coded Visits)	*31,215*	*10,653*	*21,075**

Average MH Plans per patient	*1.67*	*1.59*	*1.67*
Number GPs who have billed a MH Plan	*592 (out of 856 =69%)* *Min=1, Max= 1,410* *Average = 88.3 per GP*	*181 (out of 197 = 92%)* *Min=1, Max=854* *Average = 93.8 per GP*	*411 (out of 659 = 62%)* *Min=1, Max=1,410* *Average = 85.9 per GP*

** There were 513 patients who had MH Plans created by both MH participants and non-participants*

Results: Use of Mental Health Plans

Of the 197 GPs who enrolled in the module, 181 wrote one or more MH plans during the study periods. To quantify whether there was a change in the number MH plans created associated with module attendance, a paired-samples t-test was performed on the numbers of plans before and after training, with and without adjustment for GP age and gender.

As in the previous chapter, the number of MH patients seen by this group of GPs was not statistically different between the test periods: (M=145.77, SD=66.53) and (M=147.30, SD=62.47); t(180)=-0.612, p=.541.

Analysis of the number of MH plans written in the period prior to MH module attendance and following showed a significant increase in the number of plans written between the pre and post periods: (M=18.36, SD=30.20) to (M=25.86, SD=33.62); t(180)=-3.618, p<0.001, α=.05. With adjustment for gender and age, the results were less pronounced, although still significant, with (M=19.384, SD=41.08) and (M=27.87, SD=47.17); t(180)=-2.99, p=0.003, α=.05.

The change in the proportion of MH Plans written for MH patients between the pre- and post-period was also found to be significant (M=0.111, SD=0.1476) and (M=0.158, SD=.1646); t(180)=-4.534, p<0.001. Once adjusted for age and gender, the impact appeared smaller, with pre-period mean

(M=0.1142, SD=.18598) and post-period means (M=.1674, SD=.23973); t(180)=-3.586, p<0.001. A summary of these findings is presented in Table 6.

Table 6: Summary of Findings regarding Mental Health Planning

MH Plans	*Pre-period Mean*	*Post-period Mean*	*Pre-period Standard Deviation*	*Post-period Standard Deviation*	*Relative Change (%)*	*Degrees of Freedom*	*T-value*	*p-value*
Number MH patients								
Without Adjustment	145.77	147.3	66.53	62.47	1.0	180	-0.612	0.541
With Adjustment	146.18	149.14	98.66	103.8	2.0	180	-0.792	0.43
Number MH Plans								
Without Adjustment	18.36	25.86	30.2	33.62	40.8	180	-3.618	<0.001
With Adjustment	19.38	27.87	41.08	47.17	43.8	180	-2.991	0.003
Proportion Pts with MH Plans								
Without Adjustment	0.1111	0.1578	0.14761	0.16459	42.0	180	-4.534	<0.001
With Adjustment	0.1142	0.1674	0.18598	0.23973	46.6	180	-3.586	<0.001

The standard deviation was high in both the number of MH plans and the proportion of MH plans. It is not surprising that there is a great deal of variability among GPs. This fee code is intended for patients with a confirmed DSM diagnosis who struggle with the activities of daily living. Its use requires a great deal of documentation and can only be billed at most once per calendar year per patient (GP Services Committee, 2015). Nonetheless, these results indicate that the mean number of MH Plans written following MH module training was significantly higher, which may suggest that GPs feel more comfortable tackling this task following their training. This could be an area for further study.

Chapter 6 Summary

This chapter examined the use of the MH planning fee codes before and after MH module attendance, and found that there was a statistically significant increase in its use following the training. The following chapter contains the findings regarding patient outcomes in terms of hospitalizations before and after MH module participation and use of MH Plans for that specific patient population.

Chapter 7 –Acute admissions for Mental Health (DAD) - Patient Outcomes

Background

The only source of patient outcomes available from the administrative data used in this research were MH-related hospitalizations obtained from the DAD dataset. Although these patients are not representative of most MH patients seen in general practice, it was thought worthwhile to examine hospital data for evidence of change for these high-risk patients. The main outcome of interest was the number of hospital admissions with a MH code recorded as one of the reasons for admission. Also of interest was the number of MH plans written for this group of patients. MH hospitalizations are of concern for both Island Health and the provincial MOH, as these patients face multiple barriers in life and are challenging to care for.

As seen in Table 7, overall the number of acute encounters with MH patients has decreased since 2007.

Table 7: MH Hospitalizations on Vancouver Island between 2007 and 2012

	Patients attached to MH participants		*Patients not attached to MH participants*		*All Patients*	
Year	*Number Acute Visits*	*Length of Stay (total)*	*Number Acute Visits*	*Length of Stay (total)*	*Number Acute Visits*	*Length of Stay (total)*
2007	1037	8391	3098	28425	4135	36816
2008	1041	7987	3079	28947	4120	36934
2009	1002	8139	3145	27611	4147	35750
2010	821	7548	2583	29478	3404	37026
2011	829	6709	2720	26359	3549	33068
2012	559	4530	2017	20648	2576	25178
Grand Total	5527	45728	17276	167450	22803	213178

Data Analysis

Using the same approach as that of the preceding chapters, observations were made regarding hospitalized patients who were attached to GPs who attended the MH module in the one-year periods before and after their training.

Identifying GP-patient pairs posed a challenge, as there is no GP identifier in the DAD record set. Comparison between the DAD dataset and the MSP and Pnet datasets revealed that 83% of acute care patients had been seen by a Vancouver Island GP at some point during the study period. Of these, 31% had seen one or more GPs who took part in the MH module. As was the case in the previous chapters, some patients had encounters both with GPs who did and did not participate in the module (19%). In this instance, only the GP who appeared to be the most responsible GP for the patient was paired with that patient. General findings regarding hospitalized patients are presented in Table 8.

Table 8: Overview of Acute Care for Mental Health

	All	*MH module participants*	*Non-participants*
Number Acute visits for MH issues	*22,803 (8,926 involuntary – 39%)*		
Number Patients presenting to Hospital for MH Crisis	*8,697 (6,241 VI residents)*		
Acute Pts with no MH Visits to a Vancouver Island GP	*1,493 (17%)*		
Acute Pts with a MH Visit to a Vancouver Island GP	*7,204 (83%)*	*2,670 (31% of those with a VI GP encounter)*	*6,178 (71% of those with a VI GP encounter)*
GP-Acute Pt pairs (based on MH-	*15,505 (i.e. patients see*	*3,569*	*11,936*

coded office Visits)	*more than one GP)*		
Number of Acute Patients with a MH Plan	*2,429*	*807*	*1,688*
Number of GPs who developed a MH Plan for a patient seen in acute care	*481 (56%)*	*152 of 197 in MH Module (77%)*	*329 of 659 non-participants (50%)*
Number MH Visits with Acute patients	*61,657*	*16,603*	*45,031*

Because no GP information is attached to DAD datasets, it was necessary to search for encounters between GPs in the MSP and Pnet datasets and patients in the DAD dataset in order to establish GP-patient pairs. There were 8,697 unique patient identifiers in the DAD dataset, of which 3,569 could be matched to GPs in the MH module through the MSP and Pnet datasets. GP-patient pairs were removed if their last encounter was prior to the first hospital visit and where there was only one visit between the GP and patient, which reduced the matched patients to 2,001. Of these, 1,656 had the same GPs for the study period, and 345 had more than one GP. For the duplicate pairs, a count of the number encounters between the GP-patient pairs was used to determine the single "most responsible" physician (highest number of encounters). The GP information (dates of module attendance, age and gender) were then merged with the DAD data for analysis using SPSS.

Two analyses were performed to examine this group of patients: a) the number of hospital visits they made and b) the number of MH Plans created for them during the pre- and post-training periods:

- The number of hospital visits were counted by GP during the pre- and post-periods and compared against the context population of all MH patients.

- A second analysis was then done to determine whether the likelihood of having a MH plan increased between the pre- and post-study period and compared against the context population of hospitalized patients only.

Results: Hospital Visits

The intent of this analysis was to determine whether MH training could make a difference in the number of MH acute visits made by the patients of GPs who received MH training, and whether there would be a change in care management reflected by the number of MH Plans created for these patients. A summary of these findings are presented in Table 9.

There were 193 GPs who saw patients seen in acute care for a MH crisis during the study periods. As in previous chapters, the number of MH patients seen by this group of GPs was not statistically different between the test periods: (M=142.44, SD=68.51) and (M=143.42, SD=65.39); t(192)=-0.402, p=.688. With adjustment, the difference between periods was (M=143.42, SD=97.98) and (M=146.01, SD=103.44); t(192)=-.723, p=.471.

Analysis of the number of hospitalizations during the period prior to MH module attendance and following showed no significant change: (M=5.05, SD=7.97) to (M=4.16, SD=6.74); t(192)=1.662, p=0.098, α=.05. With adjustment for gender and age, change was even less pronounced, with (M=5.07, SD=7.85) and (M=4.51, SD=9.04); t(192)=0.99, p=0.325, α=.05.

The change in the proportion of hospitalizations among MH patients between the pre- and post-was not significant (M=0.0387, SD=0.0616) and (M=0.0378, SD=.0943); t(192)=0.126, p=0.9. Once adjusted for age and gender, the change was less significant between pre-period and post-period means (M=0.039, SD=.0612) and (M=.0392, SD=.0978); t(192)=-0.055, p=0.956.

