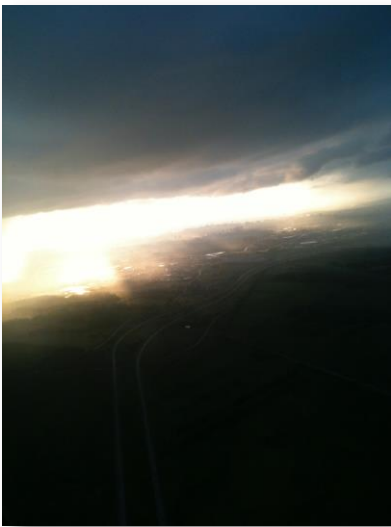


healthintelligenceinc.
and associates



PLANNING TOOL FOR PHYSICIAN RESOURCES IN SASKATCHEWAN

FINAL REPORT

Submitted to Deputy Minister

Ministry of Health

Government of Saskatchewan

David Peachey MD and Nicholas Tait CMA, MSA

January 04, 2016

LETTER OF INTRODUCTION

December 31, 2015

Mr. Max Hendricks

Deputy Minister
Ministry of Health
Government of Saskatchewan
3475 Albert Street
Regina, Saskatchewan, S4S 6X6

Dear Mr. Hendricks:

Following is the final report on Physician Resource Planning for Saskatchewan. This project and report was undertaken by Health Intelligence under contract to the Ministry of Health, in collaboration with Social Sector Metrics and supported by colleagues during the phase of stakeholder engagement. The approach merged detailed and comprehensive qualitative and quantitative assessments, adjusted by informed interviews and submissions by stakeholders, and underpinned by software that reflects 20 years of peer-reviewed and grey literature and detailed interviews with expert panels. The resulting report is an evidence-based navigational tool, custom-designed to assist the Government of Saskatchewan and its many stakeholders in advancing provincial, regional, and community-based physician resource planning to the benefit of the residents of Saskatchewan.

We acknowledge the many groups and individuals who have so willingly provided time, insight, and expertise to the project. Contributions were substantial from all stakeholder constituencies and, in particular, the medical profession, governance authorities, professional bodies, and individual representatives. The Saskatchewan Ministry of Health, provincial health programs, Health Authorities and Regions, Health Quality Council, Saskatchewan Medical Association, University of Saskatchewan College of Medicine, College of Physicians and Surgeons of Saskatchewan, and Saskatchewan Cancer Agency have each provided time, insight, and information throughout the course of the project. The input has included direct interviews and submissions, in addition to participation on the Project Advisory Committee and the Technical Working Group.

Throughout, the project principals stressed the autonomy of the consultants and the importance of an independent review. This underpinned the approach to the project and its conduct.

While the benefit from the input of these resources was substantial, accountability for the acquisition, collation, and interpretation of the qualitative and quantitative data, and the subsequent analytics and conclusions, is that of the consultants, alone, and should not be attributed elsewhere.

The report has been constructed to provide context and to distill the comprehensive Environmental Scan, originally submitted on October 1, 2014. The main body incorporates our forecast model, the forecast results, and recommendations on implementation and methodology, core, regional, and provincial services across disciplines, and approaches to maintaining the model, the underpinning data, and the future physician supply.

Respectfully submitted,

David Peachey
Principal, Health Intelligence

Nicholas Tait
President, Social Sector Metrics

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KEY TERMINOLOGY

The following **terms** have the assigned meanings wherever they are used in this report. In addition, general definitions are provided as Appendix A.3 *Definitions*.

