TRAILBLAZER CHALLENGER VISIONARY INNOVATOR ADVENTURER REBEL TRAILBLAZER

PHYSICIAN INTEGRATED NETWORK: A SECOND LOOK

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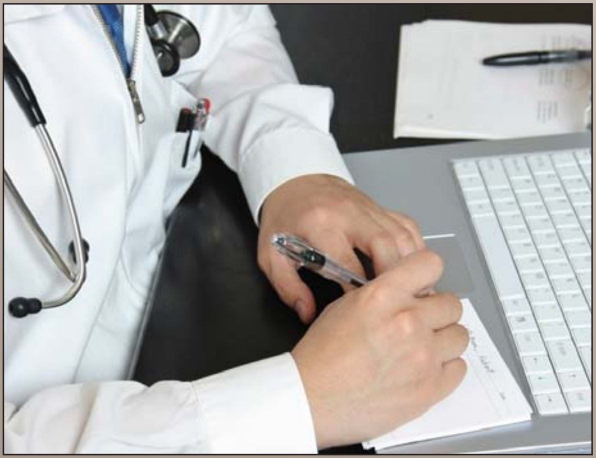

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ABOUT THE MANITOBA CENTRE FOR HEALTH POLICY

The Manitoba Centre for Health Policy (MCHP) is located within the Department of Community Health Sciences, Faculty of Medicine, University of Manitoba. The mission of MCHP is to provide accurate and timely information to healthcare decision–makers, analysts and providers, so they can offer services which are effective and efficient in maintaining and improving the health of Manitobans. Our researchers rely upon the unique Population Health Research Data Repository (Repository) to describe and explain patterns of care and profiles of illness and to explore other factors that influence health, including income, education, employment, and social status. This Repository is unique in terms of its comprehensiveness, degree of integration, and orientation around an anonymized population registry.

Members of MCHP consult extensively with government officials, healthcare administrators, and clinicians to develop a research agenda that is topical and relevant. This strength, along with its rigorous academic standards, enables MCHP to contribute to the health policy process. MCHP undertakes several major research projects, such as this one, every year under contract to Manitoba Health. In addition, our researchers secure external funding by competing for research grants. We are widely published and internationally recognized. Further, our researchers collaborate with a number of highly respected scientists from Canada, the United States, Europe, and Australia.

We thank the University of Manitoba, Faculty of Medicine, Health Research Ethics Board for their review of this project. MCHP complies with all legislative acts and regulations governing the protection and use of sensitive information. We implement strict policies and procedures to protect the privacy and security of anonymized data used to produce this report and we keep the provincial Health Information Privacy Committee informed of all work undertaken for Manitoba Health.

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ACRONYMS

ACEI	Angiotension-Converting Enzyme Inhibitors
ACSC	Ambulatory Care Sensitive Conditions
ARB	Angiotension II Receptor Blocker
CHF	Congestive Heart Failure
COC	Continuity of Care
COPD	Chronic Obstructive Pulmonary Disease
EKGs	Routine Electrocardiograms
EMRs	Electronic Medical Records
FFS	Fee-for-Service
MI	Myocardial Infarction
PIN	Physician Integrated Network
QBIF	Quality Based Incentive Funding
RUB	Resource Utilization Bands
Repository	Population Health Research Data Repository
TRM	Total Respiratory Morbidty

EXECUTIVE SUMMARY

This is the second report from Manitoba Centre for Health Policy (MCHP) that provides insight into the impact of the Physician Integrated Network (PIN) initiative—a primary care renewal initiative developed by Manitoba Health, Healthy Living and Seniors. The first report, Physician Integrated Network Baseline Evaluation: Linking Electronic Medical Records (EMRs) and Administrative Data (Katz, Bogdanovic, & Soodeen, 2010), focused on comparing extracted data from the Electronic Medical Records of participating clinics with the data from the Population Health Research Data Repository (Repository) housed at the Manitoba Centre for Health Policy. The findings primarily addressed the use of EMRs by PIN clinics and some early exploration of the impact of the initiative using indicators available from data held in the Repository.

This report builds on the previous study by adding a number of key components: first, PIN has expanded to include eight new clinics (Phase 2); second, the passage of time has provided the opportunity to provide a more realistic understanding of the impact of the initiative on patient care and outcomes; and third, we have added several new indicators that contextualize indicators associated with Quality Based Incentive Funding (QBIF).

We analyzed outcomes for the indicators for each clinic both before and after the implementation of PIN. We compared the changes over time to "shadow practices" (described below), which served as control groups for the PIN clinics. For the Phase 1 clinics we also analyzed the results for a second post-implementation period that we called "long-term follow-up." This is not yet possible for the Phase 2 clinics because the initiative has not been active in these clinics long enough. We also provide a summation of the results for the four Phase 1 clinics, and for the eight Phase 2 clinics.

There are many factors that affect the quality of primary care. Reform of primary-care delivery is complex and challenging. Readers should bear in mind that the following analyses address only one of the four PIN objectives. The reality is that the results presented in this report do not provide a comprehensive evaluation of PIN.

Population

One of the components of the PIN initiative is a requirement that each clinic to confirm which patients are "attached" to that clinic. These are patients for whom both the physician involved and the patient agree that this is the patient's primary-care physician. These patients are identified in the data extracted from the clinic's electronic medical records by Manitoba Health, Healthy Living and Seniors. We assigned patients to the PIN clinics based on these data. We assigned patients to the shadow practices by matching each PIN patient with a similar patient not attending the PIN clinic based on a number of criteria, which are described below.

The size and composition of the eligible populations for each clinic varied by the indicator examined. The smallest population included only 10 patients eligible for post myocardial infarction beta-blocker initiation at one clinic, whereas the largest eligible population included over 39,000 for routine EKG. See Table E.1 for all the eligible populations for each indicator.

Table E.1: Summary of Eligible Populations by Indicator

	Number of Eligible PIN patients			
	Pre-Implementation		Post-Implementation	
Study Indicators	**Min**	**Max**	**Min**	**Max**
Post Myocardial Infarction (MI) Management (Beta-Blocker)	10	122	20	158
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)	11	119	20	156
Congestive Heart Failure Management	23	248	29	250
Depression Care	47	446	52	406
Complete Immunizations at Age Two	72	702	75	829
Asthma Care	172	1,447	122	1,530
Smoking Cessation Prescription	207	2,319	217	2,382
Diabetes Eye Examination	269	2,262	304	2,393
Annual Influenza Immunizations, People with Total Respiratory Morbidity	400	4,188	206	3,009
Benzodiazepine Prescribing	533	3,814	513	3,935
Breast Cancer Screening	621	5,341	641	5,481
Annual Influenza Immunizations, Adults aged 65 and older	979	7,757	1,009	7,972
Pneumococcal Immunization	1,015	7,984	1,051	8,311
Continuity of Care	3,379	24,533	3,464	24,258
Hospitalizations for Ambulatory Care Sensitive Conditions	3,764	28,569	3,811	27,872
Referral Rates	3,931	28,955	4,033	28,688
Routine Electrocardiography	4,141	37,827	4,344	39,220

Indicators

The indicators we used in this study are presented in Table E.2. The table identifies which of the indicators are incentivized as part of the QBIF provided through PIN. This study is limited to those QBIF indicators can be measured using the Repository. The 23 indicators are divided into three categories: prevention and screening, disease management, and healthcare delivery. This report includes new indicators not previously used at MCHP

Comparisons

We compared each PIN clinic to itself over a two-year period before the implementation of PIN (pre-implementation period) and a two-year period after the implementation of PIN (post-implementation period). We also compared the rates for each indicator for each clinic to a comparison group consisting of patients matched to the patients assigned to the PIN clinic by age, sex, and urban/rural status. These “shadow practices” allow us to consider changes that were occurring in our healthcare system unrelated to PIN that may have affected the indicator results. The indicator results were also aggregated based on PIN phase. Because the first-phase clinics implemented PIN at a different time to the second-phase clinics, we aggregated the results by phase to determine whether there were differences based on implementation time. We were also able to conduct additional “long-term follow-up” analyses for the Phase 1 clinics.

We also present the summary of the results by clinic for all indicators so that the reader can look at all of the indicators for each clinic to account for differences between clinics that may contribute to the outcomes.

Table E.2: Study Indicators and Quality Based Incentive Funding (QBIF) Indicators

Study Indicators*	QBIF Indicators**
Prevention and Screening	
Breast Cancer Screening	✓
Complete Immunizations at Age Two	✓
Annual Influenza Immunizations	
Older Adults Aged 65+	✓
People with Total Respiratory Morbidity	
Pneumococcal Immunization	✓
Disease Management	
Congestive Heart Failure Management	
Initiation of Drug Treatment	✓
Persistence of Drug Treatment	
Depression Care	✓
Diabetes Eye Examination	✓
Post Myocardial Infarction (MI) Management (Beta-Blocker)	
Initiation of Drug Treatment	✓
Persistence of Drug Treatment	
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)	
Initiation of Drug Treatment	
Persistence of Drug Treatment	
Asthma Care	✓
Benzodiazepine Prescribing	
Healthcare Delivery	
Continuity of Care	
Assigned Physician	
Provided by any Physicians in PIN Clinic	
Routine Electrocardiography	
Ambulatory Care Sensitive Conditions	
Referral Rates	
Assigned Physician	
Clinic Based	
Total	
Smoking Cessation Prescription	

A blank cell indicates that there is no equivalent QBIF Indicator

* For full description of the study indicators see Appendix Table 1.1.

** For full QBIF indicators descriptions please see Appendix Table 1.2.

Results

Of the 23 indicators, only three showed a positive effect that could be attributed to PIN. Influenza and pneumococcal immunization rates increased, and drug initiation for patients with congestive heart failure increased. These are incentivized by QBIF provided by the PIN initiative. The reduction in routine electrocardiograms observed in five PIN clinics (with no reduction observed in any of the shadow practices) is the only example of a positive PIN effect that was not incentivized.

The prevention and screening indicators show the most notable PIN effects. This is an encouraging result because prevention and screening are often neglected aspects of primary care. PIN has demonstrated significant improvements in this area of practice.

As with most of our analyses, there are no consistent patterns across all indicators for the four clinics included in the long-term follow-up analysis. For some, improvements observed post-implementation were maintained, and for a few further improvements were observed. Some showed return to the pre-implementation rates and a few even had rates worse than the pre-implementation rates at long-term follow-up. These results suggest that sustained improvement requires ongoing, active intervention.

Conclusions

This report should not be read as a comprehensive evaluation of the PIN initiative. There are many factors that contribute to rates of each of the indicators presented. There are also other potential outcomes from the PIN initiative that we could not measure with the administrative data available in the Repository. The results presented in this report reflect both of these limitations, in that there is no clear pattern evident across indicators or within clinics. There are encouraging improvements described if the results are presented by indicator or by clinic. Many of these are present in the PIN clinics but not in the shadow practices, which suggests that the changes are PIN-related.

The Phase 1 clinics started off with rates that were lower than their shadow practices. However, due to rate increases over time—a potential positive impact of PIN—their rates were higher than their shadow practices post-implementation. The Phase 2 clinics started off with higher rates than their shadow practices and maintained higher rates despite showing rate decreases over time. However, the rate of decrease for the PIN Phase 2 clinics was lower than the rate for the shadow practices, which indicates a positive PIN effect.

While the results of this report do not present overwhelming evidence of a positive PIN effect, they do present rich information about the impact of PIN and other aspects of primary-care delivery in Manitoba.

CHAPTER 1: INTRODUCTION

Background

This is the second report that the Manitoba Centre for Health Policy (MCHP) has produced that focuses on the **Physician Integrated Network (PIN)**[1]. Our initial report (Katz et al., 2010) focused on the early implementation of the initiative in four clinics (Phase 1 clinics). The initial report's findings primarily addressed change management associated with the use of the **electronic medical records (EMRs)**, and comparisons of PIN data extracted from the clinic EMRs and data held at MCHP in the **Population Health Research Data Repository (Repository)**. Because we compared PIN clinics to other primary-care service providers, we could not use the PIN EMR data extract in our analyses. No comparable data was available for these outcomes from non-PIN clinics. Thus, our approach was to use Repository data to measure all indicators. Previous research at MCHP (Katz, De Coster, Bogdanovic, Soodeen, & Chateau, 2004) had demonstrated the capacity of Repository data to measure relevant quality indicators. At the time of that baseline study, the PIN initiative had not been functioning long enough to expect meaningful improvements in the indicators we measured based on the changes facilitated by PIN. However, the study did establish our capacity to explore the impact of PIN on primary-care service delivery in participating clinics.

This study was designed to build on the baseline study recognizing two specific advantages since the completion of the initial study. First, the addition of the Phase 2 clinics has increased the reach of the initiative. With more clinics enrolled, PIN now involves more physicians in the care of more patients. Second, the PIN initiative has matured with the passage of time. We are no longer dealing with a new initiative managing the early challenges of implementation. We are now able to compare PIN clinics across a number of indicators over time and to other non-PIN sites. We compared pre-implementation to post-implementation, and in the case of the Phase 1 clinics we were able to compare to an additional two-year period that we are calling long-term follow-up.

By only using indicators that are measurable using the Repository, this study follows the same approach as the first. The choice of indicators is therefore limited, and this limitation dictates the narrow objectives of this report. The goal of this study was to measure the impact of the PIN initiative on the quality of care delivered by PIN clinics. This report is not an evaluation of the PIN initiative or primary-care reform in Manitoba in general.

We have also added new indicators that were not used in the initial study. Some of these have been developed at MCHP and elsewhere since the first study, and others have been added specifically because they measure aspects of care not incentivized by the PIN initiative (see Primary-Care Quality Indicators section below). There are questions in the literature about the impact of incentive-based funding on care that is not incentivized. We therefore attempted to answer the question: Do clinicians neglect the non-incentivized care in favour of aspects of care that are incentivized, by including these indicators.

About PIN

PIN evolved under the guidance of an advisory committee comprising representatives from the University of Manitoba, the College of Registered Nurses of Manitoba, the College of Physicians & Surgeons of Manitoba, the Manitoba Medical Association, the Winnipeg **Regional Health Authority**, the former Assiniboine Regional Health Authority, and other primary-care stakeholders.

The four key objectives of PIN are:

1. to improve access to **primary care**
2. to improve primary-care providers' access to and use of information
3. to improve the working life for all primary-care providers
4. to demonstrate high-quality primary care with a specific focus on chronic disease management

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[1] Terms in bold typeface are defined in the Glossary at the end of this report.

Quality-Based Incentive Funding (QBIF) is one mechanism of engaging physicians in PIN. It provides funding to clinics for meeting quality targets on selected clinical process indicators—in other words, pay for performance. The indicators included in the QBIF are determined by an indicator committee that includes representatives of the participating clinics (see Primary-Care Quality Indicators below) and is measured at Manitoba Health, Healthy Living and Seniors using quarterly extracts from the clinic EMRs; see Appendix Table 1.2 for definitions of QBIF indicators. PIN is using QBIF as part of a blended funding approach (**fee-for-service (FFS)** combined with QBIF). The participating physicians continue to bill Manitoba Health, Healthy Living and Seniors for all services provided to their patients according to the same fee schedule used by other physicians, and in the same way they did this before joining PIN. QBIF is provided to the clinic in addition to the usual physician funding mechanism. The clinic chooses how to use the QBIF to serve its patients best and to meet PIN objectives. For example, a clinic may hire non-medical staff to improve clinic access, or other health professionals such as nurses or dietitians to provide patient care.

PIN was an intentionally limited reform intervention. Clinics were supported through the transition to PIN with limited change management resources and EMR support through direct involvement with the EMR vendors by Manitoba Health, Healthy Living and Seniors. While the objectives of the initiative were clear from the outset, clinics were expected to address the objectives themselves rather than implementing a proscribed reform process other than the measurement of the QBIF indicators.

Phase 1 of PIN began in 2006 with a physician-engagement process. At the time of implementation in 2007/08 there were four participating clinics: Agassiz Medical Centre, Assiniboine Medical Clinic, Dr. C. W. Wiebe Medical Centre, and Steinbach Family Medical Centre. One year after the implementation phase began, these clinics entered the next phase of the initiative. The first service agreements for Phase 2, signed in 2010, include a gradual implementation of QBIF. The number of clinics increased from the original four to 13. The eight new clinics were Altona Clinic, Centre Médical Seine Inc., Clinique St. Boniface Clinic, Concordia Health Associates, Prairie Trail Medical Clinic, Tuxedo Family Medical Centre, Virden Medical Associates and Western Medical Centre (See Figure 1.1-1.2 below for PIN clinic locations). One clinic discontinued its involvement soon after joining in Phase 2, leaving 12 clinics participating in PIN. The number of participating physicians grew from 74 (exact numbers vary over time) to more than 167 physicians providing care to more than 155,000 Manitobans. In August, 2011, Phase 2 was extended to August 2015 (Manitoba Health, 2014).

Figure 1.1: PIN Locations by Phase in Manitoba

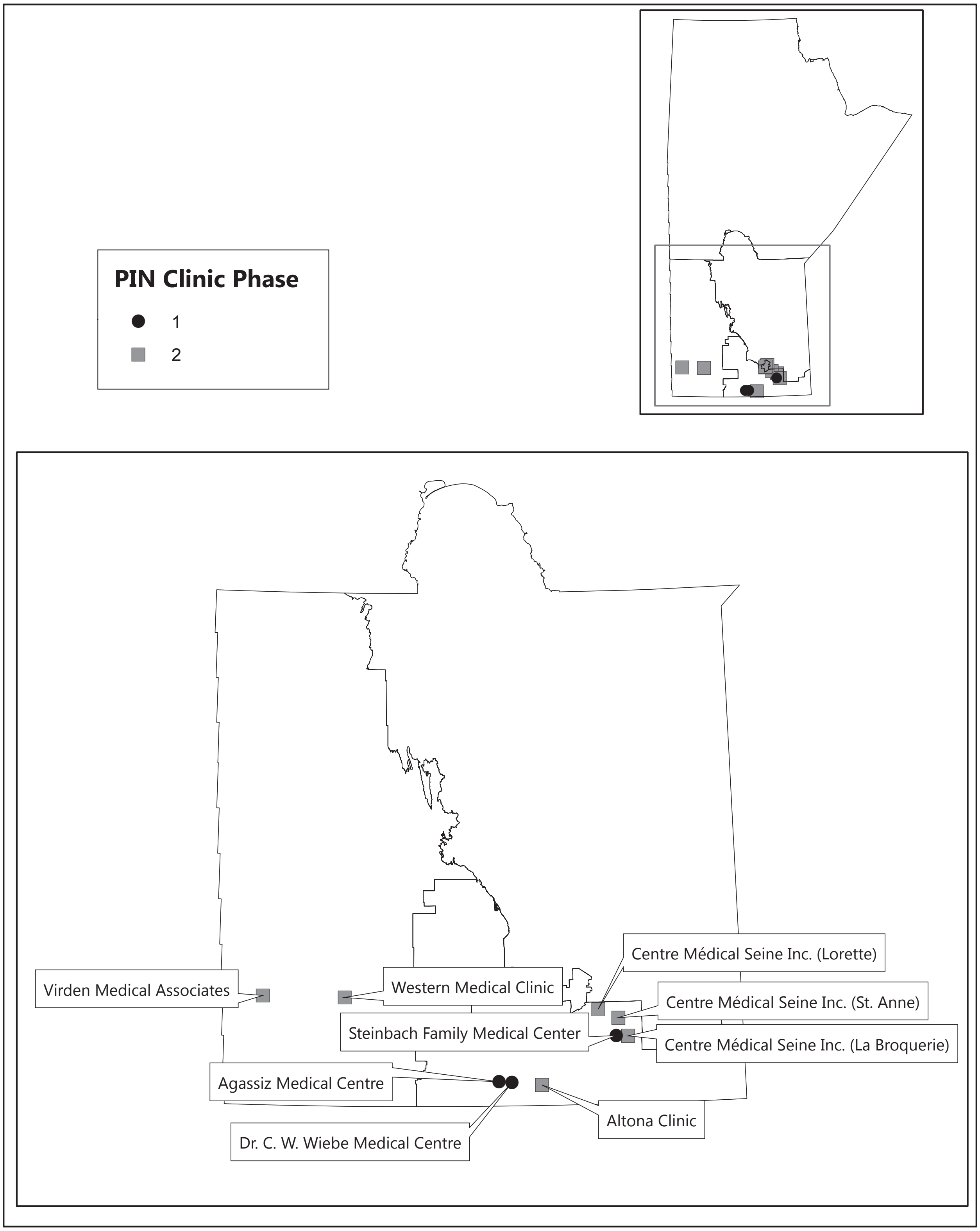


Figure 1.2: Location of PIN Clinics in Winnipeg

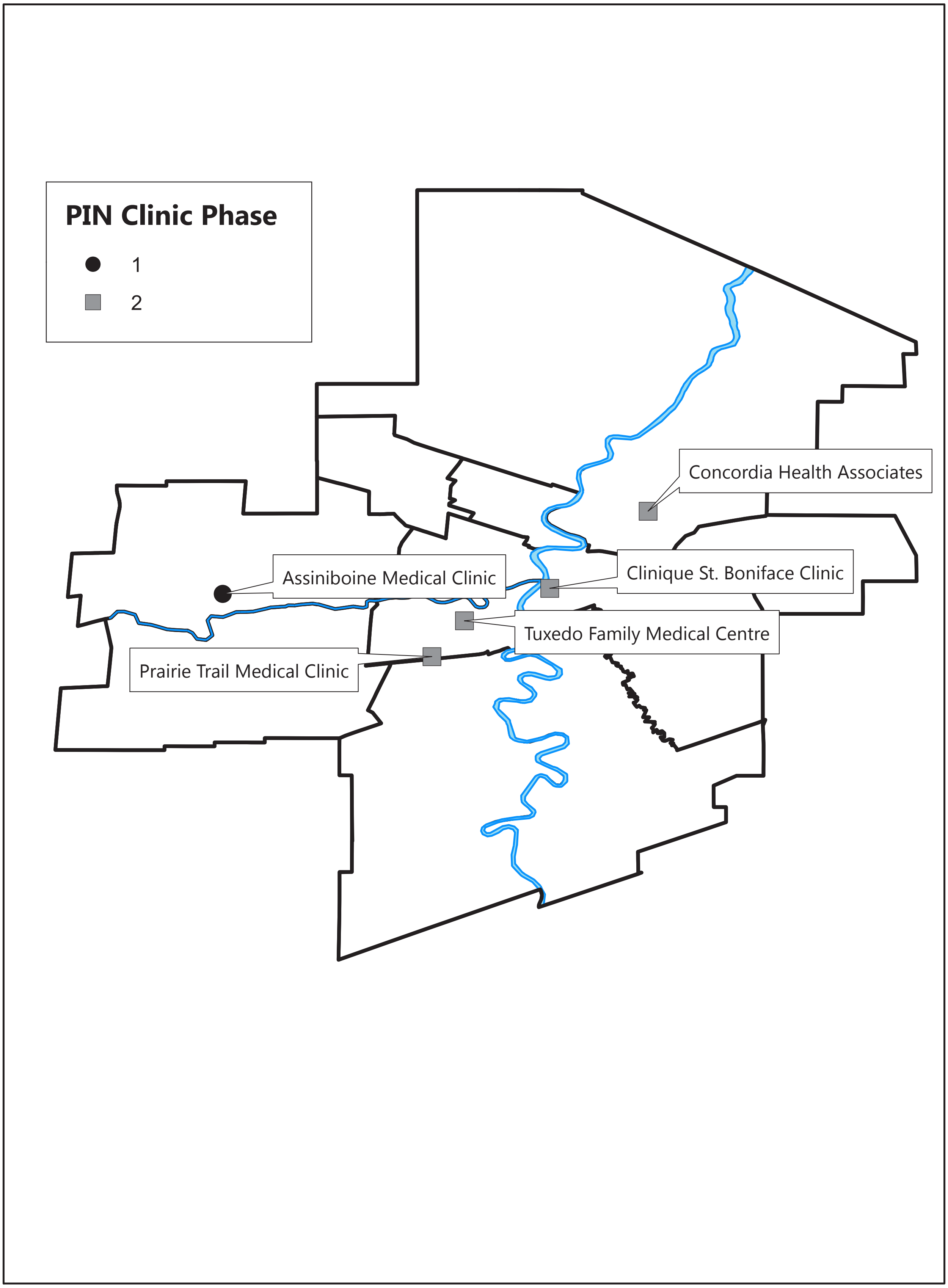
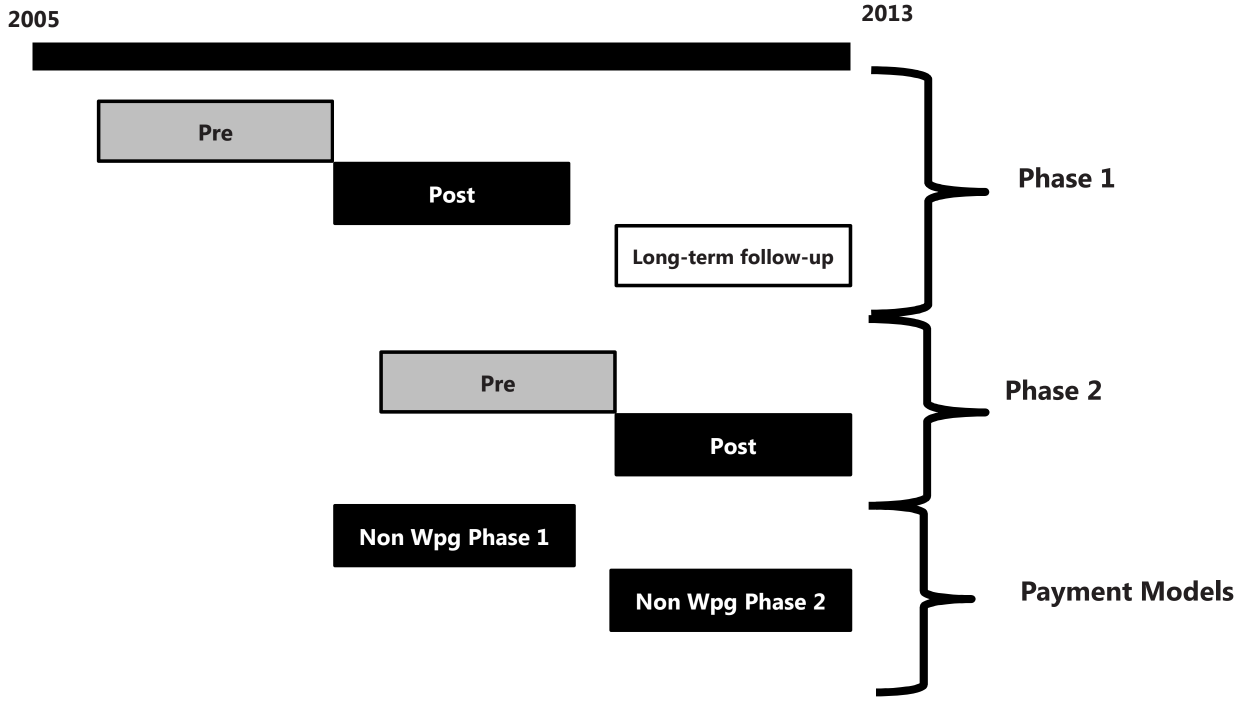


Figure 1.3 is a timeline that describes the periods for our analyses. This includes a two-year pre-implementation period and post-implementation period for each of Phase 1 and Phase 2. Phase 1 clinics also had a long-term follow-up period that coincided with the two-year period of the Phase 2 post-implementation period. The figure also includes the timing for analyses we performed to describe the impact of funding models on select outcomes (see Appendix Chapter 3).

The dates of PIN Phase 1 and Phase 2, pre-implementation, post-implementation, and long-term follow-up for Phase 1 for each clinic are included in Appendix Table 2.1.

Figure 1.3: Timeline of Analysis for PIN Report



Primary-Care Quality Indicators

All clinics participating in PIN regularly track their performance on a range of primary-care quality indicators. This enables clinics to review their performance regularly as a basis for further change. The primary-care quality indicators used in PIN are derived from evidence-based indicators originally developed by the Canadian Institute for Health Information, with the assistance of clinician experts. The definitions and codes used to calculate indicators can be found in the Appendix Table 1.1. They measure recommended screening and chronic-disease-management processes in six areas of primary care:

- prevention
- diabetes management
- asthma management
- congestive heart failure (CHF) management
- hypertension management
- coronary artery disease management

In addition to these, trial indicators for **depression** screening and patient access have been developed and are being trialed at some PIN clinics.

Purpose of this Report

This report describes the patient population of PIN Clinics during two periods across a number of parameters: number of patients, age and sex distributions, area income level, severity-of-illness measures, **continuity of care (COC)** and patterns of care. To be able to perform analyses that describe the impact of the PIN implementation, analyses were conducted on data representing a two-year period prior to implementation at the clinic (pre-implementation) and the period representing the two years following implementation (post-implementation).

We compared the results for PIN clinics with analyses performed on a matched group of other Manitobans—shadow-practice patients—to determine whether changes that have occurred since the implementation of PIN are due to a PIN effect or if similar changes have occurred among other Manitobans who are not associated with PIN clinics. Some of these changes are the dramatic increase in the use of electronic medical records in Manitoba, public campaigns to increase screening rates, and the introduction of the chronic-disease **tariffs** for physicians. Local changes unrelated to PIN and only implemented in specific sites would unfortunately not be accounted for via this process.

In addition, we performed analyses on PIN Phase 1 clinics to determine outcomes two years after the post-implementation period (long-term follow-up). This allowed us to explore the sustainability of the changes that may have occurred between the pre- and post-implementation periods.

Structure of the Report

This report includes a chapter that describes the methods we used (Chapter 2), followed by three chapters that present the results for three categories of indicators: prevention and screening, disease management and healthcare delivery. The indicators are introduced with a description of each, followed by a brief summary of the results and a table with detailed results. Following the summary table, graphs present the results for each clinic and the aggregate results by the two phases.

Chapter 3 presents five indicators measuring prevention and screening activities. Chapter 4 addresses disease management, which includes evidence-based prescribing of drugs for select conditions and follow-up visits for patients diagnosed with depression. Chapter 5 presents results on a number of indicators related to how healthcare is delivered in the clinics. None of the indicators in Chapter 5 are included in the PIN QBIF; however, they do provide context to the quality of care provided within PIN clinics and the shadow practices matched to each PIN clinic. Some of these would fall into the category of unintended consequences of QBIF. Chapter 6 presents long-term follow-up analyses for Phase 1 clinics, and Chapter 7 presents the results for all the indicators by clinic. Discussion of the results is given in Chapter 8. We also looked at the comparison of different payment models for the shadow practices for the rural clinics – this can be found in Appendix Chapter 3.

Physicians in PIN Clinics

Over time, the number of physicians working in any one clinic may change (Table 1.1). This fact is important to bear in mind when considering our analyses. Physicians providing care to patients included in the post-implementation analyses may not have been present at the clinic during the actual implementation of PIN. Changes in indicator outcomes do not therefore include only the impact of PIN but may also be influenced by changes in physicians participating in the PIN initiative. When looking at the physicians within the PIN Clinics we also wanted to look at if they have varying demographics than the rest of the physicians in Manitoba. This information can be found in Appendix Table 4.1.

It is also important to recognize that the numbers of physicians do not represent full-time equivalents but different physicians, some of whom did not work full time at the clinic.

There are a few noteworthy changes at a few of the clinics: Clinique St. Boniface Clinic and Concordia Health Associates saw significant growth between the two analysis periods; Virden Medical Associates and Western Medical Clinic had significantly fewer physicians in the post-implementation period.

Table 1.1: Total Number of Physicians by Time Period in PIN Clinics

	Clinic	Pre-Implementation	Post-Implementation	Long-Term Follow-Up
Phase 1	**Agassiz Medical Centre**	17	19	19
	Assiniboine Medical Clinic	19	20	21
	Dr. C. W. Wiebe Medical Centre	21	23	34
	Steinbach Family Medical Center	17	20	22
Phase 2	**Altona Clinic**	8	7	N/A
	Centre Médical Seine Inc.	11	11	N/A
	Clinique St. Boniface Clinic	10	15	N/A
	Concordia Health Associates	12	20	N/A
	Prairie Trail Medical Clinic	13	14	N/A
	Tuxedo Family Medical Centre	7	7	N/A
	Virden Medical Associates	13	8	N/A
	Western Medical Clinic	19	13	N/A
Phase 1		74	82	96
Phase 2		93	95	N/A
Total		167	177	96

CHAPTER 2: METHODS

The study used data available in the Repository housed at the Manitoba Centre for Health Policy. Most of these data are derived from **Administrative Data** that are collected by Manitoba Health, Healthy Living and Seniors in order to administer the universal healthcare system within Manitoba. The Repository includes person-level data such as contacts with physicians and hospitals, pharmaceutical dispensation, use of nursing homes, and other data such as **census** data.

All data files in the Repository are de-identified, which means that names and other identifying information are not available. Unique encrypted identifiers are used to allow linkage across files and follow-up over time. Data in the Repository have been extensively documented and validated for this kind of research (Roos, Gupta, Soodeen, & Jebamani, 2005).

We used data from the following sources: the **Manitoba Health Insurance Registry**, **Hospital Discharge Abstracts Database**, **Medical Services Database**, **Drug Program Information Network**, **Provider Registry**, Canadian Census, Long-Term-Care Utilization, **Manitoba Immunization Monitoring System** and the **Physician Integrated Network (PIN) Data File**. Each indicator is defined before presenting its results. The time period for the data used varies for each indicator based on its definition. The earliest data used was from October 2000, which coincides with the introduction of certain medications for **smoking cessation** to Manitoba. The most recent data included are those up to March 31, 2012.

All data management, programming, and analyses were performed using SAS® statistical analysis software, version 9.3.

Cohort Demographics

The tables below present information on the patients included in the study. Table 2.1 provides summary information on all patients included in the analyses. The tables that follow then provide more detail by presenting the same data by Phase—Phase 1 clinics and shadow practices in Table 2.2, Phase 2 in Table 2.3. Detailed patient demographics for each clinic are presented in Appendix Tables 5.1-5.12.

Because the shadow practices were constructed based on matching criteria, they reflect the demographic characteristics of the PIN clinics. While it was not our intention to compare the characteristics of the Phase 1 and Phase 2 clinics statistically, there are a few clear differences. Phase 2 clinics have a higher percentage of female patients that Phase 1 clinics (59.1vs. 54.5) and a higher percentage of patients in the highest socioeconomic quintile (24.4 vs. 17.4).

Table 2.1: Patient Demographics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		Post-Implementation		Pre-Implementation		Post-Implementation	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	69,518	43.3	71,113	43.4	675,733	43.3	689,973	43.4
	Female	91,142	56.7	92,658	56.6	885,648	56.7	901,373	56.6
Age (Years)	**0-5**	7,997	5.0	9,104	5.6	73,196	4.7	77,572	4.9
	6-18	22,193	13.8	21,090	12.9	225,088	14.4	217,346	13.7
	19-44	54,666	34.0	54,856	33.5	530,100	34.0	531,383	33.4
	45-64	48,047	29.9	49,295	30.1	470,785	30.2	483,033	30.4
	65+	27,757	17.3	29,426	18.0	262,212	16.8	282,012	17.7
Income Quintile	**Q1 (Lowest)**	19,377	12.1	19,473	11.9	188,993	12.1	189,908	11.9
	Q2	28,546	17.8	28,844	17.6	279,268	17.9	281,441	17.7
	Q3	39,474	24.6	38,707	23.6	380,051	24.3	375,822	23.6
	Q4	39,367	24.5	40,570	24.8	382,309	24.5	393,232	24.7
	Q5 (Highest)	33,336	20.7	34,343	21.0	326,139	20.9	336,396	21.1
	Income Unknown	560	0.3	1,834	1.1	4,621	0.3	14,547	0.9
Sickness Level (RUB)	**0-1**	38,722	24.1	38,086	23.3	434,053	27.8	437,061	27.5
	2	47,078	29.3	47,595	29.1	446,397	28.6	447,645	28.1
	3	67,855	42.2	70,389	43.0	615,441	39.4	636,177	40.0
	4-5	7,005	4.4	7,701	4.7	65,490	4.2	70,463	4.4

Table 2.2: Patient Demographics: Phase 1 Clinics

		PIN Patients						Shadow-Practice Patients			
		Pre-Implementation		Post-Implementation		Long-Term Follow-Up		Pre-Implementation		Post-Implementation	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	37,793	45.5	39,074	45.5	34,769	44.7	367,943	45.6	382,305	45.5
	Female	45,247	54.5	46,748	54.5	42,928	55.3	439,806	54.4	457,861	54.5
Age (Years)	**0-5**	4,921	5.9	5,746	6.7	4,973	6.4	43,681	5.4	49,097	5.8
	6-18	12,849	15.5	12,743	14.8	10,365	13.3	133,005	16.5	135,984	16.2
	19-44	28,361	34.2	28,771	33.5	24,957	32.1	276,318	34.2	281,346	33.5
	45-64	22,902	27.6	23,719	27.6	22,709	29.2	225,578	27.9	234,184	27.9
	65+	14,007	16.9	14,843	17.3	14,693	18.9	129,167	16.0	139,555	16.6
Income Quintile	**Q1 (Lowest)**	10,689	12.9	10,931	12.7	9,672	12.4	105,468	13.1	108,121	12.9
	Q2	15,508	18.7	15,799	18.4	13,992	18.0	153,329	19.0	156,148	18.6
	Q3	21,799	26.3	21,211	24.7	19,084	24.6	208,940	25.9	206,984	24.6
	Q4	20,328	24.5	22,019	25.7	19,986	25.7	195,639	24.2	212,717	25.3
	Q5 (Highest)	14,420	17.4	15,426	18.0	14,038	18.1	141,826	17.6	152,150	18.1
	Income Unknown	296	0.4	436	0.5	925	1.2	2,547	0.3	4,046	0.5
Sickness Level (RUB)	**0-1**	21,094	25.4	22,410	26.1	17,243	22.2	230,299	28.5	244,188	29.1
	2	24,586	29.6	24,946	29.1	23,838	30.7	234,883	29.1	238,455	28.4
	3	33,899	40.8	34,809	40.6	33,057	42.5	309,165	38.3	321,859	38.3
	4-5	3,461	4.2	3,657	4.3	3,559	4.6	33,402	4.1	35,664	4.2

Table 2.3: Patient Demographics: Phase 2 Clinics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		Post-Implementation		Pre-Implementation		Post-Implementation	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	31,725	40.9	32,039	41.1	307,790	40.8	307,668	41.0
	Female	45,895	59.1	45,910	58.9	445,842	59.2	443,512	59.0
Age (Years)	**0-5**	3,076	4.0	3,358	4.3	29,515	3.9	28,475	3.8
	6-18	9,344	12.0	8,347	10.7	92,083	12.2	81,362	10.8
	19-44	26,305	33.9	26,085	33.5	253,782	33.7	250,037	33.3
	45-64	25,145	32.4	25,576	32.8	245,207	32.5	248,849	33.1
	65+	13,750	17.7	14,583	18.7	133,045	17.7	142,457	19.0
Income Quintile	**Q1 (Lowest)**	8,688	11.2	8,542	11.0	83,525	11.1	81,787	10.9
	Q2	13,038	16.8	13,045	16.7	125,939	16.7	125,293	16.7
	Q3	17,675	22.8	17,496	22.4	171,111	22.7	168,838	22.5
	Q4	19,039	24.5	18,551	23.8	186,670	24.8	180,515	24.0
	Q5 (Highest)	18,916	24.4	18,917	24.3	184,313	24.5	184,246	24.5
	Income Unknown	264	0.3	1,398	1.8	2,074	0.3	10,501	1.4
Sickness Level (RUB)	**0-1**	17,628	22.7	15,676	20.1	203,754	27.0	192,873	25.7
	2	22,492	29.0	22,649	29.1	211,514	28.1	209,190	27.8
	3	33,956	43.7	35,580	45.6	306,276	40.6	314,318	41.8
	4-5	3,544	4.6	4,044	5.2	32,088	4.3	34,799	4.6

Patient Allocation

PIN clinics identified the patients they considered to be core patients based on their own criteria. For some clinics, this was a matter of confirming an already present and frequently updated field in the EMR. For others, a review of individual charts was necessary. This information was then included in the PIN file provided by Manitoba Health, Healthy Living and Seniors for inclusion in the Repository, after removal of identifying information. We used the PIN file to identify PIN clinic patients for this study.

Shadow (Virtual) Practices

Previous MCHP work has established the value of determining the expected rates of services for a given patient group (e.g., a physician practice) based on their personal and demographic characteristics and comparing them to the observed rates (Frohlich et al., 2006). In the present study, we did this for the patients from each clinic's extract by creating comparable shadow (or virtual) practices. These shadow practices establish norms for a group of patients who are identical to those in each practice of interest in terms of age, sex, urban/rural status, and **socioeconomic status**. Neighborhood **income quintiles** based on census area income are frequently used as a surrogate for individual socio-economic status at MCHP. The income quintiles are calculated separately for Winnipeg and rural areas. By randomly matching each patient from the clinic with up to 10 people who share demographic characteristics but are not part of the participating clinic, we created a virtual practice of patients who received care from a variety of different physicians. We used the care received by this virtual practice to calculate expected rates for the corresponding PIN practice. This matched cohort served as a comparison group for each of the PIN clinics. Clearly there are differences between these virtual practices and the PIN clinics. For example, the rates that are measured from the virtual practices do not take into account the available services at the clinics where they get their care; or even if they get their care at a single clinic or from multiple doctors. The comparisons between the PIN clinics and their shadows do not take these differences into account.

These expected rates are important as they reflect any changes in the system not related to PIN. For example, in April 2012, new chronic-disease payment tariffs were introduced in Manitoba. These tariffs are available to all fee-for-service physicians. Compliance with the requirements of the tariff increases the likelihood of meeting some of the indicators in this report. The inclusion of the shadow practices accounts for the impact on this initiative in our analyses.

Indicators

Study indicators are presented in Table 2.4. The table identifies which indicators are incentivized as part of QBIF provided though PIN. The 23 indicators are divided into three categories: prevention and screening, disease management, and healthcare delivery. By including a mix of indicators, some of which are incentivized by PIN and others not, we hoped to capture both the impact of PIN on the incentivized indicators and the impact of PIN on other aspects of practice.

It is clear from the PIN objectives that the intent of the initiative is to facilitate primary-care reform beyond the clinical processes captured by the indicators we measured. Broader application of the potential of the EMR and engagement of other healthcare providers can both be expected to result in changes in patient care. In addition, there is literature that suggests that there are potential negative effects of **pay-for-performance** funding (Petersen, Woodard, Urech, Daw, & Sookanan, 2006). Physicians may pay extra attention to those aspects of care that are incentivized at the expense of others, which may result in worse care in those areas.

This report includes new indicators not previously used at MCHP for primary-care reports. In past studies we developed quality indicators that supported descriptions of the quality of care provided. Other investigators have also developed measures appropriate to primary-care analysis. We have included both a new, original indicator (Routine Electrocardiograms, or EKGs) and other indicators not previously used in our primary-care reports. It should be noted that the asthma indicator was never funded through QBIF. In addition we have excluded some indicators from this study due to challenges in measuring them. For example, the guidelines for cervical cancer screening changed during the PIN implementation period making it impossible to measure accurately.

Table 2.4 lists the indicators included in the study and indicates whether QBIF is associated with them. This table is also included in the executive summary (Table E.2).

Table 2.4: Study Indicators and Quality Based Incentive Funding (QBIF) Indicators

Study Indicators*	QBIF Indicators**
Prevention and Screening	
Breast Cancer Screening	✓
Complete Immunizations at Age Two	✓
Annual Influenza Immunizations	
Older Adults Aged 65+	✓
People with Total Respiratory Morbidity	
Pneumococcal Immunization	✓
Disease Management	
Congestive Heart Failure Management	
Initiation of Drug Treatment	✓
Persistence of Drug Treatment	
Depression Care	✓
Diabetes Eye Examination	✓
Post Myocardial Infarction (MI) Management (Beta-Blocker)	
Initiation of Drug Treatment	✓
Persistence of Drug Treatment	
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)	
Initiation of Drug Treatment	
Persistence of Drug Treatment	
Asthma Care	✓
Benzodiazepine Prescribing	
Healthcare Delivery	
Continuity of Care	
Assigned Physician	
Provided by any Physicians in PIN Clinic	
Routine Electrocardiography	
Ambulatory Care Sensitive Conditions	
Referral Rates	
Assigned Physician	
Clinic Based	
Total	
Smoking Cessation Prescription	

A blank cell indicates that there is no equivalent QBIF Indicator

* For full description of the study indicators see Appendix Table 1.1.

** For full QBIF indicators descriptions please see Appendix Table 1.2.

Statistical Testing

Comparisons between PIN clinic patients and shadow-practice patients were made using **Poisson** or **negative binomial regression** models. These statistical models allow for comparisons of the rate of the outcomes for each indicator. Several different types of comparisons were conducted, all within a single complex model. First, a comparison over time was made for PIN clinic patients within a clinic. The rate of the outcome for each indicator in the two years before PIN implementation was compared to the rate of the outcome in the two years after PIN implementation. Second, the same comparison over time was made for shadow practices. Finally, the interaction between PIN status (PIN vs shadow) and time (before and after PIN implementation) was also assessed. This vital statistical test allows us to determine if the change in the rate of an outcome among PIN clinic patients was different from the change seen in their corresponding shadow-practice patients. If both groups of patients changed equally, then the effect seen among PIN patients could likely be attributed to more general trends in healthcare, rather than to PIN itself. Comparisons of the PIN patient group over time and the interaction between PIN status and time were calculated at a Type 1 Error rate (or alpha) of 0.05.

For comparisons of the shadow-practice patients over time, a different means of determining significance was employed. This was because the shadow-practice patient groups were 10 times the size of the PIN patient groups. The matched cohort had much greater statistical power, so a relatively small change among these patients might be significant. For these comparisons of shadow-practice patients over time, a **Minimum Detectable Effect Size** to obtain a power of 0.80 was calculated for each PIN practice. Only a difference in excess of this amount was considered a significant change over time for shadow-practice patients. This helped to ensure that a comparable difference would be required among the shadow practices to result in a significant change over time.

The results of these statistical tests are presented for each indicator in both the tables and subsequent graphs. Footnotes explain the results and their meaning.

In Chapters 3, 4 and 5 we present the results by indicator. However, we only comment on statistically significant changes over time. Chapter 6 presents the comparisons by length of follow-up after implementation. Chapter 7 is a summary of the results reorganized by clinic and by phase rather than by indicator and Chapter 8 is the discussion of the results.

Statistical testing allowed us to determine that observed differences between the rates are true, rather than due to chance. While this is useful mathematically, it does not necessarily reflect a meaningful difference from a policy or clinical perspective. Similarly, for some indicators we have a very small sample size, which made it very unlikely that we would have found statistically significant changes over time.

PIN Effect

For QBIF-associated indicators, we looked for a clear pattern that would suggest that the funding mechanism had a positive or negative effect. For indicators that are not associated with QBIF, the PIN effect could be negative—a decline in the quality of care. This may be related to attention being diverted from non-incentivized to incentivized indicators.

There is the potential for a PIN effect for each indicator at each clinic. We have chosen to comment on the collective PIN effect on the Phase 1 clinics together and Phase 2 clinics together, rather than each clinic separately. The PIN effect is defined by the interaction between the clinic affiliation (PIN, not PIN) and time, as described above.

CHAPTER 3: PREVENTION AND SCREENING

This chapter includes five indicators that focus on prevention and screening. Higher rates of prevention and screening are desirable and represent better outcomes.

Breast Cancer Screening

Manitoba introduced a province-wide breast cancer screening program in 1995. BreastCheck, which is operated by CancerCare Manitoba, provides screening **mammography** for eligible women without requiring a doctor's referral. The program has both fixed screening locations and mobile clinics. Women in the eligible age group receive invitations for screening in the mail. It is recommended that all women between the ages of 50 and 69 receive a mammogram every two years. Approximately 900 women in Manitoba are told they have breast cancer every year and approximately 220 women in Manitoba die every year due to breast cancer (CancerCare Manitoba, 2014).

This indicator looks at the age-adjusted proportion of women, aged 50 to 69, who had at least one mammogram in a two-year period. Both screening and diagnostic mammograms are included in this definition.

Observations

- Eligible populations in PIN clinics ranged from 621 to 5,341 pre-implementation, and from 641 to 5,481 post-implementation.
- Rates for PIN clinics ranged from 49% to 84% pre-implementation, and from 56% to 80% post-implementation.

In the pre-implementation period, four PIN clinics had lower rates of screening than their shadow practices, while seven clinics had higher rates.[2] Post-implementation, two clinics had lower rates than their shadow practices and eight PIN clinics had higher rates. Three PIN clinics had rates that showed improvement over time, while two PIN clinics had rates that decreased over time. One shadow practice had a higher rate over time, while one shadow practice had a decreased rate.

PIN Effect: Although a clinic-by-clinic listing does not indicate a clear effect, the summary results by phase suggest that PIN resulted in a significantly larger increase among Phase 1 clinics, and significantly lower decrease among Phase 2 clinics when compared to shadow practices. Both of these are positive outcomes for PIN. However, as indicated by the asterisks for the Phase 2 clinics in Figure 2.1, the interaction between type of clinic and time is significant—it indicates a positive PIN effect for the Phase 2 clinics as a group.

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[2] In the text that follows in Chapters 3, 4, and 5, we only comment on statistically significant changes over time.