Table 9: Summary of Findings regarding Patient MH Hospitalizations

Hospitalizations	*Pre-period Mean*	*Post-period Mean*	*Pre-period Standard Deviation*	*Post-period Standard Deviation*	*Relative Change (%)*	*Degrees of Freedom*	*T-value*	*p-value*
Number MH patients								
Without Adjustment	142.44	143.42	68.51	65.39	0.7	192	-0.402	0.688
With Adjustment	143.42	146.01	97.98	103.44	1.8	192	-0.723	0.471
Number Hospitalizations								
Without Adjustment	5.05	4.16	7.97	6.74	-17.6	192	1.66	0.098
With Adjustment	5.07	4.51	7.85	9.04	-11.0	192	0.987	0.325
Proportion Hospitalizations								
Without Adjustment	0.0387	0.0378	0.06163	0.0943	-2.3	192	0.126	0.9
With Adjustment	0.0388	0.0392	0.06116	0.09781	1.0	192	-0.055	0.956

When analyzed, the data did not show any impact of the MH training on the number of acute care visits. Additionally, the number of MH visits before and after was essentially unchanged, as were the number of MH Plans.

Results: MH Plans for Hospitalized Patients

MH hospitalization is an indication of serious MH illness and those patients require special care. It was thought that following MH training, the number of MH plans for this patient population might increase. In this case, the patient population was limited to those patients who had a history of hospitalization. Table 10 provides a summary of these findings.

There was no significant change found in the number of patients with a history of hospitalization who were seen during the pre- and post-periods: (M=4.73, SD=3.85) to (M=4.98, SD=3.74); t(189)=-1.60, p=0.111, α=.05. There was also no change observed in the number of these patients with MH Plans following MH training (M=1.17, SD=1.84) and (M=1.36, SD=2.05); t(189)=-1.36, p=0.176, α=.05.

Table 10: Summary of Findings regarding Use of MH Plans to Support Patients seen in Acute Care

MH Plans for Hospitalized Patients	*Pre-period Mean*	*Post-period Mean*	*Pre-period Standard Deviation*	*Post-period Standard Deviation*	*Relative Change (%)*	*Degrees of Freedom*	*T-value*	*p-value*
Number Hospitalized MH patients								
Without Adjustment	4.73	4.98	3.85	3.74	5.3	189	-1.599	0.111
With Adjustment	4.97	5.37	5.34	6.43	8.0	189	-1.887	0.061
Number Hospitalized Pts with MH Plan								
Without Adjustment	1.17	1.36	1.84	2.05	16.2	189	-1.358	0.176
With Adjustment	1.22	1.53	2.34	3.55	25.4	189	-1.281	0.202

Chapter 7 Summary

The focus in this portion of the study was those patients with MH issues of a sufficiently severe nature that they required hospitalization for their illness on at least one occasion during the study period. The results from these analyses did not find any evidence of change in MH hospitalizations or in number of MH plans, amongst this patient population following GPs' participation in the MH module. This is not altogether unexpected, as the module was intended to train GPs to provide support to patients with mild to moderate MH issues, while patients seen in acute care have serious issues. Discussion of the

findings regarding prescribing, the use of the MH Plan, and patient hospitalizations follow, together with study limitations and conclusions.

Chapter 8 – Discussion and Conclusion

The literature reviewed suggests that physician education that is interactive, relevant to practice, involves multiple exposures, fosters collegial networks, and benefits patients, is most likely to change GP practice behaviors. The goal of PSP training modules, of which the MH module is one, is to motivate practice change, and all incorporate those elements in their curricula. GPs report through follow-up surveys that participation has changed the way they practice (MacCarthy, Weinerman, Kallstrom, Kadlec, Hollander, & Patten, 2013), and it was felt an objective measure of this change would be worthy of investigation. The BC MOH collects immense quantities of health data regarding physician billing, pharmaceutical dispensing, and hospital admissions. These data are available for research purposes and, it was thought, could provide an objective source of evidence to assess whether GP practice changed following training.

This study sought to determine whether measurable changes took place in practice behavior following participation in this training module by answering the following research questions:

1) Is completion of PSP MH module training associated with changes in antidepressant prescribing?
2) Is completion of PSP MH module training associated with changes in MH Planning?
3) Is completion of PSP MH module training associated with reductions in number of MH hospitalizations of these GPs' patients?

A search for evidence of changes in prescribing, use of MH plans, and changes to patient outcomes in terms of hospitalization was made through the use of data available from MOH databases and formed the basis of this research. The interpretation of those findings and their implications are presented in this chapter.

Changes in MH Prescribing

Most cases of mild-to-moderate depression and anxiety are managed entirely in primary care. Although psychotherapy is recommended as the first line of treatment, most GPs have neither the time nor the training to provide psychotherapeutic treatment themselves (Verdoux, Cortaredona, Dumesnil, Sebbah, & Verger, 2014). This may explain why, with less than one-third of patients responding fully to antidepressant medication, pharmacotherapy remains "usual care" and psychotherapeutic treatment, such as CBT, its adjunct (Wiles, et al., 2013). The Canadian Primary Care Sentinel Surveillance Network Study evaluated prescribing of antidepressants between 2006 and 2012 and found that prevalence of antidepressant prescribing rose over that period, although incidence did not (Morkem, Barber, Williamson, & Patten, 2015). Disturbingly, an American study found 27 to 39% of the patients who were prescribed antidepressant medications had no corresponding psychiatric diagnosis on their charts (Simon, et al., 2014).

The use of CBT in primary care has been found as effective as pharmacotherapy for managing mild to moderate cases, with the added benefits of long-term effectiveness and reduced rates of relapse (Høifødt, Strøm, Kolstrup, Eisemann, & Waterloo, 2011). As GPs frequently, and at times unnecessarily, choose to treat patients with medications (Dowrick & Frances, 2013), changes in prescribing were deemed a significant surrogate marker for practice change in MH care. It was felt that reduction in new prescriptions for MH medications would imply that GPs made use of CBT and other non-pharmacologic treatment options taught during the module. For this reason, the primary goal of this study was to assess whether having an alternative therapy to offer patients with mild to moderate depression, anxiety and other MH issues could result in a change in the number of new MH prescriptions written for patients.

Paired t-tests of the individual behaviours of all study subjects, using a 90% confidence interval, indicated a significant change in prescribing took place, with fewer new prescriptions written following MH training. This finding held for both the number of new prescriptions and proportion of new prescriptions among MH patients with and without adjustment for GP gender and age ($p<0.001$).

A small change in the number of new prescriptions was anticipated, bearing in mind that the prescribing of anti-depressants or other MH medications is often completely appropriate. Although the impact on the actual number of new prescriptions was modest, the strength of the association was strong. The results showed a reduction in the "incidence" of new prescriptions following the training module, with a relative decrease in the mean number prescriptions of 30 to 33%.

These findings are similar to a study conducted in the Netherlands in which GPs participated in a national "Quality Improvement Collaborative" focused on guideline care for depression over a 15-month period. These guidelines recommended a stepped approach to care, in which antidepressant medication was not the first step in treatment. This study found a 23.3% reduction (from 49.4% to 26.1%) in the number of antidepressant prescriptions for patients with newly diagnosed depression over a three-year period (Franx, et al., 2014).

One of the strengths of this study was the inclusion of all GPs who completed the MH module during the study period, which made it a population analysis rather than a sampling. The changes observed in prescribing may have broad implications regarding treatment choices made by this group of GPs.

Limitations regarding Prescribing Analysis

Pnet data only indicates that a prescription was filled. GPs may prescribe medication, but the patient does not fill the prescription, while a patient may fill a prescription, but not take the medication. So prescribing information from Pnet may not accurately reflect actual patient treatment.

Another limitation is that some of the medications deemed "MH" may be prescribed for other reasons, such as sleep aids (Morkem, Barber, Williamson, & Patten, 2015). Inclusion of bupropion in the medication list was another potential confounder. Although its primary use is for smoking cessation, it is now accepted as a first-line antidepressant medication (British Columbia Ministry of Health, 2013). From these data, it is impossible to distinguish between its use as a smoking cessation aid and its use as an antidepressant.

Use of MH Plans

GPs play an important role in the care of people with serious MH illness, who also contend with more physical ill health, financial barriers and other challenges, than the average patient (van Hasselt, Oud, & Loonen, 2013). Patients often prefer to receive their care in a primary care setting where they receive all their care from a clinician with whom they feel familiar (Whitley, Palmer, & Gunn, 2015). GPs have reported that having the MH Plan and other MH fee codes to assess more seriously ill patients has improved the care they provide and also improved their own experience and satisfaction (General Practice Services Committee).

The analysis of MH Plans written prior to and post MH module with and without adjustment for GP age and gender showed that more MH Plans were written following training ($p=0.003$ and $p<0.001$ respectively), with relative increase in the mean number of plans of 41 to 44%.