- **Comprehensive family practice** includes,¹ but is not limited to the following:
  - Illness and injury prevention, screening, and health promotion
  - Management of undifferentiated medical problems
  - Care for persons of all ages
  - Initial diagnosis and ongoing medical management of most illnesses and injuries
  - Provision or arrangement of timely response for urgent and emergent patient needs
  - Chronic disease management
  - Mental health care
  - Palliative and end-of-life care
  - Home for the aged and nursing home visits
  - Provision and/or arrangement of maternity care (including prenatal, delivery, and postpartum care)
  - Arrangements for referrals for investigations, treatments, and other consultations
- **Current or Base Year** is 2012/13 and is the last year of known data prior to the first forecast year.
- **Family Practice** refers to an MD with a license to practice as either a General Practitioner (MD without CFPC certification) or a Family Medicine (certified by the CFPC) physician with the majority of practice being community-based, having a defined practice population, and holding the patient-physician relationship as central to their role.
- **Forecast period** is the ten years (Forecast Year 1 [F1] to Forecast Year 10 [F10]) beginning 2013/14 and ending 2022/23. The current or base year is 2012/13 and is the last year of known data prior to the first forecast year.
- **Generalist** refers to comprehensive family practice, emergency medicine, general internal medicine, general surgery (plus anaesthesia services), and general psychiatry, paediatrics, and obstetrics, supported by general laboratory (specimen collection and transport, ECG) and diagnostic imaging (screening, routine diagnostic imaging, x-ray) services.
- **General Practice** refers to those licensed physicians who have either completed residency training in Canada prior to the creation of the mandatory CCFP Family Medicine residency-training program, or completed the training outside Canada. They have not completed the certification examination in Family Medicine administered by the College of Family Physicians of Canada.
- **Family Medicine** refers to those physicians who, most often, have successfully completed the certification examination in Family Medicine administered by the College of Family Physicians of Canada; they can use the CCFP professional designation. The examination is open to College members who have either successfully completed an approved residency-training program in family medicine or successfully completed a combination of training and practice experience as outlined in the eligibility criteria. Alternatively, certification (CCFP) without examination, based on recognition of training and certification obtained in international jurisdictions, is available.
- **Nurse Practitioners (NPs)** are registered nurses who have additional education and nursing experience. They are health-care professionals who treat the whole person: addressing needs relating to their physical and mental health, gathering their medical history, focusing on how their illness affects their lives and their family, and offering ways for people to lead a healthy life and teaching them how to manage chronic illness (source: Canadian Nurses Association)
- **Physician Extender (PE)** refers to a specially trained non-physician with the skills, experience, and training to see the same types of patients as a physician; however, typically, patients seen by a PE require routine and straightforward care. Physician Extenders perform generic tasks such as taking

¹ CFPC, *Family Practice: The Patient's Medical Home* September 2011

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medical histories, conducting physical exams, making diagnoses and treating illnesses, ordering and interpreting tests, counseling on preventive health care, assisting in surgery, making referrals and, in many cases, writing prescriptions. Specialized procedures (such as, insertion of central access lines and chest tubes, invasive diagnostic procedures, ambulatory surgery) performed by PEs are specific to a particular clinical field or setting, not unlike those undertaken by physicians, and are commensurate with adequate formal or informal postgraduate training. A **physician extender** may, by training, come from a number of professional backgrounds but is most often one of a physician assistant (PA), advance practice nurse (APN), or nurse practitioner (NP). The preferred model in Saskatchewan has been nurse practitioners.

- **Scenario** refers to a specific forecast generated by the forecast model under a specific set of assumptions. The forecast model generates three specific scenarios as follows:
  - **Base Case Scenario** represents the forecast scenario most likely to occur based on the current research, analysis, experience, and findings. It is the recommended target planning scenario.
  - **Low Case Scenario** represents the forecast scenario that generates the lowest overall future aggregated need for physician FTE based on the stated assumptions
  - **High Case Scenario** represents the forecast scenario that generates the highest overall future aggregated need for physician FTE based on the stated assumptions
  - **Scenario planning range** represents the range of physician FTE needs by specialty within the low and high case scenario forecast estimates
- **Subspecialist** is defined by the RCPSC as the disciplines of:

Adolescent Medicine	Hematology
Cardiology	Infectious Diseases
Child and Adolescent Psychiatry	Interventional Radiology
Clinical Immunology and Allergy	Maternal-Fetal Medicine
Clinical Pharmacology and Toxicology	Medical Oncology
Colorectal Surgery	Neonatal-Perinatal Medicine
Critical Care Medicine	Nephrology
Developmental Pediatrics	Neuroradiology
Endocrinology and Metabolism	Occupational Medicine
Forensic Pathology	Pain Medicine
Forensic Psychiatry	<u>Palliative Medicine</u>
Gastroenterology	Pediatric Emergency Medicine
General Internal Medicine	Pediatric Hematology/Oncology
General Surgical Oncology	Pediatric Radiology
Geriatric Medicine	Pediatric Surgery
Geriatric Psychiatry	Respirology
Gynecologic Oncology	Rheumatology
Gynecologic Reproductive Endocrinology and Infertility	Thoracic Surgery

- **Turnover** refers to counts of physicians occurs through departures to other jurisdictions or abroad, retirement, death, and leaving practice. Turnover in FTEs occurs for the same reasons, plus the change in FTE value as one progresses through each age cohort.