Table 3.1: Breast Cancer Screening for Women aged 50-69

Age-adjusted

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	1,712	53.0	↓	1,861	55.5	↓	
		Shadow-Practice Patients	18,316	62.9		19,348	60.4		
	Assiniboine Medical Clinic*	PIN Patients	5,341	75.0	↑	5,481	79.0	↑	⇧
		Shadow-Practice Patients	52,697	62.1		55,252	64.0		⇧
	Dr. C. W. Wiebe Medical Centre*	PIN Patients	1,599	49.4	↓	1,755	58.8		⇧
		Shadow-Practice Patients	17,399	62.2		18,825	51.7		
	Steinbach Family Medical Center*	PIN Patients	2,257	64.4		2,501	71.3	↑	⇧
		Shadow-Practice Patients	24,723	63.9		26,556	58.2		
Phase 2	**Altona Clinic**	PIN Patients	621	58.5	↓	641	61.1	↓	
		Shadow-Practice Patients	6,796	67.8		6,887	61.8		
	Centre Médical Seine Inc.*	PIN Patients	1,319	66.1	↓	1,333	65.5		
		Shadow-Practice Patients	13,234	67.0		14,079	64.5		
	Clinique St. Boniface Clinic*	PIN Patients	3,135	75.7	↑	3,389	77.9	↑	
		Shadow-Practice Patients	31,556	66.4		32,814	61.6		⇩
	Concordia Health Associates	PIN Patients	1,363	71.5	↑	1,450	67.8	↑	
		Shadow-Practice Patients	14,319	66.3		14,996	66.5		
	Prairie Trail Medical Clinic	PIN Patients	1,735	78.7	↑	1,843	75.5	↑	⇩
		Shadow-Practice Patients	17,881	69.2		18,974	68.0		
	Tuxedo Family Medical Centre	PIN Patients	2,377	83.5	↑	2,494	80.2	↑	⇩
		Shadow-Practice Patients	22,678	69.9		23,882	68.2		
	Virden Medical Associates*	PIN Patients	636	72.3	↑	664	75.5	↑	
		Shadow-Practice Patients	6,636	65.2		6,992	61.1		
	Western Medical Clinic	PIN Patients	2,302	70.2	↑	2,214	69.5	↑	
		Shadow-Practice Patients	23,205	63.8		24,672	61.8		
Phase 1		PIN Patients	10,909	65.6	↓	11,598	79.7	↑	⇧
		Shadow-Practice Patients	113,135	71.0		119,981	73.7		
Phase 2*		PIN Patients	13,488	84.0	↑	14,028	83.3	↑	
		Shadow-Practice Patients	136,305	75.9		143,296	72.2		⇩

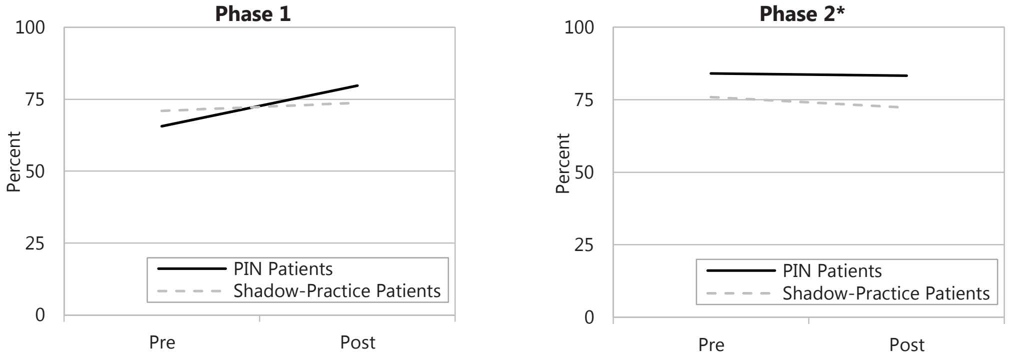
"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

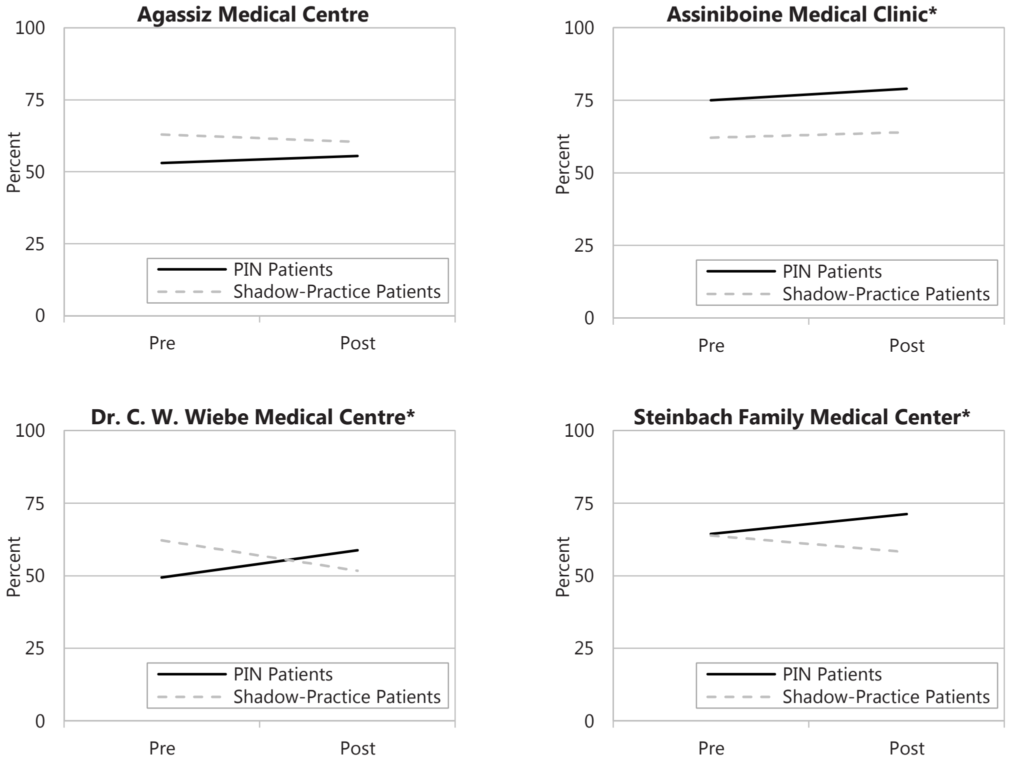
Figure 3.1: Breast Cancer Screening for Women aged 50-69 by Phase
Age-adjusted


Phase 1

Phase 2*

* indicates that there was a significant interaction (p<0.05)

Figure 3.2: Breast Cancer Screening for Women aged 50-69 for Phase 1 Clinics
Age-adjusted


Agassiz Medical Centre

Assiniboine Medical Clinic*

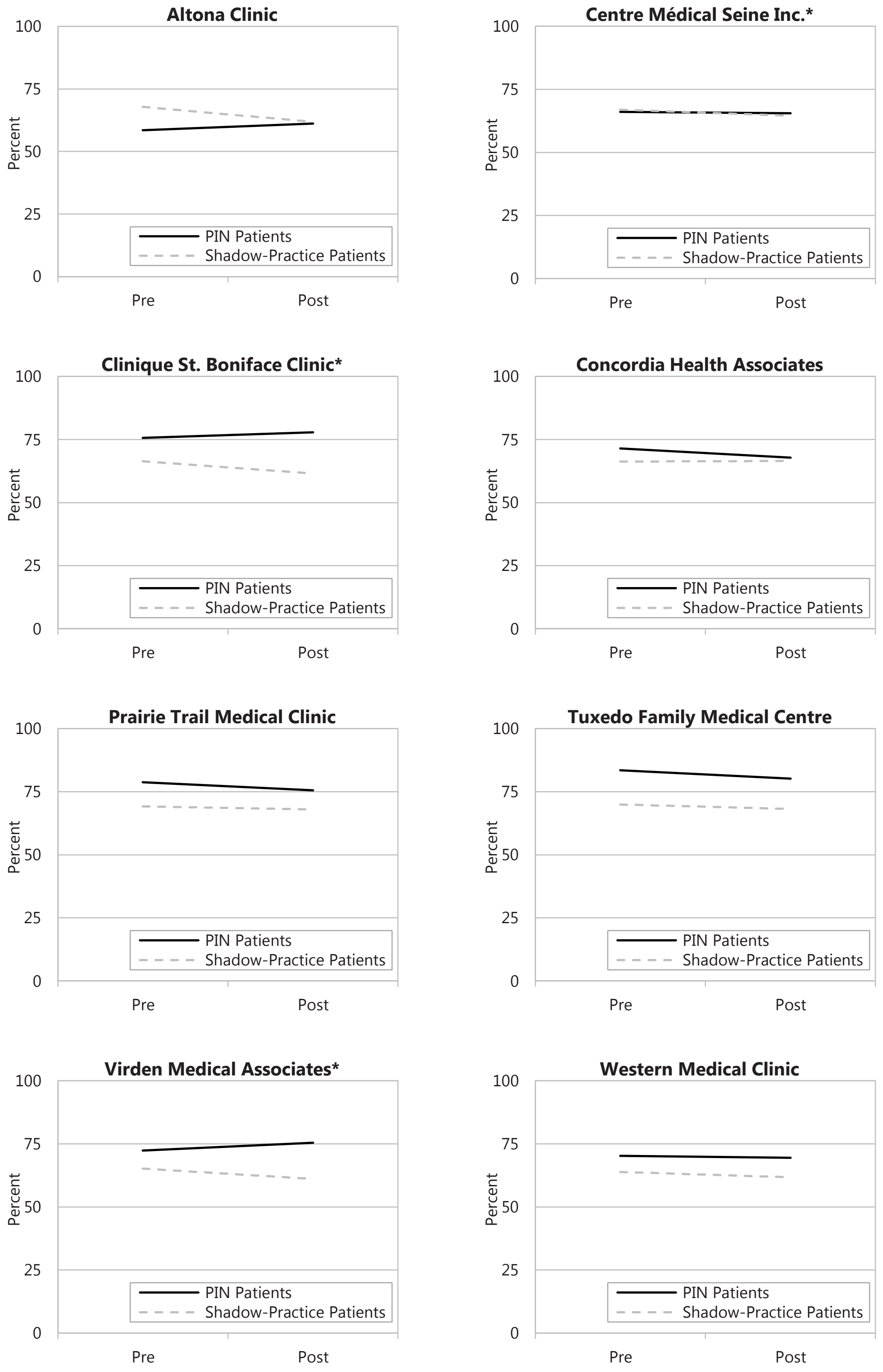
Dr. C. W. Wiebe Medical Centre*

Steinbach Family Medical Center*

* indicates that there was a significant interaction (p<0.05)

Figure 3.3: Breast Cancer Screening for Women aged 50-69 for Phase 2 Clinics

Age-adjusted



Altona Clinic

Centre Médical Seine Inc.*

Clinique St. Boniface Clinic*

Concordia Health Associates

Prairie Trail Medical Clinic

Tuxedo Family Medical Centre

Virden Medical Associates*

Western Medical Clinic

* indicates that there was a significant interaction ($p<0.05$)

Complete Immunizations at Age Two

The World Health Organization, UNICEF, and the World Bank (2009) maintain that "immunization is one of the most powerful and cost-effective of all health interventions. It prevents debilitating illness and disability and saves millions of lives each year."

Manitoba has a universal childhood immunization program that provides protection against a number of bacterial pathogens and viral infections. "Manitoba's immunization schedule recommends immunization with DTaP-IPV-Hib at two, four, six and 18 months. These five antigens are delivered with a single intramuscular injection. In addition, Manitoba recommends MMR and varicella (separate injections) at 12 months" (Hilderman et al., 2011). As of 2009, Men-C vaccine was added to the 12-month immunization schedule (Hilderman et al., 2011). To be considered complete for age at two, a child would have had to receive the vaccines described in Table 3.2.

Table 3.2: Doses Required to be "Complete for Age" for Two-Year-Olds

Antigen	Year						
	2005	2006	2007	2008	2009	2010	2011
Tetanus	4	4	4	4	4	4	4
Diphtheria	4	4	4	4	4	4	4
Pertussis	4	4	4	4	4	4	4
Haemophilus Influenza Type B (HIB)	4	4	4	4	4	4	4
Polio	3	3	3	3	3	3	3
Measles	1	1	1	1	1	1	1
Mumps	1	1	1	1	1	1	1
Rubella	1	1	1	1	1	1	1
Varicella	N/A	1	1	1	1	1	1
Pneumococcal Conjugate (PCV-7)	N/A	3	4	4	4	4	4
Meningococcal Conjugate C (Men-C, MCV)	N/A	0	0	0	0	0	1

Source: Manitoba Immunization Monitoring System Annual Reports 2005-2011
N/A indicates immunizations that were not on the immunization schedule for any age group during the year.

This indicator looks at the percent of two-year-old children, among those who were continuously registered with Manitoba Health, Healthy Living and Seniors up to their second birthday, who had all of the recommended vaccines for their age.

Only children who have been completely covered from birth by Manitoba Health, Healthy Living and Seniors are included in this analysis. Since Manitoba uses a mixed delivery model for its childhood immunizations, PIN physicians may not be the ones giving the vaccination. Physicians, **nurse practitioners,** and public health nurses administer vaccines in private- and public-health-office settings.

Observations

- Eligible population in PIN clinics ranged from 72 to 702 pre-implementation, and from 75 to 829 post-implementation.
- Rates for PIN clinics ranged from 52% to 82% pre-implementation, and from 47% to 79% post-implementation.

In the pre-implementation period, three PIN clinics had better rates of immunization than their shadow practices, while four had lower rates than their shadow practices. In the post-implementation period, six clinics had higher rates than their shadow practices and three had lower rates than their shadow practices. Three PIN clinics had rates that increased over time and three clinics had rates that decreased over time. The interaction term for one clinic suggests a significant negative change.

PIN Effect: The phase results suggest that PIN had a net positive effect on immunization for Phase 2 clinics. There was a significantly lower decrease in the rate among Phase 2 clinics, despite the individual clinic results described above.

Table 3.3: Complete Immunizations at Age Two

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	407	51.6	↓	414	58.9		⇧
		Shadow-Practice Patients	3,070	58.8		3,582	62.2		
	Assiniboine Medical Clinic*	PIN Patients	122	66.4	↓	113	69.9	↑	⇧
		Shadow-Practice Patients	2,526	69.2		2,142	67.3		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	671	56.0	↓	818	56.7	↓	
		Shadow-Practice Patients	5,813	62.2		7,189	62.2		
	Steinbach Family Medical Center	PIN Patients	702	69.9	↑	829	69.5	↑	
		Shadow-Practice Patients	5,835	62.3		6,834	63.8		
Phase 2	**Altona Clinic**	PIN Patients	86	65.1		83	61.4		
		Shadow-Practice Patients	1,173	66.5		1,144	61.5		
	Centre Médical Seine Inc.	PIN Patients	214	76.2	↑	195	71.3	↑	⇩
		Shadow-Practice Patients	1,707	66.3		1,648	60.7		
	Clinique St. Boniface Clinic*	PIN Patients	89	68.5		91	47.3	↓	⇩
		Shadow-Practice Patients	1,258	69.3		1,037	63.5		
	Concordia Health Associates	PIN Patients	72	61.1		97	51.5	↓	⇩
		Shadow-Practice Patients	1,017	66.0		882	64.2		
	Prairie Trail Medical Clinic*	PIN Patients	105	56.2	↓	134	68.7		⇧
		Shadow-Practice Patients	1,287	70.6		1,107	64.5		
	Tuxedo Family Medical Centre	PIN Patients	100	76.0		75	77.3	↑	
		Shadow-Practice Patients	996	71.4		899	67.1		
	Virden Medical Associates	PIN Patients	77	81.8	↑	90	78.9	↑	
		Shadow-Practice Patients	875	62.4		841	60.2		
	Western Medical Clinic*	PIN Patients	541	62.1		361	67.6	↑	
		Shadow-Practice Patients	3,488	63.4		3,509	60.8		
Phase 1		PIN Patients	1,902	60.9	↓	2,174	62.7	↓	
		Shadow-Practice Patients	17,244	62.7		19,747	63.3		
Phase 2*		PIN Patients	1,284	66.8	↑	1,126	66.4	↑	⇩
		Shadow-Practice Patients	11,801	66.4		11,067	62.2		⇩

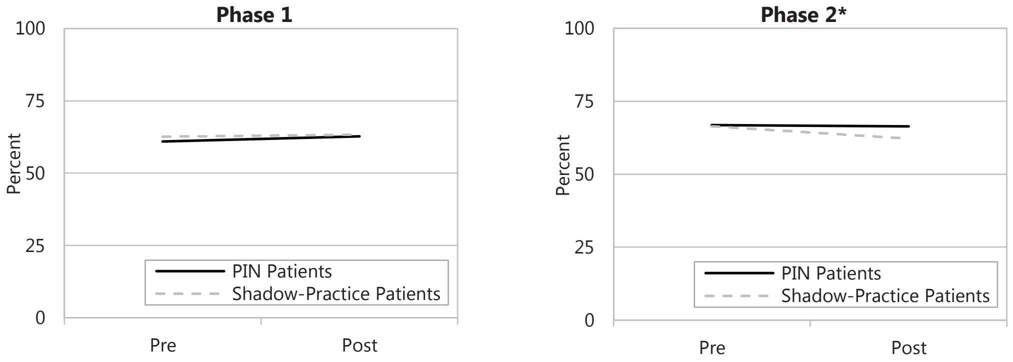
"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

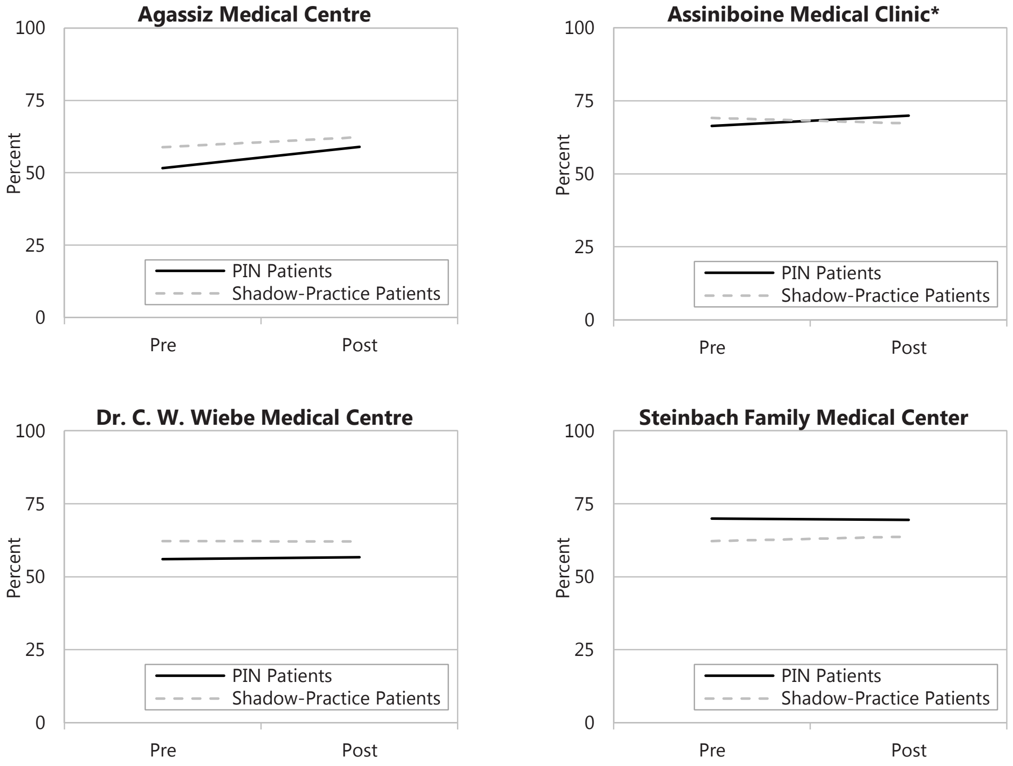
A blank cell indicates that the two rates were similar.

Figure 3.4: Complete Immunizations at Age Two by Phase



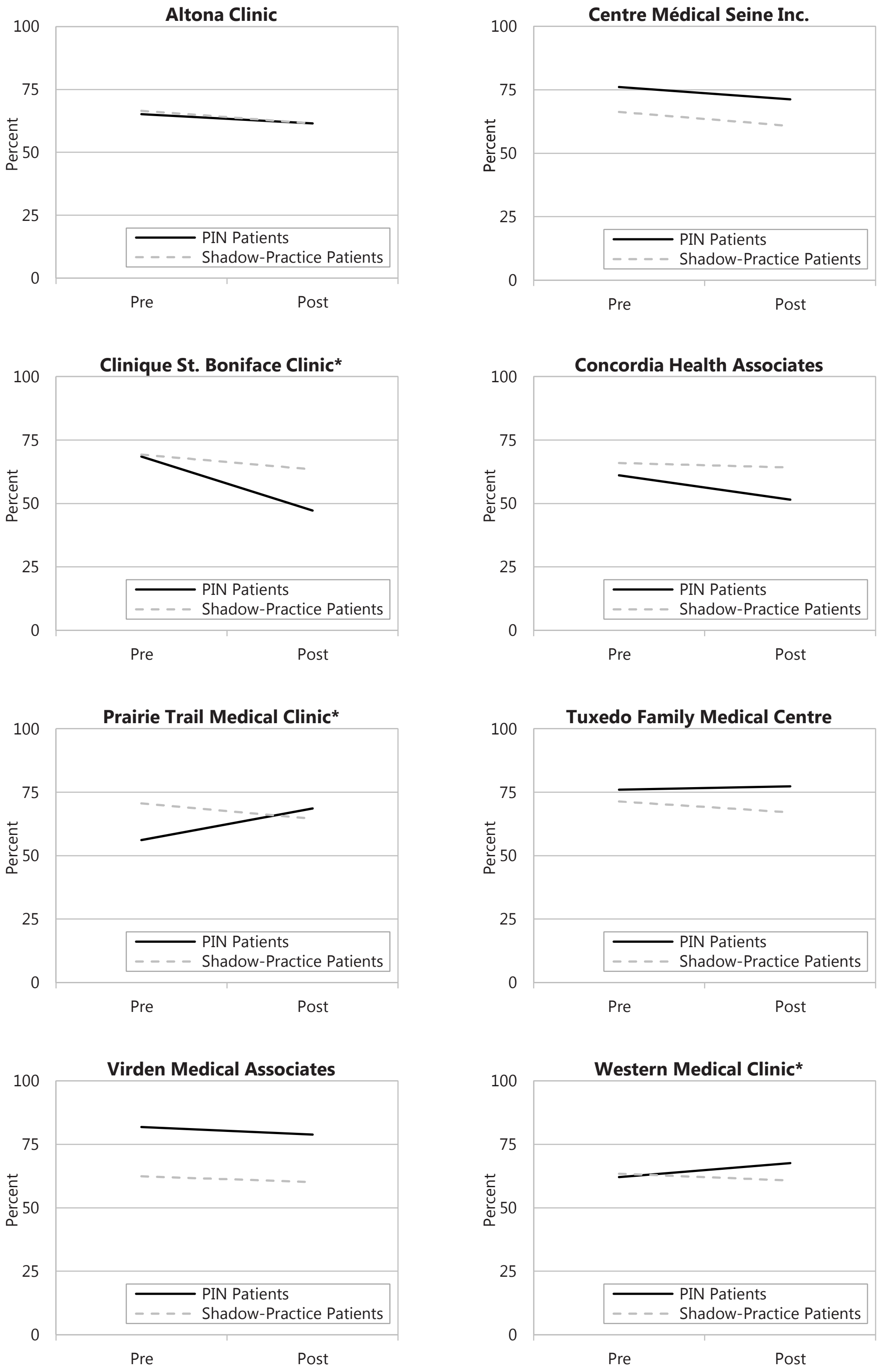
* indicates that there was a significant interaction (p<0.05)

Figure 3.5: Complete Immunizations at Age Two for Phase 1 Clinics



* indicates that there was a significant interaction (p<0.05)

Figure 3.6: Complete Immunizations at Age Two for Phase 2 Clinics



* indicates that there was a significant interaction (p<0.05)

Annual Influenza Immunization

Influenza is an acute viral disease of the respiratory tract caused by influenza A and B viruses and occurs in Canada every year, generally during late fall and the winter months (Public Health Agency of Canada, 2006). Yearly epidemics affect all age groups but have the highest risk of complications in children under two, adults older than 64, and people of any age with an extensive list of medical conditions. Manitoba introduced the influenza vaccine as a publicly funded program in 1999. At that time, it was introduced for healthcare workers and high-risk individuals, which included people aged 65 and older, those whose immune systems were weakened by disease or medication, and those with chronic conditions such as heart disease, kidney disease, and asthma (Manitoba Government, 1999). In 2004, this program was expanded to include children aged six to 23 months, their household contacts, and pregnant women expected to deliver during the influenza season. In 2005, the program was expanded again, this time to broaden eligibility to those with any condition that reduces ability to breathe or increases risk of choking. In 2007, the program was expanded to include all pregnant women regardless of delivery date and those who provide services within closed or relatively closed settings to persons at high risk. In 2010, Manitoba moved to a universal influenza immunization program.

The annual influenza immunization rates were studied for two groups of people: those aged 65 and older and those with respiratory illness, both of whom have been eligible for funded influenza immunization since 1999. Total respiratory morbidity (TRM) is a cumulative measure of the burden of respiratory illnesses in the population and includes the following diseases: asthma, chronic or acute bronchitis, emphysema, and chronic airway obstruction. TRM is often used in MCHP studies because of the challenge in separating these conditions from each other using the Repository's administrative data.

Adults Aged 65 and Older

The proportion of people aged 65 and older who received an influenza vaccination in each year of the two-year period that the patient was eligible.

Observations

- The eligible population in PIN clinics ranged from 979 to 7,757 pre-implementation, and from 1,009 to 7,972 post-implementation.
- Rates for PIN clinics ranged from 38% to 63% pre-implementation, and from 38% to 65% post-implementation.

In the pre-implementation period, six PIN clinics had higher rates of immunization than their shadow practices, and three had lower rates than their shadow practices. These numbers remained unchanged post-implementation. In the post-implementation period, two PIN clinics had increased rates, while two PIN clinics had decreased rates.

PIN Effect: The interactions analysis shows a significantly greater increase for Phase 1 clinics and significantly lower decrease for Phase 2 clinics. This suggests a positive PIN effect, despite the negative effect in one clinic.

Table 3.4: Annual Influenza Immunization, Adults Aged 65+

Age- and sex-adjusted

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	1,970	50.5	↑	2,015	48.6	↑	
		Shadow-Practice Patients	19,914	48.3		21,485	47.5		
	Assiniboine Medical Clinic*	PIN Patients	7,757	58.6	↑	7,972	62.4	↑	⇧
		Shadow-Practice Patients	69,319	50.3		75,303	48.6		⇩
	Dr. C. W. Wiebe Medical Centre	PIN Patients	1,935	38.3	↓	2,053	37.7	↓	
		Shadow-Practice Patients	19,868	48.2		20,937	48.3		
	Steinbach Family Medical Center	PIN Patients	2,701	40.2	↓	2,900	39.1	↓	
		Shadow-Practice Patients	27,743	48.6		29,846	47.8		
Phase 2	**Altona Clinic**	PIN Patients	1,003	43.6	↓	1,009	42.5	↓	
		Shadow-Practice Patients	9,900	50.8		9,928	50.2		
	Centre Médical Seine Inc.	PIN Patients	1,664	50.1	↑	1,685	48.5		
		Shadow-Practice Patients	16,418	49.4		17,334	48.3		
	Clinique St. Boniface Clinic*	PIN Patients	3,801	60.5	↑	4,097	58.5	↑	⇩
		Shadow-Practice Patients	39,490	52.7		42,038	50.5		
	Concordia Health Associates	PIN Patients	1,589	50.7		1,696	48.6		
		Shadow-Practice Patients	15,484	53.3		16,912	51.1		
	Prairie Trail Medical Clinic	PIN Patients	1,461	51.9		1,637	49.7		
		Shadow-Practice Patients	15,278	52.8		16,681	51.5		
	Tuxedo Family Medical Centre*	PIN Patients	1,418	63.1	↑	1,535	64.9	↑	⇧
		Shadow-Practice Patients	13,823	54.3		15,241	47.7		⇩
	Virden Medical Associates*	PIN Patients	979	51.6		1,015	53.2	↑	
		Shadow-Practice Patients	9,742	49.5		10,267	44.3		
	Western Medical Clinic*	PIN Patients	2,143	57.6	↑	2,202	51.4	↑	⇩
		Shadow-Practice Patients	21,257	46.5		23,598	49.5		
Phase 1*		PIN Patients	14,363	51.3	↓	14,940	56.7	↑	⇧
		Shadow-Practice Patients	136,844	53.2		147,571	52.8		
Phase 2*		PIN Patients	14,058	59.5	↑	14,876	57.6	↑	⇩
		Shadow-Practice Patients	141,392	55.2		151,999	51.6		⇩

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

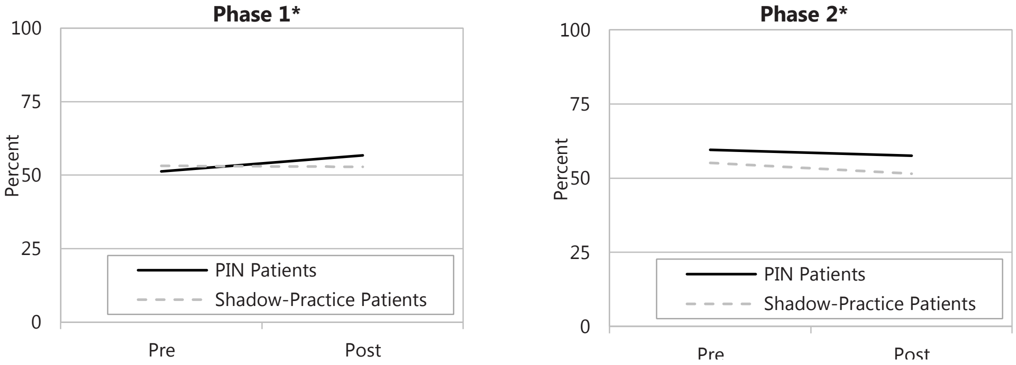
"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 3.7: Annual Influenza Immunization, Adults Aged 65+ by Phase

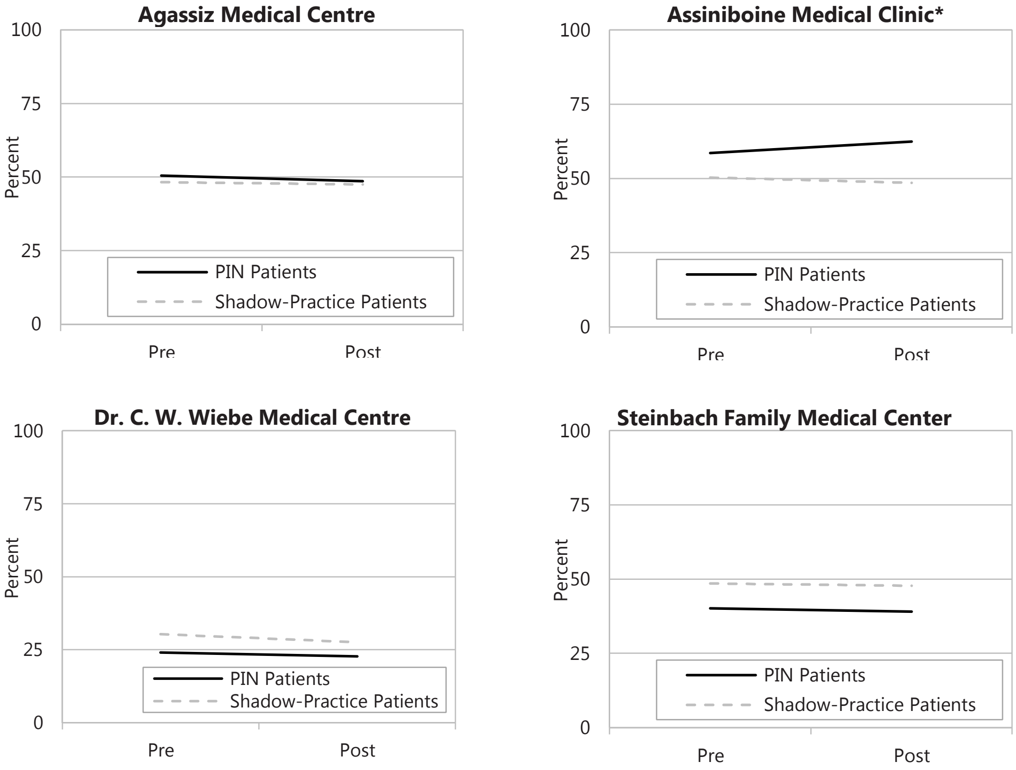
Age- and sex-adjusted



* indicates that there was a significant interaction ($p<0.05$)

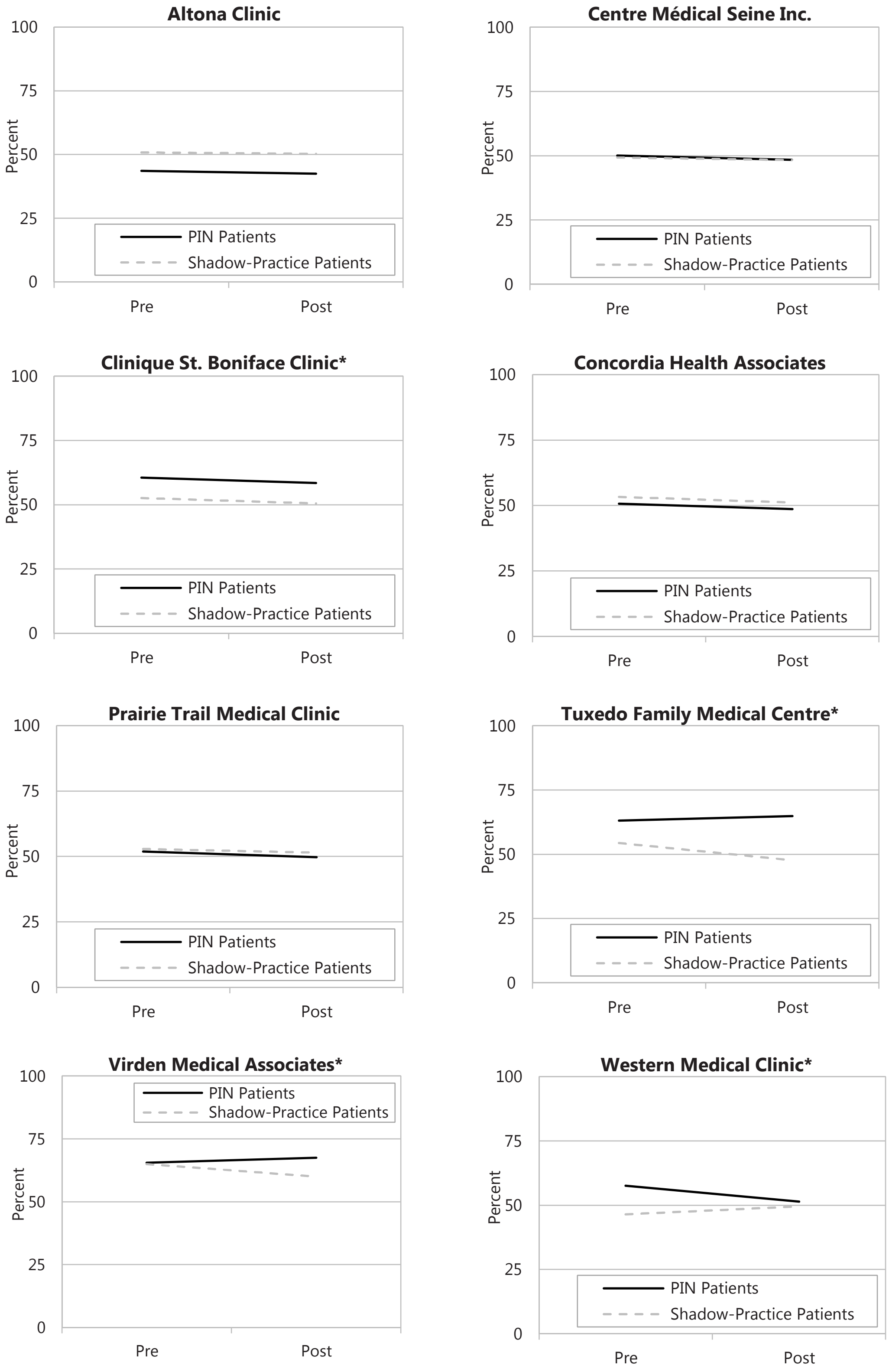
Figure 3.8: Annual Influenza Immunization, Adults Aged 65+ for Phase 1 Clinics

Age- and sex-adjusted



* indicates that there was a significant interaction ($p<0.05$)

Figure 3.9: Annual Influenza Immunization, Adults Aged 65+ for Phase 2 Clinics
Age- and sex-adjusted



Altona Clinic

Centre Médical Seine Inc.

Clinique St. Boniface Clinic*

Concordia Health Associates

Prairie Trail Medical Clinic

Tuxedo Family Medical Centre*

Virden Medical Associates*

Western Medical Clinic*

* indicates that there was a significant interaction ($p<0.05$)

People with Total Respiratory Morbidity (TRM)

The proportion of people with total respiratory morbidty (TRM) who received an influenza vaccination in a two-year period was calculated using data available in the Manitoba Immunization Monitoring System. If a person had at least one physician visit or hospitalization in a year for asthma, acute bronchitis, chronic bronchitis, bronchitis not specfied as acute or chronic, emphysema, or chronic airway obstruction, they were considered to have TRM (see Appendix Table 1.1 for a complete list of codes). An influenza vaccination was needed in each year that the patient met the criteria for diagnosis of TRM.

Observations

- The eligible population in PIN clinics ranged from 400 to 4,188 pre-implementation, and from 206 to 3,009 post-implementation.
- Rates for PIN clinics ranged from 23% to 44% pre-implementation, and from 22% to 45% post-implementation.

In the pre-implementation period, six PIN clinics had rates lower than their corresponding shadow practices,while five PIN clinics had rates higher than their shadow practices. In the post-implementation period, only three clinics had lower rates than their shadow practices, and five had higher rates. Two PIN clinics had an increase in rate over time while three had a decrease in rate over time.

PIN Effect: There is a positive PIN effect for Phase 1 clinics suggested by an increase in the rate over time. There is also a positive PIN effect for Phase 2 clinics suggested by a significantly lower decrease for this indicator.

Table 3.5: Annual Influenza Immunization, People with Total Respiratory Morbidity

Age- and sex-adjusted

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	871	29.3	↓	770	30.2		
		Shadow-Practice Patients	13,490	31.1		11,413	30.3		
	Assiniboine Medical Clinic	PIN Patients	4,188	40.3	↑	3,009	42.8	↑	⇧
		Shadow-Practice Patients	37,286	38.4		26,867	36.8		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	1,410	24.1	↓	936	22.8	↓	
		Shadow-Practice Patients	24,313	30.4		17,967	27.6		
	Steinbach Family Medical Center*	PIN Patients	1,608	23.9	↓	1,136	21.9	↓	⇩
		Shadow-Practice Patients	21,892	28.9		18,901	31.5		
Phase 2	**Altona Clinic**	PIN Patients	400	23.0	↓	206	23.1	↓	
		Shadow-Practice Patients	4,183	30.7		3,298	29.4		
	Centre Médical Seine Inc.*	PIN Patients	746	30.0	↓	559	31.5	↑	⇧
		Shadow-Practice Patients	7,511	34.5		5,979	30.6		
	Clinique St. Boniface Clinic*	PIN Patients	1,529	43.0	↑	1,068	44.3	↑	
		Shadow-Practice Patients	15,568	40.8		11,835	38.6		
	Concordia Health Associates	PIN Patients	698	34.2	↓	486	36.1		
		Shadow-Practice Patients	7,962	36.9		5,988	34.7		
	Prairie Trail Medical Clinic	PIN Patients	891	35.8	↑	673	33.6		⇩
		Shadow-Practice Patients	9,544	33.8		7,460	35.4		
	Tuxedo Family Medical Centre	PIN Patients	600	43.7	↑	551	44.7	↑	
		Shadow-Practice Patients	7,700	36.9		5,753	35.2		
	Virden Medical Associates	PIN Patients	443	36.6		305	37.2		
		Shadow-Practice Patients	3,794	36.3		3,184	32.3		
	Western Medical Clinic	PIN Patients	1,770	35.8	↑	1,762	31.9	↑	⇩
		Shadow-Practice Patients	13,023	27.9		10,800	29.0		
Phase 1*		PIN Patients	8,077	33.0	↓	5,851	37.6	↑	⇧
		Shadow-Practice Patients	96,981	37.8		75,148	36.8		
Phase 2*		PIN Patients	7,077	41.9	↑	5,610	41.7	↑	
		Shadow-Practice Patients	69,285	39.8		54,297	38.1		

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

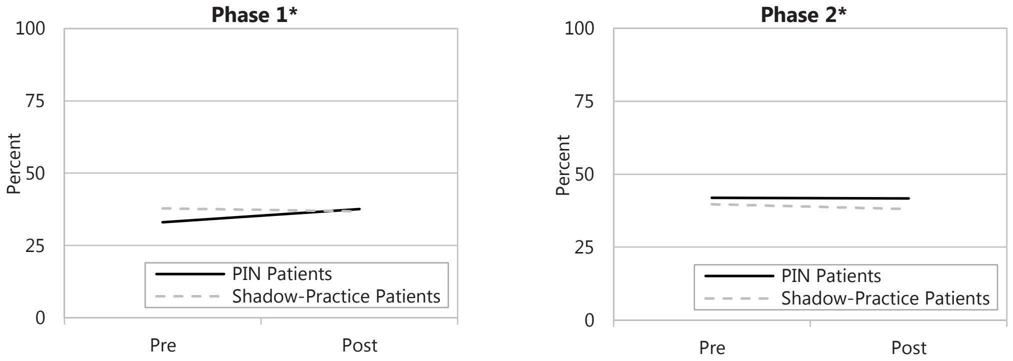
"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 3.10: Annual Influenza Immunization, People with Total Respiratory Morbidity by Phase

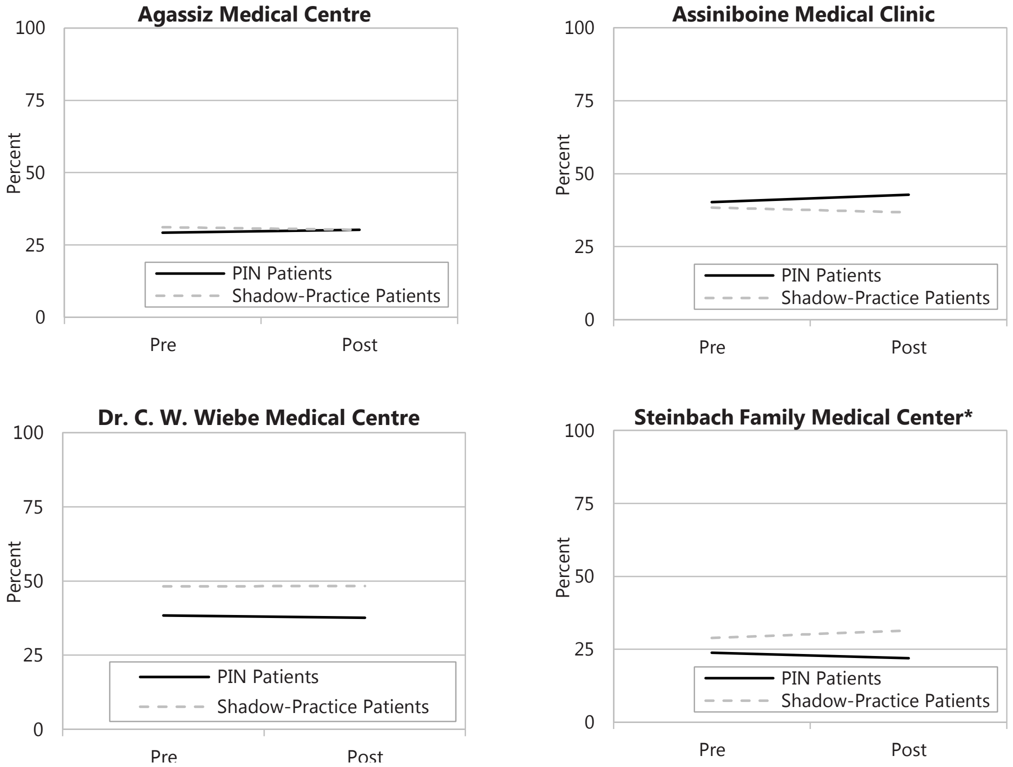
Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

Figure 3.11: Annual Influenza Immunization, People with Total Respiratory Morbidity for Phase 1 Clinics

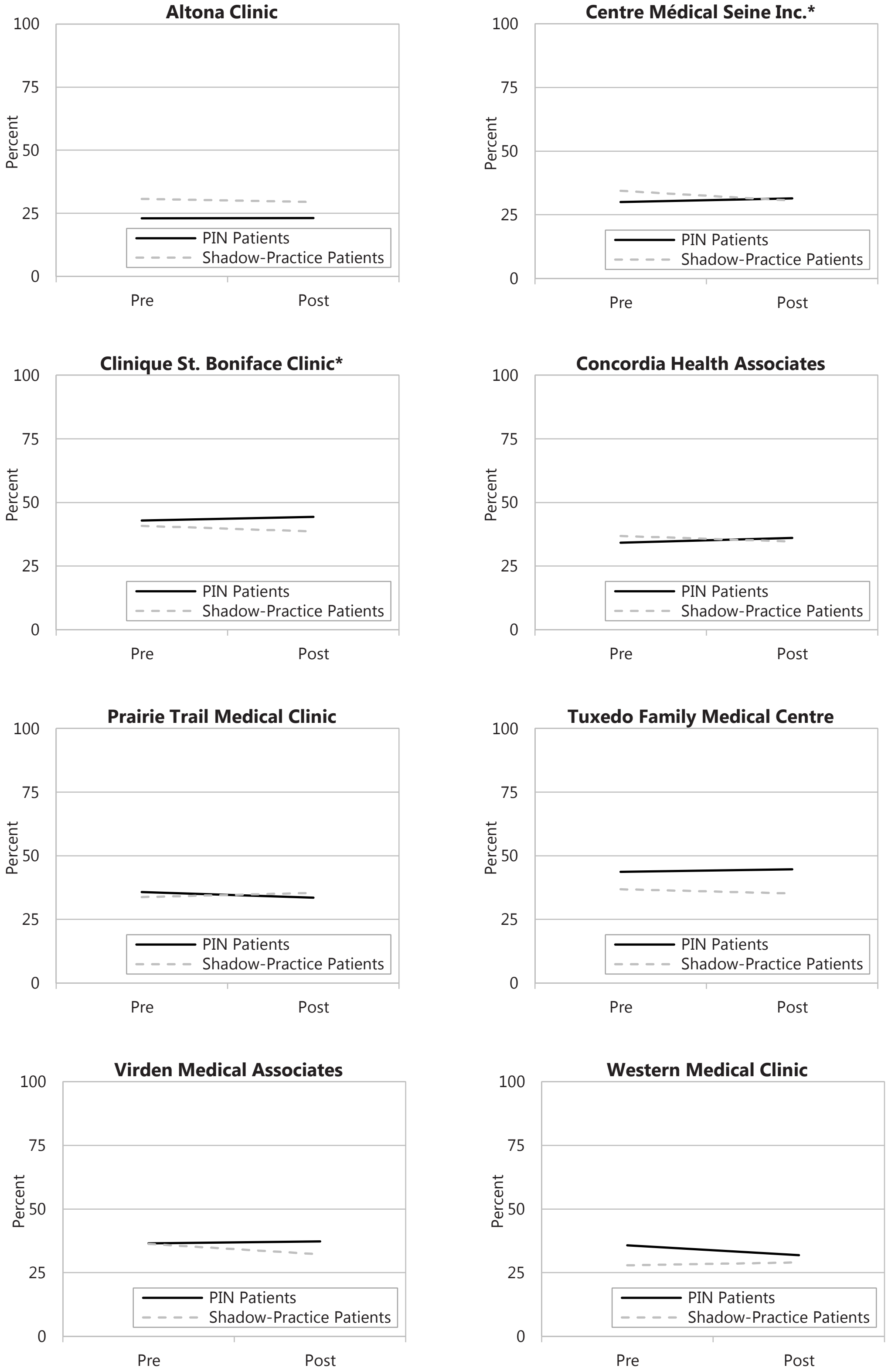
Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

Figure 3.12: Annual Influenza Immunization, People with Total Respiratory Morbidity for Phase 2 Clinics

Age- and sex-adjusted



* indicates that there was a significant interaction ($p<0.05$)

Pneumococcal Immunization

Invasive pneumococcal disease is an important cause of morbidity and mortality in those 65 and older, regardless of comorbidities. Manitoba introduced its pneumococcal polysaccharide immunization program (PPV-23) for those 65 and older in 2001.

The proportion of people aged 65 and older who received a pneumoccocal immunization was calculated using the Manitoba Immunization Monitoring System data. Current guidelines recommend a single lifetime vaccination for pneumococcal disease. Therefore, we included all Manitobans aged 65 and older who had received the vaccine at anytime as meeting the indicator requirement, and standardized the results for age and sex.

Observations:

- The eligible population in PIN clinics ranged from 1,015 to 7,984 pre-implementation, and from 1,051 to 8,311 post-implementation.
- Rates for PIN clinics ranged from 55% to 75% pre-implementation and from 58% to 75% post-implementation.

In the pre-implementation period, four PIN clinics had higher rates than their shadow practices while six had lower rates than their shadow practices. Of the six clinics that were lower pre-implementation, four had higher rates than their shadow practices post-implementation. Seven PIN clinics showed increased rates over time, and ten shadow practices showed decreased rates over time.

PIN Effect: This indicator shows a positive PIN effect. There are significant interactions between time and clinic type for both Phase 1 and Phase 2 analyses, as well as the individual clinic analyses.

Table 3.6: Pneumococcal Immunizations, Adults Aged 65+

Age- and sex-adjusted

	PIN Clinic	Patient Group	Pre-Implementation Eligible Population	Pre-Implementation Rate (%)	Pre-Implementation Compared to Shadow	Post-Implementation Eligible Population	Post-Implementation Rate (%)	Post-Implementation Compared to Shadow	Change Over Time
Phase 1	**Agassiz Medical Centre***	PIN Patients	2,105	59.0	↓	2,224	62.2	↑	⇧
		Shadow-Practice Patients	19,914	63.2		21,485	56.9		
	Assiniboine Medical Clinic*	PIN Patients	7,984	74.6	↑	8,311	75.0	↑	
		Shadow-Practice Patients	69,319	68.7		75,303	65.2		⇩
	Dr. C. W. Wiebe Medical Centre*	PIN Patients	2,011	56.4	↓	2,133	58.3	↑	⇧
		Shadow-Practice Patients	19,868	64.9		20,937	58.3		⇩
	Steinbach Family Medical Center*	PIN Patients	2,828	55.9	↓	3,037	64.9	↑	⇧
		Shadow-Practice Patients	27,743	63.7		29,846	52.2		⇩
Phase 2	**Altona Clinic***	PIN Patients	1,018	54.7	↓	1,051	59.0	↓	⇧
		Shadow-Practice Patients	9,900	67.6		9,928	59.9		⇩
	Centre Médical Seine Inc.*	PIN Patients	1,678	63.3		1,759	65.4	↑	⇧
		Shadow-Practice Patients	16,418	64.9		17,334	59.6		⇩
	Clinique St. Boniface Clinic*	PIN Patients	4,096	72.5	↑	4,302	75.1	↑	⇧
		Shadow-Practice Patients	39,490	68.7		42,038	63.0		⇩
	Concordia Health Associates*	PIN Patients	1,638	67.9	↓	1,756	67.7		
		Shadow-Practice Patients	15,484	70.1		16,912	67.0		
	Prairie Trail Medical Clinic*	PIN Patients	1,557	64.8	↓	1,717	66.6	↑	
		Shadow-Practice Patients	15,278	67.3		16,681	62.5		⇩
	Tuxedo Family Medical Centre*	PIN Patients	1,435	72.2	↑	1,587	73.3	↑	⇧
		Shadow-Practice Patients	13,823	67.6		15,241	63.2		⇩
	Virden Medical Associates*	PIN Patients	1,015	65.5		1,059	67.5	↑	
		Shadow-Practice Patients	9,742	65.0		10,267	60.0		⇩
	Western Medical Clinic*	PIN Patients	2,206	69.7	↑	2,422	69.4	↑	⇩
		Shadow-Practice Patients	21,257	61.8		23,598	59.4		⇩
Phase 1*		PIN Patients	14,928	66.4		15,705	70.5	↑	⇧
		Shadow-Practice Patients	136,844	67.8		147,571	64.5		⇩
Phase 2*		PIN Patients	14,643	69.7		15,653	71.4	↑	⇧
		Shadow-Practice Patients	141,392	68.6		151,999	65.2		⇩

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

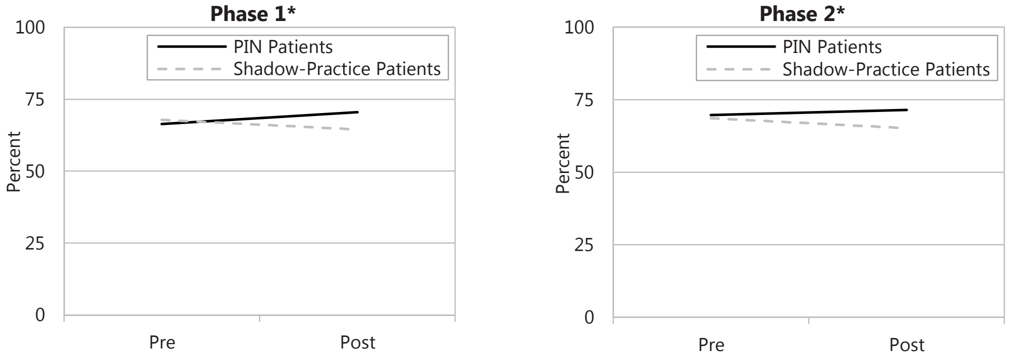
"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 3.13: Pneumococcal Immunizations, Adults Aged 65+

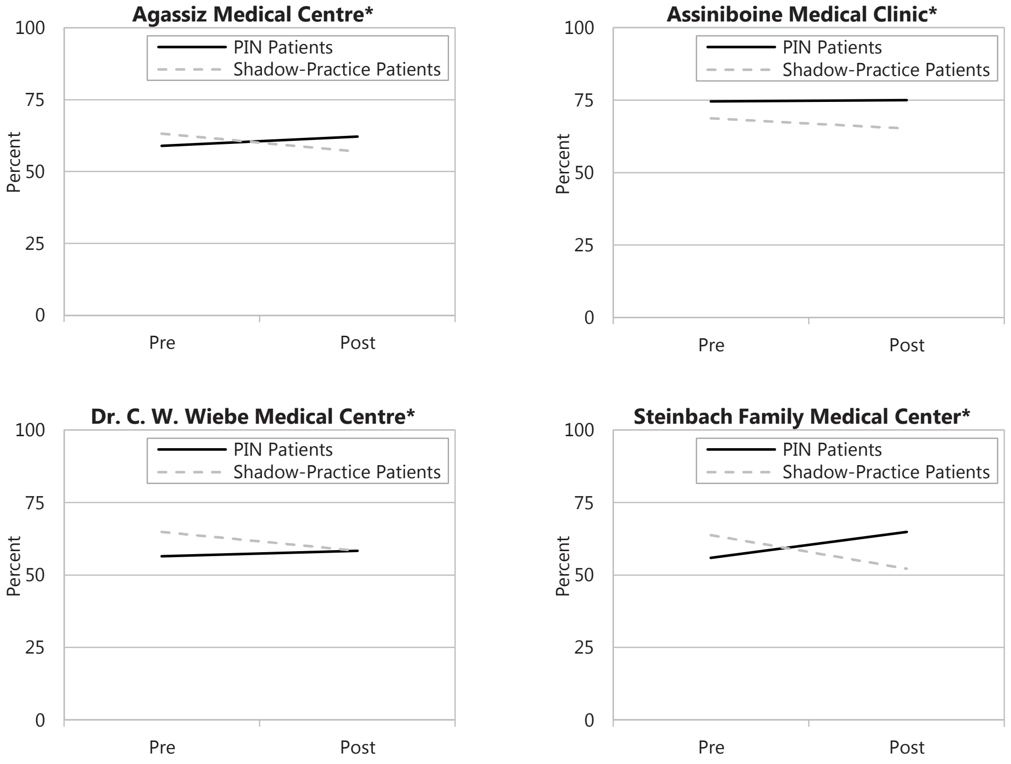
Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

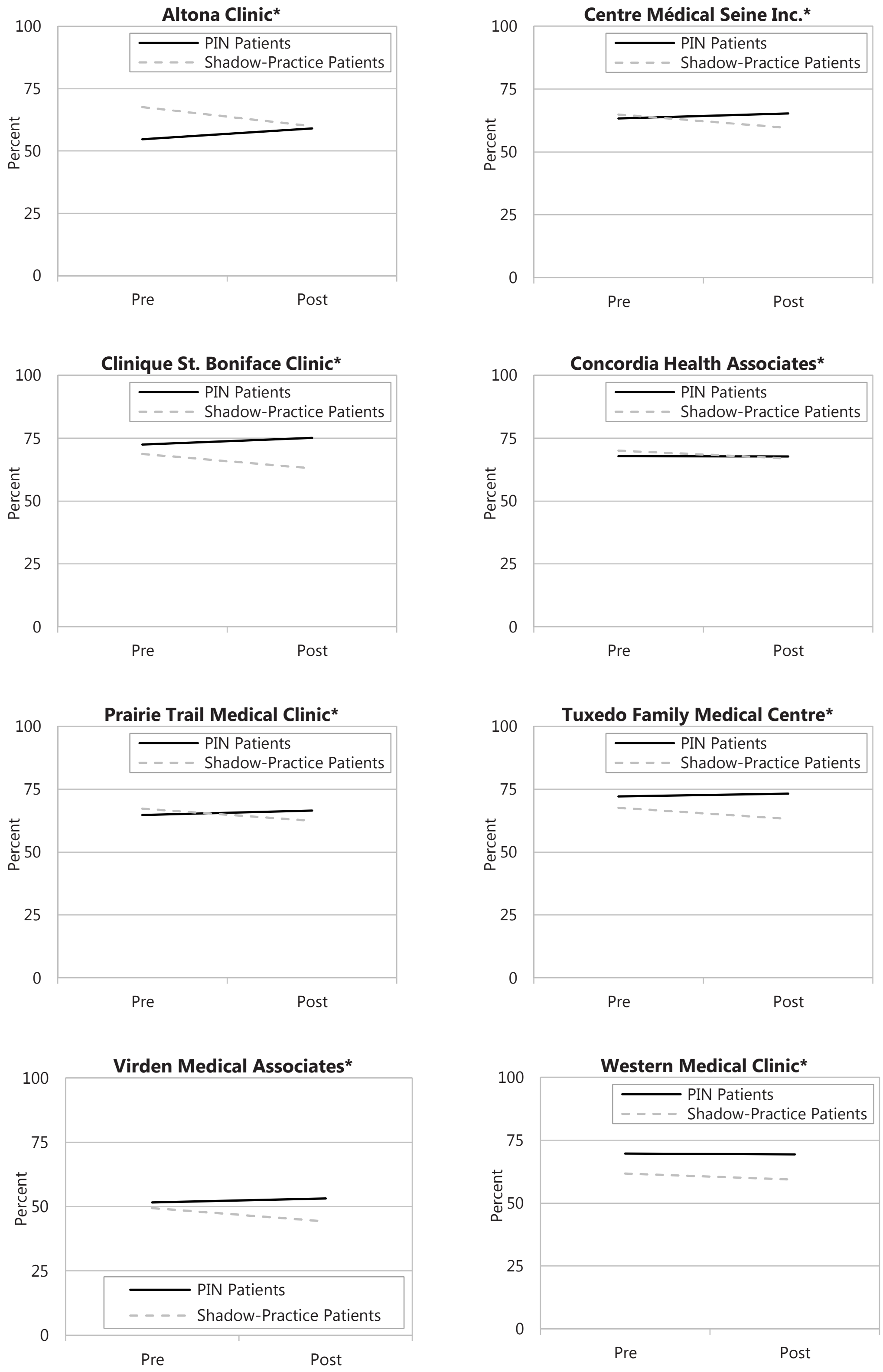
Figure 3.14: Pneumococcal Immunizations, Adults Aged 65+ for Phase 1 Clinics

Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

Figure 3.15: Pneumococcal Immunizations, Adults Aged 65+ for Phase 2 Clinics
Age- and sex-adjusted



Altona Clinic*

Centre Médical Seine Inc.*

Clinique St. Boniface Clinic*

Concordia Health Associates*

Prairie Trail Medical Clinic*

Tuxedo Family Medical Centre*

Virden Medical Associates*

Western Medical Clinic*

* indicates that there was a significant interaction ($p<0.05$)

CHAPTER 4: DISEASE MANAGEMENT

This chapter includes 10 indicators that describe disease management. These indicators are independent of the patient's age and sex; therefore, crude (i.e., unadjusted) rates are presented. It should be restated that the indicators used in this study were dictated by the availability of data to measure outcomes, rather than their relative clinical importance. However, these indicators do provide good insight into the disease management provided by the PIN clinics and shadow practices over time.