Limitations regarding MH Plan

This fee code can only be billed once per calendar year per patient and requires considerable commitment on the part of the GP in terms of documentation requirements, time and skill. The GPSC MH initiative fee guide stipulates that this is not intended as a routine annual fee (GP Services Committee, 2015), so there may be some degree of disincentive to use it. This was probably not a fair

indicator to assess, given that the intent of the module is to train GPs in the management of mild to moderate MH issues. However, the increase found in the number of MH Plans billed could indicate significant and positive changes in MH management in these GP practices.

Patient outcomes: Hospitalizations

Presentation to acute care due to a MH crisis is a rare event, but this was the only patient outcome indicator available from the administrative data sets used in the study. Although hospitalized patients are not representative of the average MH patient seen in primary care, it was thought worthwhile to examine whether rates of hospitalizations changed following the MH training.

One British study undertook a similar analysis, and investigated whether practices with high performance score (measured routinely in English general practice) would predict low hospital admission rates for their MH patients. This study looked at all emergency admissions, due to both mental and physical causes, and linked those patients to their GP's practice and corresponding performance score for that practice. However, what they found was counterintuitive, and that in fact higher emergency admission rates were associated with patients of GP practices with high performance scores (Jacobs, et al., 2015).

The results from this study were similarly disappointing, finding no significant association between module attendance and reduced emergency encounters among MH patients ($p=0.098$, $p=0.325$), nor an associated increase in the number of MH plans for those patients ($p=0.202$).

Hospitalization rates were probably not a fair indicator to assess patient outcomes, given that the intent of the module is to train GPs in the management of mild to moderate MH issues.

Limitations associated with data source

The choice of MOH administrative data as the sole source of information presented a number of challenges, such as a) the process involved to obtain approval from the MOH and Island Health, b) identification of a means to manage a large volume of data (over 6.5 million records), and finally c) developing methods to extract meaningful information from the raw data.

Administrative data relies on the accuracy of information reported. It is impossible to say without further study whether some GPs do not code visits to MH or whether they simply do not see many patients with MH conditions, and whether this has an impact on management of these patients. An American study found over a quarter of antidepressant prescriptions were filled by patients with no corresponding MH diagnosis on their chart (Simon, et al., 2014). If there were a similar lack of coding of MH diagnoses in patients with no MH medications, this would result in MH patients being underrepresented in the results.

Administrative databases are designed to support administrative needs, not for research or quality improvement purposes. The information it captures is black and white, with no straightforward way to assess the seriousness of patients' illness, other than those who required hospitalization and large amounts of medication.

Limitations associated with study subjects

The primary “subjects” in this study were the GPs who attended the module, and by extension their patients. Module participants self-selected into the training, and the practices of these 197 GPs may not be representative of other GPs on Vancouver Island, let alone of other GPs in BC or Canada. GP location was not linked to results; however, location of practice has been found to influence prescribing (e.g., more frequent in rural areas in one Australian study) (Richards, Ryan, McCabe, Groom, & Hickie, 2004)

Among this group there was considerable variability in the number of patients seen by GPs for MH appointments or prescriptions, ranging from fewer than 10 to more than 900. Other than the raw data of dates of treatment, no patient information was available, so it was not possible to standardize patient information for age, sex, or severity.

Another limitation was the variability in training received by the participants. Because this is a locally administered program, the training itself (beyond the environmental factors) may be quite different between one Vancouver Island location and another, let alone from training in communities in other health authorities. It is known that the "action period" requirements were not applied the same way outside of Vancouver Island, and there are undoubably other differences as well. A number of different GPs taught the module, and each may have adapted material and improved delivery over time; however, this was not a consideration in the analysis.

Limitations associated with methodology

Reliance on administrative data meant there was no "context" information available regarding the nature of GP practice (full-time, part-time, locum; nature of practice, such as the type of patients seen), nor any GP experience indicators, which could have been obtained from interviews or surveys. These could have been used to gather their perspectives on the experience – positive and negative – and their own assessment of the program's impact on their practice. This would have been a means to put some "meat" on the bones of the administrative data.

Future Research

Using the same data sets, further analysis of the medications (dosage and duration), the number of visits, and other indicators might provide insight into the severity of patients' illness. In this study, all the

cohorts were combined, but it might also be worthwhile to consider regional differences, or differences between early and late cohorts.

It could also be interesting to investigate the feasibility of case-matched non-participants as control group, or to survey or conduct interviews with a sample of the participants and trainers, and possibly some patients, to provide personal insights.

Use of health administrative databases is a relatively new area of research which can be applied in many ways, from monitoring population health to supporting public policy. Currently, MH and other healthy community measures are being developed by the Canadians Institutes for Health, which will improve the quality of information available for this type of research in the future (Hubka & Lakaski, 2012).

Conclusion

GP education in MH treatment options provides benefit to GPs, patients, and society. Patients are most likely to turn to their GP in a crisis as a known and trusted care-giver, and PSP MH module training equips GPs with additional tools to provide this care. Mental illness is both a health and social issue, and effective and timely management benefits everyone.

This research sought to assess whether the PSP MH module had an impact on GP prescribing behavior and use of the MH Plan, and whether training in this module could have an impact on patients with serious MH conditions, as reflected in acute care utilization.

The results showed a statistically significant reduction in the number of new prescriptions written for patients following training in the MH module. This suggested that other methods for managing care were successful, and that it was not necessary to resort to medications in all cases. Greater use of the MH Plan was also found in the period following training. This implied not only better patient care, but a

high commitment to this area of practice, as completion of these plans involves an intense and lengthy process.

No significant change was found in the number of acute care encounters between the pre-period and post-period, nor significant differences in the number of MH Plans created for patients seen in acute care. However, though not significant, there was a slight reduction in the mean number of hospitalizations and increase in the number of MH Plans. Although somewhat disappointing, these results were not entirely surprising. Care of patients with serious mental illness is difficult and lies in the outer reaches of general practice.

This study attempted to assess whether a MH educational intervention resulted in clinical practice change. Analyses of physician billing, prescribing and hospitalizations suggested that there were significant improvements in both prescribing and use of the MH Plan following the training, although significant changes were not found in acute patient outcomes. It is hoped that this research provides evidence of the importance of PSP clinical module training for GPs and that it will encourage continued support of this educational initiative. It is also hoped that this study will help encourage further research of this nature.

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MSP Fee Code Type	Billing Code	Additional codes (optional)	Diagnostic Codes[2]

Appendices

Appendix A - List of Physician Billing Codes requested for MSP Extract

[2] Diagnostic codes are defined in appendix D

MH Planning Fee (once per year) - TREATED SEPARATELY	G14043	00100, 00120	311, 300, 50b, 296, 308, 309
Office visit	00100		311, 300, 50b, 296, 308, 309
Counseling Fees			
2-49 years of age	00120		311, 300, 50b, 296, 308, 309
50-59 years	15320		311, 300, 50b, 296, 308, 309
60-69 years	16120		311, 300, 50b, 296, 308, 309
70-79 years	17120		311, 300, 50b, 296, 308, 309
80+ years	18120		311, 300, 50b, 296, 308, 309
Point of care drug screening fee	15040		311, 300, 50b, 296, 308, 309
Mental Health Management Fees			
2-49 years of age	G14044		311, 300, 50b, 296, 308, 309
50-59 years	G14045		311, 300, 50b, 296, 308, 309
60-69 years	G14046		311, 300, 50b, 296, 308, 309
70-79 years	G14047		311, 300, 50b, 296, 308, 309
80+ years	G14048		311, 300, 50b, 296, 308, 309
Telephone/Email follow-up	14079		311, 300, 50b, 296, 308, 309
Attachment Patient Telephone	14076		311, 300, 50b, 296, 308, 309
Attachment Patient Conferencing Fee	G14077		311, 300, 50b, 296, 308, 309
Community Patient Conferencing Fee	G14016		311, 300, 50b, 296, 308, 309
GP Urgent Telephone Conference with a Specialist	G14018		311, 300, 50b, 296, 308, 309

Appendix B – Listings of codes used for DAD Extract

Reporting Province/Institution Number	= 90XXX (Island Health, Acute care)
	90202, 90203, 90204, 90206, 90217, 90501, 90502, 90507, 90508, 90510, 90511, 90851, 90854
Admission Date	
Discharge Disposition	
Diagnosis Type	= M (most responsible Diagnosis) and/or 3 (Secondary Diagnosis)
Diagnostic Code	Where diagnostic code matches item on the list of Mental Health diagnostic codes on tabs 2. or 3.