EXECUTIVE SUMMARY

Introduction

The development of an evidence-based provincial Planning Tool for Physician Resources (PPR) In Saskatchewan enables the Ministry of Health to take a proactive approach towards medical school enrolment, physician training, recruitment and retention, and the delivery of medical services. While the planning tool model is needs-based, demand cannot be ignored as a reflection of patients' preferences and available resources. As such, the planning tool model is "adjusted" to modify metric evidence of need and supply through an understanding of demand. Merged qualitative and quantitative assessments are then able to be transformed into a navigational tool founded on current data, transparent assumptions, and evidence-based variables.

The **scope** of the study included all population needs as they align with physician services and includes all physician disciplines. The needs of the population drive the distribution and mix of specialties. Forecasting transformed to planning assists, over time, the effective delivery of medically necessary care in a sustainable fashion.

The scope can be summarized, as follows:

- Publicly funded family physicians and specialists in Saskatchewan
- Clinical service,
- Recommendations on implementation, monitoring, and evaluation
- Alignment with overall provincial health human resource planning
- Alignment with best practices in physician resource planning
- Incorporation of the current state academic mandate of the College of Medicine
- Ten-year evidence-based physician workforce planning model and implementation framework that includes:
  - Changing scopes of practice
  - Increased use of alternative providers
  - Adoption of collaborative, inter-professional team-based care
  - Evolving models of care
  - **Excludes** application, monitoring, and evaluation of the implementation process
  - **Excludes** planning for non-physician health professionals (but includes the impact of non-physician health professionals and models of care)

The project **deliverables** were defined clearly, as follows:

- Project charter
- Environmental scan - literature - Ministry of Health and stakeholders
- Environmental scan - literature - third party
- Environmental scan – stakeholder engagement
- Data research, acquisition, compilation and assessment
- Forecasting software Matrix Model
- Ten-year forecasts (Low, Base, and High Case scenarios)
- Final report
- Forecasting software knowledge transfer

Central to achieving the deliverables is a merging of validated qualitative and quantitative assessments of population need and physician supply, adjusted for the impact of demand and experience; this is described as the **Adjusted Population Needs-Based Model (APNM)**. Key to this hybrid methodology is the ability to adjust validated research metrics that reflect needs and supply through application of qualitative inputs by providers, administrators, managers, and funders of care.

The research methodology incorporated the following:

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- Client and stakeholder database (interviews and supporting documents)
- Literature search
- Data acquisition, catalogue, and analysis
- Modeling

Achieving this approach also required considerations of the following:

- Burden of Disease
- Population Risk Adjusted Grouper (Canadian Institute for Health Information)
- Clinical Risk Groups (Saskatchewan)

Environmental Scan

The Environmental Scan provides a substantial basis for ongoing research and management of physician resources in Saskatchewan. Advancing the planning, as recommended in the Final Report, and acting on the recommendations, incorporates an evidence-based planning model and implementation framework founded on quality and timely access to required services in the province into a strategic framework. The foundation, provided in the Environmental Scan, extends into a navigational, non-prescriptive tool that is built on assumptions that may be stable or may change, especially as data are refreshed in real time in order to maintain the integrity of planning.

It is a general experience that a carefully considered physician resource planning model can be implemented in an incremental fashion that is sensitive to government policy and fiscal realities. The underpinning healthcare system can be defined by infrastructure, facilities, and providers, all working at a level of role optimization in patient-centred delivery models.

A typical environment for PPR is a cross-sectional snapshot of a constantly evolving, often reactive, group of stakeholders, the structures they have developed and on which they depend, and the economic and societal forces shaping their decisions. Physicians offer diverse types and intensities of services, and are distributed unequally across geographic regions. Governments face varying levels of financial pressure and public involvement, and their responses differ significantly.

The focus for moving forward is the current state of the system; an environmental scan becomes a starting point for evaluating the delivery of services and for providing an opportunity to effect reasoned change. Such is the nature of physician resource planning—planning that is transparent and based on the best outcomes for patients that need those services.