Congestive Heart Failure Management: Initiation and Persistence of Drug Treatment

Congestive Heart Failure (CHF) is a chronic condition that is often referred to as heart failure or congestive cardiac failure. This condition is characterized by the inability of the heart to pump a sufficient amount of blood throughout the body or by the requirement for elevated filling pressures in order to pump effectively. It is a condition that is "costly to both the patient and the health system" (Gwadry-Sridhar, Flintoft, Lee, Lee, & Guyatt, 2004). Treatment with two drugs, **Beta-blockers** and angiotension-converting enzyme inhibitors (ACEI), has been demonstrated to reduce the mortality and morbidity associated with CHF (Flather et al., 2000; Fonarow et al., 2008; Gruszczynski, Schuster, Regier, & Jensen, 2010). Current guidelines for the management of CHF include treatment with an ACEI or an Angiotension II Receptor Blocker (ARB) as first-line treatment. These two drug classes are considered to be interchangeable in their therapeutic effects.

Two indicators are presented in this section. The first looks at the proportion of newly diagnosed—i.e. no diagnosis of CHF in the year prior to the study period—CHF patients who filled a prescription of either an ACEI or an ARB within three months of diagnosis (initiation of treatment). A patient was considered to have a CHF diagnosis by the presence of at least one diagnosis for CHF in either a hospital abstract or a **physician claim** during the study period. The second indicator looks at the percentage of these same patients who had a prescription filled for 80% of the days between CHF diagnosis and end of the study period (persistence of treatment).

Observations for Initiation of ACEI or ARB Treatment:

- The eligible population—for both initiation and persistence of drug use—in PIN clinics ranged from 23 to 248 pre-implementation, and from 29 to 250 post-implementation.
- Rates of drug initiation for PIN clinics ranged from 39% to 87% pre-implementation, and from 49% to 74% post-implementation.

In the pre-implementation period, two PIN clinics had higher rates of initiation of drug treatment than their shadow practices. Four clinics had higher rates post-implementation. Two clinics had increased rates over time, while two had decreased rates over time.

PIN Effect: There is a significant interaction for the Phase 2 clinics that represents a negative PIN effect. Only one clinic showed a positive PIN effect, while one showed a negative PIN effect.

Table 4.1: Congestive Heart Failure Management: Initiation of Drug Treatment

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	94	61.7		96	65.6		
		Shadow-Practice Patients	850	64.2		863	61.3		
	Assiniboine Medical Clinic	PIN Patients	248	61.7		250	54.0		
		Shadow-Practice Patients	2,486	54.2		2,577	53.2		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	98	74.5	↑	83	65.1		⇩
		Shadow-Practice Patients	963	65.1		919	62.2		
	Steinbach Family Medical Center*	PIN Patients	94	60.6		115	73.9	↑	⇧
		Shadow-Practice Patients	1,142	61.6		1,099	60.9		
Phase 2	**Altona Clinic***	PIN Patients	30	86.7	↑	31	71.0	↑	⇩
		Shadow-Practice Patients	326	60.7		329	60.5		
	Centre Médical Seine Inc.*	PIN Patients	62	53.2		55	67.3	↑	⇧
		Shadow-Practice Patients	577	61.4		579	62.3		
	Clinique St. Boniface Clinic	PIN Patients	133	60.2		159	49.1		
		Shadow-Practice Patients	1,373	56.1		1,385	52.6		
	Concordia Health Associates	PIN Patients	64	56.3		76	50.0		
		Shadow-Practice Patients	547	56.1		559	56.2		
	Prairie Trail Medical Clinic	PIN Patients	39	38.5		42	52.4		
		Shadow-Practice Patients	532	54.3		564	54.1		
	Tuxedo Family Medical Centre	PIN Patients	23	65.2		35	60.0	↑	
		Shadow-Practice Patients	425	51.1		471	50.3		
	Virden Medical Associates	PIN Patients	32	71.9		29	62.1		
		Shadow-Practice Patients	378	64.0		340	61.5		
	Western Medical Clinic	PIN Patients	77	58.4		82	61.0		
		Shadow-Practice Patients	888	61.9		892	60.4		
Phase 1		PIN Patients	534	63.9		544	61.9		
		Shadow-Practice Patients	5,441	59.3		5,458	57.5		
Phase 2*		PIN Patients	460	59.3		509	56.2		⇩
		Shadow-Practice Patients	5,046	58.0		5,119	56.5		

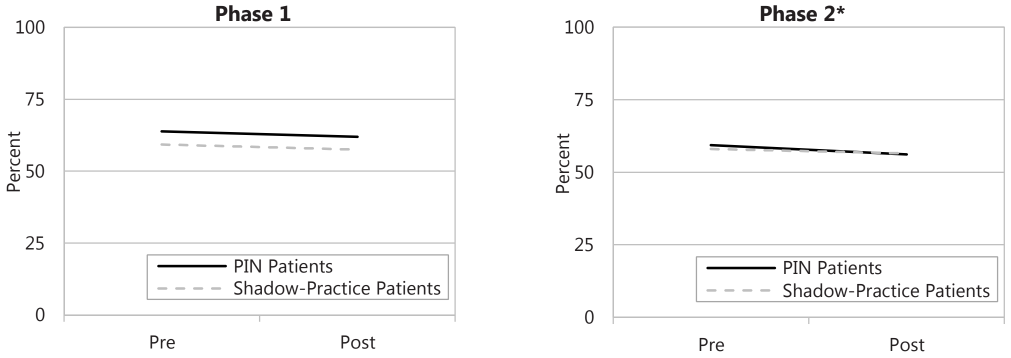
"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

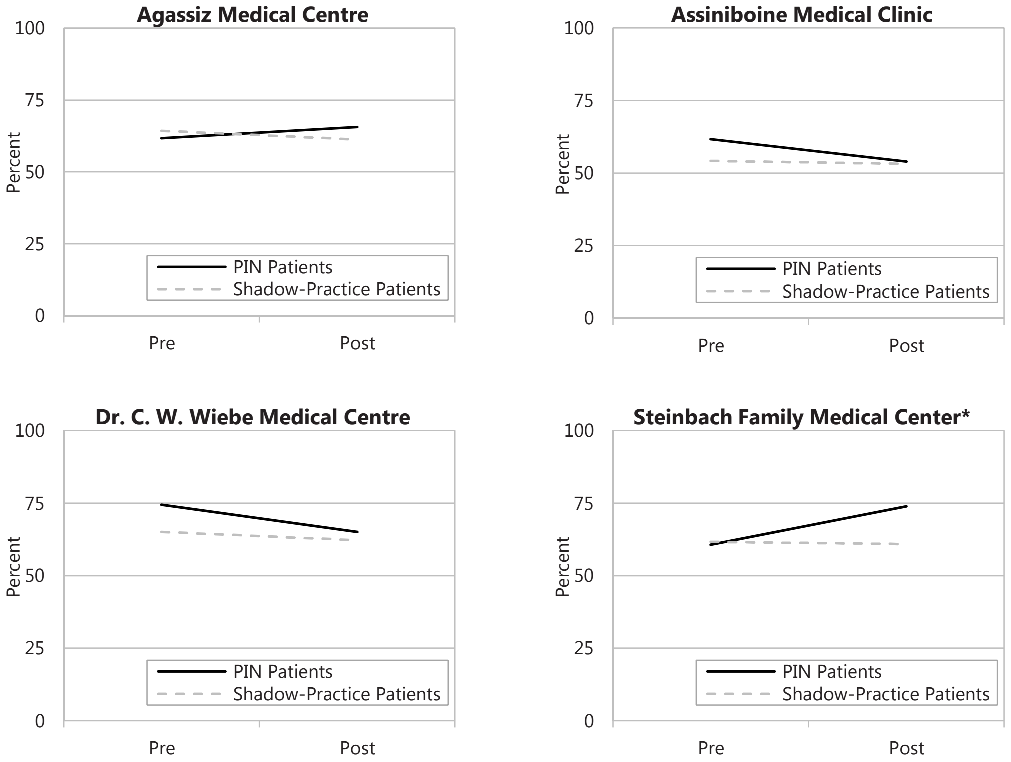
A blank cell indicates that the two rates were similar.

Figure 4.1: Congestive Heart Failure Management: Initiation of Drug Treatment by Phase



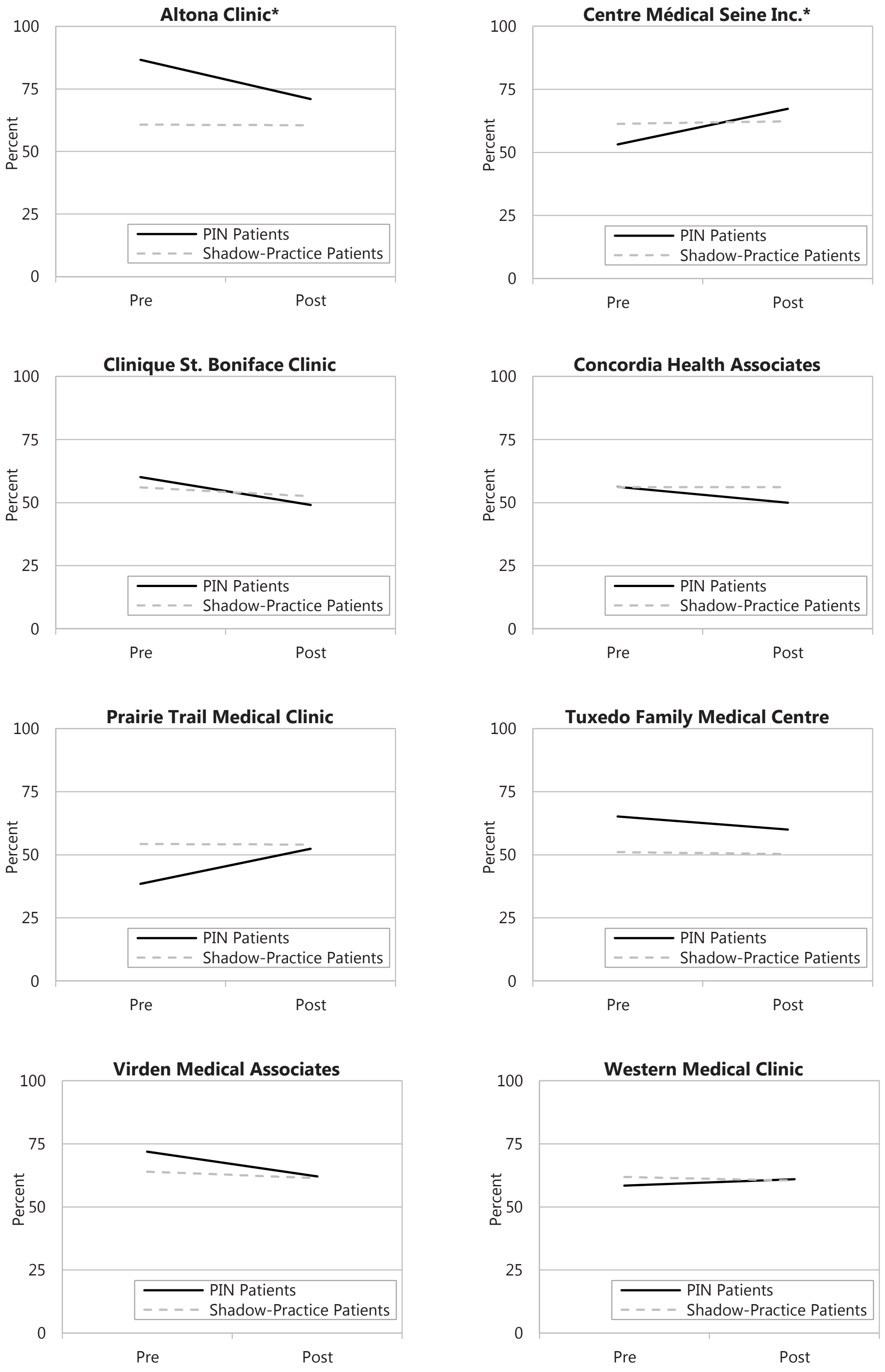
* indicates that there was a significant interaction (p<0.05)

Figure 4.2: Congestive Heart Failure Management: Initiation of Drug Treatment for Phase 1 Clinics



* indicates that there was a significant interaction (p<0.05)

Figure 4.3: Congestive Heart Failure Management: Initiation of Drug Treatment for Phase 2 Clinics



* indicates that there was a significant interaction ($p<0.05$)

Observations for Persistence of ACEI or ARB Treatment:

- The eligible population in PIN clinics ranged from 23 to 248 pre-implementation, and from 29 to 250 post-implementation.
- Rates of drug persistence for PIN clinics ranged from 36% to 83% pre-implementation, and from 46% to 71% post-implementation.

In the pre-implementation period, two PIN clinics had higher rates of drug persistence than their shadow practices, while four practices had higher rates than their shadow practices. One clinic had a decreased rate over time and one had an increased rate over time.

PIN Effect: As with the ACEI or ARB initiation indicator, there is a negative PIN effect for Phase 2 clinics for this indicator.

Table 4.2: Congestive Heart Failure Management: Persistence of Drug Treatment

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	94	50.0		96	59.4		
		Shadow-Practice Patients	850	58.2		863	56.3		
	Assiniboine Medical Clinic	PIN Patients	248	56.5		250	48.0		
		Shadow-Practice Patients	2,486	49.8		2,577	48.4		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	98	65.3		83	60.2		
		Shadow-Practice Patients	963	59.7		919	54.6		
	Steinbach Family Medical Center*	PIN Patients	94	56.4		115	63.5	↑	⇧
		Shadow-Practice Patients	1,142	56.5		1,099	56.1		
Phase 2	**Altona Clinic**	PIN Patients	30	83.3	↑	31	71.0	↑	⇩
		Shadow-Practice Patients	326	57.4		329	53.2		
	Centre Médical Seine Inc.	PIN Patients	62	51.6		55	61.8	↑	
		Shadow-Practice Patients	577	56.7		579	56.5		
	Clinique St. Boniface Clinic	PIN Patients	133	51.9		159	45.9		
		Shadow-Practice Patients	1,373	49.8		1,385	47.8		
	Concordia Health Associates	PIN Patients	64	56.3		76	46.1		
		Shadow-Practice Patients	547	51.0		559	50.4		
	Prairie Trail Medical Clinic	PIN Patients	39	35.9		42	52.4		
		Shadow-Practice Patients	532	47.9		564	48.6		
	Tuxedo Family Medical Centre	PIN Patients	23	56.5	↑	35	60.0	↑	
		Shadow-Practice Patients	425	45.9		471	47.3		
	Virden Medical Associates	PIN Patients	32	68.8		29	58.6		
		Shadow-Practice Patients	378	59.0		340	57.1		
	Western Medical Clinic	PIN Patients	77	51.9		82	52.4		
		Shadow-Practice Patients	888	56.6		892	52.7		
Phase 1		PIN Patients	534	56.9		544	55.1		
		Shadow-Practice Patients	5,441	54.3		5,458	52.3		
Phase 2*		PIN Patients	460	54.6		509	52.5		⇩
		Shadow-Practice Patients	5,046	52.6		5,119	50.9		

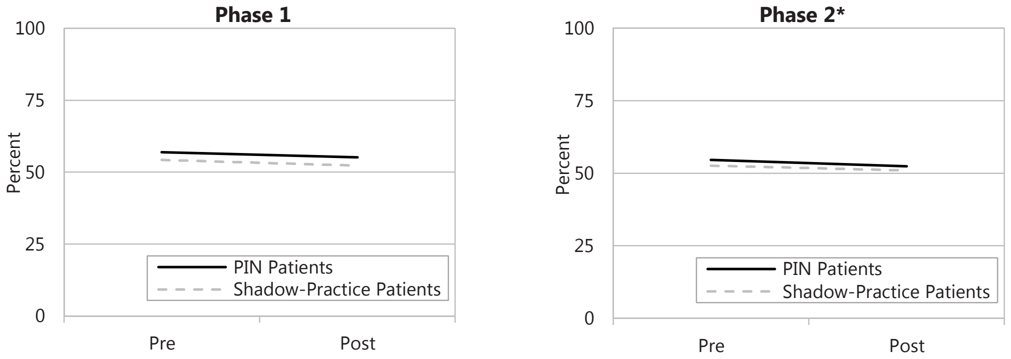
"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

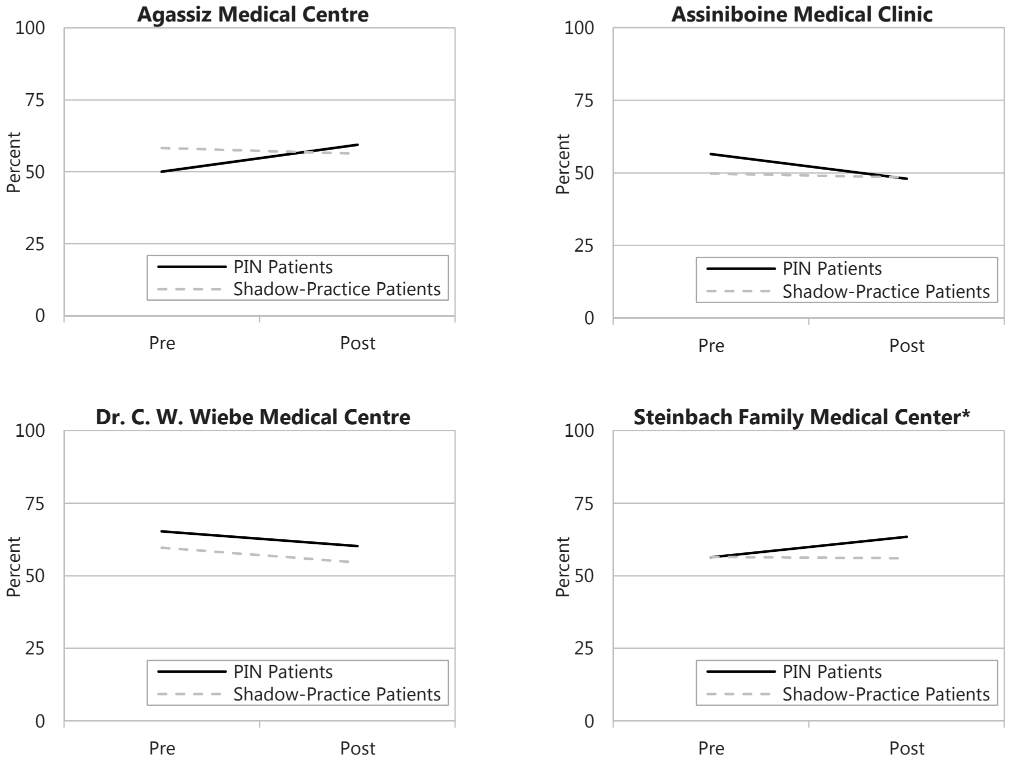
A blank cell indicates that the two rates were similar.

Figure 4.4: Congestive Heart Failure Management: Persistence of Drug Treatment by Phase



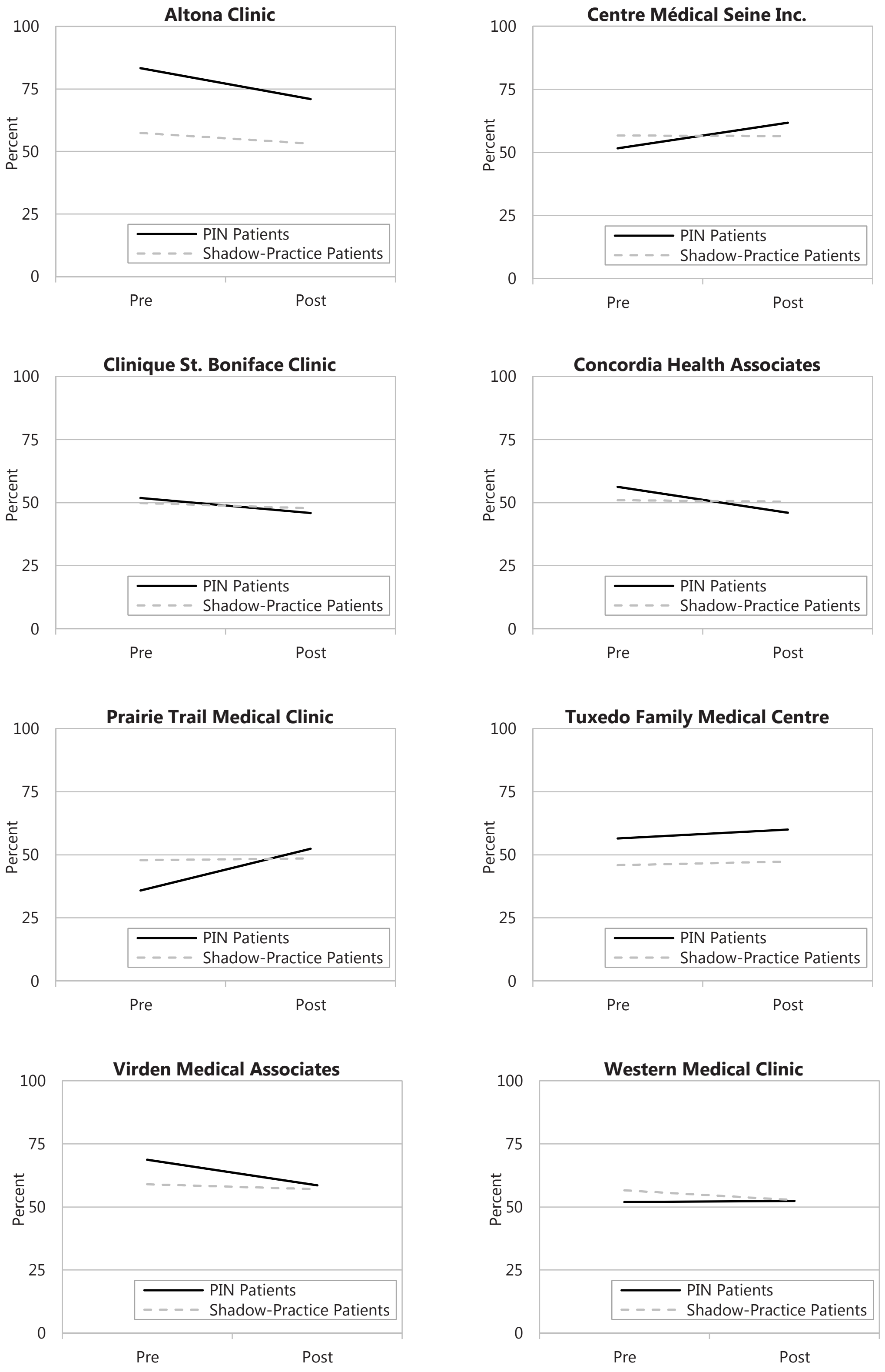
* indicates that there was a significant interaction ($p<0.05$)

Figure 4.5: Congestive Heart Failure Management: Persistence of Drug Treatment for Phase 1 Clinics



* indicates that there was a significant interaction ($p<0.05$)

Figure 4.6: Congestive Heart Failure Management: Persistence of Drug Treatment for Phase 2 Clinics



* indicates that there was a significant interaction ($p<0.05$)

Depression Care

Approximately eight percent of Canadians will experience a major depression in their lifetime, and between approximately 4% and 5% of Canadians are depressed at any point in time (Mood Disorders Society of Canada, 2009). Depression can be treated with medication or other non-drug related treatments. Initially, mild depression is not generally treated with medication. Clinical guidelines recommend routine follow-up of patients to whom antidepressants have been prescribed, both to monitor side-effects of the medication and to monitor the patient's mood (Hauser, 2013).

Depression care was calculated as the percent of patients newly diagnosed with depression, as well as those who filled a prescription for an antidepressant medication and made three subsequent **ambulatory visits** within four months of the prescription being filled (any diagnosis, any physician).

Observations

- The eligible population in PIN clinics ranged from 47 to 446 pre-implementation, and from 52 to 406 post-implementation.
- Rates for PIN clinics ranged from 48% to 65% pre-implementation, and from 37% to 65% post-implementation.

The number of new prescriptions for depression care is small. In the pre-implementation period, only one PIN clinic had a rate that was higher than its shadow practice. That clinic showed no change over time, but still had a higher rate than its shadow in the post-implementation period. In the post-implementation period, one additional PIN clinic had a higher rate than its shadow practice, and two clinics had lower rates than their shadow practices. The only different rate change over time was for two PIN clinics where the rates decreased.

PIN Effect: Phase 1 clinics demonstrated a negative PIN effect for this indicator.

Table 4.3: Depression Care: Prescription Follow-Up

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	142	54.2		136	45.6		
		Shadow-Practice Patients	1,427	54.7		1,414	51.6		
	Assiniboine Medical Clinic	PIN Patients	446	60.1		406	53.0		
		Shadow-Practice Patients	2,963	59.7		2,895	58.6		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	173	56.1		173	52.0		
		Shadow-Practice Patients	1,744	53.7		1,945	50.2		
	Steinbach Family Medical Center	PIN Patients	271	48.3		258	37.2	↓	⇩
		Shadow-Practice Patients	2,128	54.9		2,354	50.5		
Phase 2	**Altona Clinic**	PIN Patients	68	51.5		52	59.6		
		Shadow-Practice Patients	472	48.7		511	52.6		
	Centre Médical Seine Inc.	PIN Patients	91	54.9		94	42.6		
		Shadow-Practice Patients	870	51.4		892	53.3		
	Clinique St. Boniface Clinic	PIN Patients	173	56.6		215	59.1		
		Shadow-Practice Patients	1,605	58.9		1,600	59.5		
	Concordia Health Associates	PIN Patients	131	53.4		117	41.0	↓	⇩
		Shadow-Practice Patients	769	56.0		884	57.0		
	Prairie Trail Medical Clinic	PIN Patients	133	61.7		141	65.2	↑	
		Shadow-Practice Patients	1,054	54.8		1,075	55.3		
	Tuxedo Family Medical Centre	PIN Patients	105	62.9		104	63.5		
		Shadow-Practice Patients	805	60.2		889	56.5		
	Virden Medical Associates	PIN Patients	47	51.1		76	56.6		
		Shadow-Practice Patients	444	56.1		486	53.3		
	Western Medical Clinic	PIN Patients	309	65.0	↑	273	61.9	↑	
		Shadow-Practice Patients	1,707	49.7		1,740	48.7		
Phase 1*		PIN Patients	1,032	55.5		973	47.6		⇩
		Shadow-Practice Patients	8,262	56.4		8,608	53.3		
Phase 2		PIN Patients	1,057	59.2		1,072	57.5		
		Shadow-Practice Patients	7,726	54.5		8,077	54.5		

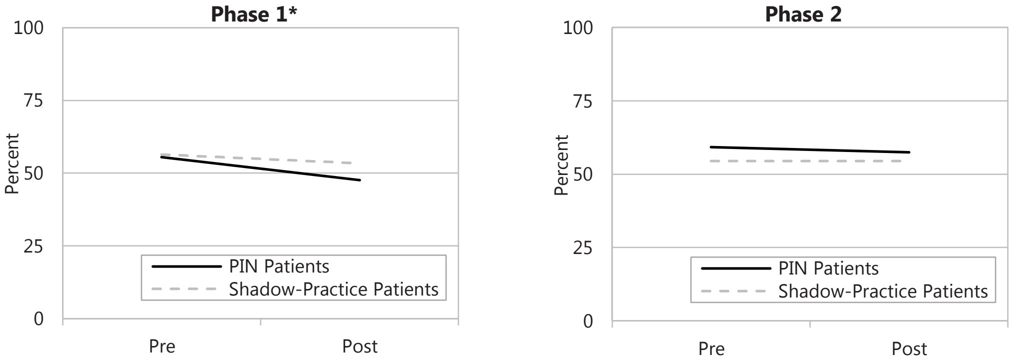
"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

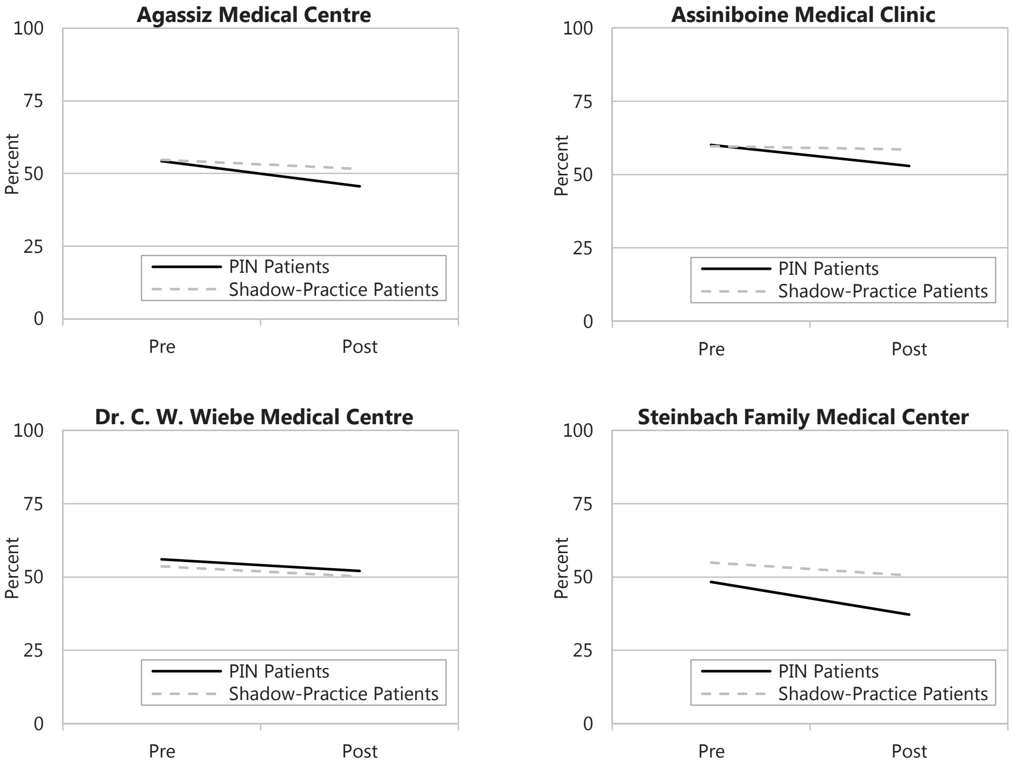
A blank cell indicates that the two rates were similar.

Figure 4.7: Depression Care: Prescription Follow-Up by Phase



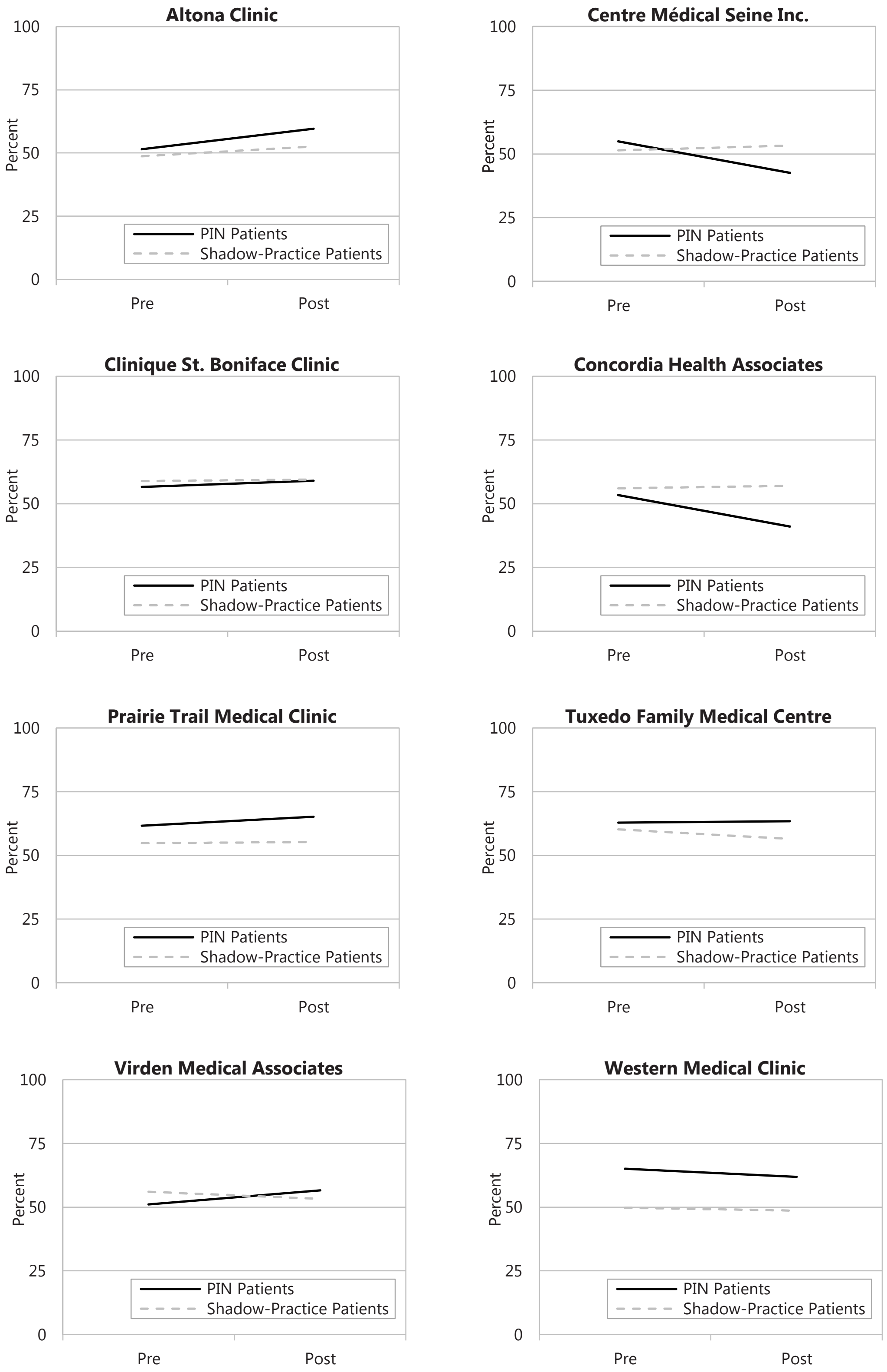
* indicates that there was a significant interaction (p<0.05)

Figure 4.8: Depression Care: Prescription Follow-Up for Phase 1 Clinics



* indicates that there was a significant interaction (p<0.05)

Figure 4.9: Depression Care: Prescription Follow-Up for Phase 2 Clinics



* indicates that there was a significant interaction (p<0.05)

Diabetes Eye Examination

Individuals with diabetes are at a greater risk of damage to the retina, the light-sensitive layer of tissue at the back of the inner eye, than the general population. Regular eye examinations for people with diabetes are recommended to help to diagnose retinopathy early and initiate treatment to slow its progression. Rates of annual eye examination were calculated as the percentage of persons with diabetes aged 20 to 79 who had at least one eye examination by an **ophthalmologist** or **optometrist** during the period. Note that if a patient had a diabetes diagnosis in both years, they needed two examinations to be counted.

Observations

- The eligible population in PIN clinics ranged from 269 to 2,262 pre-implementation, and from 304 to 2,393 post-implementation.
- Rates for PIN clinics ranged from 35% to 43% pre-implementation, and from 34% to 49% post-implementation.

In the pre-implementation period, seven of the twelve PIN clinics had higher rates of eye examinations than their shadow practices. In the post-implementation period, one additional PIN clinic had a higher rate than its shadow practice. Four PIN clinics had an increased rate over time while one PIN clinic had a decreased rate over time.

PIN Effect: Because we have defined a PIN effect as an interaction between clinic type and time that occurs in both Phase 1 and Phase 2 clinics together, rather than each clinic separately, and there is a positive interaction for only two clinics, there is no PIN effect for this indicator

Table 4.4: People with Diabetes Diagnosis who had an Eye Examination

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre***	PIN Patients	661	38.0	🡑	747	49.4	🡑	⇧
		Shadow-Practice Patients	8,483	32.9		9,493	33.8		
	Assiniboine Medical Clinic	PIN Patients	2,262	34.7		2,393	37.4		
		Shadow-Practice Patients	23,612	34.4		25,712	35.2		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	639	35.2	🡑	694	33.6	🡑	⇩
		Shadow-Practice Patients	10,461	29.6		11,856	29.9		
	Steinbach Family Medical Center	PIN Patients	977	35.7		1,063	39.4	🡑	⇧
		Shadow-Practice Patients	12,075	33.4		13,469	33.2		
Phase 2	**Altona Clinic**	PIN Patients	269	37.2		304	37.5		
		Shadow-Practice Patients	3,484	34.1		3,641	37.2		
	Centre Médical Seine Inc.	PIN Patients	590	36.1		619	36.2		
		Shadow-Practice Patients	6,210	35.1		6,683	35.7		
	Clinique St. Boniface Clinic	PIN Patients	1,290	37.8		1,480	39.5		
		Shadow-Practice Patients	13,668	34.5		14,678	35.5		
	Concordia Health Associates	PIN Patients	565	37.5	🡑	587	41.7	🡑	
		Shadow-Practice Patients	6,114	33.3		6,654	33.5		
	Prairie Trail Medical Clinic	PIN Patients	603	38.0	🡑	667	38.8	🡑	
		Shadow-Practice Patients	6,506	32.6		7,266	34.5		
	Tuxedo Family Medical Centre*	PIN Patients	343	37.6	🡑	389	44.2	🡑	⇧
		Shadow-Practice Patients	4,973	33.7		5,506	36.2		
	Virden Medical Associates	PIN Patients	317	42.9	🡑	359	44.0	🡑	⇧
		Shadow-Practice Patients	3,612	34.8		3,793	37.3		
	Western Medical Clinic	PIN Patients	1,143	38.1	🡑	1,219	38.1	🡑	
		Shadow-Practice Patients	11,380	30.8		12,428	33.5		
Phase 1		PIN Patients	4,539	35.4		4,897	39.1		⇧
		Shadow-Practice Patients	54,631	33.0		60,530	33.5		
Phase 2		PIN Patients	5,120	37.9		5,624	39.5		
		Shadow-Practice Patients	55,947	33.4		60,649	35.1		

"🡑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "🡓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 4.10: People with Diabetes Diagnosis who had an Eye Examination by Phase

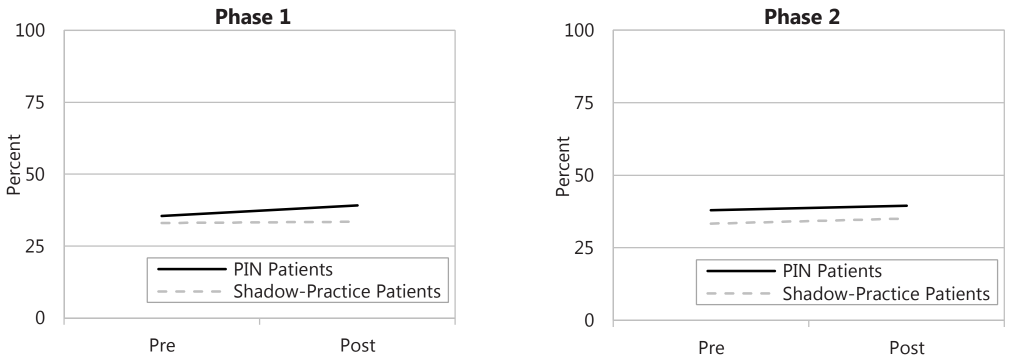
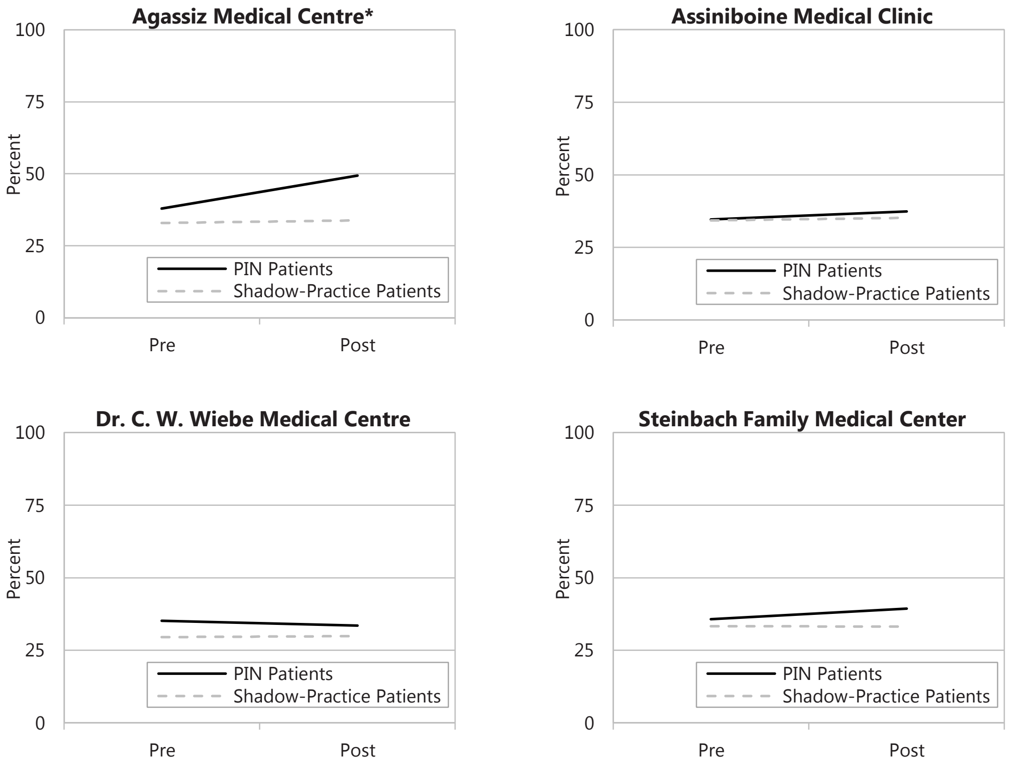
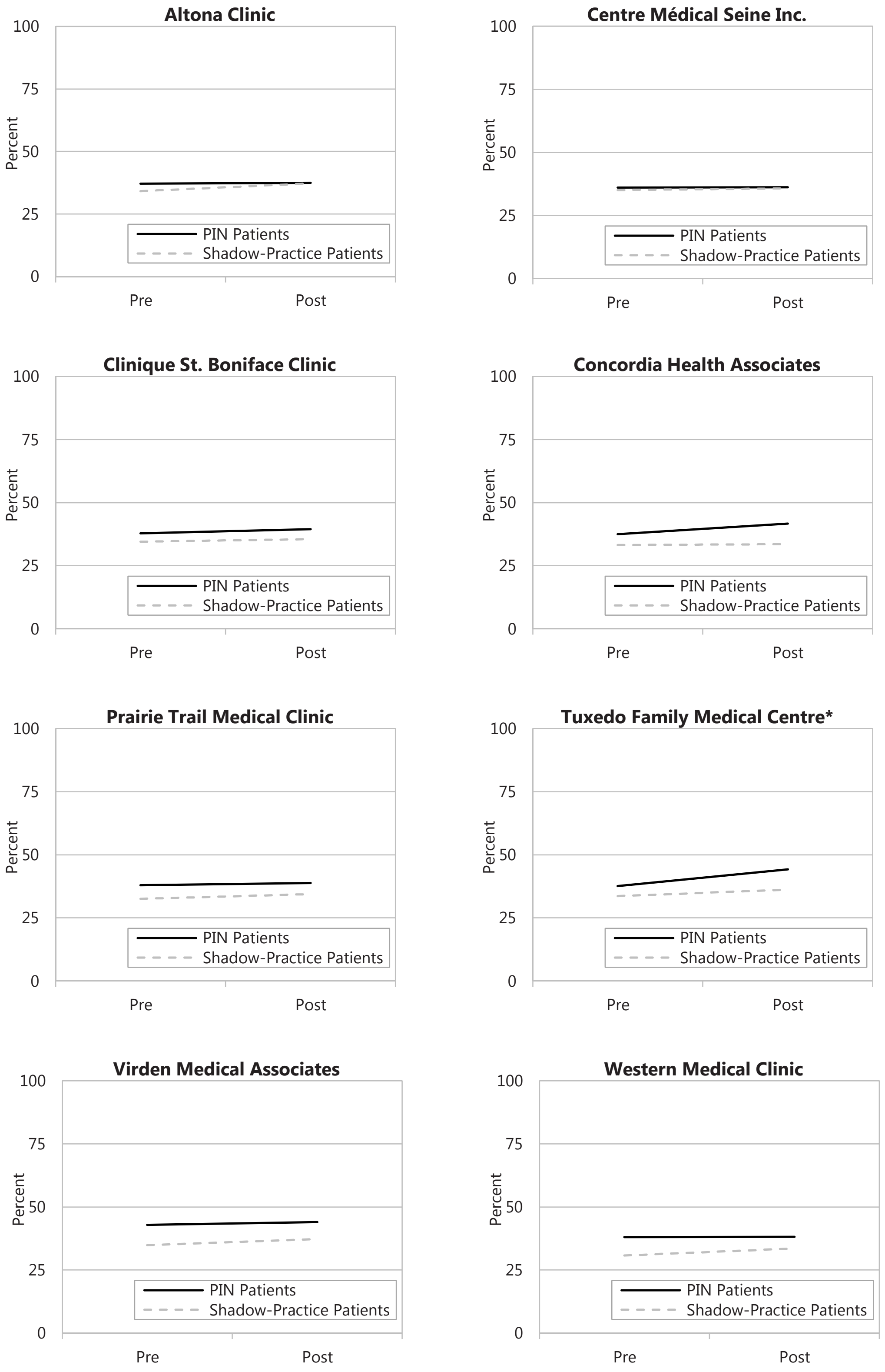


Figure 4.11: People with Diabetes Diagnosis who had an Eye Examination for Phase 1 Clinics



* indicates that there was a significant interaction ($p<0.05$)

Figure 4.12: People with Diabetes Diagnosis who had Eye Examination for Phase 2 Clinics



* indicates that there was a significant interaction ($p<0.05$)

Post Myocardial Infarction Management

Also known as a heart attack, a myocardial infarction (MI) occurs when the heart muscle (the myocardium) experiences sudden deprivation of circulating blood. The interruption of blood supply leads to the deprivation of oxygen to the muscle causing muscle damage.

After the initial treatment post-MI, clinical practice guidelines recommend both medication and lifestyle changes to prevent recurrence. Beta-blockers have been shown to lower the risk of subsequent MIs among people who have suffered an MI. Guidelines also recommend the prescription of cholesterol-lowering drugs for all patients after an MI regardless of cholesterol levels.

Post Myocardial Infarction Management: Initiation and Persistence of Beta-Blocker Drug Treatment

Two indicators are presented in this section. The first looks at the percentage of newly diagnosed MI patients who filled at least one beta-blocker prescription within four months of the hospital discharge at the time of the MI. The second looks at the percentage of patients who had a prescription filled for 80% of the days between MI diagnosis and end of the study period. For both indicators, patients who had been diagnosed within the past three years with asthma, COPD, and peripheral vascular disease were excluded, since these conditions are contra-indications for the use of these drugs.

Observations for Initiation of Beta-Blocker Treatment:

- The eligible population for both the initiation and persistence of the drug in PIN Clinics ranged from 10 to 122 pre-implementation, and from 20 to 158 post-implementation.
- Rates for PIN clinics ranged from 75% to 93% pre-implementation, and from 72% to 95% post-implementation.

Statistically significant results are less likely when working with small sample sizes, such as occur in these two indicators. Moreover, the baseline rates for this indicator are high, which reduces the likelihood of a significant improvement in the rate over time. Despite this, three clinics have higher pre-implementation prescribing rates than their shadow practices. One clinic has a lower rate. In the post-implementation period, three PIN clinics have higher rates, one of which had lower rates during the pre-implementation period. One clinic had increased rates over time and one decreased.

PIN Effect: There is no PIN effect on this indicator.