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F100	Ment/beh disrd dt alcohol use ac intox	Mental and behavioural disorders due to use of alcohol, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F101	Ment/beh disrd dt harmful alcohol use	Mental and behavioural disorders due to use of alcohol, harmful use	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F102	Ment/beh disrd dt alcohol use dep syndr	Mental and behavioural disorders due to use of alcohol, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F103	Ment/beh disrd dt alco use withdrawal st	Mental and behavioural disorders due to use of alcohol, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F104	Ment/beh disrd dt alco use withdr w del	Mental and behavioural disorders due to use of alcohol, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F105	Ment/beh disrd dt alco use psych disrd	Mental and behavioural disorders due to use of alcohol, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F106	Ment/beh disrd dt alcohol use amnesic	Mental and behavioural disorders due to use of alcohol, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F107	Ment/beh disrd dt alco res & late psych	Mental and behavioural disorders due to use of alcohol, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F108	Ment/beh disrd dt alco oth ment/beh dis	Mental and behavioural disorders due to use of alcohol, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F109	Ment/beh disrd dt alco ment/beh dis NOS	Mental and behavioural disorders due to use of alcohol, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F110	Ment/beh disrd dt opioid use ac intox	Mental and behavioural disorders due to use of opioids, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F111	Ment/beh disrd dt harmful opioid use	Mental and behavioural disorders due to use of opioids, harmful use	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F112	Ment/beh disrd dt opioid use dep syndr	Mental and behavioural disorders due to use of opioids, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F113	Ment/beh disrd dt opioid use withdr st	Mental and behavioural disorders due to use of opioids, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F114	Ment/beh disrd dt opioid withdr st w del	Mental and behavioural disorders due to use of opioids, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F115	Ment/beh disrd dt opioids psych disrd	Mental and behavioural disorders due to use of opioids, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F116	Ment/beh disrd dt opioids amnesic syndr	Mental and behavioural disorders due to use of opioids, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F117	Ment/beh disrd dt opioids res late psych	Mental and behavioural disorders due to use of opioids, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F118	Ment/beh disrd dt opioids oth ment/beh	Mental and behavioural disorders due to use of opioids, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F119	Ment/beh disrd dt opioids w ment/beh NOS	Mental and behavioural disorders due to use of opioids, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F120	Ment/beh disrd dt cannab use ac intox	Mental and behavioural disorders due to use of cannabinoids, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F121	Ment/beh disrd dt cannab use harmf use	Mental and behavioural disorders due to use of cannabinoids, harmful use	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F122	Ment/beh disrd dt cannab use dep syndr	Mental and behavioural disorders due to use of cannabinoids, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F123	Ment/beh disrd dt cannab use withdr st	Mental and behavioural disorders due to use of cannabinoids, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F124	Ment/beh disrd dt cannab withdr st w del	Mental and behavioural disorders due to use of cannabinoids, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F125	Ment/beh disrd dt cannab use psych disrd	Mental and behavioural disorders due to use of cannabinoids, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F126	Ment/beh disrd dt cannab amnesic syndr	Mental and behavioural disorders due to use of cannabinoids, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F127	Ment/beh disrd dt cannab res late psych	Mental and behavioural disorders due to use of cannabinoids, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F128	Ment/beh disrd dt cannab oth ment/beh	Mental and behavioural disorders due to use of cannabinoids, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F129	Ment/beh disrd cannab ment/beh disrd NOS	Mental and behavioural disorders due to use of cannabinoids, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F130	Ment/beh disrd dt use sed hypn ac intox	Mental and behavioural disorders due to use of sedatives or hypnotics, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F131	Ment/beh disrd dt harmf use sed hypn	Mental and behavioural disorders due to use of sedatives or hypnotics, harmful use	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F132	Ment/beh disrd dt use sed hypn dep syndr	Mental and behavioural disorders due to use of sedatives or hypnotics, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F133	Ment/beh disrd dt use sed hypn withdr st	Mental and behavioural disorders due to use of sedatives or hypnotics, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F134	Ment/beh dis dt sed hypn withdr st w del	Mental and behavioural disorders due to use of sedatives or hypnotics, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F135	Ment/beh disrd dt use sed hypn psych dis	Mental and behavioural disorders due to use of sedatives or hypnotics, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F136	Ment/beh disrd dt sed hypn amnes syndr	Mental and behavioural disorders due to use of sedatives or hypnotics, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F137	Ment/beh disrd sed hypn res & late psych	Mental and behavioural disorders due to use of sedatives or hypnotics, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F138	Ment/beh disrd sed hypn oth ment/beh dis	Mental and behavioural disorders due to use of sedatives or hypnotics, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F139	Ment/beh disrd sed hypn res ment/beh NOS	Mental and behavioural disorders due to use of sedatives or hypnotics, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F140	Ment/beh disrd dt use cocaine ac intox	Mental and behavioural disorders due to use of cocaine, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F141	Ment/beh disrd dt harmful use cocaine	Mental and behavioural disorders due to use of cocaine, harmful use	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F142	Ment/beh disrd dt use cocaine dep syndr	Mental and behavioural disorders due to use of cocaine, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F143	Ment/beh disrd dt use cocaine withdr st	Mental and behavioural disorders due to use of cocaine, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F144	Ment/beh disrd cocaine withdr st w del	Mental and behavioural disorders due to use of cocaine, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F145	Ment/beh disrd dt cocaine psych disrd	Mental and behavioural disorders due to use of cocaine, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F146	Ment/beh disrd dt cocaine amnesic syndr	Mental and behavioural disorders due to use of cocaine, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F147	Ment/beh disrd dt cocaine res late psych	Mental and behavioural disorders due to use of cocaine, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F148	Ment/beh disrd cocaine oth ment/beh dis	Mental and behavioural disorders due to use of cocaine, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F149	Ment/beh disrd cocaine w ment/beh NOS	Mental and behavioural disorders due to use of cocaine, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F150	Ment/beh disrd dt stimulants ac intox	Mental and behavioural disorders due to use of other stimulants including caffeine, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F151	Ment/beh disrd dt harmf use stimulants	Mental and behavioural disorders due to use of other stimulants including caffeine, harmful use	Mental & behavioural disorders due to psychoactive substance use (F10-F19)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F152	Ment/beh disrd dt stimulants dep syndr	Mental and behavioural disorders due to use of other stimulants including caffeine, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F153	Ment/beh disrd dt stimulants withdr st	Mental and behavioural disorders due to use of other stimulants including caffeine, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F154	Ment/beh disrd dt stimt withdr st w del	Mental and behavioural disorders due to use of other stimulants including caffeine, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F155	Ment/beh disrd dt stimulants psych disrd	Mental and behavioural disorders due to use of other stimulants including caffeine, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F156	Ment/beh disrd dt stimt amnesic syndr	Mental and behavioural disorders due to use of other stimulants including caffeine, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F157	Ment/beh disrd dt stimt res late psych	Mental and behavioural disorders due to use of other stimulants including caffeine, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F158	Ment/beh disrd dt stimt oth ment/beh	Mental and behavioural disorders due to use of other stimulants including caffeine, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F159	Ment/beh disrd dt stimt w ment/beh NOS	Mental and behavioural disorders due to use of other stimulants including caffeine, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F160	Ment/beh disrd dt hallucinogens ac intox	Mental and behavioural disorders due to use of hallucinogens, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F161	Ment/beh disrd dt harmf use hallucinogen	Mental and behavioural disorders due to use of hallucinogens, harmful use	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F162	Ment/beh disrd dt use hallucin dep syndr	Mental and behavioural disorders due to use of hallucinogens, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F163	Ment/beh disrd dt use hallucin withdr st	Mental and behavioural disorders due to use of hallucinogens, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F164	Ment/beh disrd hallucin withdr st w del	Mental and behavioural disorders due to use of hallucinogens, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F165	Ment/beh disrd dt use hallucin psych dis	Mental and behavioural disorders due to use of hallucinogens, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F166	Ment/beh disrd dt hallucin amnesic syndr	Mental and behavioural disorders due to use of hallucinogens, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F167	Ment/beh disrd hallucin res late psych	Mental and behavioural disorders due to use of hallucinogens, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F168	Ment/beh disrd hallucin oth ment/beh dis	Mental and behavioural disorders due to use of hallucinogens, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F169	Ment/beh disrd hallucin w ment/beh NOS	Mental and behavioural disorders due to use of hallucinogens, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F170	Ment/beh disrd dt use tobacco ac intox	Mental and behavioural disorders due to use of tobacco, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F171	Ment/beh disrd dt harmful use tobacco	Mental and behavioural disorders due to use of tobacco, harmful use	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F172	Ment/beh disrd dt use tobacco dep syndr	Mental and behavioural disorders due to use of tobacco, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F173	Ment/beh disrd dt use tobacco withdr st	Mental and behavioural disorders due to use of tobacco, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F174	Ment/beh disrd tobacco withdr st w del	Mental and behavioural disorders due to use of tobacco, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F175	Ment/beh disrd dt tobacco psych disrd	Mental and behavioural disorders due to use of tobacco, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F176	Ment/beh disrd dt tobacco amnesic syndr	Mental and behavioural disorders due to use of tobacco, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F177	Ment/beh disrd dt tobacco res late psych	Mental and behavioural disorders due to use of tobacco, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F178	Ment/beh disrd tobacco oth ment/beh dis	Mental and behavioural disorders due to use of tobacco, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F179	Ment/beh disrd dt tobacco w ment/beh NOS	Mental and behavioural disorders due to use of tobacco, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F180	Ment/beh disrd dt vol solvents ac intox	Mental and behavioural disorders due to use of volatile solvents, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F181	Ment/beh disrd dt harmf use vol solvents	Mental and behavioural disorders due to use of volatile solvents, harmful use	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F182	Ment/beh disrd dt vol solvents dep syndr	Mental and behavioural disorders due to use of volatile solvents, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F183	Ment/beh disrd dt vol solvents withdr st	Mental and behavioural disorders due to use of volatile solvents, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F184	Ment/beh disrd vol solv withdr st w del	Mental and behavioural disorders due to use of volatile solvents, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F185	Ment/beh disrd vol solvents psych disrd	Mental and behavioural disorders due to use of volatile solvents, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F186	Ment/beh disrd vol solvents amnes syndr	Mental and behavioural disorders due to use of volatile solvents, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F187	Ment/beh disrd vol solv res late psych	Mental and behavioural disorders due to use of volatile solvents, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F188	Ment/beh disrd vol solv oth ment/beh dis	Mental and behavioural disorders due to use of volatile solvents, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F189	Ment/beh disrd vol solv w ment/beh NOS	Mental and behavioural disorders due to use of volatile solvents, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F190	Ment/beh disrd mult dr & psyact ac intox	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, acute intoxication	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F191	Ment/beh dis harmf use mult dr & psyact	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances,	Mental & behavioural disorders due to psychoactive substance use (F10-F19)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
		harmful use	