The caveat is that the planning process cannot be prescriptive, but must be navigational and responsive to changes in both pre-identified and unforeseen variables. Successful planning provides better services for patients and their families and provides opportunities to address inequities. To achieve successful planning in the long-term requires commitment across the system and belief in the values of the system and the imperative for change that maintains the patient at the centre of that system. Making progress is incremental and the full engagement of stakeholders across the system is always staggered; however, policy persistence and an unwavering dedication to “our system” will lead to a successful end point.

PPR addresses the challenge of balancing supply and need in a highly labour intensive delivery system. To be effective and sustainable requires the right mix and number of health care workers, ideally in multidisciplinary teams founded on mutual support and respect. Understanding the complexity of the work force, the contributing roles of supply and demand in generating shortages, demographic trends, and working conditions are additive in assessing the current and long-term pressures on the workforce. While sound, evidence-based decisions are essential to improve physician resource planning and, in this context, effective productivity, less



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frequently referenced are the consequences and challenges of silo thinking. Resource planning and related policy initiatives may be dysfunctional without coordination across the health workforce.

Objectives

The fundamental purpose of PPR and related service planning is to support achievement of, and continuous improvement in, high quality, economically sustainable, patient-centred healthcare. High quality means services that are timely, efficient, equitable, patient-centred, safe, and effective, as described in 2001 by the Institute of Medicine. Sustainable means affordable for current and future generations, such that changes in annual expenditures are consistent with the annual change in real (net of inflation) gross domestic product. Patient-centred means a health delivery system organized around the holistic needs of patient and family.

In the absence of workforce planning as the basis of health system planning, policy, and implementation, the status quo will prevail. Across Canada, the status quo means a largely demand-based system of growth and change in health workforce needs. The work of clinical services planning is neither formulaic nor, necessarily, intuitive; rather, it is navigating and weighting details, both seeking information and responding to it. It requires sensitivity to the key determinants and variables of physician resource and service planning, and responsiveness to unanticipated changes in those variables. Application of the determinants of need and supply to a forecasting model requires informed assumptions about their current state and future behaviour. The validity of assumptions requires ongoing and detailed research on each key determinant.

Implementation of the recommendations contained in this report would provide a material contribution to strengthening the healthcare system in the medium- and long-terms by:

- Consolidating delivery of tertiary services resulting in greater program sustainability, improved quality of subspecialist work life, and improved patient outcomes
- Increasing local access to core services across the province
- Increasing quality of generalist work life across the province by creating sustainable clusters of core service physicians that care share expertise, distribute the burden of call duty, and formalize and refine subspecialty referral pathways
- Increasing access to enhanced primary health care through local collaborative care model(s)

There are risks associated with maintenance of the status quo rather than moving forward with planned effective change. Across Canada for the foreseeable future, a far greater number of new physicians will be entering the workforce than have in the past. Strong indications are that the increased supply, combined with international medical graduates and Canadians studying abroad, will more than offset needs generated through forecasted retirements, gender shift, emigration, and population growth and aging. Provinces will find their already taxed healthcare budgets under even greater pressure. New physicians will be looking across the country for opportunities to enter the workforce. Those provinces taking steps to proactively manage the number and type of physician positions available in their health care system will have an opportunity to match physician supply with population need in a rational, planned manner. Faculties of Medicine can, and are ready to be, a significant contributor to the strategies and solutions, through graduating more family physicians and other generalists, and fewer subspecialists.

Evidence-based PPR facilitates an innovative healthcare system and framework with inter-dependent recommendations. For example, implementation of a core services model requires province-wide planning for all other specialty services.