Table 4.5: Post Myocardial Infarction Management: Initiation of Beta-Blocker Drug Treatment

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	42	88.1	↑	50	86.0		
		Shadow-Practice Patients	413	83.8		483	81.4		
	Assiniboine Medical Clinic	PIN Patients	122	89.3		158	90.5		
		Shadow-Practice Patients	1,217	87.6		1,374	86.2		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	55	87.3		38	78.9		
		Shadow-Practice Patients	463	86.8		575	84.2		
	Steinbach Family Medical Center	PIN Patients	74	86.5		81	87.7		
		Shadow-Practice Patients	632	85.0		688	84.3		
Phase 2	**Altona Clinic**	PIN Patients	28	92.9	↑	20	95.0	↑	
		Shadow-Practice Patients	232	81.5		186	81.7		
	Centre Médical Seine Inc.	PIN Patients	33	81.8		31	87.1		
		Shadow-Practice Patients	388	84.5		380	82.9		
	Clinique St. Boniface Clinic	PIN Patients	82	87.8		73	83.6		
		Shadow-Practice Patients	715	84.2		725	85.7		
	Concordia Health Associates	PIN Patients	40	85.0		28	75.0	↓	
		Shadow-Practice Patients	310	86.8		306	88.6		
	Prairie Trail Medical Clinic*	PIN Patients	32	75.0	↓	36	91.7	↑	⇧
		Shadow-Practice Patients	313	87.9		301	86.0		
	Tuxedo Family Medical Centre	PIN Patients	10	80.0		24	91.7	↑	
		Shadow-Practice Patients	187	84.0		195	84.1		
	Virden Medical Associates	PIN Patients	24	83.3		23	82.6		
		Shadow-Practice Patients	204	84.8		198	79.3		
	Western Medical Clinic	PIN Patients	62	90.3	↑	29	72.4		⇩
		Shadow-Practice Patients	502	84.9		590	79.8		
Phase 1		PIN Patients	293	88.1		327	87.8		
		Shadow-Practice Patients	2,725	86.3		3,120	84.6		
Phase 2		PIN Patients	311	85.9		264	84.5		
		Shadow-Practice Patients	2,851	84.8		2,881	83.7		

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 4.13: Post Myocardial Infarction Management: Initiation of Beta-Blocker Drug Treatment by Phase

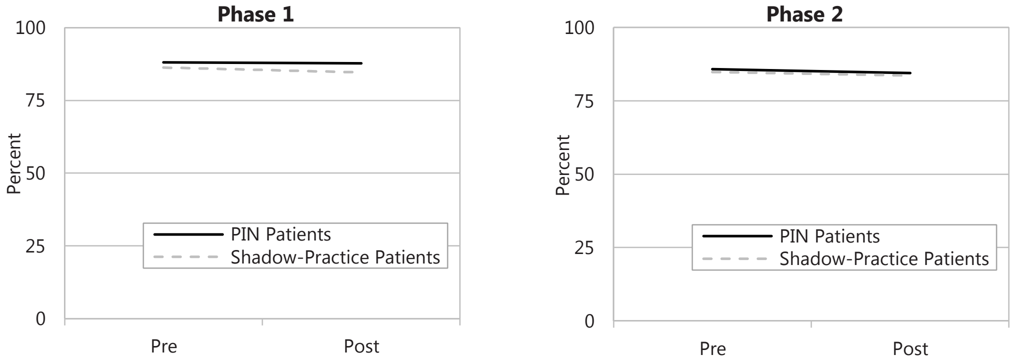


Figure 4.14: Post Myocardial Infarction Management: Initiation of Beta-Blocker Drug Treatment for Phase 1 Clinics

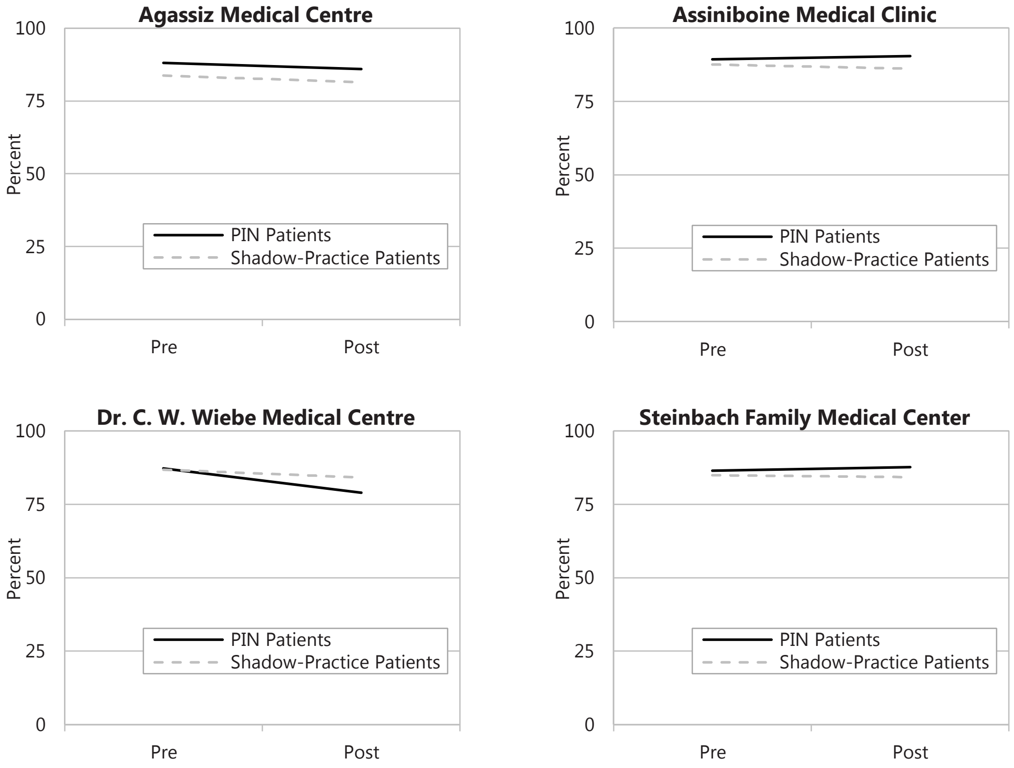
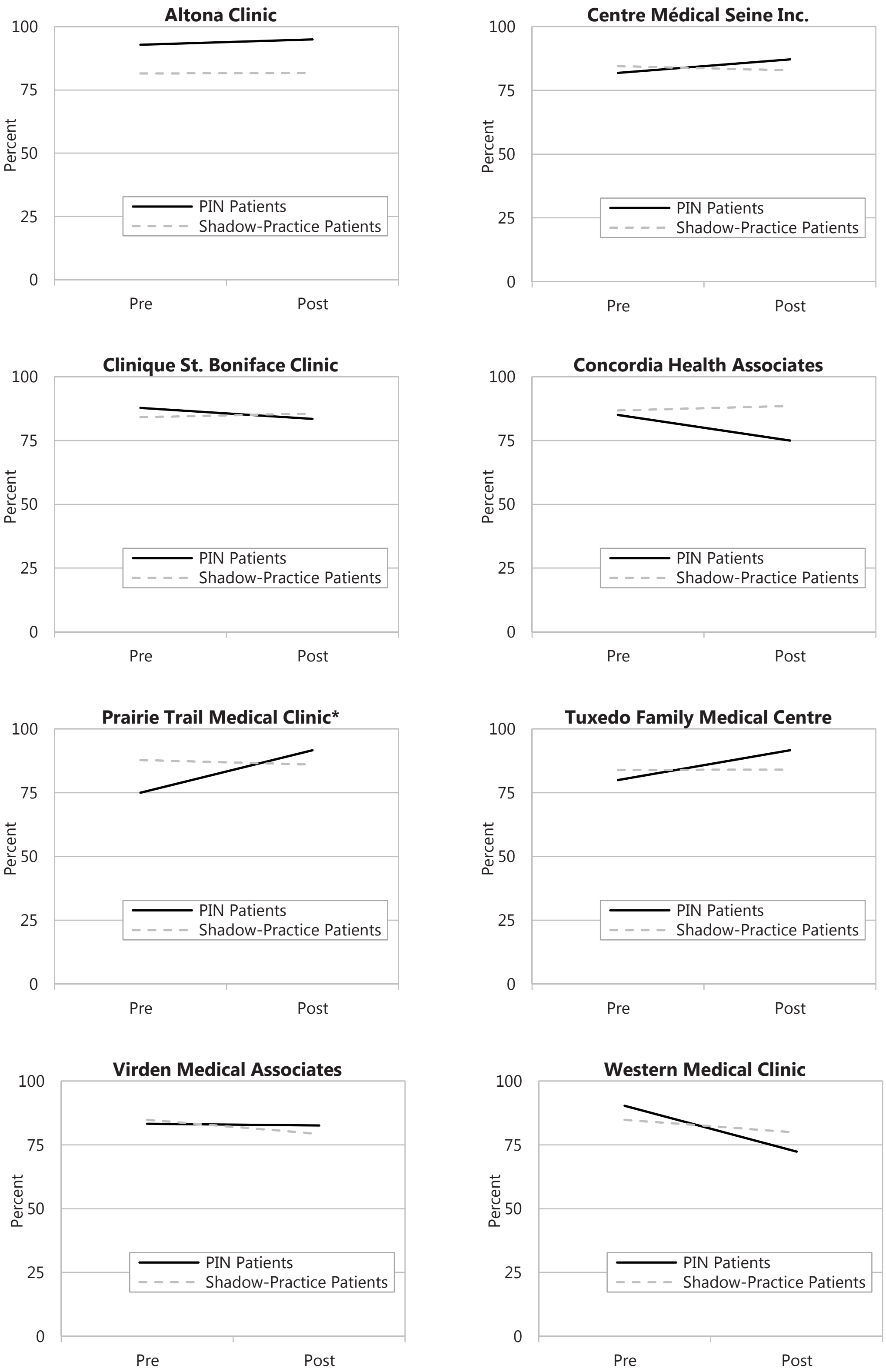


Figure 4.15: Post Myocardial Infarction Management: Initiation of Beta-Blocker Drug Treatment for Phase 2 Clinics



Observations for Persistence of Beta-Blocker Drug Treatment:

- The eligible population in PIN Clinics ranged from 10 to 122 pre-implementation, and from 20 to 158 post-implementation.
- Rates for PIN clinics ranged from 66% to 85% pre-implementation, and from 57% to 89% post-implementation.

In the pre-implementation period, two PIN clinics had higher rates of treatment persistence than their shadow practices. In the post-implementation period, four clinics had higher rates of treatment persistence than their shadow practices, and two had lower rates. The comparisons of change over time show two clinics having decreased rates while two clinics had higher rates. Once again this indicator has a very small sample size, making statistically significant changes very unlikely.

PIN Effect: As with initiation of beta-blocker drug treatment, there is no PIN effect on persistence. Two clinics demonstrated significant interaction with negative effects, while two clinics had significant interactions with positive effects.

Table 4.6: Post Myocardial Infarction Management: Persistence of Beta-Blocker Drug Treatment

	PIN Clinic	Patient Group	Pre-Implementation Eligible Population	Pre-Implementation Rate (%)	Pre-Implementation Compared to Shadow	Post-Implementation Eligible Population	Post-Implementation Rate (%)	Post-Implementation Compared to Shadow	Change Over Time
Phase 1	**Agassiz Medical Centre***	PIN Patients	42	81.0	↑	50	82.0	↑	
		Shadow-Practice Patients	413	77.5		483	74.1		⇩
	Assiniboine Medical Clinic	PIN Patients	122	85.2		158	83.5	↑	
		Shadow-Practice Patients	1,217	80.8		1,374	78.1		
	Dr. C. W. Wiebe Medical Centre*	PIN Patients	55	80.0		38	68.4	↓	⇩
		Shadow-Practice Patients	463	79.9		575	76.2		
	Steinbach Family Medical Center	PIN Patients	74	77.0		81	80.2		
		Shadow-Practice Patients	632	78.0		688	77.6		
Phase 2	**Altona Clinic**	PIN Patients	28	82.1		20	75.0		
		Shadow-Practice Patients	232	75.4		186	75.8		
	Centre Médical Seine Inc.	PIN Patients	33	75.8		31	83.9		
		Shadow-Practice Patients	388	79.4		380	75.8		
	Clinique St. Boniface Clinic	PIN Patients	82	82.9		73	79.5		
		Shadow-Practice Patients	715	76.6		725	79.7		
	Concordia Health Associates*	PIN Patients	40	82.5		28	57.1	↓	⇩
		Shadow-Practice Patients	310	76.5		306	79.7		
	Prairie Trail Medical Clinic*	PIN Patients	32	65.6		36	88.9	↑	⇧
		Shadow-Practice Patients	313	78.3		301	80.1		
	Tuxedo Family Medical Centre	PIN Patients	10	70.0		24	87.5	↑	⇧
		Shadow-Practice Patients	187	70.6		195	76.4		
	Virden Medical Associates	PIN Patients	24	75.0		23	78.3		
		Shadow-Practice Patients	204	78.4		198	70.7		
	Western Medical Clinic	PIN Patients	62	83.9	↑	29	65.5		
		Shadow-Practice Patients	502	77.9		590	72.0		
Phase 1		PIN Patients	293	81.6	↑	327	80.7	↑	
		Shadow-Practice Patients	2,725	79.5		3,120	77.0		
Phase 2		PIN Patients	311	79.4		264	77.7		
		Shadow-Practice Patients	2,851	77.0		2,881	76.6		

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 4.16: Post Myocardial Infarction Management: Persistence of Beta-Blocker Drug Treatment by Phase

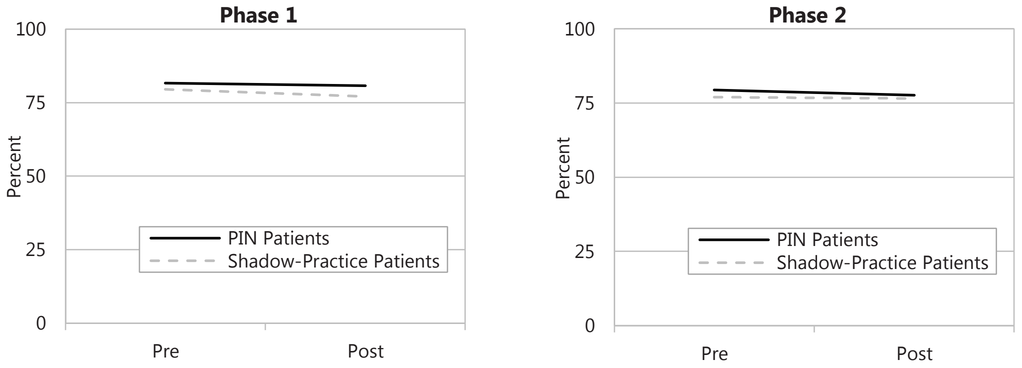


Figure 4.17: Post Myocardial Infarction Management: Persistence of Beta-Blocker Drug Treatment for Phase 1 Clinics

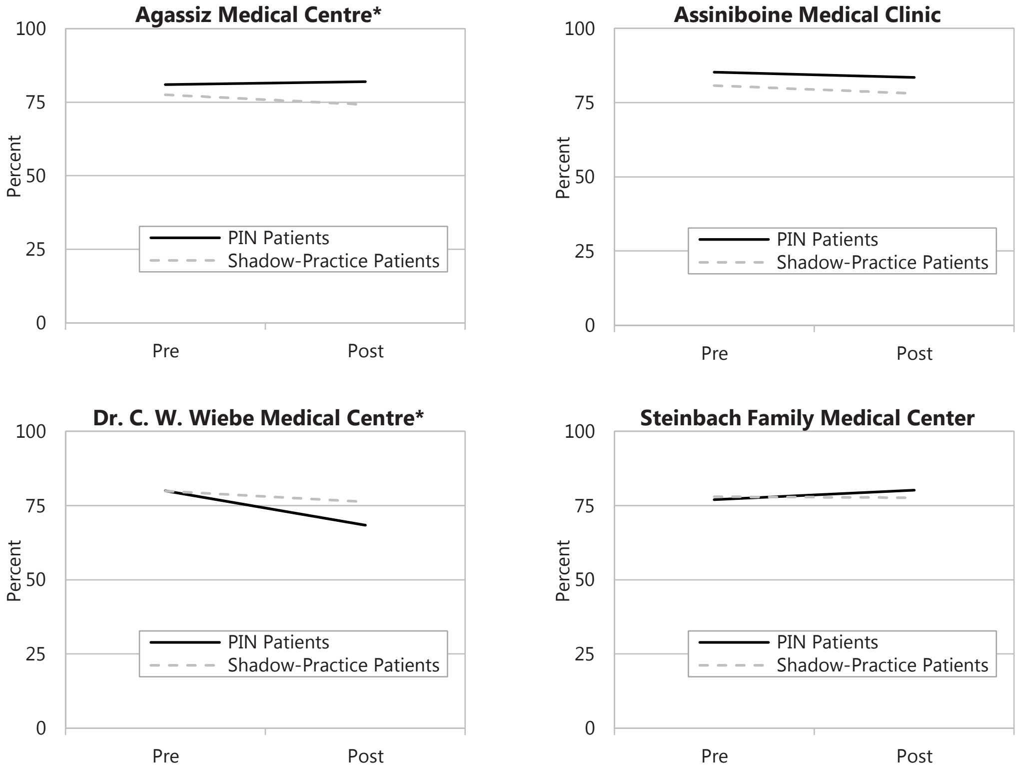
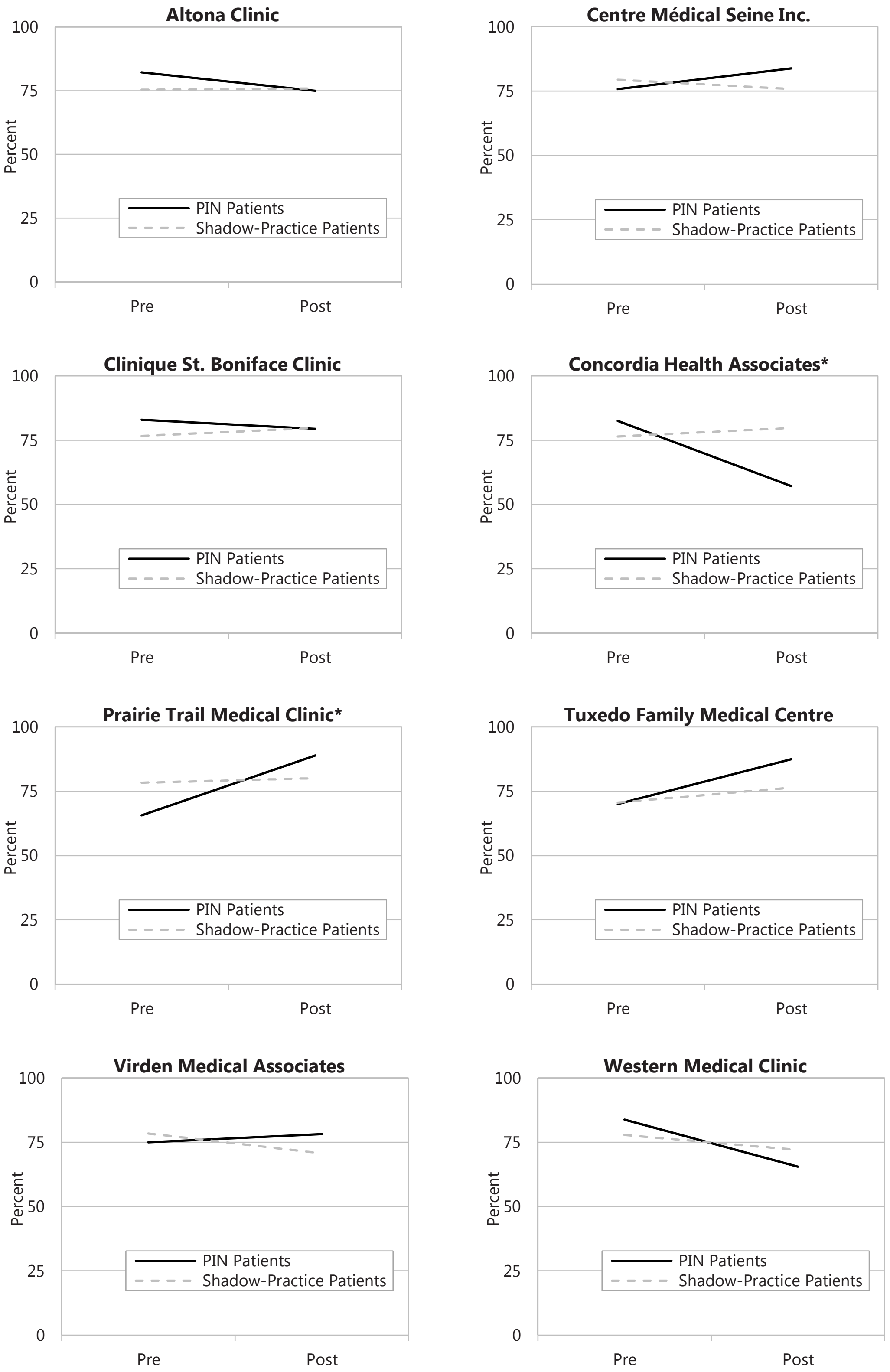


Figure 4.18: Post Myocardial Infarction Management: Persistence of Beta-Blocker Drug Treatment for Phase 2 Clinics



* indicates that there was a significant interaction (p<0.05)

Post Myocardial Infarction Management: Initiation and Persistence of Cholesterol Lowering Drug Treatment

Lipid modifying agents such as HMG CoA reductase inhibitors (statins), fibrates, bile acid sequestrates (resins), and nicotinic acid derived (niacin) are recommended routinely for use by patients following a myocardial infarction.

Observations for Initiation of Cholesterol-Lowering Drug Treatment:

- The eligible population for both initiation and persistence in PIN clinics ranged from 11 to 119 pre-implementation, and from 20 to 156 post-implementation.
- Rates for PIN clinics ranged from 46% to 82% pre-implementation, and from 40% to 71% post-implementation.

In the pre-implementation period, two PIN clinics had higher rates of initiation of cholesterol-lowering drug treatment than their shadow practices, and one clinic had a lower rate than its shadow practice. In the post-implementation period, there was no difference between PIN clinics and their corresponding shadow practices. The rate for one PIN clinic increased over time, while the rate for one decreased.

PIN Effect: Because the only two significant interactions point in opposite directions, and because of the small sample size, there is no clear PIN effect observed on this indicator.

Table 4.7: Post Myocardial Infarction Management: Initiation of Cholesterol Lowering Drug Treatment

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	41	63.4		49	55.1		
		Shadow-Practice Patients	424	57.8		498	52.0		
	Assiniboine Medical Clinic	PIN Patients	119	57.1		156	56.4		
		Shadow-Practice Patients	1,223	59.0		1,395	56.9		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	54	66.7		41	56.1		
		Shadow-Practice Patients	464	54.1		591	55.7		
	Steinbach Family Medical Center	PIN Patients	75	53.3		83	67.5		
		Shadow-Practice Patients	631	58.2		706	55.7		
Phase 2	**Altona Clinic***	PIN Patients	28	78.6	🡅	20	50.0		⇩
		Shadow-Practice Patients	239	53.1		193	53.4		
	Centre Médical Seine Inc.	PIN Patients	33	57.6		31	64.5		
		Shadow-Practice Patients	397	54.7		402	52.0		
	Clinique St. Boniface Clinic	PIN Patients	81	61.7		74	56.8		
		Shadow-Practice Patients	725	58.6		740	56.6		
	Concordia Health Associates*	PIN Patients	39	46.2	🡇	29	58.6		⇧
		Shadow-Practice Patients	313	63.9		306	55.9		
	Prairie Trail Medical Clinic	PIN Patients	30	60.0		35	51.4		
		Shadow-Practice Patients	315	59.4		306	58.5		
	Tuxedo Family Medical Centre	PIN Patients	11	81.8	🡅	24	70.8		
		Shadow-Practice Patients	189	58.2		200	55.5		
	Virden Medical Associates	PIN Patients	24	54.2		23	52.2		
		Shadow-Practice Patients	214	46.3		211	53.6		
	Western Medical Clinic	PIN Patients	64	50.0		30	40.0		
		Shadow-Practice Patients	519	56.3		615	57.9		
Phase 1		PIN Patients	289	58.8		329	59.0		
		Shadow-Practice Patients	2,742	57.8		3,190	55.6		
Phase 2		PIN Patients	310	58.4		266	55.6		
		Shadow-Practice Patients	2,911	56.9		2,973	55.9		

"🡅" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "🡇" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 4.19: Post Myocardial Infarction Management: Initiation of Cholesterol Lowering Drug Treatment by Phase

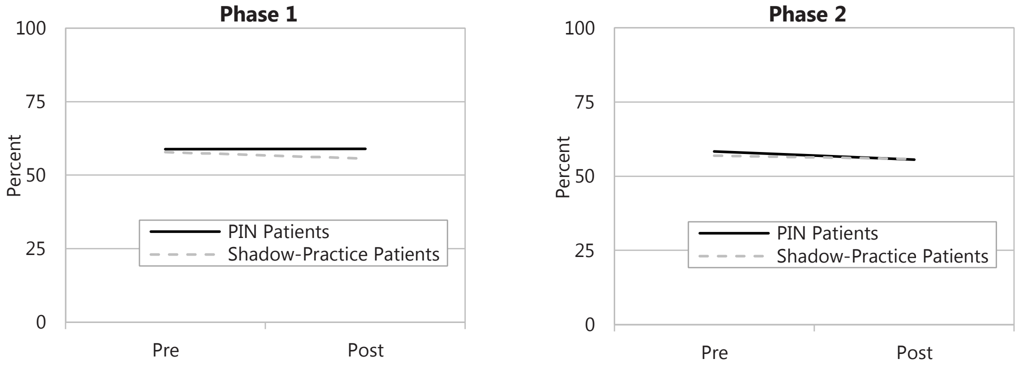


Figure 4.20: Post Myocardial Infarction Management: Initiation of Cholesterol Lowering Drug Treatment for Phase 1 Clinics

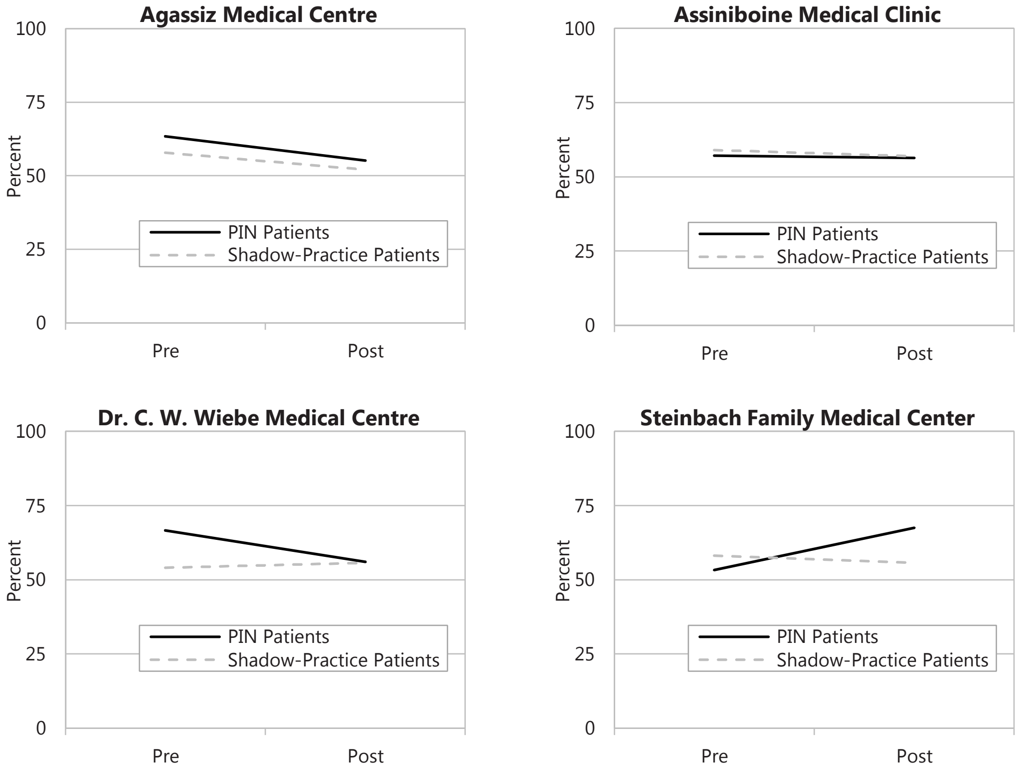
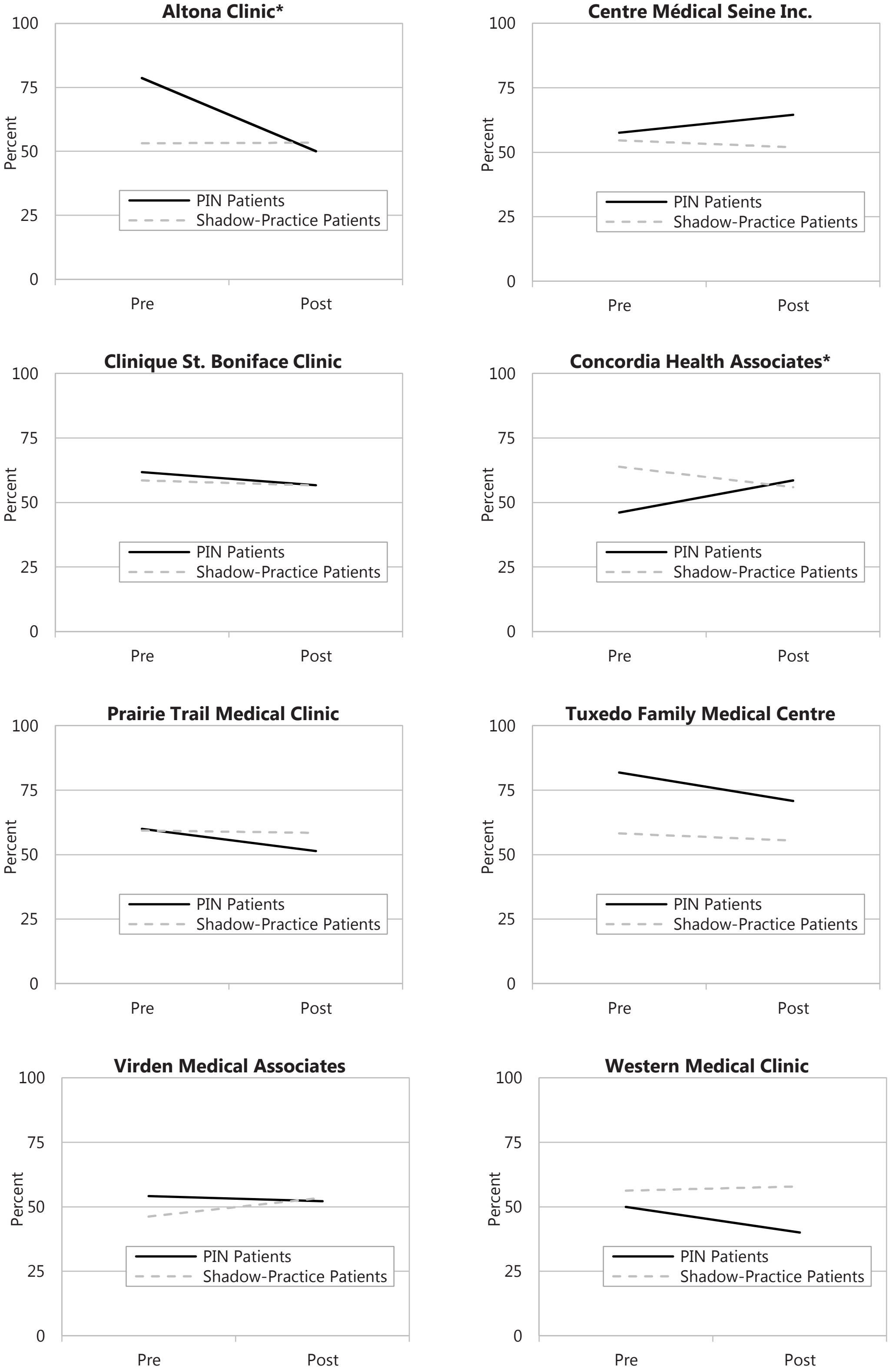


Figure 4.21: Post Myocardial Infarction Management: Initiation of Cholesterol Lowering Drug Treatment for Phase 2 Clinics



* indicates that there was a significant interaction ($p<0.05$)

Observations for Persistence of Cholesterol-Lowering Drug Treatment:

- The eligible population in PIN clinics ranged from 11 to 119 pre-implementation, and from 20 to 156 post-implementation.
- Rates for PIN clinics ranged from 45% to 82% pre-implementation, and from 30% to 60% post-implementation.

In the pre-implementation period, two PIN clinics had higher rates than their shadow practices, and one clinic had a lower rate than its shadow practice. In the post-implementation period, two PIN clinics had lower rates of drug persistence than their shadow practices. One clinic had a decreased rate over time and one had an increased rate.

PIN Effect: There is no clear PIN effect on this indicator because there is only one clinic with a significant interaction.

Table 4.8: Post Myocardial Infarction Management: Persistence of Cholesterol Lowering Drug Treatment

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	41	56.1		49	49.0		
		Shadow-Practice Patients	424	53.5		498	46.2		
	Assiniboine Medical Clinic	PIN Patients	119	51.3		156	52.6		
		Shadow-Practice Patients	1,223	54.3		1,395	51.5		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	54	51.9		41	39.0	🡣	
		Shadow-Practice Patients	464	48.9		591	49.2		
	Steinbach Family Medical Center	PIN Patients	75	49.3		83	60.2		
		Shadow-Practice Patients	631	52.8		706	50.0		
Phase 2	**Altona Clinic**	PIN Patients	28	67.9	🡡	20	50.0		⇩
		Shadow-Practice Patients	239	48.1		193	48.7		
	Centre Médical Seine Inc.	PIN Patients	33	57.6		31	54.8		
		Shadow-Practice Patients	397	48.9		402	48.5		
	Clinique St. Boniface Clinic	PIN Patients	81	55.6		74	55.4		
		Shadow-Practice Patients	725	52.8		740	52.7		
	Concordia Health Associates*	PIN Patients	39	46.2	🡣	29	58.6		⇧
		Shadow-Practice Patients	313	58.1		306	52.3		
	Prairie Trail Medical Clinic	PIN Patients	30	60.0		35	48.6		
		Shadow-Practice Patients	315	54.3		306	55.9		
	Tuxedo Family Medical Centre	PIN Patients	11	81.8	🡡	24	58.3		
		Shadow-Practice Patients	189	50.3		200	52.5		
	Virden Medical Associates	PIN Patients	24	45.8		23	43.5		
		Shadow-Practice Patients	214	43.0		211	46.9		
	Western Medical Clinic	PIN Patients	64	45.3		30	30.0	🡣	
		Shadow-Practice Patients	519	50.1		615	51.7		
Phase 1		PIN Patients	289	51.6		329	52.3		
		Shadow-Practice Patients	2,742	52.9		3,190	49.9		
Phase 2		PIN Patients	310	54.2		266	50.8		
		Shadow-Practice Patients	2,911	51.3		2,973	51.5		

"🡡" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "🡣" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 4.22: Post Myocardial Infarction Management: Persistence of Cholesterol Lowering Drug Treatment by Phase

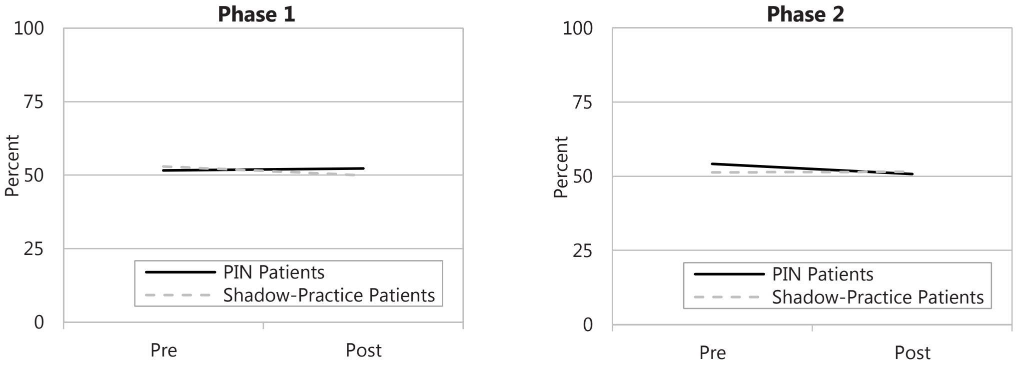


Figure 4.23: Post Myocardial Infarction Management: Persistence of Cholesterol Lowering Drug Treatment for Phase 1 Clinics

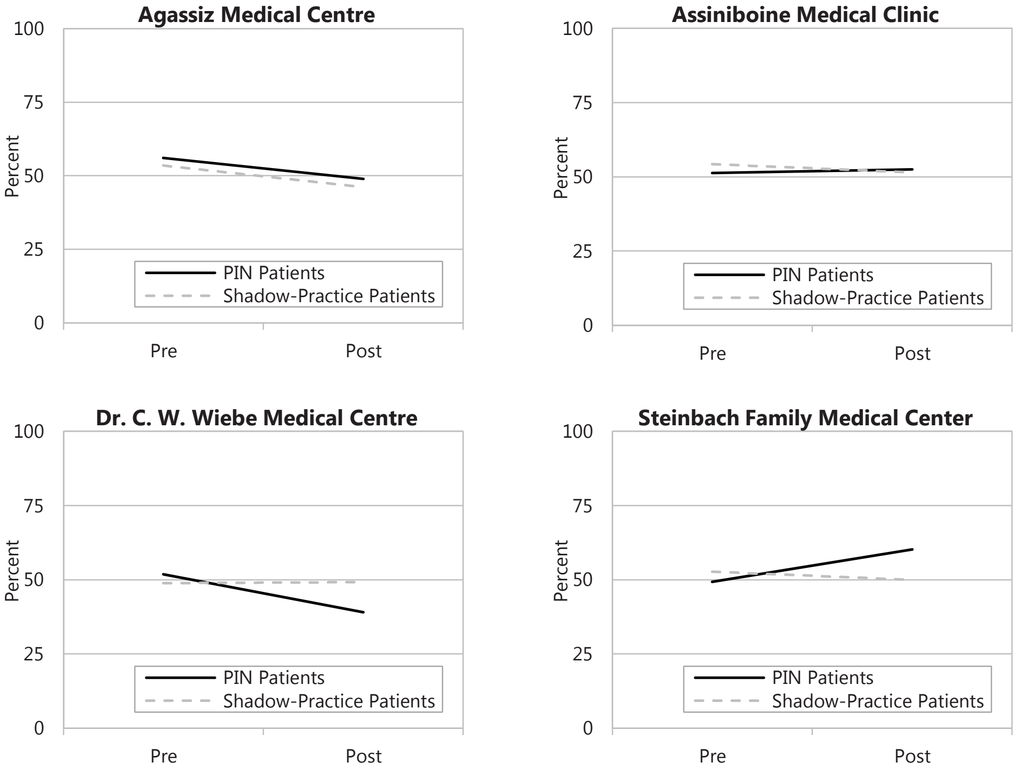
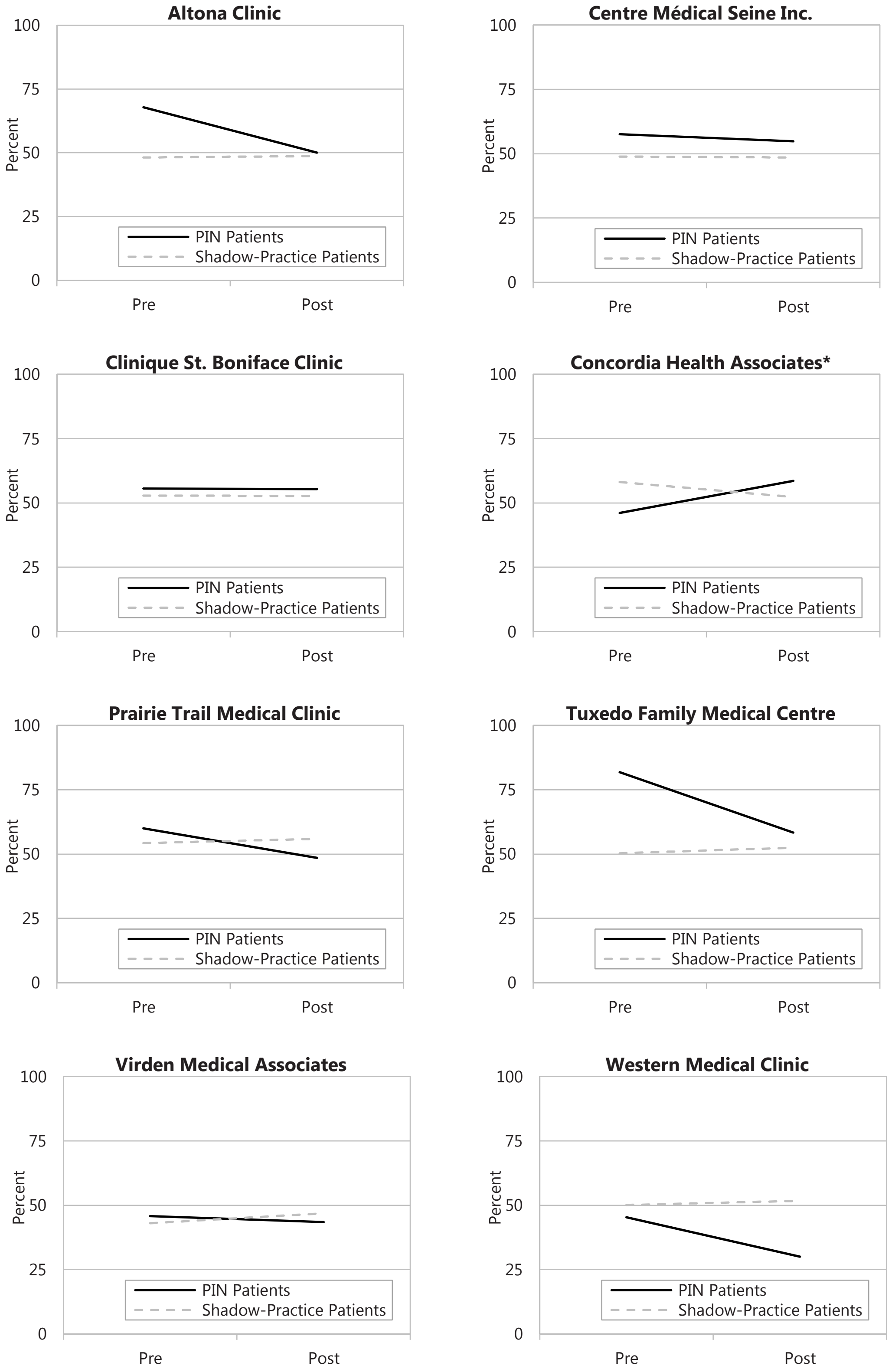


Figure 4.24: Post Myocardial Infarction Management: Persistence of Cholesterol Lowering Drug Treatment for Phase 2 Clinics



* indicates that there was a significant interaction ($p<0.05$)

Asthma Care

Asthma is a disease in which inflammation of the airways causes airflow into and out of the lungs to be restricted. It is characterized by periodic attacks of wheezing, shortness of breath, chest tightness and coughing. The Asthma Society of Canada (2014) reports that approximately 250 Canadians die every year from asthma, but that "most of these deaths … could have been prevented with proper education and management."

There are two kinds of medications available to treat asthma: relievers (acute-treatment medications) and controllers—also called preventers—which reduce inflammation in the airways when taken regularly. Asthma treatment guidelines recommend that all patients requiring the use of acute-treatment medication (i.e. relievers such as Beta 2-agontists) more than twice weekly should also be treated with long-acting anti-inflammatory medications (controllers) for long-term control.

This indicator looks at the proportion of people aged 20 and older with asthma who used relievers enough to warrant the addition of a controller medication, and who filled a prescription for a medication recommended for long-term control of asthma. People with asthma requiring controller medications were defined as individuals with two or more prescriptions for Beta 2-agonists (relievers) within 12 months in a three-year period. Long-term asthma medications (controllers) include inhaled corticosteroids and leukotriene antagonists. This analysis excluded chronic obstructive pulmonary disease (COPD) patients, who were defined as filling one or more prescriptions of ipratropium bromide.

Observations:

- Eligible population in PIN clinics ranged from 172 to 1,447 pre-implementation, and from 122 to 1,530 post-implementation.
- Rates for PIN clinics ranged from 56% to 72% pre-implementation, and from 59% to 73% post-implementation.

In the pre-implementation period, four clinics had higher rates than their shadow practices. In the post-implementation period, only three clinics had higher rates than their shadow practices. The only significant change over time was a decreased rate in one clinic.

PIN Effect: There is no clear PIN effect on this indicator. There was only one significant interaction for a PIN clinic where rates decreased for over time more than for its shadow practice.

Table 4.9: Asthma Care: Medication Use

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	342	64.0		371	58.8		
		Shadow-Practice Patients	4,759	61.1		5,428	61.8		
	Assiniboine Medical Clinic	PIN Patients	1,447	66.3	↑	1,530	65.2	↑	
		Shadow-Practice Patients	13,345	61.9		14,733	61.1		
	Dr. C. W. Wiebe Medical Centre*	PIN Patients	286	72.4	↑	312	63.8		⇩
		Shadow-Practice Patients	6,007	61.0		6,779	59.8		
	Steinbach Family Medical Center	PIN Patients	532	60.7		613	66.4		
		Shadow-Practice Patients	7,254	61.6		8,156	61.4		
Phase 2	**Altona Clinic**	PIN Patients	174	59.2		122	59.8		
		Shadow-Practice Patients	1,955	63.2		1,951	61.6		
	Centre Médical Seine Inc.	PIN Patients	373	55.5		274	59.1		
		Shadow-Practice Patients	3,574	63.2		3,806	62.9		
	Clinique St. Boniface Clinic	PIN Patients	892	61.9		947	59.9		
		Shadow-Practice Patients	8,278	62.8		8,657	62.8		
	Concordia Health Associates	PIN Patients	353	68.3	↑	386	67.9	↑	
		Shadow-Practice Patients	3,901	63.1		4,139	61.9		
	Prairie Trail Medical Clinic	PIN Patients	411	64.7		458	65.7		
		Shadow-Practice Patients	4,607	62.0		4,893	63.3		
	Tuxedo Family Medical Centre	PIN Patients	365	71.2	↑	430	73.0	↑	
		Shadow-Practice Patients	3,556	64.5		3,721	64.8		
	Virden Medical Associates	PIN Patients	172	68.6		135	63.7		
		Shadow-Practice Patients	1,706	63.4		1,848	62.9		
	Western Medical Clinic	PIN Patients	839	60.1		654	59.0		
		Shadow-Practice Patients	6,125	60.5		6,537	62.9		
Phase 1		PIN Patients	2,607	65.6		2,826	64.5		
		Shadow-Practice Patients	31,365	61.5		35,096	61.0		
Phase 2		PIN Patients	3,579	62.9		3,406	63.2		
		Shadow-Practice Patients	33,702	62.6		35,552	62.9		

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 4.25: Asthma Care: Medication Use by Phase

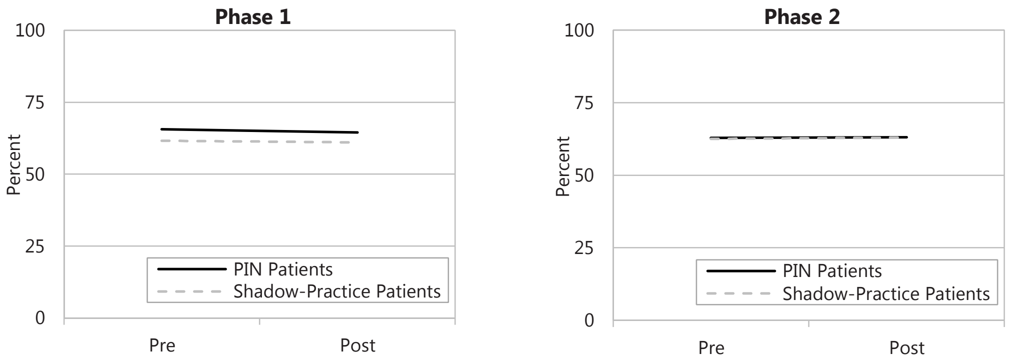
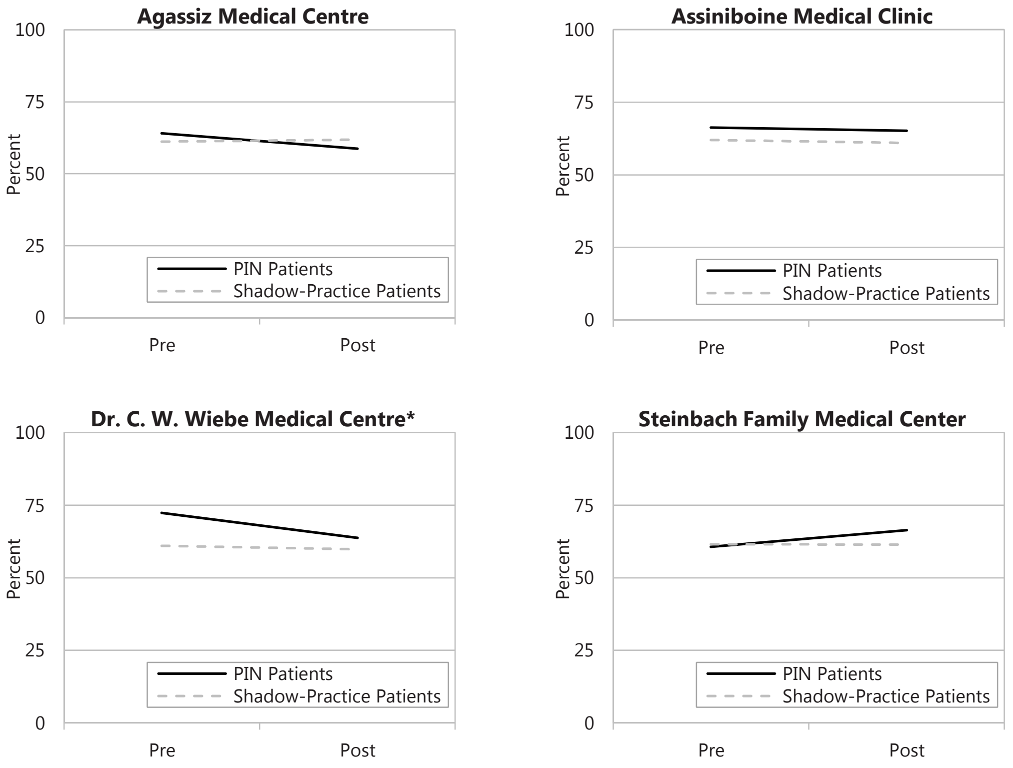
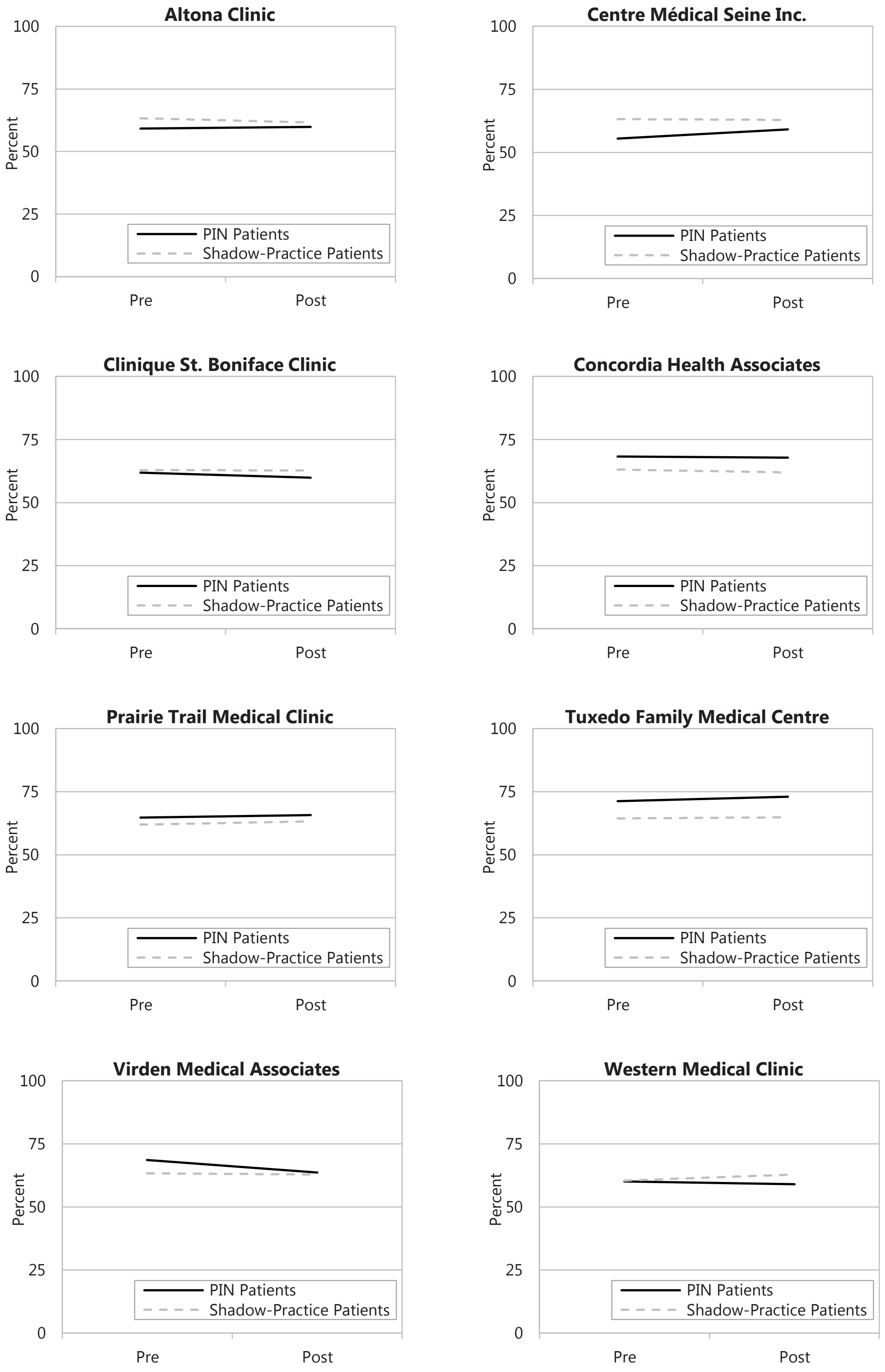


Figure 4.26: Asthma Care: Medication Use for Phase 1 Clinics



* indicates that there was a significant interaction ($p<0.05$)

Figure 4.27: Asthma Care: Medication Use for Phase 2 Clinics



* indicates that there was a significant interaction (p<0.05)

Benzodiazepine Prescribing for Community-Dwelling Adults

Benzodiazepines fall into a class of drugs called anxiolytics that can be used to treat a variety of disorders including anxiety disorders and insomnia. Long-term use of benzodiazepines is not recommended for older adults because they are more sensitive to the depressant effects benzodiazepines cause on the central nervous system, and because prolonged use can cause confusion, night wandering, amnesia and loss of balance. The use of high daily doses by older adults has been associated with an increased risk of hip fractures and accidental falls (Egan, Wolfson, Moride, & Monette, 2001). In addition, tolerance and physical and psychological dependence may occur with prolonged use. Lower rates of benzodiazepine prescription are therefore desirable.