F192	Ment/beh dis mult dr & psyact dep syndr	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, dependence syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F193	Ment/beh dis mult dr & psyact withdr st	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, withdrawal state	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F194	Ment/beh dis mult dr psyact withdr w del	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, withdrawal state with delirium	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F195	Ment/beh dis mult dr & psyact psych dis	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F196	Ment/beh dis mult dr psyact amnes syndr	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, amnesic syndrome	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F197	Ment/beh dis mult dr psyact res & late	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, residual and late-onset psychotic disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F198	Ment/beh dis mult dr psyact oth ment/beh	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, other mental and behavioural disorders	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F199	Ment/beh dis mult dr psyact ment/beh NOS	Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, unspecified mental and behavioural disorder	Mental & behavioural disorders due to psychoactive substance use (F10-F19)
F200	Paranoid schizophrenia	Paranoid schizophrenia	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F201	Hebephrenic schizophrenia	Hebephrenic schizophrenia	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F202	Catatonic schizophrenia	Catatonic schizophrenia	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F203	Undifferentiated schizophrenia	Undifferentiated schizophrenia	Schizophrenia, schizotypal and delusional disorders (F20-F29)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F204	Post-schizophrenic depression	Post-schizophrenic depression	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F205	Residual schizophrenia	Residual schizophrenia	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F206	Simple schizophrenia	Simple schizophrenia	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F208	Other schizophrenia	Other schizophrenia	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F209	Schizophrenia unspecified	Schizophrenia, unspecified	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F21	Schizotypal disorder	Schizotypal disorder	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F220	Delusional disorder	Delusional disorder	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F228	Other persistent delusional disorders	Other persistent delusional disorders	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F229	Persistent delusional disorder NOS	Persistent delusional disorder, unspecified	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F230	Ac polymorphic psych disrd wo sym schiz	Acute polymorphic psychotic disorder without symptoms of schizophrenia	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F231	Ac polymorphic psych disrd w sym schiz	Acute polymorphic psychotic disorder with symptoms of schizophrenia	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F232	Ac schizophrenia-like psychotic disorder	Acute schizophrenia-like psychotic disorder	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F233	Oth ac predom delusional psych disorders	Other acute predominantly delusional psychotic disorders	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F238	Other acute & transient psychotic disrd	Other acute and transient psychotic disorders	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F239	Acute & transient psychotic disrd NOS	Acute and transient psychotic disorder, unspecified	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F24	Induced delusional disorder	Induced delusional disorder	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F250	Schizoaffective disorder manic type	Schizoaffective disorder, manic type	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F251	Schizoaffective disrd depressive type	Schizoaffective disorder, depressive type	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F252	Schizoaffective disorder mixed type	Schizoaffective disorder, mixed type	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F258	Other schizoaffective disorders	Other schizoaffective disorders	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F259	Schizoaffective disorder unspecified	Schizoaffective disorder, unspecified	Schizophrenia, schizotypal and delusional disorders (F20-F29)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F28	Other nonorganic psychotic disorders	Other nonorganic psychotic disorders	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F29	Unspecified nonorganic psychosis	Unspecified nonorganic psychosis	Schizophrenia, schizotypal and delusional disorders (F20-F29)
F300	Hypomania	Hypomania	Mood [affected] disorders (F30-F39)
F301	Mania without psychotic symptoms	Mania without psychotic symptoms	Mood [affected] disorders (F30-F39)
F302	Mania with psychotic symptoms	Mania with psychotic symptoms	Mood [affected] disorders (F30-F39)
F308	Other manic episodes	Other manic episodes	Mood [affected] disorders (F30-F39)
F309	Manic episode unspecified	Manic episode, unspecified	Mood [affected] disorders (F30-F39)
F310	Bipolar affective disrd curr hypomanic	Bipolar affective disorder, current episode hypomanic	Mood [affected] disorders (F30-F39)
F311	Bipol aff disrd curr manic wo psych sym	Bipolar affective disorder, current episode manic without psychotic symptoms	Mood [affected] disorders (F30-F39)
F312	Bipol aff disrd curr manic w psych sym	Bipolar affective disorder, current episode manic with psychotic symptoms	Mood [affected] disorders (F30-F39)
F313	Bipol aff disrd curr mild/mod depression	Bipolar affective disorder, current episode mild or moderate depression	Mood [affected] disorders (F30-F39)
F314	Bipol aff disrd sev depres wo psych sym	Bipolar affective disorder, current episode severe depression without psychotic symptoms	Mood [affected] disorders (F30-F39)
F315	Bipol aff disrd sev depres w psych sym	Bipolar affective disorder, current episode severe depression with psychotic symptoms	Mood [affected] disorders (F30-F39)
F316	Bipolar affective disrd currently mixed	Bipolar affective disorder, current episode mixed	Mood [affected] disorders (F30-F39)
F317	Bipolar aff disrd curr in remission	Bipolar affective disorder, currently in remission	Mood [affected] disorders (F30-F39)
F318	Other bipolar affective disorders	Other bipolar affective disorders	Mood [affected] disorders (F30-F39)
F319	Bipolar affective disorder unspecified	Bipolar affective disorder, unspecified	Mood [affected] disorders (F30-F39)
F320	Mild depressive episode	Mild depressive episode	Mood [affected] disorders (F30-F39)
F321	Moderate depressive episode	Moderate depressive episode	Mood [affected] disorders (F30-F39)
F322	Sev depressive episode wo psych symptoms	Severe depressive episode without psychotic symptoms	Mood [affected] disorders (F30-F39)
F323	Sev depressive episode w psych symptoms	Severe depressive episode with psychotic symptoms	Mood [affected] disorders (F30-F39)
F328	Other depressive	Other depressive episodes	Mood [affected] disorders (F30-F39)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
	episodes		
F329	Depressive episode unspecified	Depressive episode, unspecified	Mood [affected] disorders (F30-F39)
F330	Rec depressive disrd curr episode mild	Recurrent depressive disorder, current episode mild	Mood [affected] disorders (F30-F39)
F331	Rec depressive disrd curr episode mod	Recurrent depressive disorder, current episode moderate	Mood [affected] disorders (F30-F39)
F332	Rec depres disrd curr sev wo psych	Recurrent depressive disorder, current episode severe without psychotic symptoms	Mood [affected] disorders (F30-F39)
F333	Rec depres disrd current sev w psych sym	Recurrent depressive disorder, current episode severe with psychotic symptoms	Mood [affected] disorders (F30-F39)
F334	Rec depres disrd currently in remission	Recurrent depressive disorder, currently in remission	Mood [affected] disorders (F30-F39)
F338	Other recurrent depressive disorders	Other recurrent depressive disorders	Mood [affected] disorders (F30-F39)
F339	Recurrent depressive disorder NOS	Recurrent depressive disorder, unspecified	Mood [affected] disorders (F30-F39)
F340	Cyclothymia	Cyclothymia	Mood [affected] disorders (F30-F39)
F341	Dysthymia	Dysthymia	Mood [affected] disorders (F30-F39)
F348	Oth persistent mood [affective] disorder	Other persistent mood [affective] disorders	Mood [affected] disorders (F30-F39)
F349	Persistent mood [affective] disorder NOS	Persistent mood [affective] disorder, unspecified	Mood [affected] disorders (F30-F39)
F380	Other single mood [affective] disorders	Other single mood [affective] disorders	Mood [affected] disorders (F30-F39)
F381	Oth recurrent mood [affective] disorders	Other recurrent mood [affective] disorders	Mood [affected] disorders (F30-F39)
F388	Oth specified mood [affective] disorders	Other specified mood [affective] disorders	Mood [affected] disorders (F30-F39)
F39	Unspecified mood [affective] disorder	Unspecified mood [affective] disorder	Mood [affected] disorders (F30-F39)
F400	Agoraphobia	Agoraphobia	Neurotic, stress-related and somatoform disorders (F40-F48)
F401	Social phobias	Social phobias	Neurotic, stress-related and somatoform disorders (F40-F48)
F402	Specific (isolated) phobias	Specific (isolated) phobias	Neurotic, stress-related and somatoform disorders (F40-F48)
F408	Other phobic anxiety disorders	Other phobic anxiety disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F409	Phobic anxiety disorder unspecified	Phobic anxiety disorder, unspecified	Neurotic, stress-related and somatoform disorders (F40-F48)
F410	Panic disrd [ep paroxysmal anxiety]	Panic disorder [episodic paroxysmal anxiety]	Neurotic, stress-related and somatoform disorders (F40-F48)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F411	Generalized anxiety disorder	Generalized anxiety disorder	Neurotic, stress-related and somatoform disorders (F40-F48)
F412	Mixed anxiety and depressive disorder	Mixed anxiety and depressive disorder	Neurotic, stress-related and somatoform disorders (F40-F48)
F413	Other mixed anxiety disorders	Other mixed anxiety disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F418	Other specified anxiety disorders	Other specified anxiety disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F419	Anxiety disorder unspecified	Anxiety disorder, unspecified	Neurotic, stress-related and somatoform disorders (F40-F48)
F420	Predom obsessional thoughts/ruminations	Predominantly obsessional thoughts or ruminations	Neurotic, stress-related and somatoform disorders (F40-F48)
F421	Predom compulsive acts/rituals	Predominantly compulsive acts [obsessional rituals]	Neurotic, stress-related and somatoform disorders (F40-F48)
F422	Mixed obsessional thoughts and acts	Mixed obsessional thoughts and acts	Neurotic, stress-related and somatoform disorders (F40-F48)
F428	Other obsessive-compulsive disorders	Other obsessive-compulsive disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F429	Obsessive-compulsive disorder NOS	Obsessive-compulsive disorder, unspecified	Neurotic, stress-related and somatoform disorders (F40-F48)
F430	Acute stress reaction	Acute stress reaction	Neurotic, stress-related and somatoform disorders (F40-F48)
F431	Post-traumatic stress disorder	Post-traumatic stress disorder	Neurotic, stress-related and somatoform disorders (F40-F48)
F432	Adjustment disorders	Adjustment disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F438	Other reactions to severe stress	Other reactions to severe stress	Neurotic, stress-related and somatoform disorders (F40-F48)
F439	Reaction to severe stress unspecified	Reaction to severe stress, unspecified	Neurotic, stress-related and somatoform disorders (F40-F48)
F440	Dissociative amnesia	Dissociative amnesia	Neurotic, stress-related and somatoform disorders (F40-F48)
F441	Dissociative fugue	Dissociative fugue	Neurotic, stress-related and somatoform disorders (F40-F48)
F442	Dissociative stupor	Dissociative stupor	Neurotic, stress-related and somatoform disorders (F40-F48)
F443	Trance and possession disorders	Trance and possession disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F444	Dissociative motor disorders	Dissociative motor disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F445	Dissociative convulsions	Dissociative convulsions	Neurotic, stress-related and somatoform disorders (F40-F48)
F446	Dissociative anaesthesia & sensory loss	Dissociative anaesthesia and sensory loss	Neurotic, stress-related and somatoform disorders (F40-F48)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F447	Mix dissociative [conversion] disorders	Mixed dissociative [conversion] disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F448	Oth dissociative [conversion] disorders	Other dissociative [conversion] disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F449	Dissociative [conversion] disorder NOS	Dissociative [conversion] disorder, unspecified	Neurotic, stress-related and somatoform disorders (F40-F48)
F450	Somatization disorder	Somatization disorder	Neurotic, stress-related and somatoform disorders (F40-F48)
F451	Undifferentiated somatoform disorder	Undifferentiated somatoform disorder	Neurotic, stress-related and somatoform disorders (F40-F48)
F452	Hypochondriacal disorder	Hypochondriacal disorder	Neurotic, stress-related and somatoform disorders (F40-F48)
F453	Somatoform autonomic dysfunction	Somatoform autonomic dysfunction	Neurotic, stress-related and somatoform disorders (F40-F48)
F454	Persistent somatoform pain disorder	Persistent somatoform pain disorder	Neurotic, stress-related and somatoform disorders (F40-F48)
F458	Other somatoform disorders	Other somatoform disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F459	Somatoform disorder unspecified	Somatoform disorder, unspecified	Neurotic, stress-related and somatoform disorders (F40-F48)
F480	Neurasthenia	Neurasthenia	Neurotic, stress-related and somatoform disorders (F40-F48)
F481	Depersonalization-derealization syndrome	Depersonalization-derealization syndrome	Neurotic, stress-related and somatoform disorders (F40-F48)
F488	Other specified neurotic disorders	Other specified neurotic disorders	Neurotic, stress-related and somatoform disorders (F40-F48)
F489	Neurotic disorder unspecified	Neurotic disorder, unspecified	Neurotic, stress-related and somatoform disorders (F40-F48)
F600	Paranoid personality disorder	Paranoid personality disorder	Disorders of adult personality and behaviour (F60-F69)
F601	Schizoid personality disorder	Schizoid personality disorder	Disorders of adult personality and behaviour (F60-F69)
F602	Dissocial personality disorder	Dissocial personality disorder	Disorders of adult personality and behaviour (F60-F69)
F603	Emotionally unstable personality disrd	Emotionally unstable personality disorder	Disorders of adult personality and behaviour (F60-F69)
F604	Histrionic personality disorder	Histrionic personality disorder	Disorders of adult personality and behaviour (F60-F69)
F605	Anankastic personality disorder	Anankastic personality disorder	Disorders of adult personality and behaviour (F60-F69)
F606	Anxious [avoidant] personality disorder	Anxious [avoidant] personality disorder	Disorders of adult personality and behaviour (F60-F69)
F607	Dependent personality disorder	Dependent personality disorder	Disorders of adult personality and behaviour (F60-F69)

Most responsible cause codes - Mental Disorders

ICD10 Code	Short Description	Long Description	Diagnosis Short List
F608	Other specific personality disorders	Other specific personality disorders	Disorders of adult personality and behaviour (F60-F69)
F609	Personality disorder unspecified	Personality disorder, unspecified	Disorders of adult personality and behaviour (F60-F69)
F61	Mixed and other personality disorders	Mixed and other personality disorders	Disorders of adult personality and behaviour (F60-F69)
F620	Enduring person ch dt catastrophic expr	Enduring personality change after catastrophic experience	Disorders of adult personality and behaviour (F60-F69)
F621	Endure person change dt psychiatric ill	Enduring personality change after psychiatric illness	Disorders of adult personality and behaviour (F60-F69)
F628	Other enduring personality changes	Other enduring personality changes	Disorders of adult personality and behaviour (F60-F69)
F629	Enduring personality change unspecified	Enduring personality change, unspecified	Disorders of adult personality and behaviour (F60-F69)
F680	Elaboration physical sym psychol reasons	Elaboration of physical symptoms for psychological reasons	Disorders of adult personality and behaviour (F60-F69)
F681	Intent product/feign symptom/disability	Intentional production or feigning of symptoms or disabilities, either physical or psychological [factitious disorder]	Disorders of adult personality and behaviour (F60-F69)
F688	Oth spec disrd adult personality & beh	Other specified disorders of adult personality and behaviour	Disorders of adult personality and behaviour (F60-F69)
F69	Disrd adult personality & behaviour NOS	Unspecified disorder of adult personality and behaviour	Disorders of adult personality and behaviour (F60-F69)

Secondary Codes - Intentional Self-Harm External Cause Codes - Includes Suicide Attempts and purposely self-inflicted poisoning or injury

ICD10 Code	Short Description	Long Description	Diagnosis Short List
X60	Intent self poisn anlgsc antipyr antirhm	Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics	Intentional self-harm (X60-X84)
X61	Intent selfpoison antiep sed-hyp psytrp	Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified	Intentional self-harm (X60-X84)
X62	Intent selfpoison narc psychdyslpt NEC	Intentional self-poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified	Intentional self-harm (X60-X84)
X63	Intent selfpoison oth aut nrv sys dr	Intentional self-poisoning by and exposure to other drugs acting on the autonomic nervous system	Intentional self-harm (X60-X84)
X64	Intent selfpoison oth ?NOS dr biol sub	Intentional self-poisoning by and exposure to other and unspecified drugs, medicaments and biological substances	Intentional self-harm (X60-X84)

Secondary Codes - Intentional Self-Harm External Cause Codes - Includes Suicide Attempts and purposely self-inflicted poisoning or injury