This indicator looks at the percentage of community-dwelling people aged 75 and older who had at least two prescriptions for benzodiazepines, or at least one prescription for a benzodiazepine with a greater-than-30-day supply over a year. The latter criteria represent potentially inappropriate prescribing.

Observations

- The eligible population in PIN clinics ranged from 533 to 3,814 pre-implementation, and from 513 to 3,935 post-implementation.
- Rates for PIN clinics ranged from 23% to 32% pre-implementation, and from 23% to 29% post-implementation.

In the pre-implementation period, rates of potentially inappropriate prescribing were higher for five PIN clinics than their shadow practices. In the post-implementation period, four PIN clinics had higher rates than their shadow practices. Only one clinic had a change over time which was an increased rate.

PIN Effect: There is no PIN effect on this indicator.

Table 4.10: Benzodiazepine Prescribing in Community Dwelling Older Adults aged 75+

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	1,033	25.4		1,050	25.8		
		Shadow-Practice Patients	9,218	24.0		9,654	24.7		
	Assiniboine Medical Clinic	PIN Patients	3,814	23.2		3,935	23.2		
		Shadow-Practice Patients	33,404	22.2		35,308	22.1		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	993	23.7		1,040	24.2		
		Shadow-Practice Patients	9,141	24.6		9,259	24.5		
	Steinbach Family Medical Center	PIN Patients	1,327	25.5	🡅	1,365	25.9	🡅	
		Shadow-Practice Patients	12,098	22.9		12,654	23.0		
Phase 2	**Altona Clinic**	PIN Patients	543	24.5		532	24.2		
		Shadow-Practice Patients	4,211	22.5		3,938	23.8		
	Centre Médical Seine Inc.	PIN Patients	714	32.1	🡅	771	29.1	🡅	
		Shadow-Practice Patients	7,212	22.5		7,123	22.9		
	Clinique St. Boniface Clinic	PIN Patients	1,946	27.7	🡅	2,016	27.9	🡅	⇧
		Shadow-Practice Patients	19,226	22.7		19,656	22.4		
	Concordia Health Associates	PIN Patients	827	25.4	🡅	878	25.1	🡅	
		Shadow-Practice Patients	7,515	22.5		7,856	21.6		
	Prairie Trail Medical Clinic	PIN Patients	682	23.3		729	23.6		
		Shadow-Practice Patients	7,186	23.3		7,417	22.9		
	Tuxedo Family Medical Centre	PIN Patients	655	25.2		671	26.4		
		Shadow-Practice Patients	6,479	24.8		6,851	24.7		
	Virden Medical Associates	PIN Patients	533	24.4	🡅	513	25.3		
		Shadow-Practice Patients	4,478	23.2		4,546	24.4		
	Western Medical Clinic	PIN Patients	974	25.1		1,021	25.4		
		Shadow-Practice Patients	9,454	24.2		10,038	24.2		
Phase 1		PIN Patients	7,167	24.0		7,390	24.2		
		Shadow-Practice Patients	63,861	22.9		66,875	23.0		
Phase 2		PIN Patients	6,874	26.3	🡅	7,131	26.3	🡅	
		Shadow-Practice Patients	65,761	23.2		67,425	23.1		

"🡅" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "🡇" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 4.28: Benzodiazepine Prescribing in Community Dwelling Older Adults aged 75+ by Phase

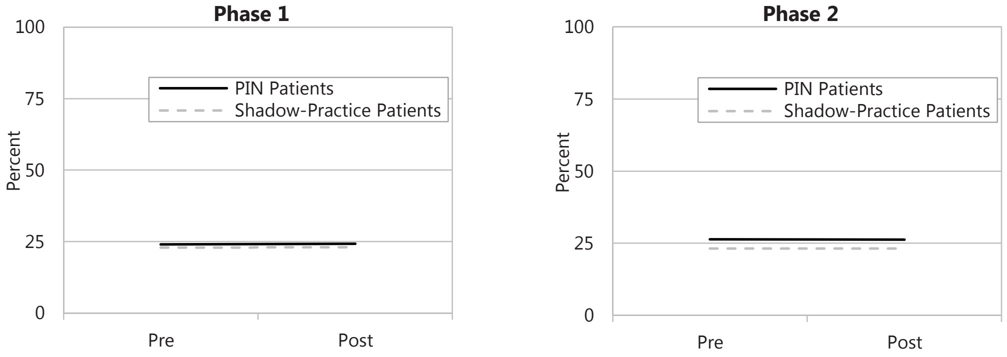


Figure 4.29: Benzodiazepine Prescribing in Community Dwelling Older Adults aged 75+ for Phase 1 Clinics

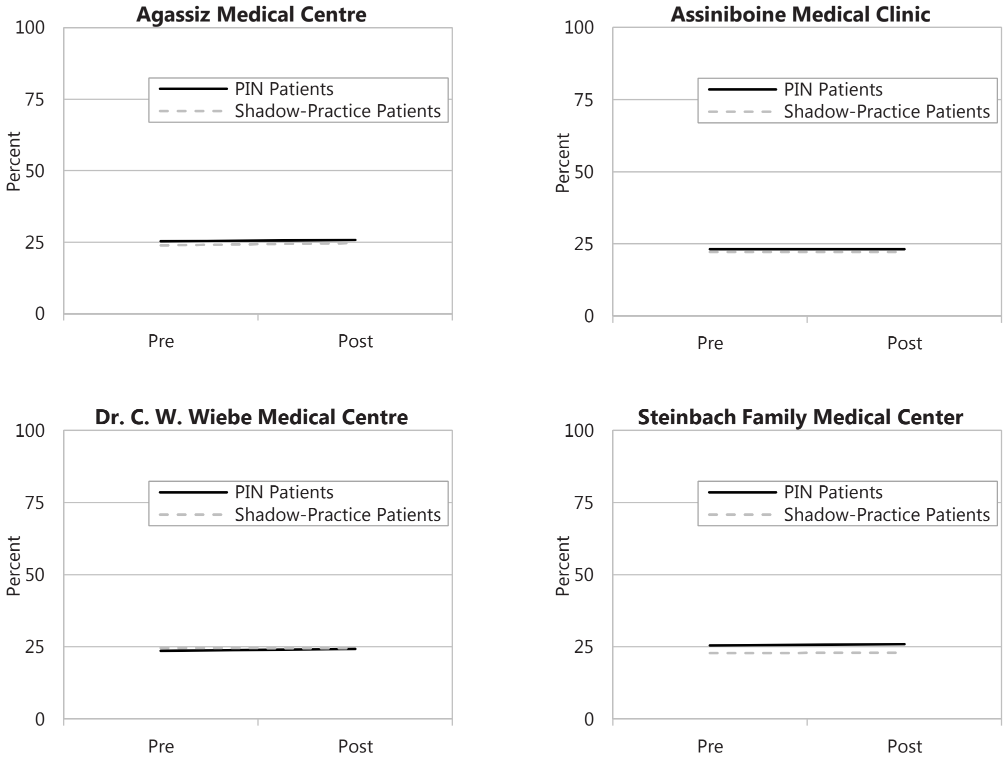
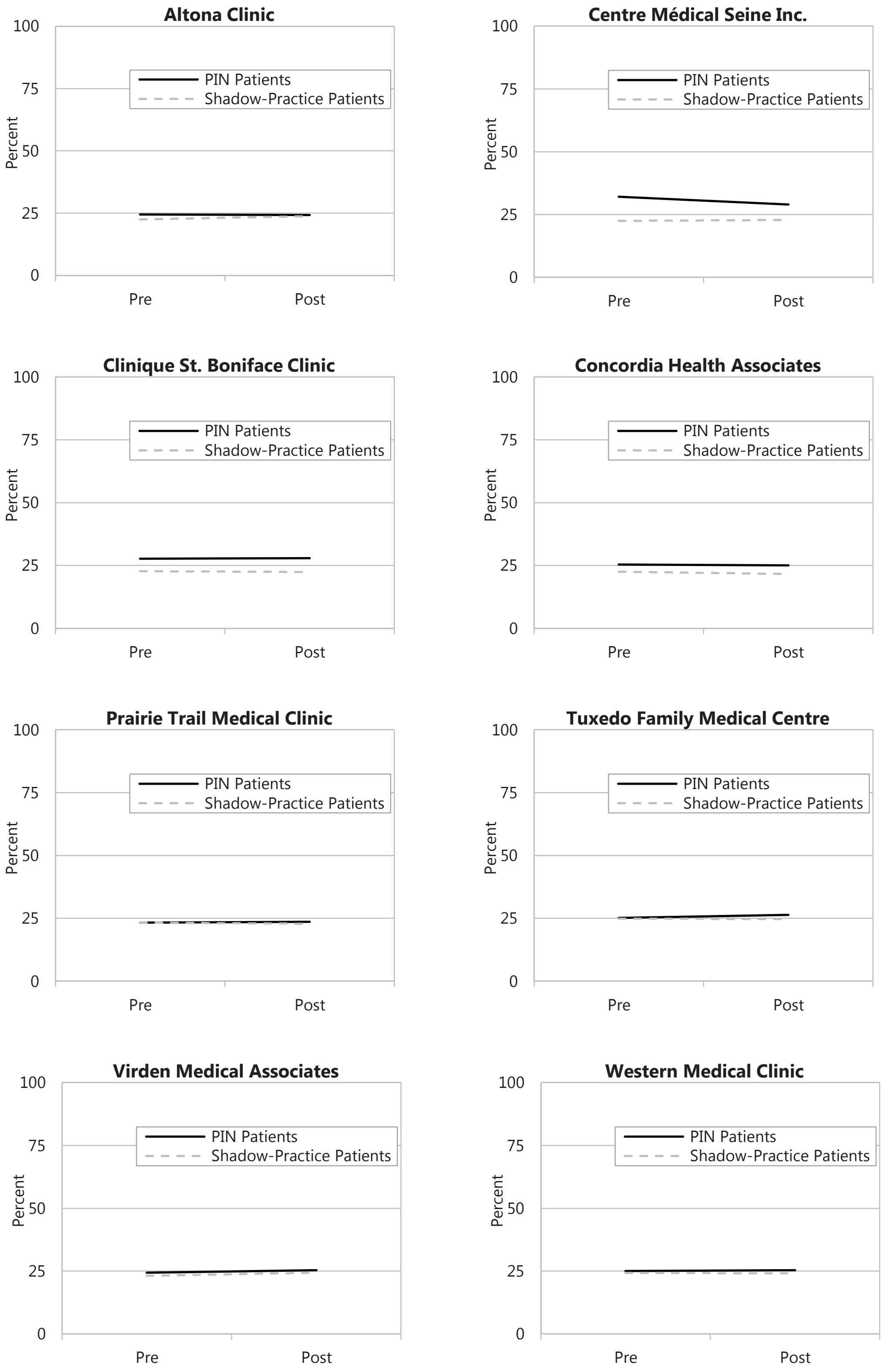


Figure 4.30: Benzodiazepine Prescribing in Community Dwelling Older Adults aged 75+ for Phase 2 Clinics



* indicates that there was a significant interaction (p<0.05)

CHAPTER 5: HEALTHCARE DELIVERY

This chapter includes eight indicators. They are not associated with QBIF. Some of these indicators were included to explore potential unintended consequences of the implementation of PIN, while others reflect commonly accepted principles of good primary-care service delivery (Mcdonald & Roland, 2009)

Continuity of Care

Continuity of care (COC) is the extent to which an individual sees a particular physician over a specified period of time. It is typically defined as an ongoing relationship between a patient and a single physician outside of a specific incident of illness, and it is often seen as a core value of patient care in primary-care medicine (Dreiher et al., 2012). COC encourages "improved communications, trust and a sense of continuous responsibility" (Dreiher et al., 2012). Individuals seeing the same **primary-care physician** over time may have improved health outcomes as a result of having one person managing their healthcare. This indicator uses an index that weights both the frequency of ambulatory visits to each **family physician** and the dispersion of ambulatory visits between family physicians. The index values range from zero (each visit made to a different physician) to one (all visits made to a single physician). We present analyses by PIN clinic rather than by individual physician. A value of zero represents all visits made to a different clinic and a value of one represents all visits made to the PIN clinic. We were not able to compare COC by clinic with shadow practices, because the shadow practices were constructed from a variety of different clinics. People who had fewer than three ambulatory visits to a family physician in a two-year period were excluded from this analysis.

Assigned Physicians

Observations

- The eligible population for PIN clinics ranged from 3,379 to 24,533 pre-implementation, and from 3,464 to 24,258 post-implementation.
- Index values for physicians at PIN clinic ranged from 0.4 to 0.7 pre-implementation, and from 0.4 to 0.6 post-implementation.

In the pre-implementation period, COC indices for all Phase 1 clinic physicians were lower than the indices we calculated for the four corresponding shadow practices. There was no consistent pattern for Phase 2 clinics. The rates increased over time at four PIN clinics and decreased for three PIN Clinics.

PIN Effect: This indicator is unusual because there are many significant interactions by individual clinics which differ in direction. Four clinics show a positive PIN effect and five clinics show a negative PIN effect. However, both the Phase 1 and Phase 2 interactions do show positive PIN effects.

Table 5.1: Continuity of Care of Assigned Physician

Age- and sex-adjusted

	PIN Clinic	Patient Group	Pre-Implementation Eligible Population	Pre-Implementation COC Index	Pre-Implementation Compared to Shadow	Post-Implementation Eligible Population	Post-Implementation COC Index	Post-Implementation Compared to Shadow	Change Over Time
Phase 1	**Agassiz Medical Centre***	PIN Patients	7,664	0.478	↓	7,898	0.469	↓	
		Shadow-Practice Patients	89,096	0.503		93,103	0.525		
	Assiniboine Medical Clinic	PIN Patients	24,533	0.598	↓	24,258	0.592	↓	
		Shadow-Practice Patients	229,417	0.614		230,502	0.624		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	10,985	0.385	↓	12,136	0.398	↓	
		Shadow-Practice Patients	120,952	0.481		127,942	0.471		
	Steinbach Family Medical Center*	PIN Patients	14,419	0.436	↓	14,743	0.493	↑	⇧
		Shadow-Practice Patients	144,694	0.502		155,743	0.456		⇩
Phase 2	**Altona Clinic***	PIN Patients	3,745	0.529	↓	3,464	0.555		⇧
		Shadow-Practice Patients	35,402	0.547		34,178	0.520		
	Centre Médical Seine Inc.*	PIN Patients	6,690	0.604	↑	6,309	0.593	↑	
		Shadow-Practice Patients	63,163	0.546		63,768	0.566		
	Clinique St. Boniface Clinic*	PIN Patients	12,442	0.651	↑	13,000	0.585	↓	⇩
		Shadow-Practice Patients	123,960	0.611		123,616	0.676		
	Concordia Health Associates*	PIN Patients	5,187	0.686	↑	6,586	0.645	↑	⇩
		Shadow-Practice Patients	60,504	0.600		60,741	0.638		
	Prairie Trail Medical Clinic*	PIN Patients	8,335	0.407	↓	8,446	0.489	↓	⇧
		Shadow-Practice Patients	78,429	0.585		78,448	0.496		⇩
	Tuxedo Family Medical Centre*	PIN Patients	6,770	0.619	↑	6,715	0.579		⇩
		Shadow-Practice Patients	61,388	0.590		61,622	0.625		
	Virden Medical Associates	PIN Patients	3,379	0.498	↓	3,532	0.503	↓	
		Shadow-Practice Patients	30,637	0.530		31,083	0.535		
	Western Medical Clinic*	PIN Patients	12,660	0.355	↓	9,803	0.393	↓	⇧
		Shadow-Practice Patients	108,218	0.505		109,228	0.471		
Phase 1*		PIN Patients	57,601	0.501	↓	59,035	0.512	↓	
		Shadow-Practice Patients	584,159	0.543		607,290	0.549		
Phase 2*		PIN Patients	59,208	0.527	↓	57,855	0.532	↓	
		Shadow-Practice Patients	561,701	0.561		562,684	0.561		

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

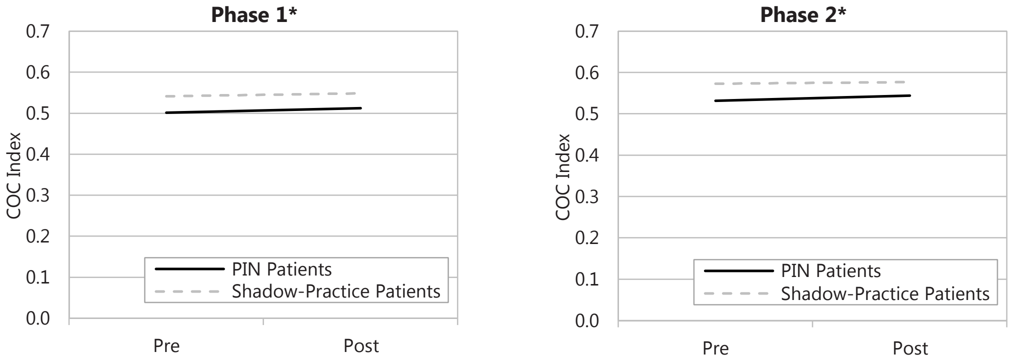
"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 5.1: Continuity of Care of Assigned Physician by Phase

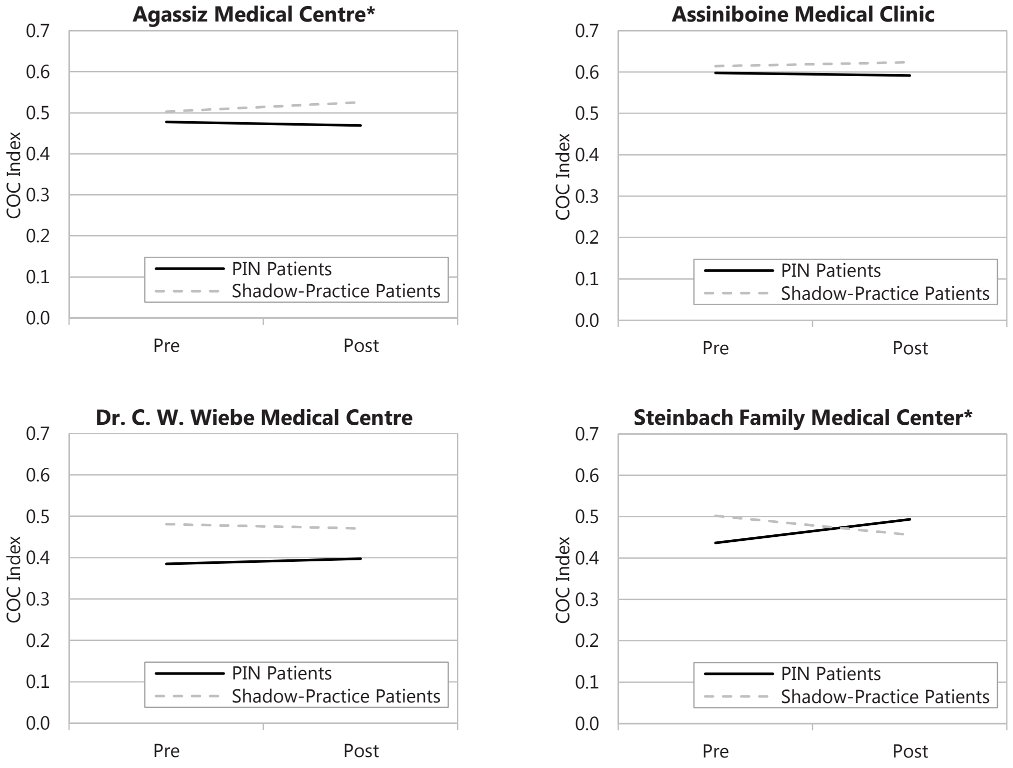
Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

Figure 5.2: Continuity of Care of Assigned Physician for Phase 1 Clinics

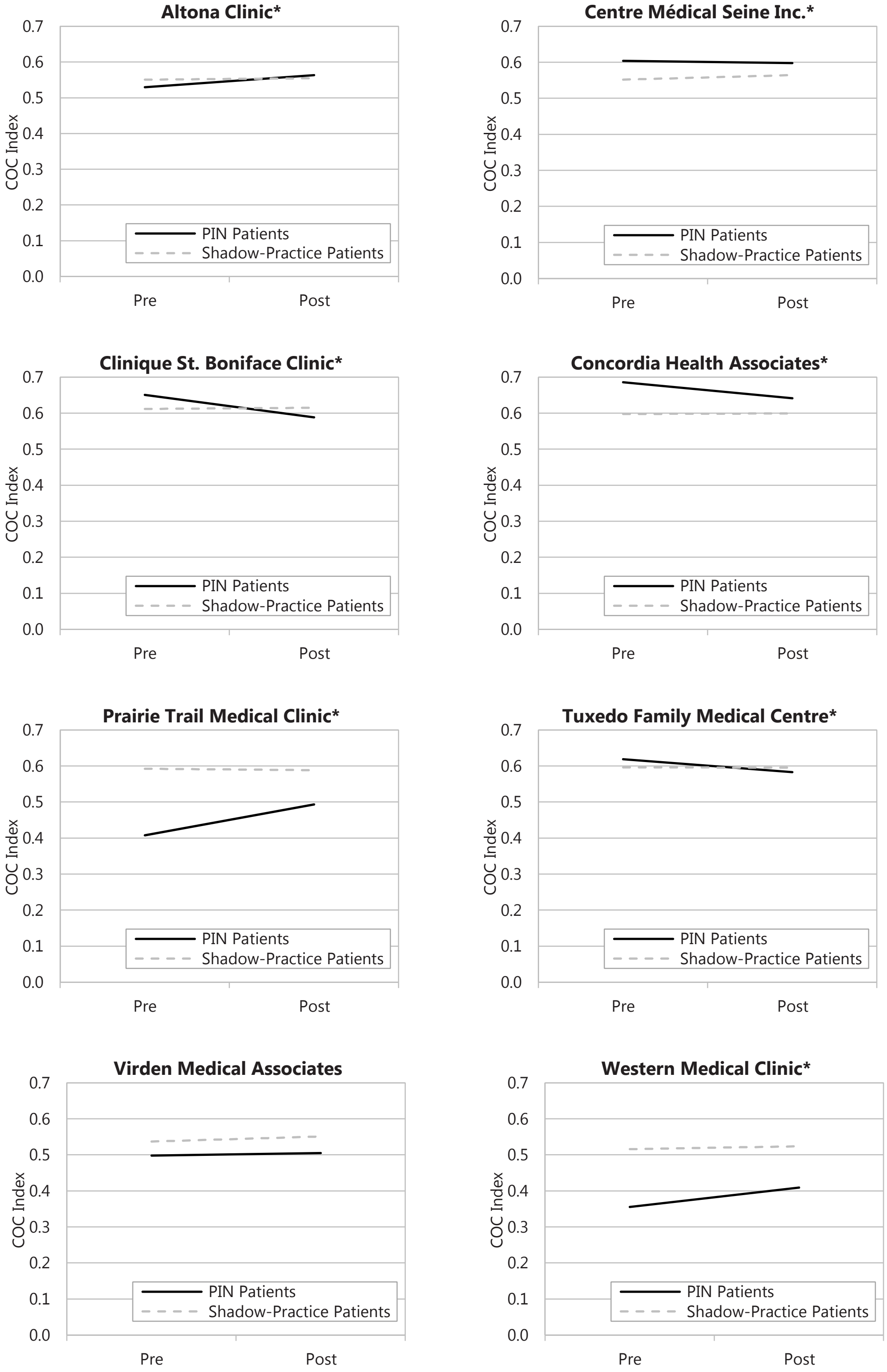
Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

Figure 5.3: Continuity of Care of Assigned Physican for Phase 2 Clinics

Age- and sex-adjusted



* indicates that there was a significant interaction ($p<0.05$)

COC Provided by any Physicians in PIN Clinic

Observations

- The eligible population for PIN clinics ranged from 3,379 to 24,533 pre-implementation, and from 3,464 to 24,258 post-implementation.
- Index values for PIN clinics ranged from 0.6 to 0.9 for both the pre- and post-implementation periods.

At the clinic level, one Phase 1 clinic had an increased rate over time and one had a decreased rate. One Phase 2 clinic had an increased rate and two Phase 2 clinics—both had significant decreases in the number of physicians working—had decreased rates of COC over time.

PIN Effect: There is no PIN effect.

Table 5.2: Continuity of Care Provided by any Physicians in PIN Clinic

Age- and sex-adjusted

	PIN Clinic	Pre-Implementation		Post-Implementation		Change Over Time
		Eligible Population	COC Index	Eligible Population	COC Index	
Phase 1	Agassiz Medical Centre	7,664	0.703	7,898	0.723	
	Assiniboine Medical Clinic	24,533	0.680	24,258	0.694	⇧
	Dr. C. W. Wiebe Medical Centre	10,985	0.888	12,136	0.888	
	Steinbach Family Medical Center	14,419	0.867	14,743	0.761	⇩
Phase 2	Altona Clinic	3,745	0.863	3,464	0.844	
	Centre Médical Seine Inc.	6,690	0.804	6,309	0.804	
	Clinique St. Boniface Clinic	12,442	0.674	13,000	0.661	
	Concordia Health Associates	5,187	0.727	6,586	0.772	⇧
	Prairie Trail Medical Clinic	8,335	0.634	8,446	0.662	
	Tuxedo Family Medical Centre	6,770	0.658	6,715	0.667	
	Virden Medical Associates	3,379	0.774	3,532	0.579	⇩
	Western Medical Clinic	12,660	0.630	9,803	0.569	⇩
Phase 1		57,601	0.769	59,035	0.756	
Phase 2		59,208	0.690	57,855	0.674	

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime.
A blank cell indicates that the two rates were similar.

Routine Electrocardiography

An electrocardiogram (EKG) is a record of the electrical activity of the heartbeat. Individuals without any evidence of heart disease do not require routine EKGs, and this is not recommended as part of a well-person check-up, periodic health examination, or complete physical examination.

The percentage of patients who had an EKG within two weeks of a complete physical examination was calculated. Patients who met the defintion of MI, CHF, Ischaemic Heart Disease, or hypertension—i.e., those with a clear indication for the test—were excluded from this analysis. While it is likely that some patients with an indication for the test were not excluded because these data were not captured in the administrative data, there is no reason that this should be happening in some practices more than in others.

Observations

- The eligible population in PIN clinics ranged from 4,141 to 37,827 pre-implementation, and from 4,344 to 39,220 post-implementation.
- Rates for PIN clinics ranged from 6% to 23% pre-implementation, and from 6% to 25% post-implementation.

It is striking that one PIN clinic had rates considerably higher than any other clinic or shadow practice in both periods. In the pre-implementation period, six PIN clinics had lower rates of routine EKGs than their shadow practices. Four clinics had higher rates. In the post-implementation period, rates were more similar. Four clinics had decreased rates over time.

PIN Effect: This indicator does not have significant interactions for either Phase 1 or Phase 2, so there is no PIN effect.

Table 5.3: Routine Electrocardiographs for Adults aged 18+

Age -and sex-adjusted

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate (%)	Compared to Shadow	Eligible Population	Rate (%)	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	11,542	8.2	↓	11,925	8.8		
		Shadow-Practice Patients	111,901	10.3		117,589	9.1		
	Assiniboine Medical Clinic	PIN Patients	37,827	23.4	↑	39,220	24.6	↑	
		Shadow-Practice Patients	336,061	11.1		349,905	10.8		
	Dr. C. W. Wiebe Medical Centre*	PIN Patients	13,563	7.1	↓	14,661	6.3	↓	⇩
		Shadow-Practice Patients	140,397	7.9		152,292	9.0		
	Steinbach Family Medical Center	PIN Patients	18,066	7.1	↓	19,267	7.5	↓	
		Shadow-Practice Patients	179,638	9.6		194,243	8.8		
Phase 2	**Altona Clinic**	PIN Patients	4,571	11.7		4,755	11.6		
		Shadow-Practice Patients	46,566	11.6		46,054	11.3		
	Centre Médical Seine Inc.	PIN Patients	9,149	11.0		9,410	9.4		⇩
		Shadow-Practice Patients	85,165	11.3		87,727	12.4		
	Clinique St. Boniface Clinic	PIN Patients	20,075	14.4	↑	20,787	12.6		⇩
		Shadow-Practice Patients	186,802	12.5		191,482	13.5		
	Concordia Health Associates*	PIN Patients	9,208	5.9	↓	9,210	6.8	↓	
		Shadow-Practice Patients	88,956	11.4		91,880	9.2		
	Prairie Trail Medical Clinic	PIN Patients	12,801	6.0	↓	13,591	6.3	↓	
		Shadow-Practice Patients	117,049	10.2		120,810	9.2		
	Tuxedo Family Medical Centre	PIN Patients	9,506	5.5	↓	9,952	5.5	↓	
		Shadow-Practice Patients	90,148	11.0		92,506	10.4		
	Virden Medical Associates	PIN Patients	4,141	16.0	↑	4,344	13.0		⇩
		Shadow-Practice Patients	39,804	13.1		41,613	14.6		
	Western Medical Clinic	PIN Patients	15,469	15.6	↑	15,953	14.2	↑	
		Shadow-Practice Patients	141,294	9.6		145,306	9.8		
Phase 1		PIN Patients	80,998	14.9	↑	85,073	11.4	↑	
		Shadow-Practice Patients	767,997	7.5		814,029	7.5		
Phase 2		PIN Patients	84,920	8.1		88,002	7.4		⇩
		Shadow-Practice Patients	795,784	8.2		817,378	7.7		

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 5.4: Routine Electrocardiography for Adults 18+ by Phase

Age- and sex-adjusted

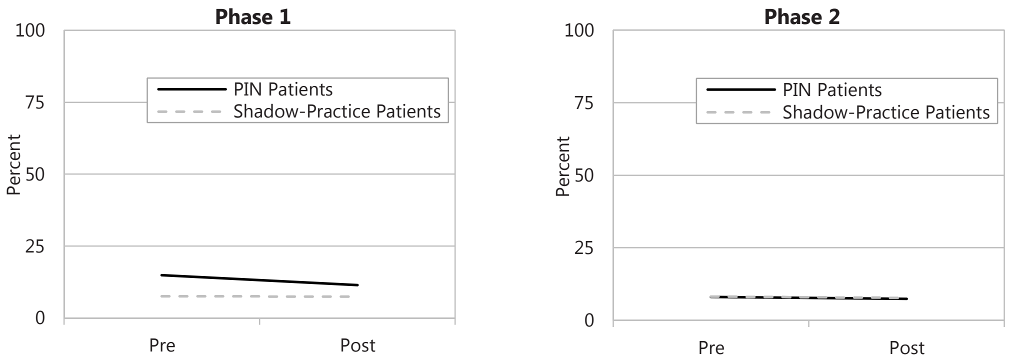
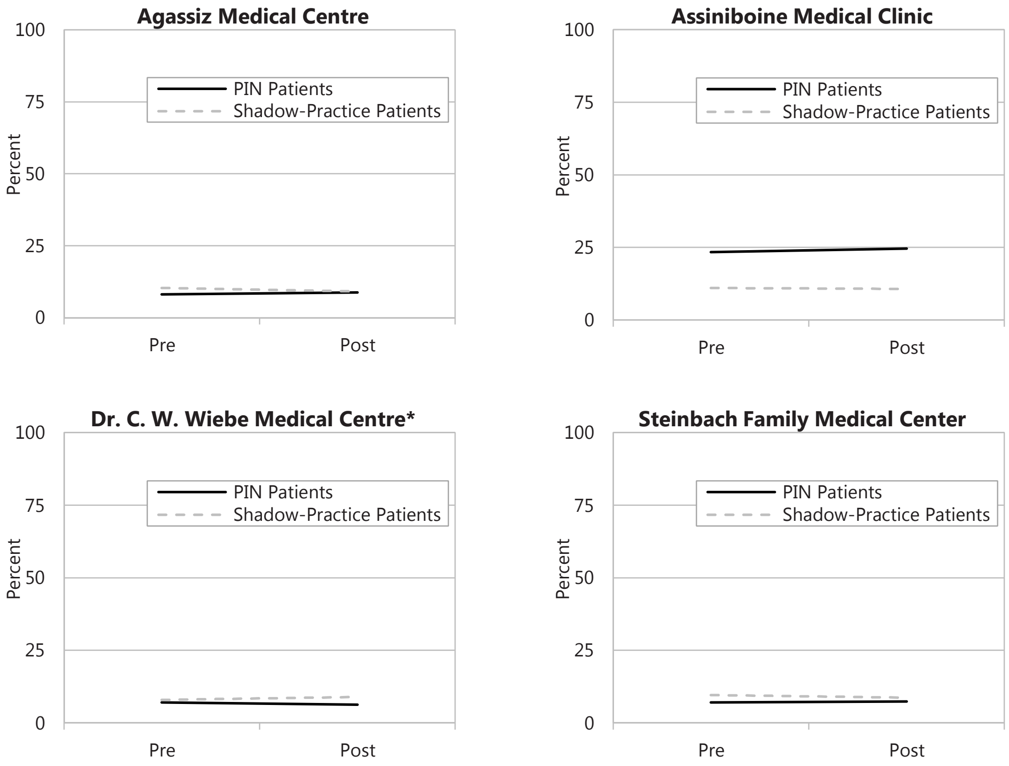


Figure 5.5: Routine Routine Electrocardiography for Adults 18+ for Phase 1 Clinics

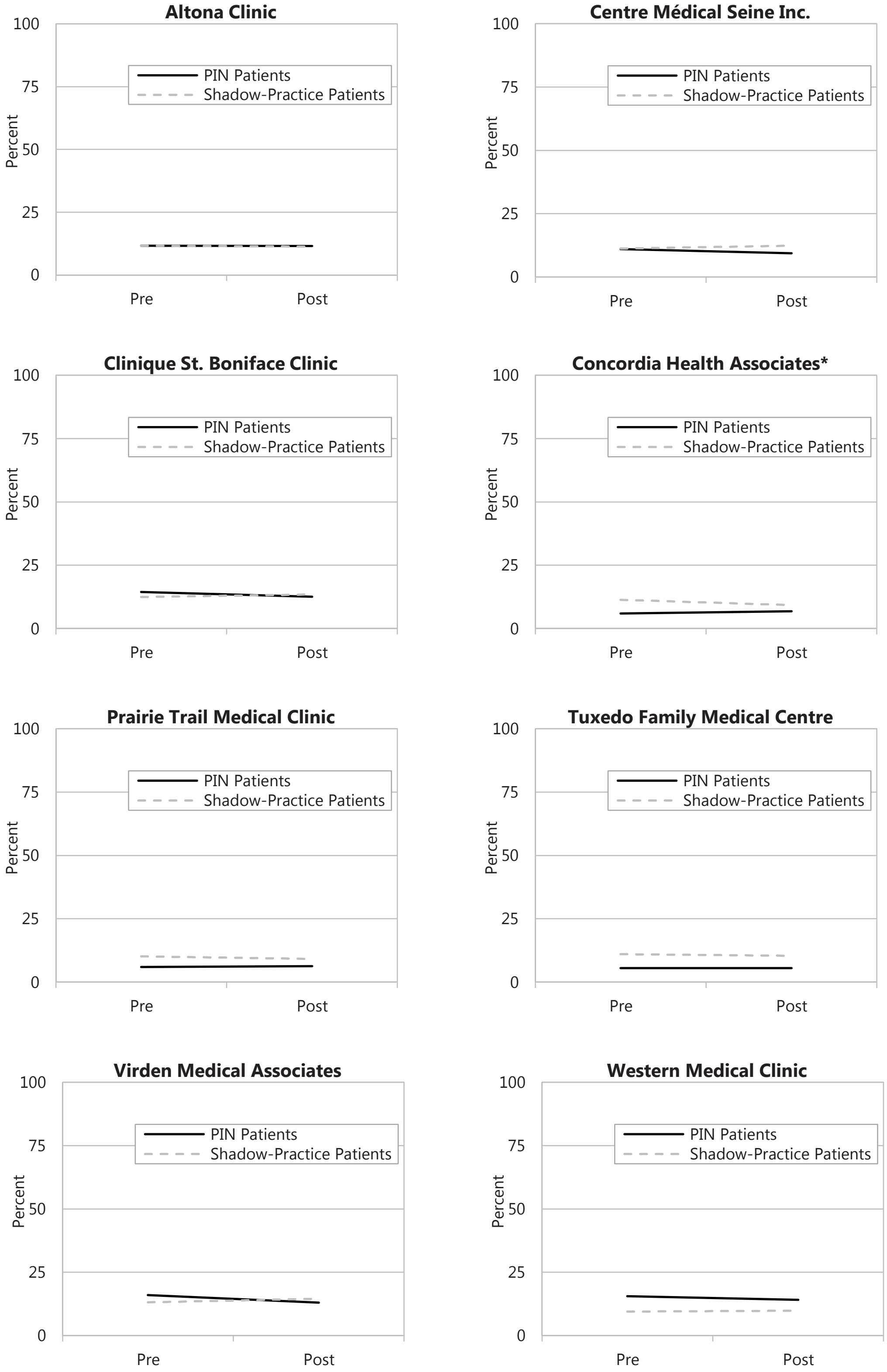
Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

Figure 5.6: Routine Electrocardiography for Adults 18+ for Phase 2 Clinics

Age- and sex-adjusted



* indicates that there was a significant interaction ($p<0.05$)

Hospitalizations for Ambulatory Care Sensitive Conditions

Ambulatory Care Sensitive Conditions (ACSC) were first described by Billings et al. (Billings et al., 1993).These are conditions that should not require hospitalization if the patient receives adequate care in the community. The initial list of conditions described by Billings has been modified repeatedly by other authors over time.

Because patients are very rarely hospitalized for many conditions described in the original list of ACSC, we used only a select group of chronic diseases that were included in it: chronic obstructive pulmonary disease, congestive heart failure, diabetes, and asthma.

The Repository contains data on patients collected when they are discharged, rather than when they are admitted to hospital. All patients admitted to hospital eventually have hospital discharge (or separation) abstracts completed. We use these abstracts to count hospitalizations.

We adjusted the rates by age, sex and **Resource Utilization Bands (RUBs)** (a reflection of how sick the patient is based on their use of the healthcare system).

Observations:

- Eligible population ranged from 3,764 to 28,569 pre-implementation, and from 3,811 to 27,872 post-implementation.
- Rates (per 1000 patients) for PIN clinics ranged from 2 to 15 pre-implementation, and from 1 to 10 post-implementation.

In the pre-implementation period, eight PIN clinics had lower (better) rates of hospitalization than their shadow practices and one clinic had a higher rate. In the post-implementation period, eight clinics had lower rates of hospitalization than their shadow practices. Two PIN clinics had decreased rates over time and one clinic had an increased rate. Three shadow practices had decreased rates over time, and one shadow practices had an increased rate.

PIN Effect: Phase 1 clinics had a significant increase over time (a negative PIN effect), but their rates are still noticeably lower than their shadow practice rates. Phase 2 clinics did not demonstrate a significant interaction. Because we have defined a PIN effect as an interaction between clinic type and time that occurs in both Phase 1 and Phase 2 clinics together, rather than each clinic separately, there is no PIN effect for this indicator.

Table 5.4: Hospitalizations for Ambulatory Care Sensitive Conditions

Age-, sex-, RUB-adjusted, per 1,000 patients

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate	Compared to Shadow	Eligible Population	Rate	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	11,535	4.94	↓	12,061	4.69	↓	
		Shadow-Practice Patients	114,889	8.44		119,594	8.80		
	Assiniboine Medical Clinic	PIN Patients	28,569	3.19	↓	27,872	3.38	↓	
		Shadow-Practice Patients	271,511	6.44		267,748	5.46		⇩
	Dr. C. W. Wiebe Medical Centre*	PIN Patients	16,373	3.36	↓	17,740	3.68	↓	
		Shadow-Practice Patients	167,413	9.45		180,733	7.59		⇩
	Steinbach Family Medical Center*	PIN Patients	20,004	3.40	↓	21,291	4.66	↓	⇧
		Shadow-Practice Patients	195,735	7.11		210,665	4.91		
Phase 2	**Centre Médical Seine Inc.**	PIN Patients	8,322	4.81	↓	8,321	2.98	↓	
		Shadow-Practice Patients	79,966	7.63		80,337	9.53		⇧
	Clinique St. Boniface Clinic	PIN Patients	14,850	2.90	↓	14,656	3.92		
		Shadow-Practice Patients	143,285	5.79		141,702	3.59		
	Concordia Health Associates	PIN Patients	7,769	3.48		7,729	4.74		
		Shadow-Practice Patients	74,190	4.82		73,672	3.37		
	Prairie Trail Medical Clinic	PIN Patients	10,230	1.86	↓	10,253	1.77	↓	
		Shadow-Practice Patients	99,466	4.13		98,769	3.23		⇩
	Tuxedo Family Medical Centre	PIN Patients	7,725	1.68	↓	7,655	1.44	↓	
		Shadow-Practice Patients	73,511	3.27		72,947	3.15		
	Virden Medical Associates	PIN Patients	3,764	15.14	↑	3,811	10.29		⇩
		Shadow-Practice Patients	37,019	11.06		37,493	15.12		
	Western Medical Clinic	PIN Patients	14,259	9.05		14,564	5.78		
		Shadow-Practice Patients	141,842	8.46		141,523	11.69		
Phase 1*		PIN Patients	76,481	3.54	↓	78,964	5.82	↓	⇧
		Shadow-Practice Patients	749,548	11.09		778,740	10.28		⇩
Phase 2		PIN Patients	71,499	7.86		71,575	6.02	↓	
		Shadow-Practice Patients	694,582	9.15		689,610	8.14		⇩

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

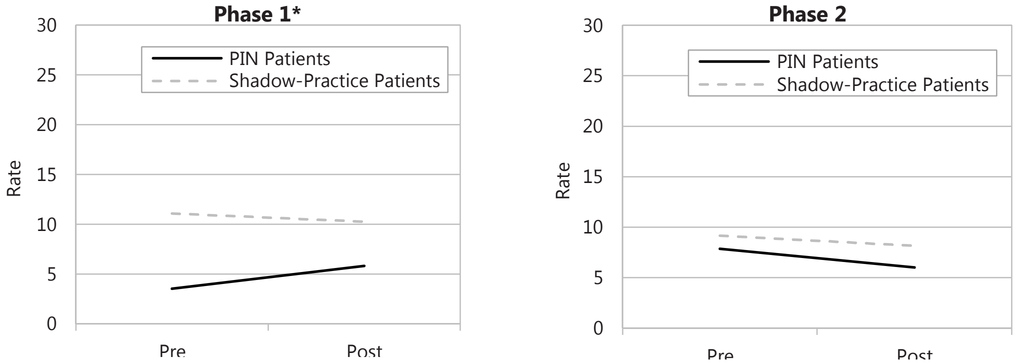
"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Altona Clinic has been removed from this analysis due to modelling challenges.

Figure 5.7: Hospitalizations for Ambulatory Care Sensitive Conditions by Phase

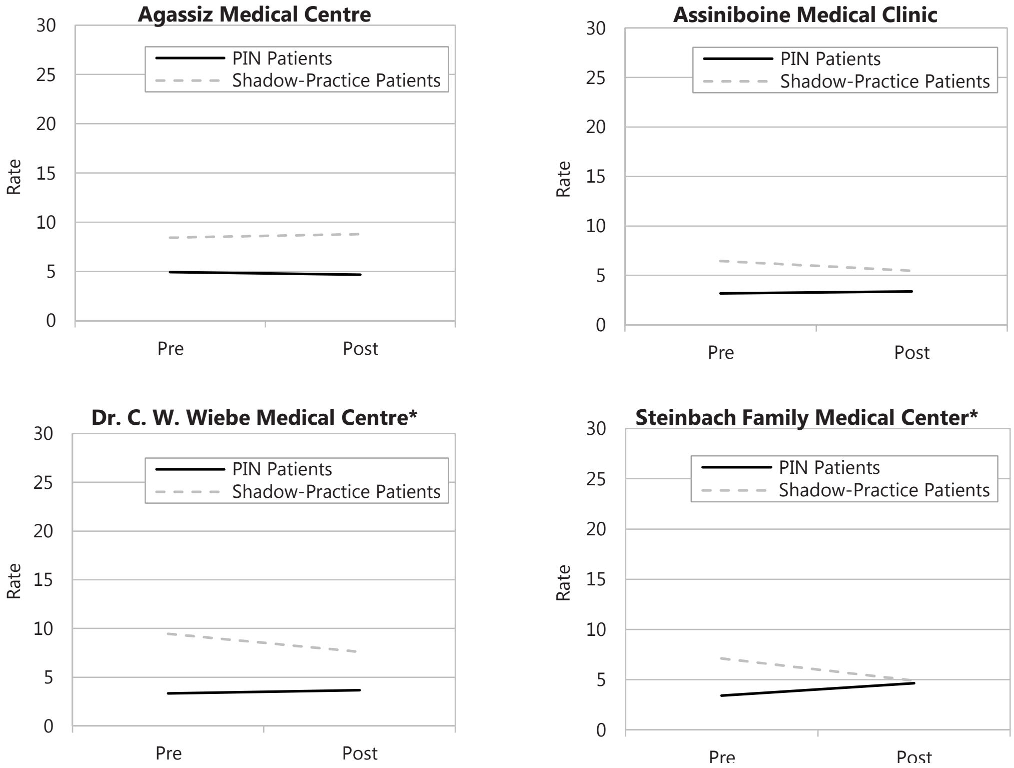
Age-, sex- & RUB-adjusted, per 1,000 patients



* indicates that there was a significant interaction (p<0.05)

Figure 5.8: Hospitalizations for Ambulatory Care Sensitive Conditions for Phase 1 Clinics

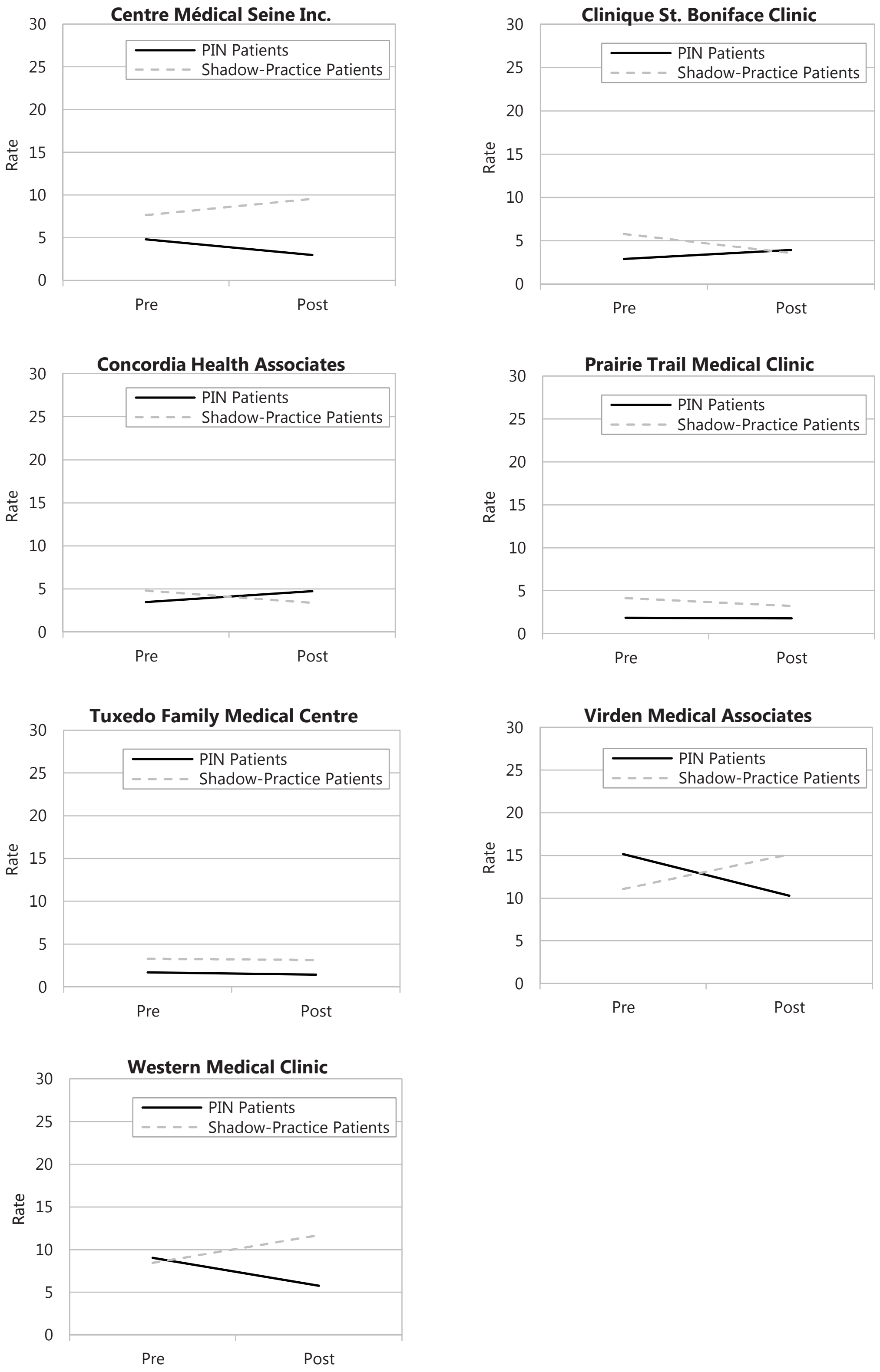
Age-, sex- & RUB-adjusted, per 1,000 patients



* indicates that there was a significant interaction (p<0.05)

Figure 5.9: Hospitalizations for Ambulatory Care Sensitive Conditions for Phase 2 Clinics

Age-, sex- & RUB-adjusted, per 1,000 patients



Altona Clinic has been removed from this analysis due to modelling challenges.

Referral Rates

Referrals from primary-care physicians to **specialists** are a routine part of primary care. The decision to refer a patient is based on a number of factors and has a number of consequences for the patient and the healthcare system. While analysis of administrative data does not allow evaluation of the appropriateness of any one specific referral, practice-based analysis does suggest a pattern of clinical behavior. Previous research has demonstrated significant differences in referrals that are extremely unlikely to be a reflection of individual patient need based on differences in disease pattern (Liddy et al., 2014). For example, fee-for-service physicians have been shown to have lower referral rates than physicians funded through other mechanisms. As with many other indicators included in this report there is no "correct" rate of referral but we are able to provide comparisons both before and after PIN implementation and between PIN clinic patients and their matched shadow practices. We calculated the rate of referrals three ways:

1. Rate of referral by the patient's own assigned family physician
2. Rate of referral by any family physician working at the same clinic
3. Rate of referral by any family physician seen regardless of where they work

Previous research has suggested that patients tend to be referred for specialist care more often by physicians who do not have an ongoing therapeutic relationship with the patient. All the rates are based on ambulatory visits.