ICD10 Code	Short Description	Long Description	Diagnosis Short List
X65	Intentional selfpoisoning alcohol	Intentional self-poisoning by and exposure to alcohol	Intentional self-harm (X60-X84)
X66	Intent selfpoison orgnc solv hydcarb	Intentional self-poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours	Intentional self-harm (X60-X84)
X67	Intent selfpoison oth gases & vapours	Intentional self-poisoning by and exposure to other gases and vapours	Intentional self-harm (X60-X84)
X68	Intentional selfpoison pesticides	Intentional self-poisoning by and exposure to pesticides	Intentional self-harm (X60-X84)
X69	Intent selfpoison oth/NOS chem nox sub	Intentional self-poisoning by and exposure to other and unspecified chemicals and noxious substances	Intentional self-harm (X60-X84)
X70	Intent selfharm hanging strangltn suffn	Intentional self-harm by hanging, strangulation and suffocation	Intentional self-harm (X60-X84)
X71	Intentional selfharm by drowning	Intentional self-harm by drowning and submersion	Intentional self-harm (X60-X84)
X72	Intentional selfharm by handgun disch	Intentional self-harm by handgun discharge	Intentional self-harm (X60-X84)
X73	Intent selfharm by rifle shotgun disch	Intentional self-harm by rifle, shotgun and larger firearm discharge	Intentional self-harm (X60-X84)
X7400	Intentional self-harm by BB gun	Intentional self-harm by BB gun discharge	Intentional self-harm (X60-X84)
X7401	Intentional self-harm by air gun	Intentional self-harm by air gun discharge	Intentional self-harm (X60-X84)
X7408	Intentional self-harm, oth spec firearm	Intentional self-harm by other specified firearm discharge	Intentional self-harm (X60-X84)
X7409	Intentional self-harm by unspec firearm	Intentional self-harm by unspecified firearm discharge	Intentional self-harm (X60-X84)
X75	Intent selfharm by explosive material	Intentional self-harm by explosive material	Intentional self-harm (X60-X84)
X76	Intent selfharm by smoke fire & flames	Intentional self-harm by smoke, fire and flames	Intentional self-harm (X60-X84)
X77	Intent selfharm steam vapour hot obj	Intentional self-harm by steam, hot vapours and hot objects	Intentional self-harm (X60-X84)
X78	Intentional selfharm by sharp object	Intentional self-harm by sharp object	Intentional self-harm (X60-X84)
X79	Intentional selfharm by blunt object	Intentional self-harm by blunt object	Intentional self-harm (X60-X84)
X80	Intent selfharm jump from a high place	Intentional self-harm by jumping from a high place	Intentional self-harm (X60-X84)
X81	Intent selfharm - before moving object	Intentional self-harm by jumping or lying before moving object	Intentional self-harm (X60-X84)
X82	Intentional selfharm by crashing of MV	Intentional self-harm by crashing of motor vehicle	Intentional self-harm (X60-X84)
X83	Intentional selfharm by oth spec means	Intentional self-harm by other specified means	Intentional self-harm (X60-X84)

Secondary Codes - Intentional Self-Harm External Cause Codes - Includes Suicide Attempts and purposely self-inflicted poisoning or injury

ICD10 Code	Short Description	Long Description	Diagnosis Short List
X84	Intentional selfharm by unspec means	Intentional self-harm by unspecified means	Intentional self-harm (X60-X84)

Appendix C – List of Medications requested for Pharmanet Extract

Drug Name[3]
ALPRAZOLAM
AMITRIPTYLINE HYDROCHLORIDE
BUPROPION HYDROCHLORIDE
BUSPIRONE HYDROCHLORIDE
CITALOPRAM (CITALOPRAM HYDROBROMIDE)
CLOMIPRAMINE HYDROCHLORIDE
CLONAZEPAM
DESIPRAMINE HYDROCHLORIDE
DESVENLAFAXINE (DESVENLAFAXINE SUCCINATE)
DIAZEPAM
DOXEPIN HYDROCHLORIDE
ESCITALOPRAM (ESCITALOPRAM OXALATE)
FLUOXETINE (FLUOXETINE HYDROCHLORIDE)
FLUVOXAMINE MALEATE
IMIPRAMINE HYDROCHLORIDE
LORAZEPAM
MIRTAZAPINE
MOCLOBEMIDE
PAROXETINE (PAROXETINE HYDROCHLORIDE ACETONE SOLVATE)
PAROXETINE (PAROXETINE HYDROCHLORIDE HEMIHYDRATE)
PAROXETINE (PAROXETINE HYDROCHLORIDE)
PAROXETINE (PAROXETINE HYDROCHLORIDE, ISOPROPYL SOLVATE)
PHENELZINE (PHENELZINE SULFATE)
QUETIAPINE (QUETIAPINE FUMARATE)
RISPERIDONE (RISPERIDONE TARTRATE)
SERTRALINE (SERTRALINE HYDROCHLORIDE)
TRIMIPRAMINE (TRIMIPRAMINE MALEATE)
VENLAFAXINE (VENLAFAXINE HYDROCHLORIDE)
ZOPICLONE[4]

[3] These medications corresponded to 530 Drug Identification Numbers (DIN)

[4] Zopiclone was subsequently removed from the medication data set, as its primary use is as a sleep aid.

Appendix D – UVic/VIHA Joint Research Ethics Sub-Committee

University of Victoria

UVic/VIHA Joint Research Ethics Sub-Committee
Human Research Ethics, University of Victoria
PO Box 1700, Stn CSC, Victoria BC, V8W 2Y2
Tel 250-472-4545 Fax 250-721-8960 Web www.research.uvic.ca

Vancouver Island Health Authority, Memorial Pavilion, Kenning Wing
1952 Bay Street, Victoria BC, V8R 1J8
Tel 250-370-8261 Fax 250-370-8106 Web www.viha.ca

Vancouver Island health authority

Certificate of Approval

PRINCIPAL INVESTIGATOR:	Sarah Lupton	ETHICS PROTOCOL NUMBER	J2014-056
POSITION:	Master's Student	ORIGINAL APPROVAL DATE:	22-Dec-14
DEPARTMENT:	HEIS	APPROVED ON:	22-Dec-14
SUPERVISOR:	Dr. Abdul Roudsari	APPROVAL EXPIRY DATE:	21-Dec-15

PROJECT TITLE: **Evaluation of Mental Health Education Program for Family Doctors on Vancouver Island**

RESEARCH TEAM MEMBERS: Dr. Abdyl Roudsari (Advisor, UVic), Cornel Lencar (Senior Health Data Request Officer, Health Data Extraction, BC Ministry of Health), Paul Lam (Medical Services Information Support, BC Ministry of Health), Lina Bennett (Senior Research Methodology Analyst, BC Ministry of Health)

DECLARED PROJECT FUNDING: **None**

CONDITIONS OF APPROVAL

This Certificate of Approval is valid for the above term provided there is no change in the protocol. Extensions or minor amendments may be granted upon receipt of a Request for Annual Renewal or Modification form.

Amendments
To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol.

Extensions
Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Annual Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol before your expiry date.

Project Closures
When you have completed all data collection activities and will have no further contact with participants, please notify the UVic/VIHA Joint Research Ethics Sub-Committee by submitting a "Notice of Project Completion" form.

Certification

This certifies that the UVic/VIHA Joint Research Ethics Sub-Committee has examined this research protocol and concluded that, in all respects, the proposed research meets the appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Participants and the Vancouver Island Health Authority Research Ethics office.

Rachael Scarth

Dr. Rachael Scarth
Associate Vice-President Research Operations

Dr. Lynn Cummings
Acting Co-Chair, Joint UVic/VIHA Sub-committee

Certificate Issued On: 22-Dec-14

J2014-056 Lupton, Sarah

Appendix E – Diagnostic Include/Exclude Criteria

ICD9 Psychiatric (DSM IV) Codes Commonly Used in General Practice:			
Code	**Description**	**Include**	**Exclude**
296	Bipolar disorder	Y	
300	Neurotic Disorders (Anxiety, Phobia, OCD, Neurotic depression)	Y	
308	Acute Reaction to Stress	Y	
309	Adjustment Disorder/Reaction	Y	
311	Depressive Disorder, NOS	Y	
50B	Depression, Anxiety - this is a	Y	
290	Dementia, senile, uncomplicated		Y
291	Delirium tremens		Y
292	Drug Psychoses		Y
293	Delirium, acute		Y
294	Dementia, unspecified		Y
298	Depressive psychosis		Y
299	Autism, current or active		Y
312	Conduct disorder, unspec.		y
315	Learning disability/devlop. Delay, NOS		Y
317	Intellectual disabilities, mild		Y
319	Intellectual disabilities, unspec		Y
331	Alzheimer's		Y

Include Patients

With one or more of the "include" codes prior to 31-Dec-2011

>=19 yrs of Age on 01-Jan-2007

Exclude Patients

with any of the "exclude" codes on MSP billing prior to 31-Dec-2011

Appendix F: SPSS Tables – Prescribing Patterns

The following tables were derived from SPSS and contain the Paired Samples Statistics regarding pre- and post-period Number of Patients(N), Number of New Prescriptions (n), Proportion with new prescriptions (n/N)– without adjustment for GP age and gender

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreN	141.6041	197	68.17097	4.85698
	PostN	142.4264	197	65.32291	4.65406
Pair 2	NewRxPrePeriod	11.2449	196	7.57196	.54085
	NewRxPostPeriod	7.8112	196	5.91218	.42230
Pair 3	ProportionPre (n/N)	: .0775	196	.03812	.00272
	ProportionPost (n/N)	.0533	196	.03167	.00226

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower				
Pair 1	PreN - PostN	-.82234	33.52678	2.38868	-5.53316				
Pair 2	NewRxPrePeriod - NewRxPostPeriod	3.43367	5.61780	.40127	2.64228				
Pair 3	ProportionPre - ProportionPost	.02415	.03999	.00286	.01851				

Paired Samples Test

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	t	df	Sig. (2-tailed)
Pair 1	PreN - PostN	3.88849	-.344	196	.731
Pair 2	NewRxPrePeriod - NewRxPostPeriod	4.22506	8.557	195	.000
Pair 3	ProportionPre - ProportionPost	.02978	8.454	195	.000