Exclusions:

We excluded referrals made to pathology, radiology, anesthesia, and all obstetrical referrals due to a normal pregnancy. When looking at the referral rates from physicians at the same clinic we were unable to have shadow practices; therefore, we only looked at changes over time.

Referral Rates are a per-person rate and could technically go over 1.0 because one person can get more than one referral.

Assigned Physician

Observations:

- Eligible population ranged from 3,931 to 28,955 pre-implementation, and from 4,033 to 28,688 post-implementation.
- Rates for PIN clinics ranged from 0.23 to 0.66 referrals per person pre-implementation, and from 0.24 to 0.65 referrals per person post-implementation.

In the pre-implementation period, referral rates for assigned patients of physicians at eight PIN clinics were higher than the rates at their shadow practices. Rates at two clinics were lower. In the post-implementation period, ten clinics had higher rates and only one had lower rates. Five PIN clinics showed increased rates over time. One PIN clinic showed a decreased rate over time, but its rate remained higher than its shadow practice.

PIN Effect: Both Phase 1 and Phase 2 analyses indicate greater increases over time in referral rates at PIN clinics than shadow practices. Because there is no correct rate of referral, this is neither a positive nor a negative effect.

Table 5.5: Assigned Physician Referral Rates

Age -and sex-adjusted

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate	Compared to Shadow	Eligible Population	Rate	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	11,165	0.340	↑	11,474	0.377	↑	⇧
		Shadow-Practice Patients	122,887	0.253		128,180	0.245		
	Assiniboine Medical Clinic	PIN Patients	28,955	0.611	↑	28,688	0.654	↑	
		Shadow-Practice Patients	299,800	0.426		298,830	0.396		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	15,482	0.259	↑	17,075	0.264	↑	
		Shadow-Practice Patients	175,074	0.227		188,813	0.216		
	Steinbach Family Medical Center*	PIN Patients	19,082	0.377	↑	20,185	0.357	↑	
		Shadow-Practice Patients	205,909	0.241		221,557	0.275		
Phase 2	**Altona Clinic**	PIN Patients	4,822	0.230	↓	4,617	0.241	↓	⇧
		Shadow-Practice Patients	48,783	0.298		46,909	0.295		
	Centre Médical Seine Inc.	PIN Patients	8,496	0.413	↑	8,129	0.432	↑	⇧
		Shadow-Practice Patients	85,962	0.310		86,471	0.310		
	Clinique St. Boniface Clinic*	PIN Patients	14,394	0.656	↑	15,143	0.611	↑	⇩
		Shadow-Practice Patients	159,844	0.436		159,199	0.460		
	Concordia Health Associates	PIN Patients	7,865	0.492	↑	7,960	0.475	↑	
		Shadow-Practice Patients	80,668	0.393		80,721	0.402		
	Prairie Trail Medical Clinic	PIN Patients	9,705	0.397		9,856	0.412	↑	
		Shadow-Practice Patients	105,572	0.392		105,314	0.372		
	Tuxedo Family Medical Centre*	PIN Patients	7,829	0.574	↑	7,755	0.627	↑	
		Shadow-Practice Patients	79,017	0.441		79,059	0.387		
	Virden Medical Associates	PIN Patients	3,931	0.225	↓	4,033	0.288		⇧
		Shadow-Practice Patients	40,809	0.285		41,484	0.241		
	Western Medical Clinic*	PIN Patients	14,416	0.246		12,004	0.320	↑	⇧
		Shadow-Practice Patients	150,058	0.265		150,582	0.211		
Phase 1*		PIN Patients	74,684	0.438	↑	77,422	0.445	↑	⇧
		Shadow-Practice Patients	803,670	0.304		837,380	0.309		
Phase 2*		PIN Patients	71,458	0.395	↑	69,497	0.415	↑	⇧
		Shadow-Practice Patients	750,713	0.331		749,739	0.331		

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

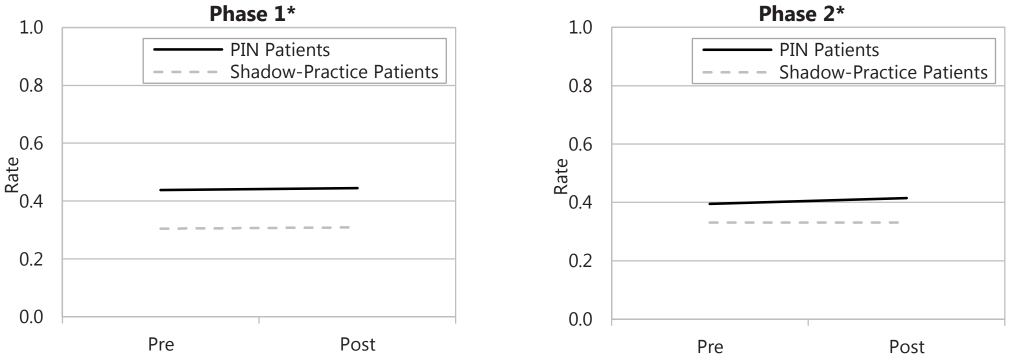
"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 5.10: Assigned Physician Referral Rates by Phase

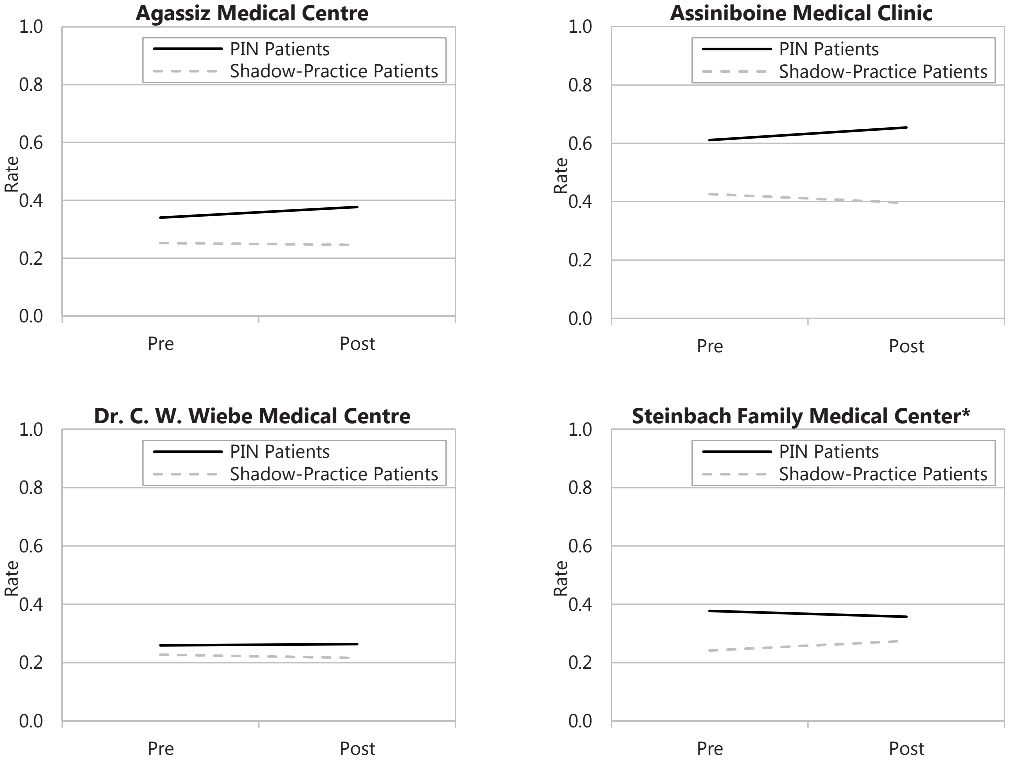
Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

Figure 5.11: Assigned Physician Referral Rates for Phase 1 Clinics

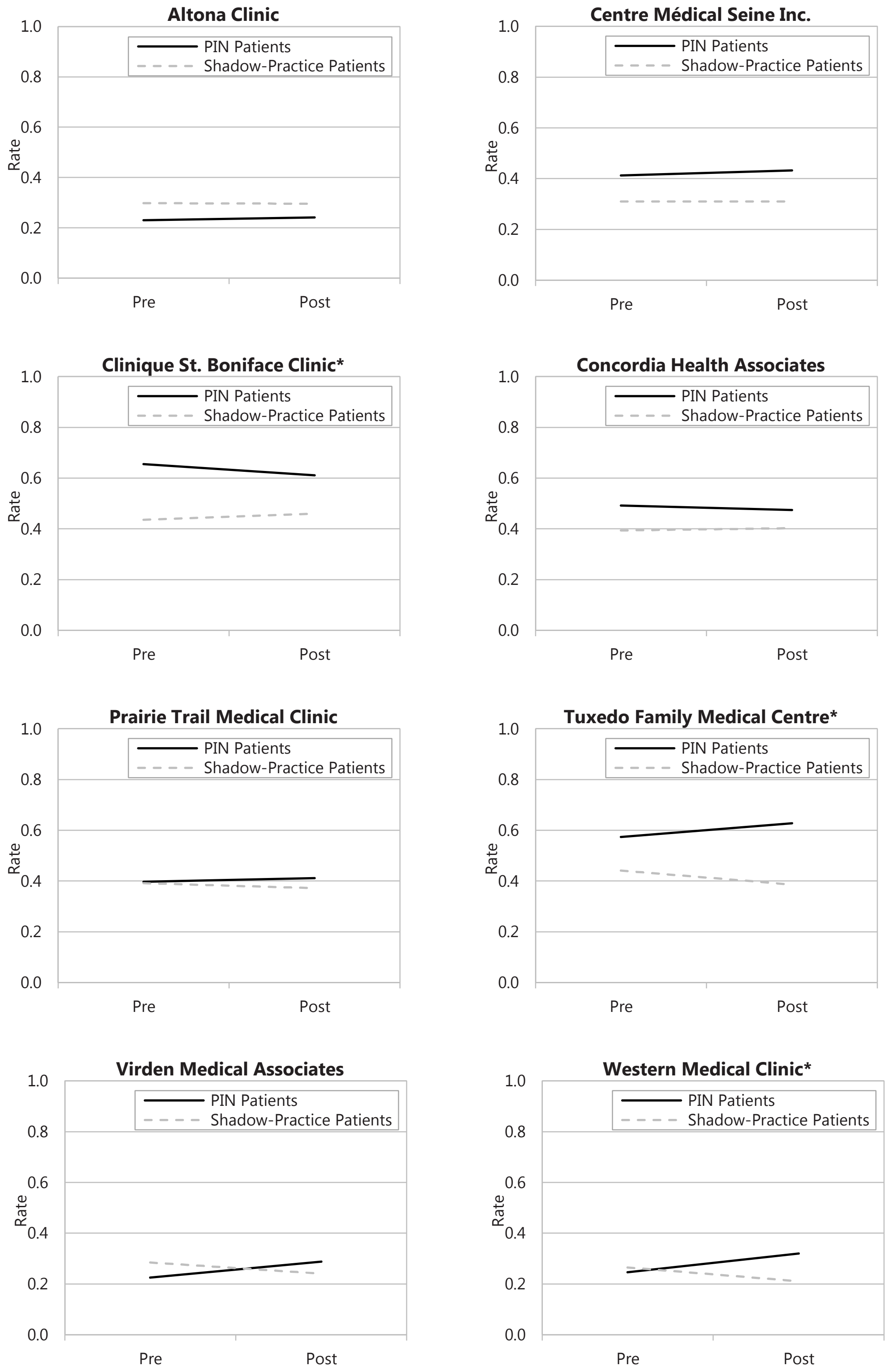
Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

Figure 5.12: Assigned Physician Referral Rates for Phase 2 Clinics

Age- and sex-adjusted



* indicates that there was a significant interaction ($p<0.05$)

Clinic-Based Referrals

Observations

- Eligible population ranged from 3,931 to 28,955 pre-implementation, and from 4,033 to 28,688 post-implementation.
- Rates for PIN clinics ranged from 0.32 to 0.79 referrals per person pre-implementation, and from 0.32 to 0.79 referrals per person post-implementation.

The referral rates increased over time for five PIN clinics and decreased for one clinic. Table 5.6, which presents the clinic-based rates, does not include comparisons with shadow practices because we are unable to establish clinic-based referral rates for shadow practices.

PIN Effect: This indicator demonstrates an increase in referral rates associated with PIN clinics. Because there is no "correct" rate of referral, this is neither a positive nor a negative effect.

Table 5.6: Clinic Based Referrals Rates
Age- and sex-adjusted

	PIN Clinic	Pre-Implementation		Post-Implementation		Change Over Time
		Eligible Population	Rate	Eligible Population	Rate	
Phase 1	**Agassiz Medical Centre**	11,165	0.455	11,474	0.492	⇧
	Assiniboine Medical Clinic	28,955	0.739	28,688	0.789	
	Dr. C. W. Wiebe Medical Centre	15,482	0.341	17,075	0.350	
	Steinbach Family Medical Center	19,082	0.482	20,185	0.490	
Phase 2	**Altona Clinic**	4,822	0.315	4,617	0.324	
	Centre Médical Seine Inc.	8,496	0.500	8,129	0.521	⇧
	Clinique St. Boniface Clinic	14,394	0.788	15,143	0.792	
	Concordia Health Associates	7,865	0.568	7,960	0.558	
	Prairie Trail Medical Clinic	9,705	0.616	9,856	0.586	⇩
	Tuxedo Family Medical Centre	7,829	0.668	7,755	0.745	⇧
	Virden Medical Associates	3,931	0.333	4,033	0.419	⇧
	Western Medical Clinic	14,416	0.392	12,004	0.488	⇧
Phase 1		74,684	0.548	77,422	0.583	⇧
Phase 2		71,458	0.529	69,497	0.561	⇧

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime.

A blank cell indicates that the two rates were similar.

Total Referrals

Observations:

- Eligible population ranged from 3,931 to 28,955 pre-implementation, and from 4,033 to 28,688 post-implementation.
- Rates for PIN clinics ranged from 0.32 to 0.80 referrals per person pre-implementation, and from 0.34 to 0.80 referrals per person post-implementation.

The total referral rates are only marginally higher than the clinic-based rates, which indicates that the majority of referrals are made from the PIN clinic. The PIN clinics once again have higher rates than the shadow-practice patients (eight clinics pre-implementation and ten clinics post-implementation). The rate of change increased in six PIN clinics.

PIN Effect: The increase in referral rates associated with PIN is only present for Phase 2 clinics in this indicator. However, there is also an overall increase in referral rates for shadow practices that suggests a more general trend.

Table 5.7: Rates of Specialist Referral by any Physician

Age -and sex-adjusted

	PIN Clinic	Patient Group	Pre-Implementation			Post-Implementation			Change Over Time
			Eligible Population	Rate	Compared to Shadow	Eligible Population	Rate	Compared to Shadow	
Phase 1	**Agassiz Medical Centre**	PIN Patients	11,165	0.492	↑	11,474	0.523	↑	⇧
		Shadow-Practice Patients	122,887	0.357		128,180	0.370		
	Assiniboine Medical Clinic	PIN Patients	28,955	0.744	↑	28,688	0.798	↑	
		Shadow-Practice Patients	299,800	0.558		298,830	0.533		
	Dr. C. W. Wiebe Medical Centre	PIN Patients	15,482	0.356		17,075	0.363	↑	
		Shadow-Practice Patients	175,074	0.324		188,813	0.318		
	Steinbach Family Medical Center	PIN Patients	19,082	0.492	↑	20,185	0.499	↑	
		Shadow-Practice Patients	205,909	0.338		221,557	0.364		
Phase 2	**Altona Clinic**	PIN Patients	4,822	0.324	↓	4,617	0.340	↓	⇧
		Shadow-Practice Patients	48,783	0.398		46,909	0.406		
	Centre Médical Seine Inc.	PIN Patients	8,496	0.509	↑	8,129	0.531	↑	⇧
		Shadow-Practice Patients	85,962	0.421		86,471	0.430		
	Clinique St. Boniface Clinic	PIN Patients	14,394	0.795	↑	15,143	0.801	↑	
		Shadow-Practice Patients	159,844	0.575		159,199	0.567		
	Concordia Health Associates	PIN Patients	7,865	0.608	↑	7,960	0.574	↑	
		Shadow-Practice Patients	80,668	0.520		80,721	0.552		
	Prairie Trail Medical Clinic	PIN Patients	9,705	0.622	↑	9,856	0.601	↑	
		Shadow-Practice Patients	105,572	0.514		105,314	0.534		
	Tuxedo Family Medical Centre*	PIN Patients	7,829	0.671	↑	7,755	0.752	↑	⇧
		Shadow-Practice Patients	79,017	0.573		79,059	0.501		
	Virden Medical Associates*	PIN Patients	3,931	0.337	↓	4,033	0.422		⇧
		Shadow-Practice Patients	40,809	0.393		41,484	0.345		
	Western Medical Clinic*	PIN Patients	14,416	0.398		12,004	0.511	↑	⇧
		Shadow-Practice Patients	150,058	0.375		150,582	0.311		
Phase 1		PIN Patients	74,684	0.562	↑	77,422	0.592	↑	⇧
		Shadow-Practice Patients	803,670	0.425		837,380	0.443		⇧
Phase 2*		PIN Patients	71,458	0.537	↑	69,497	0.572	↑	⇧
		Shadow-Practice Patients	750,713	0.456		749,739	0.466		⇧

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

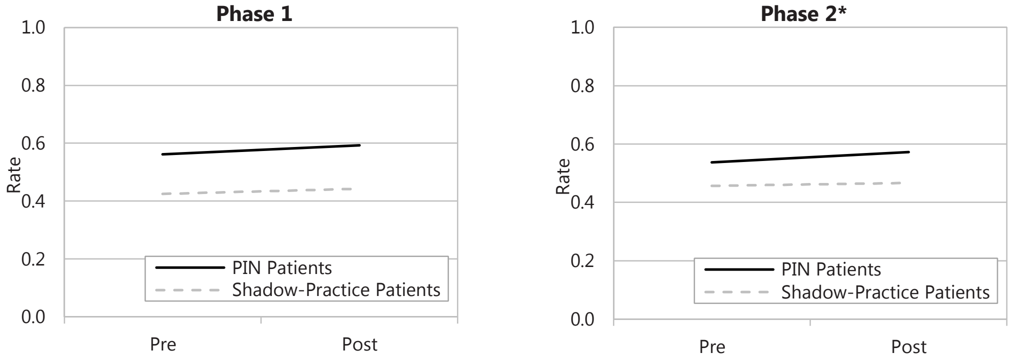
"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Figure 5.13: Rates of Specialist Referral by any Physician by Phase

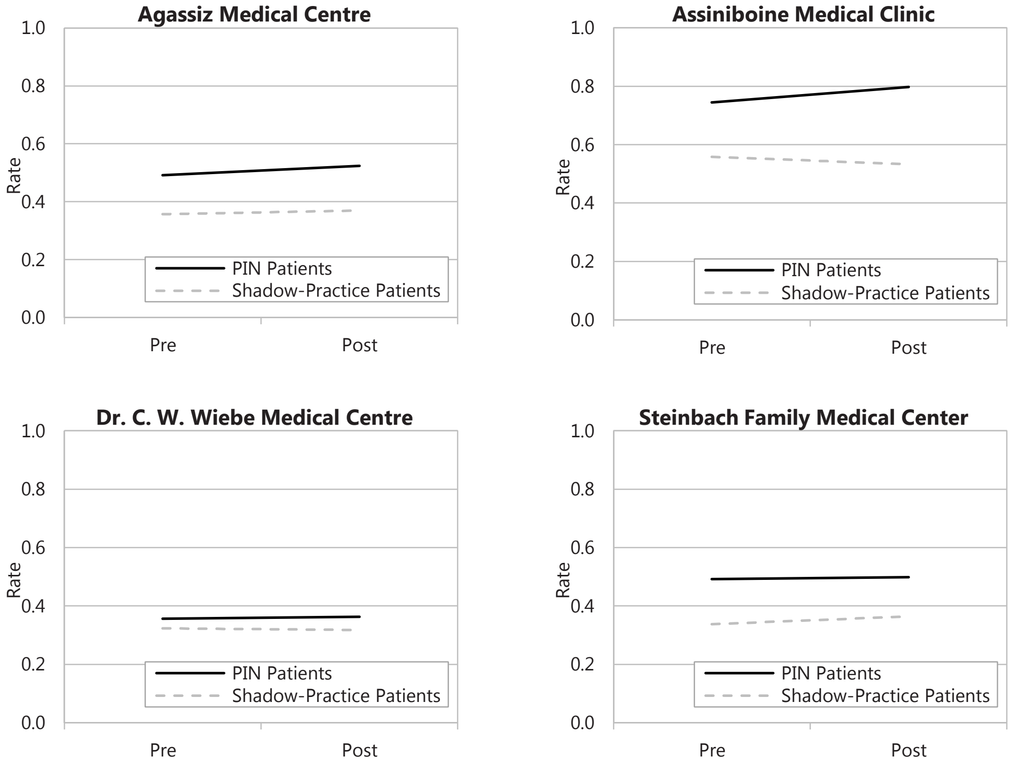
Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

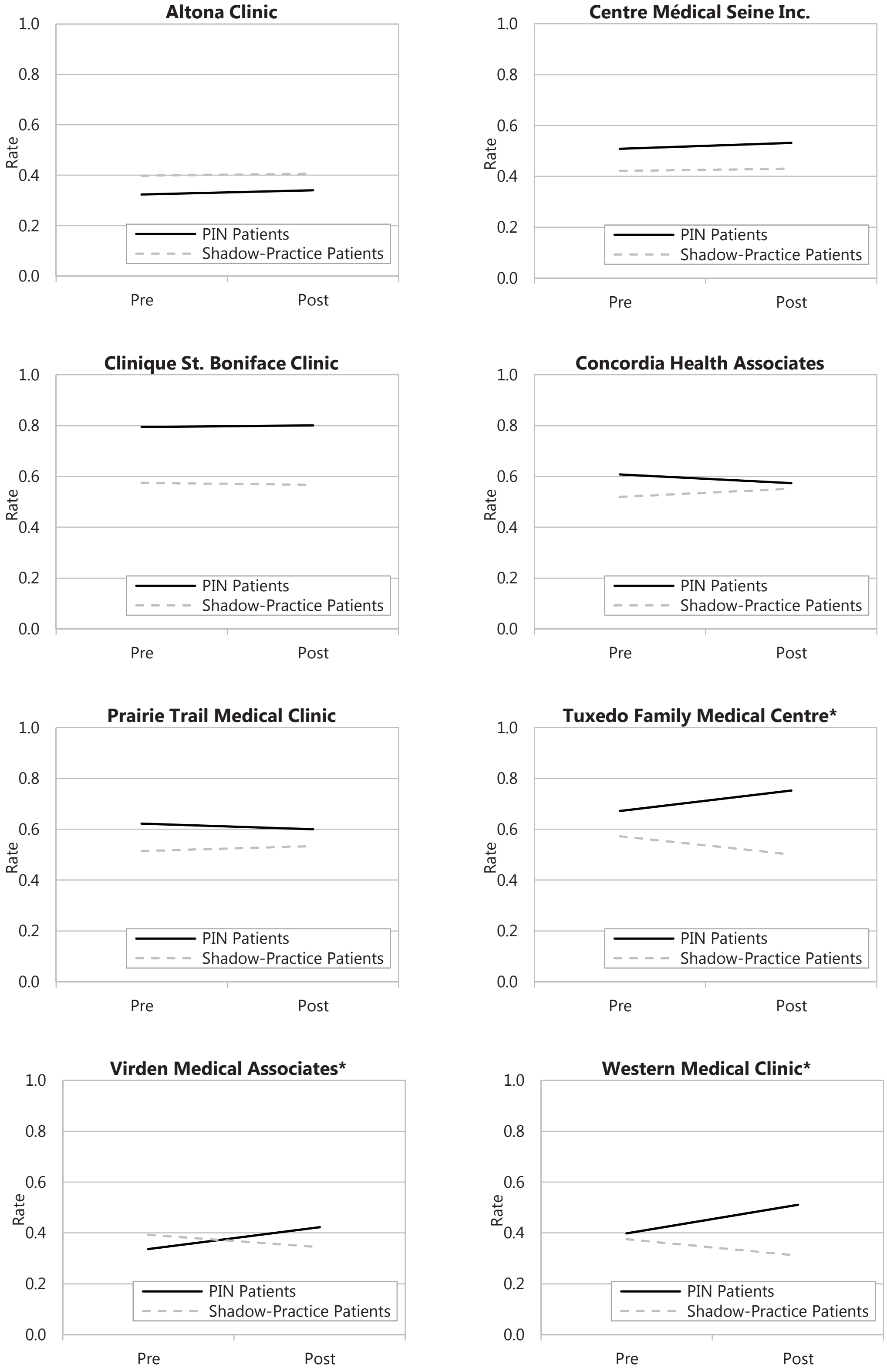
Figure 5.14: Rates of Specialist Referral by any Physician for Phase 1 Clinics

Age- and sex-adjusted



* indicates that there was a significant interaction (p<0.05)

Figure 5.15: Rates of Specialist Referral by any Physician for Phase 2 Clinics
Age- and sex-adjusted



* indicates that there was a significant interaction ($p<0.05$)

Figure 5.16: Referral Rates by Phase

Age- and sex-adjusted

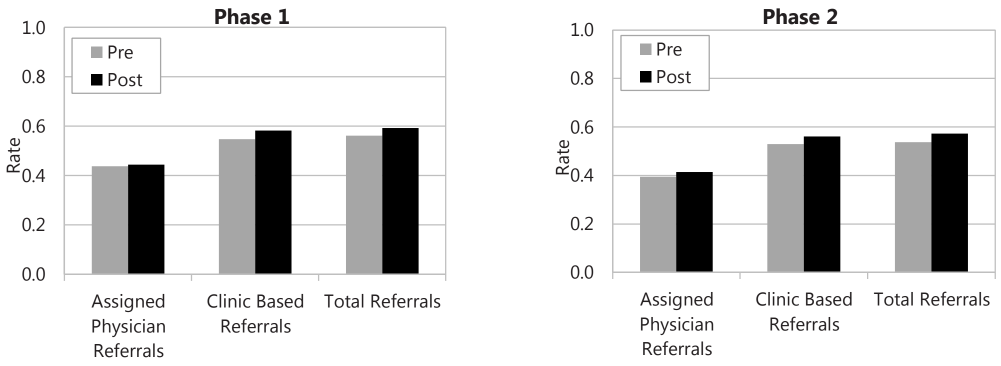


Figure 5.17: Referral Rates for Phase 1 Clinics

Age- and sex-adjusted

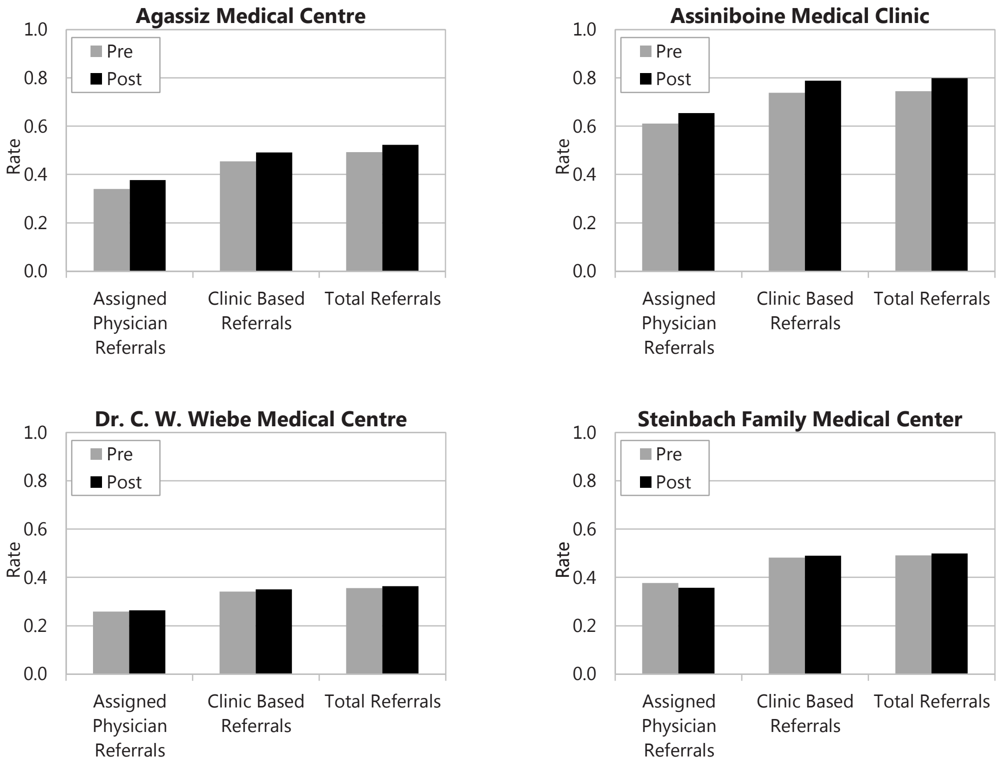
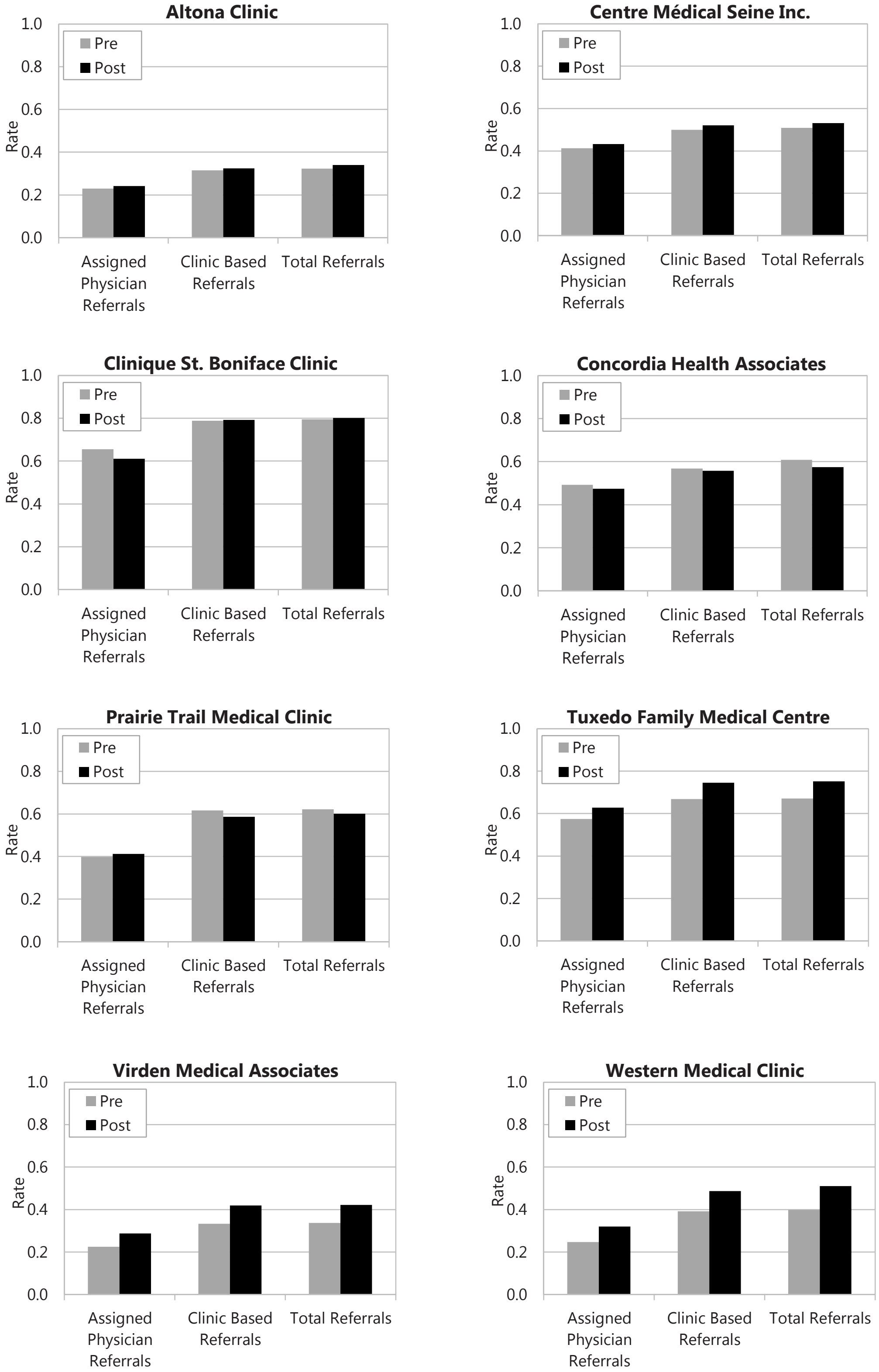


Figure 5.18: Referral Rates for Phase 2 Clinics

Age- and sex-adjusted



Smoking-Cessation Prescription

There are two main types of smoking-cessation medicines approved by Health Canada that require prescriptions and are therefore captured in the Repository: Bupropion SR (brand names Zyban and Wellbutrin SR*)* and Varenicline tartrate (brand name Champix). Wellbutrin is approved for the treatment of depression while the other two drug brands are approved for smoking cessation. To rule out the use of Buprioprion for treatment of depression, people who had a previous diagnosis of depression were excluded from the study.

While **Statistics Canada** reports that 19% to 24% of Manitobans smoked during the study period (Physicians for a Smoke-Free Canada, 2013), we were only able to identify smokers attending PIN clinics at the time of the study as this information is included in the PIN File. The Repository does not include data on the smoking status of the majority of Manitobans. The PIN QBIF indicator addresses smoking-cessation counseling which we are not able to capture from the Repository. We report on the use of approved prescription medication for smoking cessation as this is available in the Repository.

The percent of smokers, aged 18 and older, in PIN clinic with a prescription of Bupropion SR and or Varenicline tartrate in a two-year period was calculated. Patients who had a previous diagnosis of depression were excluded from the analysis.

Observations:

- The eligible population in PIN clinics ranged from 207 to 2,319 pre-implementation, and from 217 to 2,382 post-implementation.
- Rates of prescription for PIN-identified smokers for PIN clinics ranged from 18% to 41% pre-implementation, and from 18% to 43% post-implementation.

There are no comparison data for shadow practices and only one PIN clinic demonstrated an increase in prescribing rate over time.

PIN Effect: There is no PIN effect on this indicator.

Table 5.8: Adults, Aged 18+, who received 1+ Smoking Cessation Prescription

Age- and sex-adjusted

	PIN Clinic	Pre-Implementation		Post-Implementation		Change Over Time
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	
Phase 1	**Agassiz Medical Centre**	761	34.2	795	34.2	
	Assiniboine Medical Clinic	996	31.1	1,010	32.2	
	Dr. C. W. Wiebe Medical Centre	2,319	17.7	2,382	17.6	
	Steinbach Family Medical Center	1,439	33.7	1,536	33.8	
Phase 2	**Altona Clinic**	474	23.6	485	25.4	
	Centre Médical Seine Inc.	776	21.6	780	22.5	
	Clinique St. Boniface Clinic	1,483	21.7	1,531	22.5	⇧
	Concordia Health Associates	936	20.0	956	20.7	
	Prairie Trail Medical Clinic	825	31.0	832	31.5	
	Tuxedo Family Medical Centre	324	22.8	331	24.0	
	Virden Medical Associates	207	40.6	217	43.2	
	Western Medical Clinic	1,056	24.7	1,092	24.7	
Phase 1		5,577	26.7	5,777	24.2	
Phase 2		6,081	21.9	6,224	22.6	

"⇧" indicates that there was a significant increase in the rate over time; while a "⇩" indicates that there was a significant decrease in the rate overtime.

A blank cell indicates that the two rates were similar.

CHAPTER 6: LONG-TERM FOLLOW-UP

The major purpose of the following analyses is to determine whether any initial improvements over the pre-implementation rates are maintained and whether the trend following implementation is continued. That is, is there further improvement, or just maintenance of the improvement achieved in the initial post-implementation period? We did not include shadow practices in these analyses. Long-term follow-up analyses could only be performed for the four Phase 1 clinics because there has not been enough time since implementation at the Phase 2 clinics to assess the long-term impact.

Prevention and Screening Indicators

Breast Cancer Screening

Three of the four clinics improved after implementation and all four were better at the long-term follow-up measure than pre-implementation. One clinic that improved at the long-term follow-up measure had not improved post-implementation. One clinic showed a decrease in rate from post-implementation to long-term follow-up, but nevertheless had the highest rate of any of the clinics. Even though there was no clear ongoing improvement beyond the post-implementation period, the long-term follow-up rates were consistently better than the pre-implementation-period rates.

Table 6.1: Breast Cancer Screening for Women aged 50-69, Long-Term Follow-Up
Age-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	1,712	53.0	1,861	55.5		1,735	62.3	↑	↑
Assiniboine Medical Clinic	5,341	75.0	5,481	79.0	↑	5,906	76.8	↑	↓
Dr. C. W. Wiebe Medical Centre	1,599	49.4	1,755	58.8	↑	1,926	58.9	↑	
Steinbach Family Medical Center	2,257	64.4	2,501	71.3	↑	2,483	70.6	↑	

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Complete Immunizations at Age Two

Children's immunization at age two improved at two clinics post-implementation. This improvement was sustained at one clinic, but there was no further improvement between the post-implementation and long-term follow-up periods. Two clinics showed a decrease at long-term follow-up compared to both pre- and post-implementation rates.

Table 6.2: Complete Immunizations at Age Two, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	407	51.6	414	58.9	↑	394	60.9	↑	
Assiniboine Medical Clinic	122	66.4	113	69.9	↑	106	67.0		
Dr. C. W. Wiebe Medical Centre	671	56.0	818	56.7		869	51.8	↓	↓
Steinbach Family Medical Center	702	69.9	829	69.5		726	64.2	↓	↓

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Annual Influenza Immunizations for Adults aged 65 and Older and People with Total Respiratory Morbidity

While the one urban clinic had an increase in flu shots in patients aged 65 years and older post-implementation, that improvement was not sustained. All four clinics demonstrated lower rates at the long-term follow-up compared to both pre-implementation and at long-term post-implementation. In contrast, the rates for flu shots for patients with respiratory disease presented below showed a mixed pattern. None of the clinics demonstrated a sustained improvement at long-term follow-up.

Table 6.3: Annual Influenza Immunization, Adults Aged 65+, Long-Term Follow-Up
Age- and sex-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	1,970	50.5	2,015	48.6		1,893	38.0	↓	↓
Assiniboine Medical Clinic	7,757	58.6	7,972	62.4	↑	8,805	56.2	↓	↓
Dr. C. W. Wiebe Medical Centre	1,935	38.3	2,053	37.7		2,108	33.5	↓	↓
Steinbach Family Medical Center	2,701	40.2	2,900	39.1		2,875	32.0	↓	↓

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.025$).
A blank cell indicates that the two rates were similar.

Table 6.4: Annual Influenza Immunization, People with Total Respiratory Morbidity, Long-Term Follow-Up

Age- and sex-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	871	29.3	770	30.2		570	30.5	↑	
Assiniboine Medical Clinic	4,188	40.3	3,009	42.8	↑	2,434	42.4	↑	
Dr. C. W. Wiebe Medical Centre	1,410	24.1	936	22.8		678	20.6	↓	
Steinbach Family Medical Center	1,608	23.9	1,136	21.9	↓	847	22.2		

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Pneumococcal Immunization

In the post-implementation period, three clinics had increased rates. The long-term follow-up rates for all four clinics were better than the pre-implementation rates and there was an even greater increase in three of the four clinics. The fourth clinic demonstrated a decreased rate at long-term follow-up compared to the post-implementation rate.

Table 6.5: Pneumococcal Immunizations, Adults Aged 65 and Older, Long-Term Follow-Up

Age- and sex-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	2,105	59.0	2,224	62.2	↑	1,893	68.1	↑	↑
Assiniboine Medical Clinic	7,984	74.6	8,311	75.0		8,805	77.4	↑	↑
Dr. C. W. Wiebe Medical Centre	2,011	56.4	2,133	58.3	↑	2,108	57.4	↑	↓
Steinbach Family Medical Center	2,828	55.9	3,037	64.9	↑	2,875	84.7	↑	↑

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Disease-Management Indicators

Congestive Heart Failure Management: Initiation and Persistence of Drug Treatment

In the post-implementation period, one clinic had a lower rate of drug initiation, while one was improved. Unfortunately, the clinic that improved post-implementation compared to pre-implementation had decreased rates at long-term follow-up compared to both pre- and post-implementation. The clinic that had a decreased rate post-implementation compared to pre-implementation also had a decreased rate at long-term follow-up compared to pre-implementation. Another clinic demonstrated improved rates compared to pre- and post-implementation at long-term follow-up. Three clinics had lower rates for drug persistence at long-term follow-up compared to pre-implementation (Table 6.7). Rates at one clinic increased post-implementation but decreased at long-term follow-up compared to both pre- and post-implementation.

Table 6.6: Congestive Heart Failure Management: Initiation of Drug Treatment, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	94	61.7	96	65.6		63	76.2	↑	↑
Assiniboine Medical Clinic	248	61.7	250	54.0		309	52.4		
Dr. C. W. Wiebe Medical Centre	98	74.5	83	65.1	↓	91	63.7	↓	
Steinbach Family Medical Center	94	60.6	115	73.9	↑	119	57.1	↓	↓

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Table 6.7: Congestive Heart Failure Management: Persistence of Drug Treatment, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	94	50.0	96	59.4		63	60.3		
Assiniboine Medical Clinic	248	56.5	250	48.0		309	38.2	↓	
Dr. C. W. Wiebe Medical Centre	98	65.3	83	60.2		91	48.4	↓	↓
Steinbach Family Medical Center	94	56.4	115	63.5	↑	119	43.7	↓	↓

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Depression Care

Only one clinic showed any change in depression care at long-term follow-up which was negative and sustained.

Table 6.8: Depression Care: Prescription Follow-Up, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	142	54.2	136	45.6		117	44.4		
Assiniboine Medical Clinic	446	60.1	406	53.0		438	53.7		
Dr. C. W. Wiebe Medical Centre	173	56.1	173	52.0		166	53.6		
Steinbach Family Medical Center	271	48.3	258	37.2	↓	266	36.8	↓	

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Diabetes Eye Exam

For eye examinations for patients with diabetes, two PIN clinics had higher rates at post-implementation than pre-implementation. Only one sustained this change at long-term follow-up and there was no further increase compared to the post-implementation rate. One clinic had a lower rate post-implementation that was not sustained into the long-term follow-up period.

Table 6.9: People with Diabetes Diagnosis who had an Eye Examination, Long-Term Follow-Up

PIN Clinic	PreImplementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	661	38.0	747	49.4	↑	653	52.8	↑	
Assiniboine Medical Clinic	2,262	34.7	2,393	37.4		2,640	38.3		
Dr. C. W. Wiebe Medical Centre	639	35.2	694	33.6	↓	806	41.2		
Steinbach Family Medical Center	977	35.7	1,063	39.4	↑	1,008	42.7		

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Post Myocardial Infarction Management: Initiation and Persistence of Beta-Blocker Drug Treatment

The rates of beta-blocker prescribing post myocardial infarction are generally high. The sample size is small. One clinic showed a decrease at long-term follow-up compared to pre-implementation. Persistent prescribing rates below show decreases for three clinics when compared to the pre-implementation period at long-term follow-up. This pattern persisted for two clinics with further decreases when compared to the post-implementation period.

Table 6.10: Post Myocardial Infarction Management: Initiation of Beta-Blocker Drug Treatment, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	50	86.0	42	88.1		44	90.9		
Assiniboine Medical Clinic	158	90.5	122	89.3		174	83.9	↓	
Dr. C. W. Wiebe Medical Centre	38	78.9	55	87.3		62	83.9		
Steinbach Family Medical Center	81	87.7	74	86.5		64	85.9		

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Table 6.11: Post Myocardial Infarction Management: Persistence of Beta-Blocker Drug Treatment, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	42	81.0	50	82.0		44	70.5		
Assiniboine Medical Clinic	122	85.2	158	83.5		174	69.5	↓	↓
Dr. C. W. Wiebe Medical Centre	55	80.0	38	68.4	↓	62	69.4	↓	
Steinbach Family Medical Center	74	77.0	81	80.2		64	71.9	↓	↓

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Post Myocardial Infarction Management: Initiation and Persistence of Cholesterol Lowering Drug Treatment

There are no changes for initiation of cholesterol-lowering drug prescribing post myocardial infarction. One clinic showed improvement over the post-implementation rate of treatment persistence at long-term follow-up (Table 6.13).

Table 6.12: Post Myocardial Infarction Management: Initiation of Cholesterol Lowering Drug Treatment, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	41	63.4	49	55.1		47	55.3		
Assiniboine Medical Clinic	119	57.1	156	56.4		178	57.3		
Dr. C. W. Wiebe Medical Centre	54	66.7	41	56.1		66	68.2		
Steinbach Family Medical Center	75	53.3	83	67.5		66	60.6		

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Table 6.13: Post Myocardial Infarction Management: Persistence of Cholesterol Lowering Drug Treatment, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	41	56.1	49	49.0		47	48.9		
Assiniboine Medical Clinic	119	51.3	156	52.6		178	47.8		
Dr. C. W. Wiebe Medical Centre	54	51.9	41	39.0		66	56.1		↑
Steinbach Family Medical Center	75	49.3	83	60.2		66	39.4		

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Asthma Care

One clinic started with a much higher rate than the other clinics on the asthma-prescribing indicator, but this rate dropped post-implementation, and the drop was sustained at long-term follow-up compared to pre-implementation.

Table 6.14: Asthma Care: Medication Use, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	342	64.0	371	58.8		234	63.2		
Assiniboine Medical Clinic	1,447	66.3	1,530	65.2		1,629	65.4		
Dr. C. W. Wiebe Medical Centre	286	72.4	312	63.8	↓	288	61.5	↓	
Steinbach Family Medical Center	532	60.7	613	66.4		410	68.3		

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Benzodiazepine Prescribing for Community-Dwelling Adults

There were no changes at the post-implementation comparison for benzodiazepine prescribing. However, one clinic showed an increased rate—which is not desirable—at long-term follow-up, compared to both pre- and post-implementation, and one clinic had an increased rate at long-term follow-up only compared to the pre-implementation period.

Table 6.15: Benzodiazepine Prescribing in Community Dwelling Older Adults aged 75+, Long-Term Follow-Up

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	1,033	25.4	1,050	25.8		901	23.6		
Assiniboine Medical Clinic	3,814	23.2	3,935	23.2		4,390	23.5		
Dr. C. W. Wiebe Medical Centre	993	23.7	1,040	24.2		1,060	25.3	↑	
Steinbach Family Medical Center	1,327	25.5	1,365	25.9		1,363	27.4	↑	↑

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Healthcare-Delivery Indicators

Continuity of Care

Assigned Physician

The continuity-of-care rates based on individual physicians show improvement: one clinic shows consistently higher rates over all three measures, one clinic shows improvement at long-term follow-up compared to pre-implementation, and another shows improvement compared to post-implementation.

Table 6.16: Continuity of Care of Assigned Physician, Long-Term Follow-Up
Age- and sex-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	COC Index	Eligible Population	COC Index	Compared to Pre	Eligible Population	COC Index	Compared to Pre	Compared to Post
Agassiz Medical Centre	7,664	0.478	7,898	0.469		8,388	0.474		
Assiniboine Medical Clinic	24,533	0.598	24,258	0.592		24,536	0.607		↑
Dr. C. W. Wiebe Medical Centre	10,985	0.385	12,136	0.398		14,686	0.400	↑	
Steinbach Family Medical Center	14,419	0.436	14,743	0.493	↑	13,314	0.543	↑	↑

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Continuity of Care Provided by any Physicians in PIN Clinic

The post-implementation clinic-based continuity of care outcomes show no clear pattern. In the long-term follow-up analysis, one clinic showed improvement over both the pre- and post-implementation rates and one clinic showed the opposite pattern.

Table 6.17: Continuity of Care Provided by any Physicians in PIN Clinic, Long-Term Follow-Up
Age- and sex-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	COC Index	Eligible Population	COC Index	Compared to Pre	Eligible Population	COC Index	Compared to Pre	Compared to Post
Agassiz Medical Centre	7,664	0.703	7,898	0.723		8,388	0.779	↑	↑
Assiniboine Medical Clinic	24,533	0.680	24,258	0.694	↑	24,536	0.672		↓
Dr. C. W. Wiebe Medical Centre	10,985	0.888	12,136	0.888		14,686	0.865	↓	↓
Steinbach Family Medical Center	14,419	0.867	14,743	0.761	↓	13,314	0.776	↓	

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate ($p<0.05$).
A blank cell indicates that the two rates were similar.

Routine Electrocardiography

Routine EKG rates decreased at one clinic post-implementation but this decrease was not sustained through the long-term follow-up period. Another clinic had a decreased rate at long-term follow-up compared to both the pre- and post-implementation rates. A third clinic had a decreased rate at long-term follow-up compared to the post-implementation rate.

Table 6.18: Routine Electrocardiographs for Adults aged 18+, Long-Term Follow-Up

Age- and sex-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	11,542	8.2	11,925	8.8		9,737	6.7	↓	↓
Assiniboine Medical Clinic	37,827	23.4	39,220	24.6		39,781	24.6		
Dr. C. W. Wiebe Medical Centre	13,563	7.1	14,661	6.3	↓	14,518	7.2		↑
Steinbach Family Medical Center	18,066	7.1	19,267	7.5		16,964	6.6		↓

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Hospitalizations for Ambulatory Care Sensitive Conditions

Two clinics demonstrated decreased hospitalization for ACSC compared to the pre-implementation period and one showed further improvement at long-term follow-up compared to the post-implementation period.

Table 6.19: Hospitalizations for Ambulatory Care Sensitive Conditions, Long-Term Follow-Up

Age-, sex- & RUB-adjusted, per 1,000 patients

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate	Eligible Population	Rate	Compared to Pre	Eligible Population	Rate	Compared to Pre	Compared to Post
Agassiz Medical Centre	11,535	4.94	12,061	4.69		9,424	2.96	↓	↓
Assiniboine Medical Clinic	28,569	3.19	27,872	3.38		26,935	2.87		
Dr. C. W. Wiebe Medical Centre	16,373	3.36	17,740	3.68		17,072	2.34	↓	
Steinbach Family Medical Center	20,004	3.40	21,291	4.66	↑	17,824	3.07		

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Referral Rates

Assigned-Physician Referrals

There is no "correct" rate of referral. Assigned-physician-based referral rates at three clinics demonstrated increased rates compared to the post-implementation rates at long-term follow-up. One of these clinics has a lower rate at long-term follow-up. There is no dominant pattern over time.

Table 6.20: Assigned Physician Referral Rates, Long-Term Follow-Up

Age- and sex-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	11,165	0.340	11,474	0.377	↑	14,695	0.549	↑	↑
Assiniboine Medical Clinic	28,955	0.611	28,688	0.654		43,253	0.590	↓	↓
Dr. C. W. Wiebe Medical Centre	15,482	0.259	17,075	0.264		30,231	0.400	↑	↑
Steinbach Family Medical Center	19,082	0.377	20,185	0.357		24,146	0.371		↑

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Clinic-Based Referrals Rates

Two clinics had decreased rates compared to both the pre- and post-implementation rates at long-term follow-up. Two had increased rates at long-term follow-up.

Table 6.21: Clinic-Based Referrals Rates, Long-Term Follow-Up

Age- and sex-adjusted

PIN Clinic	Pre -mplementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	11,165	0.455	11,474	0.492	↑	14,695	0.584	↑	↑
Assiniboine Medical Clinic	28,955	0.739	28,688	0.789		43,253	0.638	↓	↓
Dr. C. W. Wiebe Medical Centre	15,482	0.341	17,075	0.350		30,231	0.452	↑	↑
Steinbach Family Medical Center	19,082	0.482	20,185	0.490		24,146	0.444	↓	↓

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Referral from any Physician

The results are consistent: at long-term follow-up, all four clinics' referral rates increased.

Table 6.22: Rates of Specialist Referral by any Physician, Long-Term Follow-Up

Age- and sex-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	11,165	0.492	11,474	0.523	↑	14,695	0.737	↑	↑
Assiniboine Medical Clinic	28,955	0.744	28,688	0.798		43,253	0.818	↑	↑
Dr. C. W. Wiebe Medical Centre	15,482	0.356	17,075	0.363		30,231	0.608	↑	↑
Steinbach Family Medical Center	19,082	0.492	20,185	0.499		24,146	0.509		↑

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Smoking Cessation Prescriptions

One clinic showed increased prescribing of smoking cessation drugs in both of the long-term follow-up comparisons.