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower				
Pair 1	PreN - PostN	-.82234	33.52678	2.38868	-5.53316				
Pair 2	NewRxPrePeriod - NewRxPostPeriod	3.43367	5.61780	.40127	2.64228				
Pair 3	ProportionPre - ProportionPost	.02415	.03999	.00286	.01851				

Paired Samples Test

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	t	df	Sig. (2-tailed)
Pair 1	PreN - PostN	3.88849	-.344	196	.731
Pair 2	NewRxPrePeriod - NewRxPostPeriod	4.22506	8.557	195	.000
Pair 3	ProportionPre - ProportionPost	.02978	8.454	195	.000

The following tables were derived from SPSS and contain the Paired Samples Statistics regarding pre- and post-period Number of Patients(N), Number of New Prescriptions (n), Proportion with new prescriptions (n/N)– with adjustment for GP age and gender

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreN	142.0589	197	97.45166	6.94314
	PostN	144.4423	197	103.00367	7.33871
Pair 2	NewRxPrePeriod	11.4700	196	10.20155	.72868
	NewRxPostPeriod	7.7498	196	6.34344	.45310
Pair 3	ProportionPre	.0796	196	.06527	.00466
	ProportionPost	.0530	196	.03877	.00277

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower				
Pair 1	PreNAdj - PostNAdj	-2.38331	49.28950	3.51173	-9.30894				
Pair 2	Pre_nAdj - Post_nAdj	3.72012	7.08500	.50607	2.72204				
Pair 3	PrePropAdj - PostPropAdj	.02667	.05599	.00400	.01878				

Paired Samples Test

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	t	df	Sig. (2-tailed)
Pair 1	PreNAdj - PostNAdj	4.54232	-.679	196	.498
Pair 2	Pre_nAdj - Post_nAdj	4.71819	7.351	195	.000
Pair 3	PrePropAdj - PostPropAdj	.03455	6.668	195	.000

Appendix G: SPSS Tables – Mental Health Plan Usage

The following tables were derived from SPSS and contain the Paired Samples Statistics regarding pre- and post-period Number of Patients(N), Number of Uses of Mental Health Plans (n), Proportion patients with a Mental Health Plan (n/N)– without adjustment for GP age and gender

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreN	145.7680	181	66.52937	4.94509
	PostN	147.3039	181	62.47134	4.64346
Pair 2	PreMHPlan	18.3646	181	30.20264	2.24494
	PostMHPlan	25.8619	181	33.62403	2.49925
Pair 3	PropMHPlanPre	.1111	181	.14761	.01097
	PropMHPlanPost	.1578	181	.16459	.01223

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower				
Pair 1	PreN - PostN	-1.53591	33.73928	2.50782	-6.48442				
Pair 2	PreMHPlan - PostMHPlan	-7.49724	27.87883	2.07222	-11.58620				
Pair 3	PropMHPlanPre - PropMHPlanPost	-.04663	.13835	.01028	-.06692				

Paired Samples Test

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	t	df	Sig. (2-tailed)
Pair 1	PreN - PostN	3.41260	-.612	180	.541
Pair 2	PreMHPlan - PostMHPlan	-3.40827	-3.618	180	.000
Pair 3	PropMHPlanPre - PropMHPlanPost	-.02634	-4.534	180	.000

The following tables were derived from SPSS and contain the Paired Samples Statistics regarding pre- and post-period Number of Patients(N), Number of Uses of Mental Health Plans (n), Proportion patients with a Mental Health Plan (n/N)– with adjustment for GP age and gender

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreNAdj	146.1755	181	98.65615	7.33305
	PostNAdj	149.1431	181	103.79738	7.71520
Pair 2	Pre_nAdj	19.3838	181	41.08389	3.05374
	Post_nAdj	27.8678	181	47.17481	3.50648
Pair 3	PreProp_nAdj	.1142	181	.18598	.01382
	PostProp_nAdj	.1674	181	.23973	.01782

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower				
Pair 1	PreNAdj - PostNAdj	-2.96761	50.44154	3.74929	-10.36583				
Pair 2	Pre_nAdj - Post_nAdj	-8.48396	38.16657	2.83690	-14.08182				
Pair 3	PrePropMHPlanAdj - PostPropMHPlanAdj	-.05318	.19952	.01483	-.08244				

Paired Samples Test

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	t	df	Sig. (2-tailed)
Pair 1	PreNAdj - PostNAdj	4.43060	-.792	180	.430
Pair 2	Pre_nAdj - Post_nAdj	-2.88611	-2.991	180	.003
Pair 3	PrePropMHPlanAdj - PostPropMHPlanAdj	-.02391	-3.586	180	.000

Appendix H: SPSS Tables – Hospitalizations due to Mental Health

The following tables were derived from SPSS and contain the Paired Samples Statistics regarding pre- and post-period Number of Patients(N), Number of Encounters with Acute Care (n), Proportion of Acute Encounters (n/N)– without adjustment for GP age and gender

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreN	142.4404	193	68.51116	4.93154
	PostN	143.4197	193	65.39452	4.70720
Pair 2	Hosp_Pre_n	5.0518	193	7.97440	.57401
	Hosp_Post_n	4.1554	193	6.73661	.48491
Pair 3	ProportionHospPre	.0387	193	.06163	.00444
	ProportionHospPost	.0378	193	.09430	.00679

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower				
Pair 1	PreN - PostN	-.97927	33.81829	2.43429	-5.78067				
Pair 2	Hosp_Pre_n - Hosp_Post_n	.89637	7.49164	.53926	-.16726				
Pair 3	ProportionHospPre - ProportionHospPost	.00094	.10311	.00742	-.01370				

Paired Samples Test

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	t	df	Sig. (2-tailed)
Pair 1	PreN - PostN	3.82212	-.402	192	.688
Pair 2	Hosp_Pre_n - Hosp_Post_n	1.96001	1.662	192	.098
Pair 3	ProportionHospPre - ProportionHospPost	.01558	.126	192	.900

The following tables were derived from SPSS and contain the Paired Samples Statistics regarding pre- and post-period Number of Patients(N), Number of Encounters with Acute Care (n), Proportion of Acute Encounters (n/N)– with adjustment for GP age and gender

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreNAdj	143.4215	193	97.98175	7.05288
	PostNAdj	146.0087	193	103.44320	7.44600
Pair 2	Pre_nAdj	5.0746	193	7.84716	.56485
	Post_nAdj	4.5080	193	9.03837	.65060
Pair 3	PreProp_Adj	.0388	193	.06116	.00440
	PostProp_Adj	.0392	193	.09781	.00704

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower				
Pair 1	PreNAdj - PostNAdj	-2.58724	49.74758	3.58091	-9.65021				
Pair 2	Pre_nAdj - Post_nAdj	.56668	7.97808	.57427	-.56602				
Pair 3	PreProp_Adj - PostProp_Adj	-.00041	.10522	.00757	-.01535				

Paired Samples Test

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	t	df	Sig. (2-tailed)
Pair 1	PreNAdj - PostNAdj	4.47573	-.723	192	.471
Pair 2	Pre_nAdj - Post_nAdj	1.69937	.987	192	.325
Pair 3	PreProp_Adj - PostProp_Adj	.01452	-.055	192	.956

The following tables were derived from SPSS and contain the Paired Samples Statistics regarding pre- and post-period Number of Patients with an Acute Encounter(N), Number of Mental Health Plans (n), Proportion of Acute Patients with a Mental Health Plan (n/N)– without adjustment for GP age and gender

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PrePeriod_N	4.7316	190	3.84715	.27910
	PostPeriod_N	4.9789	190	3.73735	.27114
Pair 2	PreMHPlan_n	1.1684	190	1.84392	.13377
	PostMHPlan_n	1.3579	190	2.05179	.14885

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower				
Pair 1	PrePeriod_N - PostPeriod_N	-.24737	2.13236	.15470	-.55252				
Pair 2	PreMHPlan_n - PostMHPlan_n	-.18947	1.92337	.13954	-.46472				

Paired Samples Test

		Paired Differences				
		95% Confidence Interval of the Difference				
		Upper	t	df	Sig. (2-tailed)	
Pair 1	PrePeriod_N - PostPeriod_N	.05779	-1.599	189	.111	
Pair 2	PreMHPlan_n - PostMHPlan_n	.08577	-1.358	189	.176	

The following tables were derived from SPSS and contain the Paired Samples Statistics regarding pre- and post-period Number of Patients with an Acute Encounter(N), Number of Mental Health Plans (n), Proportion of Acute Patients with a Mental Health Plan (n/N)– with adjustment for GP age and gender

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreN_Adj	4.9701	190	5.33834	.38728
	PostN_Adj	5.3731	190	6.42849	.46637
Pair 2	Pre_n_Adj	1.2211	190	2.34402	.17005
	Post_n_Adj	1.5343	190	3.54628	.25727

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower				
Pair 1	PreN_Adj - PostN_Adj	-.40298	2.94292	.21350	-.82414				
Pair 2	Pre_n_Adj - Post_n_Adj	-.31320	3.37027	.24451	-.79551				

Paired Samples Test

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	t	df	Sig. (2-tailed)
Pair 1	PreN_Adj - PostN_Adj	.01817	-1.887	189	.061
Pair 2	Pre_n_Adj - Post_n_Adj	.16911	-1.281	189	.202