Table 6.23: Adults, Aged 18+, who received 1+ Smoking Cessation Prescription, Long-Term Follow-Up

Age- and sex-adjusted

PIN Clinic	Pre-Implementation		Post-Implementation			Long-Term Follow-Up			
	Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to Pre	Eligible Population	Rate (%)	Compared to Pre	Compared to Post
Agassiz Medical Centre	761	34.2	795	34.2		580	38.3	↑	↑
Assiniboine Medical Clinic	996	31.1	1,010	32.2		1,128	32.5		
Dr. C. W. Wiebe Medical Centre	2,319	17.7	2,382	17.6		2,200	17.7		
Steinbach Family Medical Center	1,439	33.7	1,536	33.8		1,318	33.8		

"↑" indicates a significantly higher rate, while a "↓" indicates a significantly lower rate (p<0.05).
A blank cell indicates that the two rates were similar.

Summary of Long-term Follow-up Results

Table 6.24 below presents a summary of the rates for the three time periods for the four Phase 1 clinics for each indicator. This table provides the opportunity to observe how no single clinic has a consistent pattern of rate change across the three measurement periods, and also that there are no consistent patterns for any of the indicators across clinics over time.

Table 6.24: Summary of the Long-Term Follow-Up Time Period

Indicators	Agassiz Medical Centre		Assiniboine Medical Clinic		Dr. C. W. Wiebe Medical Centre		Steinbach Family Medical Center	
	Compared to Pre	Compared to Post	Compared to Pre	Compared to Post	Compared to Pre	Compared to Post	Compared to Pre	Compared to Post
Prevention and Screening								
Breast Cancer Screening	↑	↑	↑	↓	↑		↑	
Complete Immunizations at Age Two	↑				↓	↓	↓	↓
Annual Influenza Immunizations								
Adults aged 65+	↓	↓	↓	↓	↓	↓	↓	↓
People with Total Respiratory Morbidity	↑		↑		↓			
Pneumococcal Immunization	↑	↑	↑	↑	↑	↓	↑	↑
Disease Management								
Congestive Heart Failure Management								
Initiation of Drug Treatment	↑	↑			↓		↓	↓
Persistence of Drug Treatment			↓		↓	↓	↓	↓
Depression Care							↓	
Diabetes Eye Exam	↑							
Post Myocardial Infarction (MI) Management (Beta-Blocker)								
Initiation of Drug Treatment			↓					
Persistence of Drug Treatment			↓	↓	↓		↓	↓
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)								
Initiation of Drug Treatment								
Persistence of Drug Treatment						↑		
Asthma Care					↓			
Benzodiazepine Prescribing					↑		↑	↑
Healthcare Delivery								
Continuity of Care								
Assigned Physician				↑	↑		↑	↑
Provided by any Physicians in PIN Clinic	↑	↑		↓	↓	↓	↓	
Routine Electrocardiographs	↓	↓				↑		↓
Hospital Separations for Ambulatory Care Sensitive Conditions	↓	↓			↓			
Referral Rates								
Assigned Physician	↑	↑	↓	↓	↑	↑		↑
Clinic Based	↑	↑	↓	↓	↑	↑	↓	↓
Total	↑	↑	↑	↑	↑	↑		↑
Smoking Cessation Prescription	↑	↑						

"↑" indicates that the rate for the Long-Term Follow-Up was higher than the rate for the Pre- or Post-Implementation period, while a "↓" indicates that the rate for the Long-Term Follow-Up was lower than the rate for the Pre- or Post-Implementation period

A blank cell indicates that the two rates were similar.

CHAPTER 7: CLINIC-BASED RESULTS

While previous chapters presented results by indicator, this chapter presents results by clinic (Tables 7.1-7.12). This allows us to ignore the differences between clinic environments and to explore the overall impact of PIN on any particular clinic. For some, the results suggest that PIN had a positive impact, while for others the impact was mixed. Results for the indicators we measured suggest that PIN had a negative effect on one clinic.

Agassiz Medical Centre

There is an increase in the rates of three QBIF indicators at Agassiz Medical Centre. None of the QBIF indicators got worse. Moreover, there was no indication of worsening of the other indicators that would be interpreted as a negative PIN effect. PIN appears to have had an overall positive impact on the clinic practice as measured by our indicators.

Table 7.1: Summary of Agassiz Medical Centre Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↓	↓		
Complete Immunizations at Age Two	↓		increase	
Annual Influenza Immunizations				
Adults aged 65+	↑	↑		
People with Total Respiratory Morbidity	↓			
Pneumococcal Immunization	↓	↑	increase	*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Depression Care				
Diabetes Eye Exam	↑	↑	increase	*
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment	↑			
Persistence of Drug Treatment	↑	↑		*
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Asthma Care				
Benzodiazepine Prescribing				
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↓	↓		*
Provided by any Physicians in PIN Clinic	N/A	N/A		N/A
Routine Electrocardiography	↓			
Hospitalizations for Ambulatory Care Sensitive Conditions	↓	↓		
Referral Rates				
Assigned Physician	↑	↑	increase	
Clinic Based	N/A	N/A	increase	N/A
Total	↑	↑	increase	
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.
"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Assiniboine Medical Clinic

There is an increase in the rates of three QBIF indicators at Assiniboine Medical Clinic. None of the QBIF indicators got worse. In addition there was no indication of worsening of the other indicators that would be interpreted as a negative PIN effect. PIN appears to have had a positive impact on the clinic practice as measured by our indicators.

Table 7.2: Summary of Assiniboine Medical Clinic Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↑	↑	increase	*
Complete Immunizations at Age Two	↓	↑	increase	*
Annual Influenza Immunizations				
Adults aged 65+	↑	↑	increase	*
People with Total Respiratory Morbidity	↑	↑	increase	
Pneumococcal Immunization	↑	↑		*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Depression Care				
Diabetes Eye Exam				
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment				
Persistence of Drug Treatment		↑		
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Asthma Care	↑	↑		
Benzodiazepine Prescribing				
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↓	↓		
Provided by any Physicians in PIN Clinic	N/A	N/A	increase	N/A
Routine Electrocardiography	↑	↑		
Hospitalizations for Ambulatory Care Sensitive Conditions	↓	↓		
Referral Rates				
Assigned Physician	↑	↑		
Clinic Based	N/A	N/A		N/A
Total	↑	↑		
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Dr. C. W. Wiebe Medical Centre

There is an increase in the rates of two QBIF indicators with four indicators getting worse at the Dr. C.W. Wiebe Medical Clinic. The decreased rate of routine EKGs, one of the indicators not associated with PIN incentives, is a desirable change. PIN appears to have had a mixed impact on the clinic practice as measured by our indicators.

Table 7.3: Summary of Dr. C. W. Wiebe Medical Centre Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↓		increase	*
Complete Immunizations at Age Two	↓	↓		
Annual Influenza Immunizations				
Adults aged 65+	↓	↓		
People with Total Respiratory Morbidity	↓	↓		
Pneumococcal Immunization	↓	↑	increase	*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment	↑		decrease	
Persistence of Drug Treatment				
Depression Care				
Diabetes Eye Exam	↑	↑	decrease	
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment				
Persistence of Drug Treatment		↓	decrease	*
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment				
Persistence of Drug Treatment		↓		
Asthma Care	↑		decrease	*
Benzodiazepine Prescribing				
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↓	↓		
Provided by any Physicians in PIN Clinic	N/A	N/A		N/A
Routine Electrocardiography	↓	↓	decrease	*
Hospitalizations for Ambulatory Care Sensitive Conditions	↓	↓		*
Referral Rates				
Assigned Physician	↑	↑		
Clinic Based	N/A	N/A		N/A
Total		↑		
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Steinbach Family Medical Center

There is an increase in the rates of five QBIF indicators at Steinbach Family Medical Center. However, one QBIF indicator got worse. There was no indication of worsening of the other indicators. PIN appears to have had a mixed impact on the Steinbach Family Medical Center practice as measured by our indicators.

Table 7.4: Summary of Steinbach Family Medical Center Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening		↑	increase	*
Complete Immunizations at Age Two	↑	↑		
Annual Influenza Immunizations				
Adults aged 65+	↓	↓		
People with Total Respiratory Morbidity	↓	↓	decrease	*
Pneumococcal Immunization	↓	↑	increase	*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment		↑	increase	*
Persistence of Drug Treatment		↑	increase	*
Depression Care		↓	decrease	
Diabetes Eye Exam		↑	increase	
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Asthma Care				
Benzodiazepine Prescribing	↑	↑		
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↓	↑	increase	*
Provided by any Physicians in PIN Clinic	N/A	N/A	decrease	N/A
Routine Electrocardiography	↓	↓		
Hospitalizations for Ambulatory Care Sensitive Conditions	↓	↓	increase	*
Referral Rates				
Assigned Physician	↑	↑		*
Clinic Based	N/A	N/A		N/A
Total	↑	↑		
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Altona Clinic

There is an increase in the rates of only one QBIF indicator at Altona Clinic. However, four indicators got worse. PIN appears to have had a mixed impact on the clinic practice as measured by our indicators.

Table 7.5: Summary of Altona Clinic Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↓	↓		
Complete Immunizations at Age Two				
Annual Influenza Immunizations				
Adults aged 65+	↓	↓		
People with Total Respiratory Morbidity	↓	↓		
Pneumococcal Immunization	↓	↓	increase	*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment	↑	↑	decrease	*
Persistence of Drug Treatment	↑	↑	decrease	
Depression Care				
Diabetes Eye Exam				
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment	↑	↑		
Persistence of Drug Treatment				
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment	↑		decrease	*
Persistence of Drug Treatment	↑		decrease	
Asthma Care				
Benzodiazepine Prescribing				
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↓		increase	*
Provided by any Physicians in PIN Clinic	N/A	N/A		N/A
Routine Electrocardiography				
Hospitalizations for Ambulatory Care Sensitive Conditions	N/A	N/A	N/A	N/A
Referral Rates				
Assigned Physician	↓	↓	increase	
Clinic Based	N/A	N/A		N/A
Total	↓	↓	increase	
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.
"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.
A blank cell indicates that the two rates were similar.

Centre Médical Seine Inc.

There is an increase in the rates of two QBIF indicators at Centre Medical Seine Inc. One QBIF indicator got worse. One other indictor improved, indicating a lack of negative impact on non-QBIF indicators. PIN appears to have had a mixed impact on the clinic practice as measured by our indicators.

Table 7.6: Summary of Centre Médical Seine Inc. Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↓			*
Complete Immunizations at Age Two	↑	↑	decrease	
Annual Influenza Immunizations				
Adults aged 65+	↑			
People with Total Respiratory Morbidity	↓	↑	increase	*
Pneumococcal Immunization		↑	increase	*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment		↑	increase	*
Persistence of Drug Treatment		↑		
Depression Care				
Diabetes Eye Exam				
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Asthma Care				
Benzodiazepine Prescribing	↑	↑		
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↑	↑		*
Provided by any Physicians in PIN Clinic	N/A	N/A		N/A
Routine Electrocardiography			decrease	
Hospitalizations for Ambulatory Care Sensitive Conditions	↓	↓		
Referral Rates				
Assigned Physician	↑	↑	increase	
Clinic Based	N/A	N/A	increase	N/A
Total	↑	↑	increase	
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Clinique St. Boniface Clinic

There is an increase in the rates of one QBIF indicator at Clinique St. Boniface Clinic, while two QBIF indicators got worse. There was no indication of worsening of the other non-QBIF indicators that would be interpreted as a negative PIN effect. Although it was not a QBIF indicator, the increase in prescriptions to aid smoking cessation could be interpreted as a positive PIN effect. PIN appears to have had a mixed impact on the clinic practice as measured by our indicators.

Table 7.7: Summary of Clinique St. Boniface Clinic Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↑	↑		*
Complete Immunizations at Age Two		↓	decrease	*
Annual Influenza Immunizations				
Adults aged 65+	↑	↑	decrease	*
People with Total Respiratory Morbidity	↑	↑		*
Pneumococcal Immunization	↑	↑	increase	*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Depression Care				
Diabetes Eye Exam				
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Asthma Care				
Benzodiazepine Prescribing	↑	↑	increase	
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↑	↓	decrease	*
Provided by any Physicians in PIN Clinic	N/A	N/A		N/A
Routine Electrocardiography	↑		decrease	
Hospitalizations for Ambulatory Care Sensitive Conditions	↓			
Referral Rates				
Assigned Physician	↑	↑	decrease	*
Clinic Based	N/A	N/A		N/A
Total	↑	↑		
Smoking Cessation Prescription	N/A	N/A	increase	N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Concordia Health Associates

There is an increase in the rates of two QBIF indicators at Concordia Health Associates. However, three QBIF indicators got worse. There was no indication of worsening of the other indicators. PIN appears to have had a mixed impact on the clinic practice as measured by our indicators.

Table 7.8: Summary of Concordia Health Associates Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↑	↑		
Complete Immunizations at Age Two		↓	decrease	
Annual Influenza Immunizations				
Adults aged 65+				
People with Total Respiratory Morbidity	↓			
Pneumococcal Immunization	↓			*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Depression Care		↓	decrease	
Diabetes Eye Exam	↑	↑		
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment		↓		
Persistence of Drug Treatment		↓	decrease	*
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment	↓		increase	*
Persistence of Drug Treatment	↓		increase	*
Asthma Care	↑	↑		
Benzodiazepine Prescribing	↑	↑		
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↑	↑	decrease	*
Provided by any Physicians in PIN Clinic	N/A	N/A	increase	N/A
Routine Electrocardiography	↓	↓		*
Hospitalizations for Ambulatory Care Sensitive Conditions				
Referral Rates				
Assigned Physician	↑	↑		
Clinic Based	N/A	N/A		N/A
Total	↑	↑		
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Prairie Trail Medical Clinic

There is an increase in the rates of three QBIF indicators at the Prairie Trail Medical Clinic. However, one QBIF indicator got worse. There was no indication of worsening of the other indicators. PIN appears to have had a mixed impact on the clinic practice as measured by our indicators.

Table 7.9: Summary of Prairie Trail Medical Clinic Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↑	↑	decrease	
Complete Immunizations at Age Two	↓		increase	*
Annual Influenza Immunizations				
Adults aged 65+				
People with Total Respiratory Morbidity	↑		decrease	
Pneumococcal Immunization	↓	↑		*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Depression Care		↑		
Diabetes Eye Exam	↑	↑		
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment	↓	↑	increase	*
Persistence of Drug Treatment		↑	increase	*
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Asthma Care				
Benzodiazepine Prescribing				
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↓	↓	increase	*
Provided by any Physicians in PIN Clinic	N/A	N/A		N/A
Routine Electrocardiography	↓	↓		
Hospitalizations for Ambulatory Care Sensitive Conditions	↓	↓		
Referral Rates				
Assigned Physician		↑		
Clinic Based	N/A	N/A	decrease	N/A
Total	↑	↑		
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Tuxedo Family Medical Centre

There is an increase in the rates of four PIN QBIF indicators at Tuxedo Family Medical Centre, while one QBIF indicator got worse. There was no indication of worsening of the other indicators that would be interpreted as a negative PIN effect. PIN appears to have had a somewhat positive impact on the clinic practice as measured by our indicators.

Table 7.10: Summary of Tuxedo Family Medical Centre Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↑	↑	decrease	
Complete Immunizations at Age Two		↑		
Annual Influenza Immunizations				
Adults aged 65+	↑	↑	increase	*
People with Total Respiratory Morbidity	↑	↑		
Pneumococcal Immunization	↑	↑	increase	*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment		↑		
Persistence of Drug Treatment	↑	↑		
Depression Care				
Diabetes Eye Exam	↑	↑	increase	*
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment		↑		
Persistence of Drug Treatment		↑	increase	
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment	↑			
Persistence of Drug Treatment	↑			
Asthma Care	↑	↑		
Benzodiazepine Prescribing				
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↑		decrease	*
Provided by any Physicians in PIN Clinic	N/A	N/A		N/A
Routine Electrocardiography	↓	↓		
Hospitalizations for Ambulatory Care Sensitive Conditions	↓	↓		
Referral Rates				
Assigned Physician	↑	↑		*
Clinic Based	N/A	N/A	increase	N/A
Total	↑	↑	increase	*
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Virden Medical Associates

One QBIF indictor increased at this clinic and there was also a decrease in the rate of the non-recommended routine EKGs. PIN appears to have had a positive impact on the clinic practice as measured by our indicators. These results are noteworthy because Virden Medical Associates is a small clinic with a small practice size, and statistically significant results are less likely among small samples.

Table 7.11: Summary of Virden Medical Associates Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↑	↑		*
Complete Immunizations at Age Two	↑	↑		
Annual Influenza Immunizations				
Adults aged 65+		↑		*
People with Total Respiratory Morbidity				
Pneumococcal Immunization		↑		*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Depression Care				
Diabetes Eye Exam	↑	↑	increase	
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Asthma Care				
Benzodiazepine Prescribing	↑			
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↓	↓		
Provided by any Physicians in PIN Clinic	N/A	N/A	decrease	N/A
Routine Electrocardiography	↑		decrease	
Hospitalizations for Ambulatory Care Sensitive Conditions	↑		decrease	
Referral Rates				
Assigned Physician	↓		increase	
Clinic Based	N/A	N/A	increase	N/A
Total	↓		increase	*
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Western Medical Clinic

The Western Medical Clinic is unique among the PIN clinics in that PIN appears to have had a negative impact on the indicators we measured. There is a decrease in the rates of three QBIF indicators at Western with no QBIF indicators improving.

Table 7.12: Summary of Western Medical Clinic Indicators

Study Indicators	Pre	Post	Change over time	Interaction
Prevention and Screening				
Breast Cancer Screening	↑	↑		
Complete Immunizations at Age Two		↑		*
Annual Influenza Immunizations				
Adults aged 65+	↑	↑	decrease	*
People with Total Respiratory Morbidity	↑	↑	decrease	
Pneumococcal Immunization	↑	↑	decrease	*
Disease Management				
Congestive Heart Failure Management				
Initiation of Drug Treatment				
Persistence of Drug Treatment				
Depression Care	↑	↑		
Diabetes Eye Exam	↑	↑		
Post Myocardial Infarction (MI) Management (Beta-Blocker)				
Initiation of Drug Treatment	↑		decrease	
Persistence of Drug Treatment	↑			
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)				
Initiation of Drug Treatment				
Persistence of Drug Treatment		↓		
Asthma Care				
Benzodiazepine Prescribing				
Healthcare Delivery				
Continuity of Care				
Assigned Physician	↓	↓	increase	*
Provided by any Physicians in PIN Clinic	N/A	N/A	decrease	N/A
Routine Electrocardiography	↑	↑		
Hospitalizations for Ambulatory Care Sensitive Conditions				
Referral Rates				
Assigned Physician		↑	increase	*
Clinic Based	N/A	N/A	increase	N/A
Total		↑	increase	*
Smoking Cessation Prescription	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a "↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time. A blank cell indicates that the two rates were similar.

Summary of Findings by Clinic

Our results are similar to previous studies in demonstrating a variable impact of financial incentives on specific process indicators in primary care. These findings appear to be consistent across multiple jurisdictions: Canada (Hurley, Li, DeCicca, & Buckley, 2011), the United Kingdom (Langdown & Peckham, 2013) and the United States (Rosenthal, 2007). However, it is important to recognize that this is only one aspect of the PIN initiative and that other benefits of the initiative may not be captured by this analysis. Despite this limitation all clinics but one demonstrated a mixed PIN impact, there was a positive effect on three indicators overall, and no indicators demonstrated an overall negative effect.

CHAPTER 8: DISCUSSION

The PIN initiative is a unique, made-in-Manitoba approach to transforming primary-care delivery. It involves numerous components, including pay-for-performance and change management, and was designed to respect physician autonomy. The initiative is relatively narrow in scope compared to reforms in other provinces such as Ontario, Quebec, and Alberta. Because reforms in each province have been different and the context of each province is different, it is difficult to compare them to each other or to compare outcomes associated with the reforms. Even within Manitoba and within the clinics involved in PIN, there are contextual differences that make comparisons across clinics difficult. Our analyses have tried to address as many of these differences as possible by controlling for patient characteristics where possible. However, it is important to recognize this limitation of the study.

Using administrative data to evaluate interventions limits our analyses to those processes or outcomes that are reflected in those data. Were we to design a data collection system specifically to measure the impact of PIN on primary-care practice in Manitoba, that data would include many elements not available for this report. Some of these were alluded to in the previous PIN report (such as changes in EMR use, moving towards considering the patients seen at a clinic as a population at risk) but these are not addressed in this report. Nevertheless, the analyses described in this report do provide insight into some aspects of the impact of PIN on physician behavior and some patient outcomes.

The results chapters have been presented based on the type of indicator (Chapters 3, 4, and 5) and by the type of question (Chapters 6 and 7) they address. This chapter provides some general discussion of the results by PIN Phase and by clinic in recognition of the differences in timing and clinical environment at each clinic that affect the results.

Indicator Eligibility

Table E.1. (page xvi) lists the indicators from smallest to largest eligible cohort. This helps us recognize that many of the clinical conditions explored in these analyses are not seen frequently by any one physician in his or her practice. Where a condition is seen 20 or fewer times in a year (e.g., Post Myocardial Infarction) by all the physicians in the clinic it is difficult to change physician behavior and unlikely that we will see statistically significant changes over time. This table also highlights the variability between the PIN clinics in terms of practice size—there is nearly a tenfold difference in the number of eligible patients between the smallest and largest clinics.

Overall Results by Phase

Table 8.1 presents the results by indicator aggregated across the clinics in each phase of implementation. It is clear from this table how little consistency there is across clinics. This is especially true for the disease-management indicators, where, despite the larger sample size achieved through aggregating the clinics by phase, few patterns appear because different clinics have responded to the initiative differently.

The interaction between the change over time and clinic type can be interpreted as a reflection of the impact of PIN. This interaction takes into account changes that may have occurred in the shadow practices that would not be associated with the PIN effect. By exploring the impact of PIN by phase we can look at the potential system impact from a policy perspective. While the number of clinics involved in PIN is still small, this approach provides a better idea of the policy potential than results specific to any one clinic.

The results presented in Table 8.1 do not, however, present a clear indication of the policy potential of PIN on any one indicator or group of indicators. For example, the Phase 1 and Phase 2 clinics have very different results for prevention and screening indicators. The Phase 1 clinics started off with rates that were lower than their shadow practices, but due to increased rates over time (a potential positive impact of PIN) their rates were higher than the shadow practices post-implementation. The Phase 2 clinics started off with higher rates than their shadow practices and maintained higher rates, despite demonstrating decreasing rates over time. However, the rate of decrease for the PIN Phase 2 clinics was lower than the rate for the shadow practices, which indicates a positive PIN effect. We did not calculate the overall impact by combining the Phase 1 and Phase 2 results because there are twice as many clinics in Phase 2. Moreover, because of the time difference between the implementation of the two phases, there were different contextual influences on care. It would be inappropriate to assume, therefore, that the combined effect is a true reflection of the overall impact on all the clinics. This is reflected throughout Table 8.1 in that the change over time is in a different direction for the Phase 1 and Phase 2 clinics for all but the healthcare delivery indicators, which are not specifically addressed in the PIN initiative.

Long-Term Follow-Up

The intent of these analyses was to determine whether any changes that were observed during the first two years following the PIN implementation were sustained, and to identify PIN effects that may have taken longer to become evident. Previous research has shown that the relationship between quality improvement and payment schemes over time is not linear (Campbell, Reeves, Kontopantelis, Sibbald, & Roland, 2009). Some incentive-based reforms have shown improvements while others have not.

As with most of our analyses, there are no clear patterns across all indicators for the four clinics included in long-term follow-up analysis. For some, improvements observed post-implementation were maintained, and a few showed further improvement. Some showed return to the pre-implementation rates and a few even had rates worse that the pre-implementation rates. This picture suggests that sustained improvement requires ongoing, active intervention.

Unintended Consequences

We included one indicator to detect whether there were unintended negative consequences of QBIF. Routine EKGs are not recommended practice for patients without a condition suggesting the need for an EKG. An increase in routine EKGs could be perceived as an unintended consequence of having physicians focus on the study indicators. While rates were higher in PIN Phase 1 clinics as a group than their shadow practices, both pre- and post-implementation, they did not increase more than the shadow practices over time. Phase 2 clinics as a group were not different than their shadow practices either pre- or post-implementation, but rates decreased more over time than their shadow practices. This indicates a lack of negative effect in both groups. Overall, the indicator actually demonstrated lower rates over time, which suggested a positive PIN effect.

Table 8.1: Summary of Indicators

	Phase 1				Phase 2			
Study Indicators	**Pre**	**Post**	**Change over time**	**Interaction**	**Pre**	**Post**	**Change over time**	**Interaction**
Prevention and Screening								
Breast Cancer Screening	↓	↑	increase		↑	↑		*
Complete Immunizations at Age Two	↓	↓			↑	↑	decrease	*
Annual Influenza Immunizations								
Adults aged 65+	↓	↑	increase	*	↑	↑	decrease	*
People with Total Respiratory Morbidity	↓	↑	increase	*	↑	↑		*
Pneumococcal Immunization		↑	increase	*		↑	increase	*
Disease Management								
Congestive Heart Failure Management								
Initiation of Drug Treatment							decrease	*
Persistence of Drug Treatment							decrease	*
Depression Care			decrease	*				
Diabetes Eye Exam			increase					
Post Myocardial Infarction (MI) Management (Beta-Blocker)								
Initiation of Drug Treatment								
Persistence of Drug Treatment	↑	↑						
Post Myocardial Infarction (MI) Management (Cholesterol Lowering)								
Initiation of Drug Treatment								
Persistence of Drug Treatment								
Asthma Care								
Benzodiazepine Prescribing					↑	↑		
Healthcare Delivery								
Continuity of Care								
Assigned Physician	↓	↓		*	↓	↓		*
Provided by any Physicians in PIN Clinic	N/A	N/A		N/A	N/A	N/A		N/A
Routine Electrocardiography	↑	↑					decrease	
Hospitalizations for Ambulatory Care Sensitive Conditions	↓	↓	increase	*		↓		
Referral Rates								
Assigned Physician	↑	↑	increase	*	↑	↑	increase	*
Clinic Based	N/A	N/A	increase	N/A	N/A	N/A	increase	N/A
Total	↑	↑	increase		↑	↑	increase	*
Smoking Cessation Prescription	N/A	N/A		N/A	N/A	N/A		N/A

"↑" indicates that the rate for PIN Patients was higher than the rate for Shadow-Practice Patients, while a " ↓" indicates that the rate for PIN Patients was lower than the rate for Shadow-Practice Patients.

"increase" indicates that there was a significant increase in the rate over time; while "decrease" indicates that there was a significant decrease in the rate overtime. A p-value of 0.05 was used for PIN Patients while the corresponding Minimum Detectable Effective Size was used for Shadow-Practice Patients. See the Methods section for more information.

"*" indicates that the change in the PIN rate over time was significantly different than the change in the Shadow rate over time.

A blank cell indicates that the two rates were similar.

Conclusion

There are many factors that contribute to the rates for each of the study indicators considered. There are also multiple potential outcomes from the PIN initiative that we could not measure with these indicators, or others, that we could report on using the administrative-claims data available in the Repository. The results presented in this report reflect both of these limitations. There is no clear pattern evident across indicators or within clinics. However, there are encouraging improvements described if the results are presented by indicator or by clinic. Many of these are present in the PIN clinics but not in the shadow practices, which suggests that the changes are PIN-related. In particular, improvements in the screening and prevention indicators represent an encouraging PIN impact.

The large discrepancy between rates at different clinics suggests the opportunity for ongoing improvement in primary care. The delivery of primary care is complex and, as a result, reform requires sophisticated, multifaceted interventions, including quality-improvement programs with proven efficacy in other contexts.

While the results of this report do not present strong evidence of a positive PIN effect they do present rich information about the impact of PIN and other aspects of the primary-care delivery system in Manitoba.

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GLOSSARY

Administrative Data

Information usually collected "by government, for some administrative purpose (e.g., keeping track of the population eligible for certain benefits, paying doctors or hospitals), but not primarily research or surveillance purposes" (Spasoff, 1999).

Spasoff RA. *Epidemiologic Methods for Health Policy*. New York, NY: Oxford University Press, Inc. 1999. 0-0.

Ambulatory Care Sensitive Conditions (ACSC)

A set of 28 medical conditions / diagnoses "for which timely and effective outpatient care can help to reduce the risks of hospitalization by either preventing the onset of an illness or condition, controlling an acute episodic illness or condition, or managing a chronic disease or condition" (Billings et al. 1993).

Billings J, Zeitel L, Lukomnik J, Carey TS, Blank AE, Newman L. Impact of socioeconomic status on hospital use in New York City. *Health Affairs*. 1993;12(1):162-173.

Ambulatory Visits

Visits to a licensed physician in an outpatient setting in Manitoba.

Asthma

A disease in which inflammation of the airways causes airflow into and out of the lungs to be restricted.

Beta-Blockers

Also known as beta-adrenergic blocking agents, these drugs are used to reduce blood pressure and have been shown to lower the risk of subsequent heart attacks.

Census Data

Social data based on a population survey (census) that include aggregate demographic information such as age, sex, marital status, employment, and income for all persons and housing units within a **dissemination area** in Canada. **Statistics Canada** conducts a Census every five years. It takes account of all Canadian citizens (by birth and by naturalization), landed immigrants, and non-permanent residents together with family members living with them (Statistics Canada, 2009). Dissemination areas include between 400 and 700 persons and the data can be aggregated upward to various geographic levels.

Statistics Canada. 2006 Census Dictionary: Overview of the Census. 2009. http://www12.statcan.ca/english/census06/reference/dictionary/ovtoc.cfm. Accessed on November 5, 2009.

Continuity of Care

The extent to which individuals see a given healthcare provider (versus one or more other providers) over a specified period of time. A provider may be defined either as an individual physician, a physician group practice, or a clinic.

Depression

A mood disorder characterized by persistent feelings of sadness, despair, and discouragement. It is closely associated with a lack of confidence and self-esteem, an inability to express strong feelings. These feelings interfere with daily life for an extended period of time (Miller & Keane, 2003). The quality-of-care indicator used at MCHP is limited to patients with more severe depression and requiring the use of antidepressant medication.

Miller BF, Keane CB. Encyclopedia and Dictionary of Medicine, Nursing, and Allied Health, 7th edition. Philadelphia, PA: Saunders; 2003

Dissemination Area

A small, relatively stable geographic unit composed of one or more blocks. It is the smallest standard geographic area for which all **census data** are disseminated. DAs cover all the territory of Canada. In 2001 the DA replaced the Enumeration Area (EA) as a basic unit for dissemination (Statistics Canada, 2011).

Statistics Canada. 2011 Census reference material. 2011. http://www12.statcan.gc.ca/census-recensement/2011/ref/dict/geo021-eng.cfm. Accessed April 16, 2013.

Drug Program Information Network (DPIN)

Health data maintained by Manitoba Health, Healthy Living and Seniors containing prescription drug claims from the Drug Program Information Network (DPIN)—an electronic, online, point-of-sale prescription drug database that connects Manitoba Health, Healthy Living and Seniors and all pharmacies in Manitoba. The DPIN system generates complete drug profiles for each client, which include all transactions at the point of distribution. Information about pharmaceutical dispensations, prescriptions identified as potential drug utilization problems, non-adjudicated prescriptions, ancillary programs, and non-drug products is captured in real time for all Manitoba residents (including Registered First Nations), regardless of insurance coverage or final payer. Note that the prescription's indication (the physician's prescribing intent) is not collected and must be inferred from other data. Services not captured in DPIN include hospital pharmacies, nursing stations, ward stock, and outpatient visits at CancerCare Manitoba.

Electronic Medical Record (EMR)

A computer-based system for patient medical records that allows physicians and other healthcare providers within a clinic or facility to look easily through or chart their patients' health information.

Family Physician

A generalist physician who provides and coordinates personal, continuing, comprehensive **primary care** to individuals and families. Such physicians are identified by a code in MCHP's physician data. Also known as a General Practitioner (GP) / Family Practitioner (FP).

Fee-For-Service (FFS)

A method of payment whereby physicians bill for each service rendered, according to a pre-arranged schedule of fees and services. Physicians who are paid on a fee-for-service basis file a claim for each service rendered and are responsible for their operating costs. Other physicians are compensated under an alternate payment plan (APP). These claims become part of the **Medical Services** data.

Hospital Discharge Abstracts Database

Health data maintained by Manitoba Health, Healthy Living and Seniors consisting of hospital forms/computerized records containing summaries of demographic and clinical information (e.g., gender, postal code, diagnoses, and procedure codes) completed at the point of discharge (or separation) from the hospital. These data include records for both Manitoba residents and non-Manitoba residents hospitalized in Manitoba facilities, as well as information about inpatient and day surgery services.

Income Quintiles

A grouping of the population by average household income. They are created by dividing the population into five groups (quintiles) such that 20% of the population is in each group. The groups are ordered from lowest to highest income. As a result of this process, the income range within each quintile may not be equal across quintiles.

The quintiles are based on **Dissemination Area (DA)**-level average household income values from the public-use Census files. The income quintiles are created separately for two population groups: urban (Winnipeg and Brandon) and rural (other Manitoba areas). Each person within a DA is "attributed" the average household income of the DA, so this is not an individual income but rather an area-level income measure. Individuals whose postal code does not link with a DA, whose DA has a suppressed average household income or those who live in DA where 90% or more of the population is institutionalized (e.g., Personal Care Home (PCH), prison) cannot not be attributed an income quintile and are referred to as "Income Unknown." Income quintiles are often used as a proxy measure of socio-economic status.

Mammography

A low-dose x-ray of the breast used to determine if a woman has breast cancer or a breast tumor. It is commonly used for breast-cancer screening. Mammograms can show most breast cancer two to three years before it can be detected through self-exams. Manitoba has a province-wide breast screening program called BreastCheck, operated by CancerCare Manitoba.

Manitoba Health Insurance Registry

A longitudinal, population-based registry maintained by Manitoba Health, Healthy Living and Seniors, consisting of all individuals who have been registered with Manitoba Health, Healthy Living and Seniors at some point since 1970. The registry includes individual-level demographics, family composition information, residential postal codes, and data fields for registration, birth, entry into province, and migration in/out of province. It provides the needed follow-up information to track residents for longitudinal and intergenerational analyses. Federally insured individuals, such as military personnel and federal inmates, are not included in this dataset. MCHP receives "snapshot files" of registry data semi-annually from Manitoba Health, Healthy Living and Seniors. These files are central to the use of MCHP's **Population Health Research Data Repository**.

Manitoba Immunization Monitoring System (MIMS)

A population–based system that provides monitoring and reminders to help ensure that recommended immunizations are received. Immunization status is monitored by comparing the system record and the recommended schedule. This system also gives information on immunization histories, including type of vaccine administered, vaccine sequence schedule, service date, provider information, and some demographic information from the **Manitoba Health Insurance Registry**.

Medical Services Database

Health data maintained by Manitoba Health, Healthy Living and Seniors consisting of claims for physician visits in offices, hospitals and outpatient departments; **fee-for-service** components for tests such as lab and x-ray procedures performed in offices and hospitals; payments for on-call agreements (e.g. anaesthetists) that are not attributed to individual patients; as well as information about physicians' specialties. These data files contain records for both Manitoba and non-Manitoba residents who visit Manitoba providers. Some information is also included for services received by Manitoba residents from providers in other provinces. In Manitoba, fee-for-service providers must submit claims to Manitoba Health, Healthy Living and Seniors for reimbursement; a small proportion of salaried physicians also submit evaluation claims (shadow billing).

Minimum Detectable Effect Size

A minimum detectable effect is the smallest estimated true effect (i.e., group difference) that would be statistically significant at the 0.05 level using 80 percent power. In other words, it is the minimum required true difference between groups that would result in a significant difference 80% of the time

Negative Binomial Distribution

A discrete probability distribution appropriate for analyzing count data when an event is relatively rare, but is highly variable over the entire population. This distribution is often used in regression analyses when the **Poisson distribution** results in an over-dispersed model—i.e., when the variance is greater than the mean.

Negative Binomial Regression

Regression analyses for count data that follows a **negative binomial distribution**, which occurs when an event is relatively rare, but is highly variable over the entire population—i.e., when the variance is greater than the mean.

Nurse Practitioner

A registered nurse with advanced qualifications who provides a full range of primary-care services to patients. Nurse practitioners can order diagnostic tests, prescribe drugs, and perform specific procedures in a variety of healthcare settings.

Ophthalmologist

A physician with specialized training who diagnoses and treats disorders of the eye. An ophthalmologist is qualified to prescribe medication, prescribe and adjust eyeglasses and contact lenses, and is qualified to perform laser treatment and surgery.

Optometrist

Although not a doctor of medicine, an optometrist is specifically trained to diagnose eye

Physician Claims

Also called physician billing claims or medical claims, these are submitted to the provincial government by individual physicians for services they provide. **Fee-for-service** physicians receive payment based on these claims, while those submitted by physicians on alternate payment plans (APP) are for administrative purposes only. The latter is sometimes referred to as "shadow billing."

Physician Integrated Network (PIN)

A primary-care renewal initiative developed by Manitoba Health, Healthy Living and Seniors that works with **fee-for-service (FFS)** physician groups to improve primary-care services for both patients and providers. Specifically, it aims to improve access to **primary care**, providers' access to and use of information, providers' work life, and the quality of care provided, particularly for chronic disease.

Manitoba Health, Healthy Living and Seniors. Physician Integrated Network (PIN) http://www.gov.mb.ca/health/primarycare/public/pin/index.html. Accessed July 3, 2014

Physician Integrated Network (PIN) Data File

Health data that contain information about patient visits to family-practice clinics participating in PIN. This includes information such as patient demographics, prescriptions, dates of tests and lab work, and medical advice offered. Clinical data are collected directly from each PIN clinic's **electronic medical record (EMR)**. The EMR extract is used by Manitoba Health, Healthy Living and Seniors to provide the clinic with **Quality Based Incentive Funding (QBIF)**. The PIN EMR extract data is thus believed to be high quality because of the direct link with remuneration.

Poisson Regression

Statistical analyses for data that follow a **Poisson distribution**, which is the "pattern usually followed by a set of results in which the measurements are counts", and which has the assumption that the variance of an outcome is equal to its mean. Poisson regression is often the best choice for modelling counts of rare events, such as death (Hassard T, 1991).

Hassard T. *Understanding Biostatistics*. 3rd ed. St. Louis, MI: Mosby-Year Book, Inc. 1991:G4

Poisson Distribution

The pattern usually followed by a set of results in which the measurements are counts. It is a special case of the binomial distribution (see **Negative Binomial Distribution**) in which the number of individuals is very large and the chance of one of the two possible outcomes occurring is very small (Hassard T, 1991). This distribution is based on the assumption that the variance of an outcome is equal to its mean.

Hassard T. *Understanding Biostatistics*. 3rd ed. St. Louis, MI: Mosby-Year Book, Inc. 1991

Population Health Research Data Repository (Repository)

A comprehensive collection of administrative, registry, survey, and other databases primarily comprised of Manitoba residents. The Repository is housed at the Manitoba Centre for Health Policy (MCHP). It was developed to describe and explain patterns of healthcare and profiles of health and illness, facilitating inter-sectoral research in areas such as healthcare, education, and social services. The administrative health databases, for example, hold records for virtually all contacts of registered persons with the provincial healthcare system and the Manitoba Health Services Insurance Plan, including physicians, hospitals, personal care homes, home care, and pharmaceutical prescriptions. MCHP acts as a trustee or steward of the information in the Repository for agencies such as Manitoba Health, Healthy Living and Seniors.

Primary Care

The first level of contact for a patient with the healthcare system. Primary care "includes assessment, diagnosis and treatment of common illnesses generally provided by **family physicians** and nurses" (Manitoba Health, 2006).

Manitoba Health. *Primary Health Care: Working together for better health: Primary Health Care Policy Framework*. 2006.

Primary-Care Physician

A general practitioner or **family physician** who assesses, diagnoses, and treats common illnesses and who typically serves as a patient's first contact with the healthcare system (Orgain, 2009).

Orgain JC. *"Primary-care physician." Encyclopedia of Health Services Research*. Thousand Oaks, CA: SAGE Publications, Inc. 2009.

Provider Registry

A registry containing "snapshots" of provider and practice information that are received quarterly from Manitoba Health, Healthy Living and Seniors. Details about physicians, **nurse practitioners**, and their practices are available in this registry, including specialty, age, location of training, years of practice, payment methods, workloads, and practice groups.

Quality Based Incentive Funding (QBIF)

An approach to physician compensation designed to reward quality processes in **primary care**. It is being trialed in Manitoba as part of the **Physician Integrated Network (PIN)** initiative "to explore the potential of a blended model for compensating physicians that considers both the quality of services provided (pay-for-performance) and the volume of services provided (**fee-for-service**)." The funding "is tied to the clinic's performance on a number of primary care quality indicators."

Manitoba Health, Healthy Living and Seniors. Physician Intergrate Network (PIN) http://www.gov.mb.ca/health/primarycare/public/pin/qbif1.html. Accessed June 17, 2014

Resource Utilization Bands (RUBs)

Resource Utilization Bands (RUBs) are part of the Johns Hopkins Adjusted Clinical Group® (ACG®) Case Mix System. The RUBs are a simplified ranking system of each person's overall sickness level, taking into account all the diagnoses attributed to them during medical visits and hospitalizations in the preceding year. Individuals are assigned to one of 6 RUB categories: 0-Non-user, 1-Healthy User, 2-Low Morbidity, 3-Moderate Morbidity, 4-High Morbidity, 5-Very High Morbidity. Note that for the purposes of this report, RUB groups 0, 1 and 2 were analyzed together, as people in these groups are rarely hospitalized.

Socioeconomic Status

Characteristics of economic, social and physical environments in which individuals live and work, as well as their demographic and genetic characteristics.

Previous research has shown that income provides an accurate estimate of socioeconomic status (Chateau et. al.). In this study, shadow-practice patients were matched to PIN patients by **income quintile**.

Chateau D, Metge C, Prior H, Soodeen RA. Learning from the census: the Socio-economic Factor Index (SEFI) and health outcomes in Manitoba. *Can J Public Health*. 2012 Jul 4;103(8Suppl 2):S23-7.

Specialists

Physicians whose practices are limited to a specific area of medicine in which they have undergone additional training. They are identified by a code in the **Provider Registry**. This category includes physicians in the area of psychiatry, pediatrics, obstetrics & gynecology, medical specialty (internal, neurology, geriatrics, rheumatology, dermatology), general surgery, oral surgery, and surgery specialist (thoracic & cardio, plastic, urological, orthopaedic, neurological, ophthalmology, otorhinolaryngology).

Statistics Canada

An agency of the federal government that serves as Canada's central statistical office. It produces statistics about all aspects of Canada's population, resources, economy, society, and culture.

Statistics Canada. About us. 2012. http://www.statcan.gc.ca/about–apercu/about–apropos–eng.htm. Accessed July 2, 2014.

Tariff

The fee paid for a service or group of services provided by a physician or a **nurse practitioner**.

APPENDIX 1: DEFINITIONS AND CODES

Appendix Table 1.1: Table of Definitions and Codes of Indicators Used in This Deliverable

Indicators	**Definitions**
Breast Cancer Screening	• Women aged 50-69 Tariff Codes: 7098, 7099, 7104, 7110 or 7111 At least one mammogram in 2 year period
Childhood Immunizations	Two-year-olds covered in Manitoba from birth to their 2nd birthday who received complete immunizations as per the schedule at the time - Using MIMs data Children born prior to Oct 1, 2004 require 4 shots of DTP, 3 shots of polio, 4 shots of HiB, 1 shot of MMR Children born between Oct 1, 2004 and Dec 31, 2004 require 4 shots of DTP, 3 shots of polio, 4 shots of HiB, 1 shot of MMR, 3 shots of PCV, 1 shot of Varicella Children born in 2005 to 2008 require 4 shots of DTP, 3 shots of polio, 4 shots of HiB, 1 shot of MMR, 4 shots of PCV, 1 shot of Varicella Children born in 2009 up to Jul 1, 2010 require 4 shots of DTP, 3 shots of polio, 4 shots of HiB, 1 shot of MMR, 4 shots of PCV, 1 shot of Varicella, 1 shot of Men-C Children born after Jul 1, 2010 require 4 shots of DTP, 3 shots of polio, 4 shots of HiB, 1 shot of MMR, 3 shots of PCV, 1 shot of Varicella, 1 shot of Men-C Physician tariff codes for vaccinations: DTP: 8601, 8602, 8603, 8609, 8641, 8642, 8643, 8649, 8651, 8781, 8782, 8783, 8789, 8798, 8802, 8804, 8805, 8806, 8807, 8921, 8922, 8923, 8924, 8929; Polio: 8611, 8612, 8613, 8619, 8798, 8802, 8804, 8805, 8806, 8807, 8924, 8931, 8932, 8933, 8939; HiB: 8781, 8782, 8783, 8789, 8802, 8804, 8806, 8807, 8901, 8902, 8903, 8909; MMR: 8621, 8670; Varicella: 8672, 8674; PCV7/13: 8681, 8682, 8683, 8684, 8962,8896 Men-C: 8685, 8686, 8687, 8925 Note: Schedule Change in July 2012 where PCV requires 3 shots instead of 4. Also, the Men-C vaccine has also been added to the schedule in 2011.

Appendix Table 1.1: Continued

Indicators	**Definitions**
Influenza Immunization	Influenza Immunization Tariffs: 8791, 8792,8799 – defined using MIMS data Influenza Immunization Rates were calculated in 2 groups: 1. The percentage of residents aged 65 or older who received a vaccine for influenza in a 2–year period. Manitoba Health recommendation is to get flu shot annually so if senior appears in both years in period then they need 2 shots to be counted, if the senior only appears once they only need one shot to be counted. 2. Medical Condition: Respiratory Illness (TRM) TRM includes acute bronchitis, chronic bronchitis, bronchitis not specified as acute or chronic, emphysema, asthma, and chronic airway obstruction NEC. Note that all the above except for acute bronchitis make up COPD. If the person had a TRM dx in both years, they need 2 flu shots to be counted otherwise they needed 1 to be counted. Definition of Total Respiratory Morbidity: 1. 1+ Hospitalizations in 1 year (any dx code) 2. 1+ Physician visits in 1 year (prefix=7) TRM Diagnosis Codes: ICD-9-CM: 466, 490, 491, 492, 493, 496 ICD-10-CA: J20, J21, J40-J45
Pneumococcal Immunization (65-70)	The percentage of seniors aged 65+ who ever received a pneumococcal vaccination. This vaccination was introduced in 2001 and is defined using MIMS data. • Tariffs: 8681, 8682, 8683, 8684, 8961

Appendix Table 1.1: Continued

Indicators	Definitions
Congestive Heart Failure Management: Initiation of Drug Treatment Congestive Heart Failure Management: Persistence of Drug Treatment	• Patients newly Dx with CHF age 20+ who filled a Rx for either ACEI or ARB within 3 months of Dx • Patients with CHF who were persistent users of either ACEI or ARB (had to have prescription filled for 80% of the days between CHF dx and end of period) CHF patients are defined by: Definition of CHF is: 1. 1+ Inpatient Hospitalizations in 1 years (any dx code) 2. 2+ Physician visits in 1 year (prefix=7) CHF codes: ICD9-CA: 428 ICD10-CA: I50 Exclude patients who had a CHF dx within 1 years prior of the one that falls in the period. Ace Inhibitors are defined by ATC codes C09A, C09B ARB are defined as CO9C, C09D
Depression Care: Prescription Follow-up	• Patients with depression (need a new Dx) who had 3 follow-up ambulatory physician visits with 4 months of filling an Rx for an antidepressant Depressed patients are defined by an ambulatory visit with a diagnosis of depression and an Rx for antidepressants within 2 weeks of each other (it is assumed that the Rx date comes after the physician visit.) Depression diagnoses include ICD-9-CM codes 296 and 311. Antidepressants are defined by ATC code N06A. To be included as a newly depressed patient, you could not have a prescription for antidepressants or a physician visit with a diagnosis of depression in the 2 years prior to the index event.

Appendix Table 1.1: Continued

Indicators	Definitions
Diabetes Care – Eye Examinations	The crude percentage of persons with diabetes aged 20-79 who had at least one eye examination by an ophthalmologist or optometrist. Note that if a patient had a diabetes dx in both years than they need 2 eye exams to be counted, otherwise they need one. An optometrist or an ophthalmologist eye exam are defined in physician billings using the specialty bloc variable 'mdbloc' 051 and 053. Definition of Diabetes is: 1. 1+ Inpatient Hospitalizations in 3 years (any dx code) 2. 2+ Physician visits in 3 years (prefix=7) 3. 1+ Prescriptions in 3 years Diabetes Diagnosis Codes: ICD-9-CM: 250 ICD-10-CA: E10-E14 Drugs to treat diabetes are defined by ATC code A10.
Post Myocardial Infarction (MI) Management Post Myocardial Infarction (MI) Management: Initiation of Beta-Blocker Drug Treatment Post Myocardial Infarction (MI) Management: Persistence of Beta-Blocker Drug Treatment	• Patients newly Dx with MI aged 20+ who filled at least one beta-blocker Rx within 4 months of hospital discharge • Patients with MI who are persistent users of beta-blockers (had to have prescription filled for 80% of the days between MI separation date and end of period) AMI patients are defined by an inpatient hospital separation with a most responsible diagnosis of AMI: ICD-9-CM code 410 or ICD-10-CA code I21 Beta-blockers are defined by ATC codes C07AA, C07AB. Note that to be included in the denominator, patients had to be alive for the entire follow-up period. Exclusions include those hospitalized in the 3 years prior to the index AMI hospitalization with diagnoses of: 1. AMI (ICD-9-CM code 410 or ICD-10-CA codes I21 and I22) 2. Asthma (ICD-9-CM code 493 or ICD-10-CA code J45) 3. COPD (ICD-9-CM codes 491 and 492 or ICD-10-CA codes J41-J44) 4. Peripheral Vascular Disease (ICD-9-CM codes 443 and 459 or ICD-10-CA codes I73, I79.2, I87)

Appendix Table 1.1: Continued

Indicators	Definitions
Post Myocardial Infarction (MI) Management: Initiation of Cholesterol Lowering Drug Treatment Post Myocardial Infarction (MI) Management: Persistence of Cholesterol Lowering Drug Treatment	• Patients newly Dx with MI age 20+ who filled at least on cholesterol lowering Rx within 4 months of Hospital Discharge • Patients with MI who were persistent users of cholesterol-lowering drugs (had to have prescription filled for 80% of the days between MI separation date and end of period) AMI patients are defined by an inpatient hospital separation with a most responsible diagnosis of AMI: ICD-9-CM code 410 or ICD-10-CA code I21 Cholesterol Lowering Drugs are defined by ATC codes C10. Note that to be included in the denominator, patients had to be alive for the entire follow-up period. Exclusions include those hospitalized in the 3 years prior to the index AMI hospitalization with diagnoses of: 1. AMI (ICD-9-CM code 410 or ICD-10-CA codes I21 and I22) 2. Prescriptions of Cholesterol Lowering Drugs that occur up to 1 year prior the MI.
Asthma Care: Medication Use	• Asthmatic patients aged 20+ who had at least one Rx for a long-term control of asthma (3 year period) • Asthmatics are defined as individuals with a repeat prescription (i.e., 2+ Rx) for Beta 2-agonists: ATC codes R03AA, R03AB or R03AC. Long-term asthma control meds include inhaled corticosteroids (ATC code R03BA), Leukotriene modifiers (ATC code R03DC) or Adrenergics and other drugs for obstructive airway diseases (ATC code R03AK). COPD patients are excluded from the asthma cohort. These people are identified by 1+ Rx for Ipratropium Bromide: ATC codes R01AX03, R03AK04, R03BB01.
Benzodiazepine Prescribing in Community Dwelling Older Adults	• Community-dwelling patients 75+ who filled at least 2 RX for Benzos or at least 1 Rx for more than a 30-day supply of Benzos • Benzodiazepines are defined by ATC codes N05BA, N05CD, N05CF, N03AE01 (clonazepam)* * Clonazepam is categorized as an antiepileptic drug, not an anxiolytic, but it is a benzodiazepine derivative and is now included in this definition.

Appendix Table 1.1: Continued

Indicators	Definitions
Continuity of Care	Continuity of Care index (COC) This index weights both the frequency of ambulatory visits to each GP (Mdbloc 11) and the dispersion of visits between GPs. Index values range from 0 (each visit made to a different physician) to 1 (all visits made to a single physician) Need at least 3 ambulatory visits in 2-year period to be included The index is calculated 2 ways: a) Individual physician (patient sees his own rostered physician) b) clinic based (if patient sees any physician in the PIN clinic they are considered to have COC)
Routine Electrocardiography	• Patients 18+ who had a least 1 routine EKG (within 2 weeks of a complete physical) Definition of EKG is the presence of any of the following tariff codes in in physician claims: 9836 - HEART AND PERICARDIUM, ELECTROCARDIOGRAM, W INTERPRETATION AND REPORT (12 LEADS) 9837 - HEART AND PERICARDIUM, ELECTROCARDIOGRAM, W/O INTERPRETATION AND REPORT (12 LEADS) 9838 - ELECTROCARDIOGRAM, INTERPRETATION AND REPORT BY PHYSICIAN WHO DID NOT TAKE TRAINING 12 LDS Definition of Complete Physical is the presence of any of the following tariff codes in in physician claims: 8450 - Complete Physical and Gynaecological Exam - Including Cytological Smear - Cervix for Patients Aged 70 years and over 8460 - Complete Physical and Gynaecological Exam - Excluding Cytological Smear - Cervix for Patients Aged 70 years and over 8495 - OBS/GYN - Complete Physical and Gynaecological Exam - Including Cytological Smear - Cervix 8498 - GP - Complete Physical and Gynaecological Exam - Including Cytological Smear - Cervix 8499 - GP - Complete Physical and Gynaecological Exam - Excluding Cytological Smear - Cervix 8500 - Complete History and Physical Exam for Patients Aged 75 years and over 8540 - Complete History and Physical Exam *** Not including 8594 here since it routinely an exam in hospital not ambulatory care ***; Exclude patients with a diagnosis of chest pain Exclude patients with a cardiac diagnosis (i.e. AMI, CHF and IHD) occurring up to 2 years prior to complete physical exam Exclude patients with a diagnosis of hypertension occurring up to 2 years prior to complete physical exam ICD9 codes for 3 exclusions: 401-405, 410-414, 428, 786

Appendix Table 1.1: Continued

Indicators	Definitions
Hospitalizations for Ambulatory Care Sensitive Conditions	Separations are counted here, not episodes. Ambulatory Sensitive Conditions uses most responsible diagnosis only. Four Ambulatory Sensitive Conditions are looked at: 1. COPD a. ICD9: 491, 492, 494, 496 b. ICD10: J41, J42, J43, J44, J47 2. Asthma a. ICD9: 493 b. ICD10: J45 3. Congestive Heart Failure a. ICD9: 402.01, 402.11, 402.91, 428, 518.4 b. ICD10: I50, J81 c. Some Cardiac Interventions are excluded 4. Diabetes a. ICD9: 250 b. ICD10: E10-E14 Individuals age 75 and older are excluded from analysis. Individuals who died in hospital are excluded from the numerator. Personal Care Homes, Long-term Care facilities and Nursing Stations are excluded Only inpatient separations are included, defined by transact = 1. Newborn separations are included here.
Referral Rates	The rate of referrals calculated 3 ways: a) Referral of patient's own rostered MD b) Referral of patient's clinic group of MDs c) Total Referrals We only want referrals from GPs - Specialists (not Specialists - Specialists) and visits limited to ambulatory only. Exclude pathology, radiology, anesthetist and GP referrals (MD Bloc 07,08,10,11) Exclude all obstetrical referrals due to normal pregnancy (Diag = V22-V28) Exclude referrals from the same MD to a same specialist within 6 months of the first referral

Appendix Table 1.1: Continued

Indicators	Definitions
Smoking Cessation Prescription	• Patients aged 18+ who received a prescription for smoking cessation drugs (i.e. bupropion and varenicline) at least once in time period Smoking Cessations drugs are defined by this din list '02237823', '02237824', '02237825', '02238441', '02260239', '02275074', '02275082', '02275090', '02275104', '02285657', '02285665', '02291177', '02291185', '02298309', '02313421', '02325357', '02325373', '02331616', '02363399', '02363402', '02391562', '02391570' • We want to rule out the use of bupropion for the treatment of depression. People who have a previous Dx of mood/anxiety disorder (up to 5 years prior) will be excluded from this indicator. • In the PIN2 data, the variable patient_smoker = 1 was used to identify smokers.

Appendix Table 1.2: Quality Based Incentive Funding (QBIF) Indicators

QBIF Indicators	Definition
Prevention	
2.01 Cervical Cancer Screening	Percentage of female core patients 21 to 69 years of age without PAP exemptions who have had a PAP test in the past 36 months
2.02 Colon Cancer Screening	Percentage of core patients 50 to 74 years of age who have had a FOBT in the past 24 months or colonoscopy in the last 10 years
2.03 Breast Cancer Screening	Percentage of female core patients 50 to 69 years of age without mammography exemptions who have had a mammography test within the past 24 months
2.04 Dyslipidemia Screening for Women	Percentage of female core patients 50 to 69 years of age who have had a full fasting lipid test in the past 60 months
2.05 Dyslipidemia Screening for Men	Percentage of male core patients 40 to 69 years of age who have had a full fasting lipid test in the past 60 months
2.06 Fasting Blood Sugar Screening	Percentage of core patients 40 to 74 years of age without diabetes who have had a fasting blood sugar test in the past 36 months
2.07 MMR Immunization	Percentage of core patients seven years of age who have had the Measles, Mumps and Rubella (MMR) vaccination by age seven or whose parents or guardians have been counselled on the recommended immunizations
2.08 Influenza Immunization 65+	Percentage of core patients 65 years of age and over who have received the influenza immunization or counselling for the influenza immunization in the past 12 months
2.09 Pneumococcal Immunization 65 – 70	Percentage of core patients 65 to 70 years of age who have not previously had the immunization that have been counselled in the last 12 months or who have received the immunization at age 65 or older
2.11 Blood Pressure Measurement	Percentage of core patients 18 years of age and over who have had a blood pressure measurement taken in the past 24 months
2.12 Advice on Physical Activity	Percentage of core patients 12 years of age and over who have been given physical activity advice in the past 24 months
2.13 Smoking Cessation Advice	Percentage of core patients 12 years of age and over who are smokers and have been given smoking cessation advice in the past 24 months
2.14 Obesity/Overweight Screening	Percentage of core patients 12 years of age and over who have received an obesity/overweight screening in the past 24 months

Appendix Table 1.2: Continued

Indicator	Definition
Diabetes Management	
3.01 HGB A1C	Percentage of core patients with diabetes who have had the HGB A1C test in the past 6 months
3.02 Nephropathy Screening	Percentage of core patients 12 years of age or over with diabetes who have had nephropathy screening in the past 12 months
3.03 Fundoscopic Exams	Percentage of core patients 15 years of age and over with diabetes who have had a fundoscopic exam or a referral for a fundoscopic exam within the last 12 months
3.04 Foot Exams	Percentage of core patients with diabetes who have had a foot exam in the past 12 months
3.05 Full Fasting Lipid Profile Screening	Percentage of core patients 74 years of age or younger with diabetes who have had a full fasting lipid test in the past 12 months
3.06 Blood Pressure Measurement	Percentage of core patients with diabetes who have had a blood pressure measurement taken in the past 12 months
3.07 Obesity/Overweight Screening	Percentage of core patients with diabetes who have received an obesity/overweight screening in the past 12 months
Asthma Management	
4.03 Patients with Asthma Action Plans	Percentage of core patients 6 to 55 years of age with asthma with an asthma action plan developed and/or reviewed within the past 12 months
Congestive Heart Failure Management	
5.02 Obesity/Overweight Screening	Percentage of core patients 18 years of age and over with congestive heart failure who have received an obesity/overweight screening in the past 12 months
5.03 ACE Inhibitor	Percent of core patients 18 years of age and over with congestive heart failure who are using ACE inhibitors or ARB
5.04 Full Fasting Lipid Profile Screening	Percentage of core patients 18 to 74 years of age with congestive heart failure who have had a full fasting lipid test in the past 12 months
5.05 Blood Pressure Measurement	Percentage of core patients 18 years of age and over with congestive heart failure who have had a blood pressure measurement taken in the past 12 months
5.06 Fasting Blood Sugar	Percentage of core patients 18 years of age and over with congestive heart failure that do not have diabetes who have had a fasting blood sugar test in the past 12 months

Appendix Table 1.2: Continued

Indicator	Definition
Trial Depression Screening Indicators	
8.01 Depression Screening (Trial)	Percentage of core patients 18 to 69 years of age identified as high risk who have answered both PHQ-2 questions within the last 12 months
8.02 Depression Screening Follow-up (Trial)	Percentage of core patients 18 to 69 years of age identified as high risk who have given a positive answer to one or more PHQ-2 questions within the last 12 months and had a follow-up assessment completed within 4 weeks of the initial depression screening
Chronic Disease Management for Patients with Comorbidities	
9.01 Comorbidity Achievement Indicator - Patients with 2 Comorbidities	Percentage of chronic disease indicators achieved for patients with 2 co-morbidities.
9.02 Comorbidity Achievement Indicator – Patients with 3 Comorbidities	Percentage of chronic disease indicators achieved for patients with 3 co-morbidities.
9.03 Comorbidity Achievement Indicator – Patients with 4 Comorbidities	Percentage of chronic disease indicators achieved for patients with 4 co-morbidities.
9.04 Comorbidity Achievement Indicator – Patients with 5 Comorbidities	Percentage of chronic disease indicators achieved for patients with 5 co-morbidities.

Appendix Table 1.2: Continued

Indicator	Definition
Indicators On Hold	
The following indicators have been placed on hold pending further discussions around how technology may enable the provision of information needed for these indicators.	
2.10 Breast-Feeding Education	Percentage of women who have given birth in the last year who received breastfeeding support education during the last two trimesters of their pregnancy
4.01 Asthma Control	Percentage of core patients 6 to 55 years of age with asthma who have been prescribed more than 4 canisters of SABA in the past 12 months and who received preventer/controller medicine in the past 12 months
4.02 Emergency Department Visits for Asthma	100% minus the percentage of core patients 6 to 55 years of age with asthma who have been to the ER for asthma-related reasons in the past 12 months
5.01 Emergency Department Visits for Congestive Heart Failure (CHF)	100% minus the percentage of core patients 20 years of age and over with congestive heart failure who have been to the ER for CHF-related reasons in the past 12 months

Source: Manitoba Health

APPENDIX 2: PIN TIME PERIODS

Appendix Table 2.1: PIN Clinic Time Periods for Pre-Implementation, Post-Implementation and Long-Term Follow-up

	PIN Clinic	Pre-Implementation Period		PIN Implementation Date	Post-Implementation Period		Long-Term Follow-Up	
		Start *	End**		Start†	End‡	Start	End
Phase 1	**Agassiz Medical Centre**	10/17/2006	10/15/2008	10/16/2008	10/16/2008	10/16/2010	01/01/2011	31/12/2012
	Assiniboine Clinic	4/16/2006	4/14/2008	4/15/2008	4/15/2008	4/15/2010	01/01/2011	31/12/2012
	Dr. C. W. Wiebe Medical Centre	10/4/2005	10/3/2007	10/4/2007	10/4/2007	10/3/2009	01/01/2011	31/12/2012
	Steinbach Family Medical Centre	10/17/2006	10/15/2008	10/16/2008	10/16/2008	10/16/2010	01/01/2011	31/12/2012
Phase 2	**Altona Clinic**	4/1/2008	3/31/2010	4/1/2010	4/1/2010	3/31/2012	N/A	
	Centre Médical Seine	4/1/2008	3/31/2010	4/1/2010	4/1/2010	3/31/2012		
	Clinique St. Boniface Clinic	1/2/2008	12/31/2009	1/1/2010	1/1/2010	1/1/2012		
	Concordia Health Associates	1/2/2008	12/31/2009	1/1/2010	1/1/2010	1/1/2012		
	Prairie Trail Medical Clinic	2/2/2008	1/31/2010	2/1/2010	2/1/2010	2/1/2012		
	Tuxedo Family Medical Centre	1/2/2008	12/31/2009	1/1/2010	1/1/2010	1/1/2012		
	Virden Medical Associates	3/1/2008	2/28/2010	3/1/2010	3/1/2010	2/29/2012		
	Western Medical Clinic	4/1/2008	3/31/2010	4/1/2010	4/1/2010	3/31/2012		

* Pre Start = PIN Implementation date - 730
** Pre End = PIN Implementation date -1
† Post Start = PIN Implementation date
‡ Post End = PIN Implementation date +729

APPENDIX 3: PAYMENT MODELS

There are two dominant payment mechanisms for physicians in Manitoba: physicians are either paid via fee-for-service (FFS)—i.e., claims are submitted to Manitoba Health, Healthy Living and Seniors for each service provided to a patient based on a negotiated payment schedule; or, physicians are paid via a variety of alternative funding mechanisms. These include remuneration such as sessional payments where the physician is paid for a "session of work" or a shift while retaining the independence of not being a salaried employee. To be eligible to participate in PIN, the dominant payment mechanism for clinic physicians needed to be fee-for-service. This is because QBIF is intended to supplement FFS funding.

For some time, it has been suggested in the health services literature that the FFS payment mechanism is not well-suited to the delivery of high-quality team-based interdisciplinary primary care (Shen et al., 2004). While the majority of Manitoba family physicians are paid via FFS, there are a significant number outside Winnipeg who are paid via alternative funding models. We were thus able to explore the differences between the outcomes for selected indicators based on how the shadow-practice physicians were funded for the seven rural PIN clinics and their shadow practices. For ease of presentation we refer to these alternatively funded clinics as "salary" in the tables below while still using the term "alternatively funded" in the text.

Prevention and Screening Indicators

Complete Immunizations at Age Two

For the primary series of childhood immunizations delivered before age two, three alternatively funded shadow practices had higher rates than the corresponding PIN clinics. For one PIN clinic, the FFS shadow practice had higher rates of immunization, but lower than the corresponding alternatively funded shadow practice. It should be noted that in rural Manitoba most children receive these immunizations from public health nurses rather than from family physicians. Since accountability for immunizations for children before age two does not lie solely with physicians in rural contexts, PIN should be understood as having a potentially low impact on this indicator.

Appendix Table 3.1: Complete Immunizations at Age Two, Comparisons of Payment Mechanism Models

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	Agassiz Medical Centre	394	60.9	708	61.6	↑	674	59.5		
	Dr. C. W. Wiebe Medical Centre	869	51.8	1,231	59.1	↑	1,167	55.9	↑	↓
	Steinbach Family Medical Center	726	64.2	1,383	65.0		1,287	63.8		
Phase 2	Altona Clinic	83	61.4	179	65.9	↑	160	65.0		
	Centre Médical Seine Inc.	195	71.3	342	70.5		308	67.5		
	Virden Medical Associates	90	78.9	181	70.2		157	71.3		
	Western Medical Clinic	361	67.6	832	68.1		769	65.8		

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower ($p<0.025$).
A blank cell indicates that the two rates were similar.

Annual Influenza Immunizations for Adults aged 65 and Older

Five of seven alternatively funded shadow practices have higher rates of flu shots for older adults than corresponding PIN clinics. Only one PIN clinic has a higher rate of influenza vaccination than its alternatively funded shadow practice. Similarly, five of the seven FFS shadow practices had higher rates of immunization than their corresponding PIN clinics. Three of the seven FFS shadow practices have lower rates than the corresponding alternatively funded shadow practices. This suggests that the rates of influenza vaccination are better when physicians are funded via alternative funding mechanisms.

Appendix Table 3.2: Annual Influenza Immunization, Adults Aged 65+, Comparisons of Payment Mechanism Models

Age- and sex-adjusted

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	**Agassiz Medical Centre**	1,893	38.0	3,990	52.5	↑	4,030	51.7	↑	
	Dr. C. W. Wiebe Medical Centre	2,108	33.5	4,229	45.9	↑	4,266	46.4	↑	
	Steinbach Family Medical Center	2,875	32.0	5,932	46.9	↑	6,002	44.0	↑	↓
Phase 2	**Altona Clinic**	1,009	42.5	1,919	49.1	↑	1,987	47.9	↑	↓
	Centre Médical Seine Inc.	1,685	48.5	3,404	50.7		3,395	50.3		
	Virden Medical Associates	1,015	53.2	2,003	48.9	↓	1,977	49.4	↓	
	Western Medical Clinic	2,202	51.4	4,626	55.7	↑	4,641	54.2	↑	↓

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower (p<0.05).
A blank cell indicates that the two rates were similar.

Annual Influenza Immunizations for People with Total Respiratory Morbidity

For influenza immunization for patients with respiratory disease, both the alternatively funded shadow practices (six of seven) and the FFS shadow practices (four of seven) provide better rates than the PIN clinics. Two FFS shadow practices have lower rates than their corresponding PIN clinics. Four FFS shadow practices have lower rates that the corresponding alternatively funded shadow practices. As with influenza immunizations for patients aged 65 and older, this suggests that alternatively funded physicians do better at providing influenza immunization to this target group.

Appendix Table 3.3: Annual Influenza Immunization, People with Total Respiratory Morbidity, Comparisons of Payment Mechanism Models

Age- and sex-adjusted

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	Agassiz Medical Centre	570	30.5	1,331	31.1	↑	1,540	30.4	↓	↓
	Dr. C. W. Wiebe Medical Centre	678	20.6	1,714	31.0	↑	2,080	31.2	↑	
	Steinbach Family Medical Center	847	22.2	2,169	28.5	↑	2,467	28.9	↑	
Phase 2	Altona Clinic	206	23.1	497	29.5	↑	533	27.6	↑	↓
	Centre Médical Seine Inc.	559	31.5	1,146	32.9	↑	1,121	31.2	↓	↓
	Virden Medical Associates	305	37.2	557	38.9	↑	618	37.2		
	Western Medical Clinic	1,762	31.9	2,668	35.4		2,880	33.6	↑	↓

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower ($p<0.025$).
A blank cell indicates that the two rates were similar.

Pneumococcal Immunization

Clinical guidelines recommend both influenza and pneumococcal vaccinations for patients over 65 years old. While influenza vaccination is given annually, the pneumococcal vaccination is only required to be given once when patient turns 65. Five FFS shadow practices have higher rates than their alternatively funded counterparts. The comparisons between PIN clinics and the shadow practices were mixed for both FFS and alternatively funded shadow practices. FFS physicians do better for this indicator.

Appendix Table 3.4: Pneumococcal Immunizations, Adults Aged 65 and Older, Comparisons of Payment Mechanism Models

Age- and sex-adjusted

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	Agassiz Medical Centre	1,893	68.1	3,990	63.1		4,030	63.1		
	Dr. C. W. Wiebe Medical Centre	2,108	57.4	4,229	59.7	↑	4,266	61.0	↑	↑
	Steinbach Family Medical Center	2,875	84.7	5,932	66.2	↓	6,002	65.9	↓	
Phase 2	Altona Clinic	1,051	59.0	1,919	62.9	↑	1,987	63.3	↑	↑
	Centre Médical Seine Inc.	1,759	65.4	3,404	65.5		3,395	66.3		↑
	Virden Medical Associates	1,059	67.5	2,003	65.2	↓	1,977	66.8		↑
	Western Medical Clinic	2,422	69.4	4,626	66.1	↓	4,641	67.0	↓	↑

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower (p<0.025).
A blank cell indicates that the two rates were similar.

Disease-Management Indicators

Congestive-Heart-Failure Management: Initiation and Persistence of Drug Treatment

The rates for the initiation of recommended drug treatment for congestive heart failure are similar for PIN clinics, alternatively funded shadow practices, and FFS shadow practices. However, two FFS shadow practices had lower rates than their corresponding alternatively funded shadow practices. While the lack of difference between the practices may appear initially to be due mainly to the small numbers in each PIN clinic, the persistence of treatment table that follows has equally small numbers but demonstrates more differences between the PIN clinics and their shadow practices. Two alternatively funded shadow practices do better than their PIN counterparts, while two of the FFS shadow practices do worse than their PIN counterparts. Four of the seven alternatively funded shadow practices do better than the corresponding FFS shadow practices. This suggests that alternatively funded physicians are doing a better job of maintaining their patients on the recommended heart-failure treatments.

Appendix Table 3.5: Congestive Heart Failure Management: Initiation of Drug Treatment, Comparisons of Payment Mechanism Models

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	**Agassiz Medical Centre**	63	76.2	140	68.6		134	70.9		
	Dr. C. W. Wiebe Medical Centre	91	63.7	183	65.6		177	61.6		
	Steinbach Family Medical Center	119	57.1	238	58.8		213	56.3		↓
Phase 2	**Altona Clinic**	31	71.0	62	74.2		71	67.6		
	Centre Médical Seine Inc.	55	67.3	121	64.5		123	61.0		
	Virden Medical Associates	29	62.1	65	60.0		47	66.0		
	Western Medical Clinic	82	61.0	173	65.3		163	59.5		↓

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower ($p<0.025$).
A blank cell indicates that the two rates were similar.

Appendix Table 3.6: Congestive Heart Failure Management: Persistence of Drug Treatment, Comparisons of Payment Mechanism Models

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	**Agassiz Medical Centre**	63	60.3	140	53.6		134	53.7	↓	
	Dr. C. W. Wiebe Medical Centre	91	48.4	183	52.5		177	45.2		↓
	Steinbach Family Medical Center	119	43.7	238	47.1	↑	213	41.3	↓	↓
Phase 2	**Altona Clinic**	31	71.0	62	71.0		71	62.0		↓
	Centre Médical Seine Inc.	55	61.8	121	60.3		123	56.1		
	Virden Medical Associates	29	58.6	65	55.4		47	61.7		
	Western Medical Clinic	82	52.4	173	59.5	↑	163	52.1		↓

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower ($p<0.025$).
A blank cell indicates that the two rates were similar.

Post Myocardial Infarction Management: Initiation and Persistence of Beta-Blocker Drug Treatment

Three PIN clinics have higher rates of initiation of beta blockers for patients after a heart attack than their alternatively funded shadow practices, despite the small numbers. One FFS shadow practice has a higher rate of prescribing that the corresponding alternatively funded shadow practice.

For the persistence of treatment with a beta blocker after a myocardial infarction, one alternatively funded shadow practice has a lower rate than its PIN clinic and one FFS shadow practice has a higher rate than its corresponding alternatively funded shadow practice. FFS physicians seem to do better on this indicator.

Appendix Table 3.7: Post Myocardial Infarction Management: Initiation of Beta-Blocker Drug Treatment, Comparisons of Payment Mechanism Models

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	Agassiz Medical Centre	44	90.9	93	87.1	↓	84	88.1		
	Dr. C. W. Wiebe Medical Centre	62	83.9	115	84.3		121	84.3		
	Steinbach Family Medical Center	64	85.9	149	77.2	↓	139	84.9		↑
Phase 2	Altona Clinic	20	95.0	44	88.6	↓	43	95.3		
	Centre Médical Seine Inc.	31	87.1	77	84.4		66	86.4		
	Virden Medical Associates	23	82.6	42	90.5		46	82.6		
	Western Medical Clinic	29	72.4	92	76.1		73	79.5		

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower (p<0.025).
A blank cell indicates that the two rates were similar.

Appendix Table 3.8: Post Myocardial Infarction Management: Persistence of Beta-Blocker Drug Treatment, Comparisons of Payment Mechanism Models

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	Agassiz Medical Centre	44	70.5	93	66.7		84	65.5		
	Dr. C. W. Wiebe Medical Centre	62	69.4	115	67.8		121	70.2		
	Steinbach Family Medical Center	64	71.9	149	63.8	↓	139	69.1		
Phase 2	Altona Clinic	20	75.0	44	72.7		43	81.4		↑
	Centre Médical Seine Inc.	31	83.9	77	75.3		66	77.3		
	Virden Medical Associates	23	78.3	42	83.3		46	80.4		
	Western Medical Clinic	29	65.5	92	69.6		73	67.1		

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower (p<0.025).
A blank cell indicates that the two rates were similar.

Post Myocardial Infarction Management: Initiation and Persistence of Cholesterol Lowering Drug Treatment

None of the comparisons are statistically significant for the initiation of cholesterol-lowering medications.

The rates of drug persistence were lower for three alternatively funded shadow practices compared to their corresponding PIN clinics. One shadow practice had a higher rate than the corresponding PIN clinic. One FFS shadow practice had a higher rate of persistent drug prescribing that its corresponding alternatively funded shadow practice. Once again, FFS physicians do better for drug persistence.

Appendix Table 3.9: Post Myocardial Infarction Management: Initiation of Cholesterol Lowering Drug Treatment, Comparisons of Payment Mechanism Models

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	Agassiz Medical Centre	47	55.3	99	48.5		87	51.7		
	Dr. C. W. Wiebe Medical Centre	66	68.2	124	56.5		127	60.6		
	Steinbach Family Medical Center	66	60.6	154	52.6		143	53.1		
Phase 2	Altona Clinic	20	50.0	44	54.5		43	55.8		
	Centre Médical Seine Inc.	31	64.5	76	48.7		68	52.9		
	Virden Medical Associates	23	52.2	42	52.4		48	54.2		
	Western Medical Clinic	30	40.0	95	51.6		77	49.4		

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower ($p<0.025$).
A blank cell indicates that the two rates were similar.

Appendix Table 3.10: Post Myocardial Infarction Management: Persistence of Cholesterol Lowering Drug Treatment, Comparisons of Payment Mechanism Models

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	**Agassiz Medical Centre**	47	48.9	99	38.4	↓	87	42.5		
	Dr. C. W. Wiebe Medical Centre	66	56.1	124	46.0	↓	127	53.5		↑
	Steinbach Family Medical Center	66	39.4	154	39.0		143	39.2		
Phase 2	**Altona Clinic**	20	50.0	44	50.0		43	51.2		
	Centre Médical Seine Inc.	31	54.8	76	40.8	↓	68	45.6		
	Virden Medical Associates	23	43.5	42	42.9		48	50.0		
	Western Medical Clinic	30	30.0	95	45.3	↑	77	41.6		

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower ($p<0.025$).
A blank cell indicates that the two rates were similar.

Asthma Care

There are no significant differences in prescribing for asthma care in any of the comparisons made in Table 3.11.

Appendix Table 3.11: Asthma Care: Medication Use, Comparisons of Payment Mechanism Models

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	**Agassiz Medical Centre**	234	63.2	765	63.7		746	62.1		
	Dr. C. W. Wiebe Medical Centre	288	61.5	1,009	63.4		980	59.2		
	Steinbach Family Medical Center	410	68.3	1,358	67.8		1,179	64.0		
Phase 2	**Altona Clinic**	122	59.8	347	61.4		289	58.1		
	Centre Médical Seine Inc.	274	59.1	721	63.2		614	59.8		
	Virden Medical Associates	135	63.7	319	67.4		305	63.9		
	Western Medical Clinic	654	59.0	1,292	61.8		1,260	57.0		

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower ($p<0.025$).
A blank cell indicates that the two rates were similar.

Benzodiazepine Prescribing for Community-Dwelling Adults

Two of the seven alternatively funded shadow practices have lower rates of prescribing than the corresponding PIN clinics and one clinic has a lower rate than corresponding FFS shadow practice. Two of the FFS shadow practices have lower rates of prescribing than corresponding PIN clinics. FFS clinics do better than alternatively funded clinics.

Appendix Table 3.12: Benzodiazepine Prescribing in Community Dwelling Older Adults aged 75+, Comparisons of Payment Mechanism Models

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	Agassiz Medical Centre	901	23.6	884	23.4		1,067	27.3		
	Dr. C. W. Wiebe Medical Centre	1,060	25.3	941	23.1		1,081	28.1		
	Steinbach Family Medical Center	1,363	27.4	1,259	23.0	↓	1,367	24.1	↓	
Phase 2	Altona Clinic	532	24.2	202	22.3		199	24.6		
	Centre Médical Seine Inc.	771	29.1	548	23.7		517	21.3	↓	
	Virden Medical Associates	513	25.3	227	22.9		230	25.7		
	Western Medical Clinic	1,021	25.4	651	20.4	↓	643	25.7		↑

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower ($p<0.05$).
A blank cell indicates that the two rates were similar.

Healthcare-Delivery Indicators

Hospitalizations for Ambulatory Care Sensitive Conditions

With lower rates, the PIN clinics do better than all of the alternatively funded shadow practices and better than three of the seven FFS clinics as well. Four FFS shadow practices have lower rates of admission that their corresponding alternatively funded shadow practices. PIN clinics do better than their shadow practices and FFS does better than alternatively funded physicians.

Appendix Table 3.13: Hospitalizations for Ambulatory Care Sensitive Conditions, Comparisons of Payment Mechanism Models

Age-, sex- & RUB-adjusted, per 1,000 patients

				Shadow-Practice Patients						
	PIN Clinic	PIN		Salary			Fee-for-Service			
		Eligible Population	Rate (%)	Eligible Population	Rate (%)	Compared to PIN	Eligible Population	Rate (%)	Compared to PIN	Compared to Salary
Phase 1	Agassiz Medical Centre	1,893	68.1	3,990	63.1		4,030	63.1		
	Dr. C. W. Wiebe Medical Centre	2,108	57.4	4,229	59.7	↑	4,266	61.0	↑	↑
	Steinbach Family Medical Center	2,875	84.7	5,932	66.2	↓	6,002	65.9	↓	
Phase 2	Altona Clinic	1,051	59.0	1,919	62.9	↑	1,987	63.3	↑	↑
	Centre Médical Seine Inc.	1,759	65.4	3,404	65.5		3,395	66.3		↑
	Virden Medical Associates	1,059	67.5	2,003	65.2	↓	1,977	66.8		↑
	Western Medical Clinic	2,422	69.4	4,626	66.1	↓	4,641	67.0	↓	↑

"↑" indicates that the rate was significantly higher, while a "↓" indicates that the rate was significantly lower ($p<0.025$).
A blank cell indicates that the two rates were similar.

APPENDIX 4: PHYSICIAN DEMOGRAPHICS

Appendix Table 4.1: Demographics of Physcians within PIN clinics and Manitoba*

	Clinic	Male	International Medical Graduate	Average Age	Years of Practice
Phase 1	**Agassiz Medical Centre**	52.6%	47.4%	41.4	6.5
	Assiniboine Medical Clinic	75.0%	25.0%	46.9	13.1
	Dr. C. W. Wiebe Medical Centre	60.9%	60.9%	43.4	7.9
	Steinbach Family Medical Center	60.0%	55.0%	38.9	5.1
Phase 2	**Altona Clinic**	85.7%	57.1%	50.3	13.0
	Centre Médical Seine Inc.	63.6%	9.1%	48.5	16.1
	Clinique St. Boniface Clinic	60.0%	33.3%	48.0	7.3
	Concordia Health Associates	60.0%	35.0%	42.3	5.6
	Prairie Trail Medical Clinic	50.0%	7.1%	38.2	6.6
	Tuxedo Family Medical Centre	0.0%	0.0%	48.3	16.0
	Virden Medical Associates	62.5%	100.0%	43.6	4.4
	Western Medical Clinic	69.2%	61.5%	50.6	13.2
Phase 1		62.2%	47.6%	42.7	8.0
Phase 2		57.9%	35.8%	45.5	9.4
Manitoba		64.9%	47.0%	48.5	10.1

* As of the date of PIN Inplementation for all PIN Clinics; Phase 1, Phase 2 and Manitoba are as of March 2010

APPENDIX 5: PATIENT DEMOGRAPHICS

Appendix Table 5.1: Agassiz Medical Clinic Demographics

		PIN Patients						Shadow-Practice Patients			
		Pre-Implementation		**Post-Implementation**		**Long-Term Follow-Up**		**Pre-Implementation**		**Post-Implementation**	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	5,037	40.4	5,322	40.8	4,160	40.9	50,012	40.5	52,623	40.9
	Female	7,445	59.6	7,724	59.2	6,020	59.1	73,476	59.5	75,951	59.1
Age (Years)	**0-5**	934	7.5	1,139	8.7	844	8.3	7,653	6.2	8,674	6.7
	6-18	1,985	15.9	1,979	15.2	1,403	13.8	22,218	18.0	22,680	17.6
	19-44	4,251	34.1	4,356	33.4	3,134	30.8	41,969	34.0	42,740	33.2
	45-64	3,347	26.8	3,472	26.6	3,039	29.9	32,931	26.7	34,233	26.6
	65+	1,965	15.7	2,100	16.1	1,760	17.3	18,717	15.2	20,247	15.7
Income Quintile	**Q1 (Lowest)**	1,531	12.3	1,620	12.4	1,098	10.8	15,014	12.2	15,835	12.3
	Q2	4,895	39.2	4,924	37.7	3,948	38.8	48,216	39.0	48,361	37.6
	Q3	2,952	23.7	3,065	23.5	2,450	24.1	29,371	23.8	30,359	23.6
	Q4	1,998	16.0	2,182	16.7	1,670	16.4	19,941	16.1	21,762	16.9
	Q5 (Highest)	1,068	8.6	1,197	9.2	902	8.9	10,657	8.6	11,811	9.2
	Income Unknown	38	0.3	58	0.4	112	1.1	289	0.2	446	0.3
Sickness Level (RUB)	**0-1**	3,343	26.8	3,570	27.4	2,106	20.7	36,972	29.9	38,538	30.0
	2	3,883	31.1	3,968	30.4	3,431	33.7	36,646	29.7	37,847	29.4
	3	4,801	38.5	5,045	38.7	4,202	41.3	45,392	36.8	47,463	36.9
	4-5	455	3.6	463	3.5	441	4.3	4,478	3.6	4,726	3.7

Appendix Table 5.2: Assiniboine Medical Clinic Demographics

		PIN Patients						Shadow-Practice Patients			
		Pre-Implementation		**Post-Implementation**		**Long-Term Follow-Up**		**Pre-Implementation**		**Post-Implementation**	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	15,031	47.1	14,812	47.2	13,987	45.7	141,448	47.0	140,797	47.0
	Female	16,864	52.9	16,596	52.8	16,587	54.3	159,715	53.0	158,964	53.0
Age (Years)	**0-5**	409	1.3	380	1.2	322	1.1	6,640	2.2	5,782	1.9
	6-18	2,900	9.1	2,317	7.4	2,008	6.6	24,259	8.1	19,775	6.6
	19-44	10,003	31.4	9,640	30.7	8,937	29.2	95,965	31.9	92,532	30.9
	45-64	11,078	34.7	11,188	35.6	11,050	36.1	108,323	36.0	109,893	36.7
	65+	7,505	23.5	7,883	25.1	8,257	27.0	65,976	21.9	71,779	23.9
Income Quintile	**Q1 (Lowest)**	2,665	8.4	2,650	8.4	2,663	8.7	25,150	8.4	25,630	8.6
	Q2	4,594	14.4	4,460	14.2	4,472	14.6	44,136	14.7	43,230	14.4
	Q3	6,891	21.6	6,693	21.3	6,623	21.7	65,364	21.7	64,098	21.4
	Q4	8,883	27.9	8,670	27.6	8,270	27.0	80,977	26.9	79,521	26.5
	Q5 (Highest)	8,744	27.4	8,790	28.0	8,300	27.1	84,572	28.1	85,872	28.6
	Income Unknown	118	0.4	145	0.5	246	0.8	964	0.3	1,410	0.5
Sickness Level (RUB)	**0-1**	5,983	18.8	5,811	18.5	4,829	15.8	68,910	22.9	68,688	22.9
	2	8,425	26.4	7,838	25.0	7,686	25.1	79,623	26.4	75,788	25.3
	3	15,543	48.7	15,610	49.7	15,857	51.9	135,896	45.1	137,173	45.8
	4-5	1,944	6.1	2,149	6.8	2,202	7.2	16,734	5.6	18,112	6.0

Appendix Table 5.3: Dr. C. W. Wiebe Medical Centre Demographics

		PIN Patients						Shadow-Practice Patients			
		Pre-Implementation		**Post-Implementation**		**Long-Term Follow-Up**		**Pre-Implementation**		**Post-Implementation**	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	8,038	46.2	8,665	46.1	8,209	45.7	80,874	45.9	87,184	46.0
	Female	9,361	53.8	10,138	53.9	9,766	54.3	95,271	54.1	102,424	54.0
Age (Years)	**0-5**	1,797	10.3	2,159	11.5	2,093	11.6	14,729	8.4	17,506	9.2
	6-18	3,678	21.1	3,990	21.2	3,636	20.2	42,702	24.2	46,447	24.5
	19-44	6,477	37.2	6,814	36.2	6,387	35.5	64,982	36.9	68,208	36.0
	45-64	3,552	20.4	3,829	20.4	3,888	21.6	35,196	20.0	37,876	20.0
	65+	1,895	10.9	2,011	10.7	1,971	11.0	18,536	10.5	19,571	10.3
Income Quintile	**Q1 (Lowest)**	5,282	30.4	5,384	28.6	4,926	27.4	53,189	30.2	54,275	28.6
	Q2	3,188	18.3	3,329	17.7	2,947	16.4	32,857	18.7	33,978	17.9
	Q3	3,506	20.2	3,953	21.0	4,072	22.7	35,641	20.2	39,433	20.8
	Q4	4,603	26.5	5,279	28.1	4,983	27.7	46,392	26.3	53,430	28.2
	Q5 (Highest)	756	4.3	769	4.1	741	4.1	7,522	4.3	7,665	4.0
	Income Unknown	64	0.4	89	0.5	306	1.7	544	0.3	827	0.4
Sickness Level (RUB)	**0-1**	5,599	32.2	6,131	32.6	5,070	28.2	58,527	33.2	65,687	34.6
	2	5,538	31.8	5,955	31.7	6,183	34.4	54,980	31.2	57,365	30.3
	3	5,759	33.1	6,225	33.1	6,234	34.7	57,156	32.4	60,907	32.1
	4-5	503	2.9	492	2.6	488	2.7	5,482	3.1	5,649	3.0

Appendix Table 5.4: Steinbach Family Medical Center Demographics

		PIN Patients						Shadow-Practice Patients			
		Pre-Implementation		**Post-Implementation**		**Long-Term Follow-Up**		**Pre-Implementation**		**Post-Implementation**	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	9,687	45.6	10,275	45.5	8,413	44.4	95,609	46.2	101,701	45.8
	Female	11,577	54.4	12,290	54.5	10,555	55.6	111,344	53.8	120,522	54.2
Age (Years)	**0-5**	1,781	8.4	2,068	9.2	1,714	9.0	14,659	7.1	17,135	7.7
	6-18	4,286	20.2	4,457	19.8	3,318	17.5	43,826	21.2	47,082	21.2
	19-44	7,630	35.9	7,961	35.3	6,499	34.3	73,402	35.5	77,866	35.0
	45-64	4,925	23.2	5,230	23.2	4,732	24.9	49,128	23.7	52,182	23.5
	65+	2,642	12.4	2,849	12.6	2,705	14.3	25,938	12.5	27,958	12.6
Income Quintile	**Q1 (Lowest)**	1,211	5.7	1,277	5.7	985	5.2	12,115	5.9	12,381	5.6
	Q2	2,831	13.3	3,086	13.7	2,625	13.8	28,120	13.6	30,579	13.8
	Q3	8,450	39.7	7,500	33.2	5,939	31.3	78,564	38.0	73,094	32.9
	Q4	4,844	22.8	5,888	26.1	5,063	26.7	48,329	23.4	58,004	26.1
	Q5 (Highest)	3,852	18.1	4,670	20.7	4,095	21.6	39,075	18.9	46,802	21.1
	Income Unknown	76	0.4	144	0.6	261	1.4	750	0.4	1,363	0.6
Sickness Level (RUB)	**0-1**	6,169	29.0	6,898	30.6	5,238	27.6	65,890	31.8	71,275	32.1
	2	6,740	31.7	7,185	31.8	6,538	34.5	63,634	30.7	67,455	30.4
	3	7,796	36.7	7,929	35.1	6,764	35.7	70,721	34.2	76,316	34.3
	4-5	559	2.6	553	2.5	428	2.3	6,708	3.2	7,177	3.2

Appendix Table 5.5: Altona Clinic Demographics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		Post-Implementation		Pre-Implementation		Post-Implementation	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	2,596	51.1	2,609	51.2	24,998	51.1	23,798	50.6
	Female	2,488	48.9	2,488	48.8	23,963	48.9	23,192	49.4
Age (Years)	**0-5**	245	4.8	237	4.6	2,805	5.7	2,759	5.9
	6-18	891	17.5	843	16.5	7,819	16.0	6,617	14.1
	19-44	1,509	29.7	1,531	30.0	14,665	30.0	14,308	30.4
	45-64	1,483	29.2	1,495	29.3	14,319	29.2	13,938	29.7
	65+	956	18.8	991	19.4	9,353	19.1	9,368	19.9
Income Quintile	**Q1 (Lowest)**	171	3.4	182	3.6	1,574	3.2	1,585	3.4
	Q2	383	7.5	421	8.3	3,569	7.3	3,947	8.4
	Q3	718	14.1	671	13.2	6,813	13.9	6,366	13.5
	Q4	3,777	74.3	3,204	62.9	36,783	75.1	31,339	66.7
	Q5 (Highest)	25	0.5	50	1.0	156	0.3	330	0.7
	Income Unknown	10	0.2	569	11.2	66	0.1	3,423	7.3
Sickness Level (RUB)	**0-1**	1,376	27.1	1,280	25.1	14,783	30.2	13,480	28.7
	2	1,555	30.6	1,625	31.9	14,298	29.2	13,704	29.2
	3	1,944	38.2	1,974	38.7	18,023	36.8	17,903	38.1
	4-5	209	4.1	218	4.3	1,857	3.8	1,903	4.0

Appendix Table 5.6: Centre Médical Seine Inc. Demographics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		Post-Implementation		Pre-Implementation		Post-Implementation	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	4,158	46.6	4,181	46.6	40,352	46.8	40,464	46.7
	Female	4,769	53.4	4,786	53.4	45,896	53.2	46,154	53.3
Age (Years)	**0-5**	473	5.3	537	6.0	4,245	4.9	4,221	4.9
	6-18	1,246	14.0	1,132	12.6	12,393	14.4	11,482	13.3
	19-44	2,846	31.9	2,794	31.2	26,890	31.2	26,877	31.0
	45-64	2,769	31.0	2,846	31.7	27,294	31.6	27,810	32.1
	65+	1,593	17.8	1,658	18.5	15,426	17.9	16,228	18.7
Income Quintile	**Q1 (Lowest)**	310	3.5	340	3.8	2,790	3.2	3,090	3.6
	Q2	1,167	13.1	1,127	12.6	11,123	12.9	10,850	12.5
	Q3	1,531	17.2	1,498	16.7	14,859	17.2	14,539	16.8
	Q4	3,411	38.2	3,430	38.3	32,932	38.2	33,295	38.4
	Q5 (Highest)	2,471	27.7	2,505	27.9	24,198	28.1	24,370	28.1
	Income Unknown	37	0.4	67	0.7	346	0.4	474	0.5
Sickness Level (RUB)	**0-1**	2,359	26.4	2,293	25.6	25,088	29.1	23,964	27.7
	2	2,910	32.6	2,897	32.3	25,003	29.0	25,077	29.0
	3	3,441	38.5	3,525	39.3	32,814	38.0	34,088	39.4
	4-5	217	2.4	252	2.8	3,343	3.9	3,489	4.0

Appendix Table 5.7: Clinique St. Boniface Clinic Demographics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		Post-Implementation		Pre-Implementation		Post-Implementation	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	7,346	44.3	7,277	44.3	71,037	44.3	70,622	44.3
	Female	9,234	55.7	9,145	55.7	89,427	55.7	88,865	55.7
Age (Years)	**0-5**	259	1.6	266	1.6	3,147	2.0	2,838	1.8
	6-18	1,299	7.8	1,052	6.4	11,733	7.3	9,963	6.2
	19-44	5,106	30.8	5,003	30.5	49,350	30.8	47,808	30.0
	45-64	6,059	36.5	6,066	36.9	58,644	36.5	59,052	37.0
	65+	3,857	23.3	4,035	24.6	37,590	23.4	39,826	25.0
Income Quintile	**Q1 (Lowest)**	2,425	14.6	2,270	13.8	23,208	14.5	22,109	13.9
	Q2	2,969	17.9	2,891	17.6	28,494	17.8	28,057	17.6
	Q3	2,901	17.5	2,820	17.2	27,960	17.4	27,214	17.1
	Q4	3,515	21.2	3,471	21.1	34,356	21.4	33,716	21.1
	Q5 (Highest)	4,698	28.3	4,743	28.9	45,847	28.6	46,336	29.1
	Income Unknown	72	0.4	227	1.4	599	0.4	2,055	1.3
Sickness Level (RUB)	**0-1**	3,498	21.1	2,993	18.2	37,066	23.1	35,581	22.3
	2	4,204	25.4	4,096	24.9	41,777	26.0	40,395	25.3
	3	7,896	47.6	8,191	49.9	72,698	45.3	73,870	46.3
	4-5	982	5.9	1,142	7.0	8,923	5.6	9,641	6.0

Appendix Table 5.8: Concordia Health Associates Demographics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		Post-Implementation		Pre-Implementation		Post-Implementation	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	3,711	43.6	3,720	43.8	35,215	43.5	35,272	43.6
	Female	4,804	56.4	4,782	56.2	45,807	56.5	45,612	56.4
Age (Years)	**0-5**	196	2.3	223	2.6	2,617	3.2	2,431	3.0
	6-18	1,079	12.7	912	10.7	9,036	11.2	7,717	9.5
	19-44	2,925	34.4	2,935	34.5	27,836	34.4	27,764	34.3
	45-64	2,784	32.7	2,797	32.9	26,924	33.2	27,098	33.5
	65+	1,531	18.0	1,635	19.2	14,609	18.0	15,874	19.6
Income Quintile	**Q1 (Lowest)**	1,192	14.0	1,137	13.4	11,091	13.7	10,540	13.0
	Q2	1,520	17.9	1,488	17.5	14,360	17.7	14,112	17.4
	Q3	1,832	21.5	1,818	21.4	17,509	21.6	17,219	21.3
	Q4	1,844	21.7	1,806	21.2	17,712	21.9	17,411	21.5
	Q5 (Highest)	2,104	24.7	2,108	24.8	20,195	24.9	20,405	25.2
	Income Unknown	23	0.3	145	1.7	155	0.2	1,197	1.5
Sickness Level (RUB)	**0-1**	2,099	24.7	1,737	20.4	21,080	26.0	19,849	24.5
	2	2,432	28.6	2,541	29.9	22,151	27.3	22,068	27.3
	3	3,568	41.9	3,755	44.2	34,130	42.1	35,009	43.3
	4-5	416	4.9	469	5.5	3,661	4.5	3,958	4.9

Appendix Table 5.9: Prairie Trail Medical Clinic Demographics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		Post-Implementation		Pre-Implementation		Post-Implementation	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	4,418	40.6	4,457	40.9	42,924	40.5	43,107	40.8
	Female	6,452	59.4	6,434	59.1	63,066	59.5	62,434	59.2
Age (Years)	**0-5**	256	2.4	327	3.0	3,317	3.1	3,006	2.8
	6-18	1,330	12.2	1,053	9.7	12,127	11.4	10,461	9.9
	19-44	4,402	40.5	4,382	40.2	42,447	40.0	41,741	39.5
	45-64	3,433	31.6	3,550	32.6	33,914	32.0	34,952	33.1
	65+	1,449	13.3	1,579	14.5	14,185	13.4	15,381	14.6
Income Quintile	**Q1 (Lowest)**	926	8.5	901	8.3	8,923	8.4	8,601	8.1
	Q2	1,279	11.8	1,239	11.4	12,439	11.7	11,816	11.2
	Q3	1,733	15.9	1,705	15.7	16,662	15.7	16,326	15.5
	Q4	2,332	21.5	2,392	22.0	22,906	21.6	23,159	21.9
	Q5 (Highest)	4,566	42.0	4,575	42.0	44,811	42.3	44,940	42.6
	Income Unknown	34	0.3	79	0.7	249	0.2	699	0.7
Sickness Level (RUB)	**0-1**	2,328	21.4	2,024	18.6	28,156	26.6	27,062	25.6
	2	3,118	28.7	3,165	29.1	30,203	28.5	29,439	27.9
	3	4,954	45.6	5,192	47.7	43,489	41.0	44,230	41.9
	4-5	470	4.3	510	4.7	4,142	3.9	4,810	4.6

Appendix Table 5.10: Tuxedo Family Medical Centre Demographics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		Post-Implementation		Pre-Implementation		Post-Implementation	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	1,610	19.4	1,622	19.7	15,063	19.0	15,330	19.4
	Female	6,703	80.6	6,630	80.3	64,280	81.0	63,867	80.6
Age (Years)	**0-5**	279	3.4	233	2.8	2,613	3.3	2,454	3.1
	6-18	1,017	12.2	901	10.9	9,196	11.6	8,104	10.2
	19-44	2,643	31.8	2,585	31.3	25,442	32.1	24,645	31.1
	45-64	3,042	36.6	3,082	37.3	29,174	36.8	29,836	37.7
	65+	1,332	16.0	1,451	17.6	12,918	16.3	14,158	17.9
Income Quintile	**Q1 (Lowest)**	592	7.1	580	7.0	5,485	6.9	5,445	6.9
	Q2	833	10.0	849	10.3	7,839	9.9	7,969	10.1
	Q3	1,250	15.0	1,228	14.9	11,834	14.9	11,784	14.9
	Q4	1,712	20.6	1,734	21.0	16,379	20.6	16,739	21.1
	Q5 (Highest)	3,902	46.9	3,783	45.8	37,646	47.4	36,627	46.2
	Income Unknown	24	0.3	78	0.9	160	0.2	633	0.8
Sickness Level (RUB)	**0-1**	1,877	22.6	1,657	20.1	18,537	23.4	17,675	22.3
	2	2,434	29.3	2,457	29.8	21,883	27.6	21,356	27.0
	3	3,664	44.1	3,764	45.6	35,350	44.6	36,220	45.7
	4-5	338	4.1	374	4.5	3,573	4.5	3,946	5.0

Appendix Table 5.11: Virden Medical Associates Demographics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		**Post-Implementation**		**Pre-Implementation**		**Post-Implementation**	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	1,933	45.7	1,989	46.2	18,748	45.8	19,123	46.0
	Female	2,296	54.3	2,319	53.8	22,195	54.2	22,437	54.0
Age (Years)	**0-5**	186	4.4	225	5.2	2,159	5.3	2,125	5.1
	6-18	626	14.8	574	13.3	5,630	13.8	5,122	12.3
	19-44	1,157	27.4	1,188	27.6	11,240	27.5	11,671	28.1
	45-64	1,292	30.6	1,325	30.8	12,631	30.9	12,879	31.0
	65+	968	22.9	996	23.1	9,283	22.7	9,763	23.5
Income Quintile	**Q1 (Lowest)**	188	4.4	189	4.4	1,740	4.2	1,710	4.1
	Q2	750	17.7	781	18.1	7,321	17.9	7,443	17.9
	Q3	3,237	76.5	3,264	75.8	31,545	77.0	31,936	76.8
	Q4	28	0.7	39	0.9	173	0.4	280	0.7
	Q5 (Highest)	22	0.5	28	0.6	154	0.4	164	0.4
	Income Unknown	s	s	7	0.2	10	0.0	27	0.1
Sickness Level (RUB)	**0-1**	1,131	26.7	971	22.5	11,640	28.4	10,986	26.4
	2	1,299	30.7	1,354	31.4	11,474	28.0	11,854	28.5
	3	1,655	39.1	1,797	41.7	16,036	39.2	16,855	40.6
	4-5	144	3.4	186	4.3	1,793	4.4	1,865	4.5

Appendix Table 5.12: Western Medical Clinic Demographics

		PIN Patients				Shadow-Practice Patients			
		Pre-Implementation		**Post-Implementation**		**Pre-Implementation**		**Post-Implementation**	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Sex	**Male**	5,953	39.4	6,184	39.9	59,453	39.5	59,952	39.7
	Female	9,149	60.6	9,326	60.1	91,208	60.5	90,951	60.3
Age (Years)	**0-5**	1,182	7.8	1,310	8.4	8,612	5.7	8,641	5.7
	6-18	1,856	12.3	1,880	12.1	24,149	16.0	21,896	14.5
	19-44	5,717	37.9	5,667	36.5	55,912	37.1	55,223	36.6
	45-64	4,283	28.4	4,415	28.5	42,307	28.1	43,284	28.7
	65+	2,064	13.7	2,238	14.4	19,681	13.1	21,859	14.5
Income Quintile	**Q1 (Lowest)**	2,884	19.1	2,943	19.0	28,714	19.1	28,707	19.0
	Q2	4,137	27.4	4,249	27.4	40,794	27.1	41,099	27.2
	Q3	4,473	29.6	4,492	29.0	43,929	29.2	43,454	28.8
	Q4	2,420	16.0	2,475	16.0	25,429	16.9	24,576	16.3
	Q5 (Highest)	1,128	7.5	1,125	7.3	11,306	7.5	11,074	7.3
	Income Unknown	60	0.4	226	1.5	489	0.3	1,993	1.3
Sickness Level (RUB)	**0-1**	2,960	19.6	2,721	17.5	47,404	31.5	44,276	29.3
	2	4,540	30.1	4,514	29.1	44,725	29.7	45,297	30.0
	3	6,834	45.3	7,382	47.6	53,736	35.7	56,143	37.2
	4-5	768	5.1	893	5.8	4,796	3.2	5,187	3.4

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