In Saskatchewan, maintenance of the status quo would result in:

- Accelerated growth in physician supply and service utilization disproportionate to population need

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- Continued shortages of family physicians and other generalists, over subspecialization
- Marginalization of non-physician providers and budgets in a crowded supply market
- An outcome in 2023 that requires more physician resources than forecast in the 'high case' scenario, as key initiatives like collaborative primary health care fail to materialize
- Continuation of the current system design and service delivery and associated population outcomes

Key Findings

A non-prioritized summary of key findings is, as follows:

- Saskatchewan demonstrates a dependency on International Medical Graduates (IMGs), particularly in rural settings
- IMGs are a significant part of a high physician turnover in rural Saskatchewan
- There is a core group of Nurse Practitioners in Saskatchewan,; however the overall use of physician extenders in the province is less than ideal; these roles can improve accessibility and sustain quality and sustainability, but required articulated targets
- Key population characteristics include:
  - Mean annual growth of 1.6%, largely attributable to Saskatoon, Regina, and Prince Albert
  - Numerous small rural and remote communities
  - First Nations population of 10% of provincial population and an annual growth rate of 2.8%; these populations have rates of potential years of life lost (PYLL) 88% and 145% greater for males and females, respectively, than non-Aboriginal averages
  - While the percentage of the population greater than 65 years of age is comparable to the national average of 14.5%, the three most northerly health regions are less than the provincial average
- Academic medicine in Saskatchewan is in a period of transformation, including enhancement of academic activities and expansion of distributed education
- The University of Saskatchewan College of Medicine ranks 12th of 17 in Canada in the ratio of full-time faculty per trainee and 9th in total faculty per trainee
- In 2013, 46% of practising physicians were graduates of the University of Saskatchewan College of Medicine; this is an improvement over historical data, but still lags behind national trends and perpetuates the dependency on IMGs
- The annual count of Saskatchewan physicians is increasing at a rate comparable to national data, and at a rate of 15.1% for Family Physicians (compared to a national figure of 13.2%); Saskatchewan had 101 family physicians per 100,000 population, compared to 109 per 100,000 population, nationally; substantial variation in the number of family physicians per 100,000 population exists at the regional level, namely, from 40 in Athabasca to 116 in Prairie North
- At a high level, data suggest Saskatchewan had 13.3% fewer physician FTE than the national mean (608 residents per physician compared to 537 per physician FTE, nationally), fewer medical specialists per surgical specialist (ratio of 1.35 compared to 2.01, nationally), and a higher proportion of family physicians per specialist physicians (ratio of 1.53 compared to 1.31, nationally)

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- The percentage of female physicians in Saskatchewan is 31.3% of the total physician pool, second lowest nationally; it can be anticipated that this percentage will approach the national level over ensuing years with a predictable impact on physician resource planning
- In an overall comparison of the Saskatchewan physician workforce to the Canadian averages, the data reveal:
  - A mix, slightly over-weighted (4.6%) in family physicians and under-weighted in medical specialists (4.7%)
  - 18.9% fewer physicians per 100,000 population
  - 4.7% more male physicians than the national average
  - 13% fewer Canadian born family physicians, and 4.5% fewer specialist physicians
- Fee-for-service physicians in Saskatchewan provide more services per FTE than most other provinces; these calculations and assessments do not include services compensated by alternative payment plans, which comprise an increasing proportion of physician payments and services; in Saskatchewan, in 2012/13, 29.6% of all physician payments were non-FFS
- In 2011/12 the national average population per 1.0 FTE family/general practitioner was 947; Alberta had the highest population per 1.0 FTE at 1,158 or 122.3% of the national average, and Newfoundland and Labrador, the lowest at 950 or 89.8% of the national average; Saskatchewan was 6.1% higher than the national average at 1,005 residents per 1.0 FTE (the 6.1% difference is equivalent to 146 FTE less than the national average)
- Inadequate supply of medical oncologists and/or the inability to recruit medical oncologists will adversely affect supply of practitioners and will likely necessitate other models of care, with increased use of “extenders” throughout the system; a shortfall in Radiation Oncologists is anticipated to be evident in three to five years (a national issue with a direct impact on SCA recruitment)
- Overall, it is believed that a comprehensive long-term service plan is needed for the people of northern Saskatchewan as a joint undertaking of Health Canada, the province, and others; it is strongly urged that needs-based planning that recognizes the uniqueness of the north must drive the PPR; this will require a higher physician-to-population ratio (or equivalent) than traditional planning might suggest

The provincial workforce physician FTE has grown at a net overall rate of 2% per annum since 2010 (1,654 in 2008 to 1,758 in 2013) after adjusting for the combined effects of migration (international and inter-provincial), College of Medicine postgraduate and IMG recruitment, change in age cohorts, gender shift, death, and retirement within the workforce. A growth rate can indicate the number of physicians, but is silent on mix, distribution, and models of care.

Forecasting Model and Results

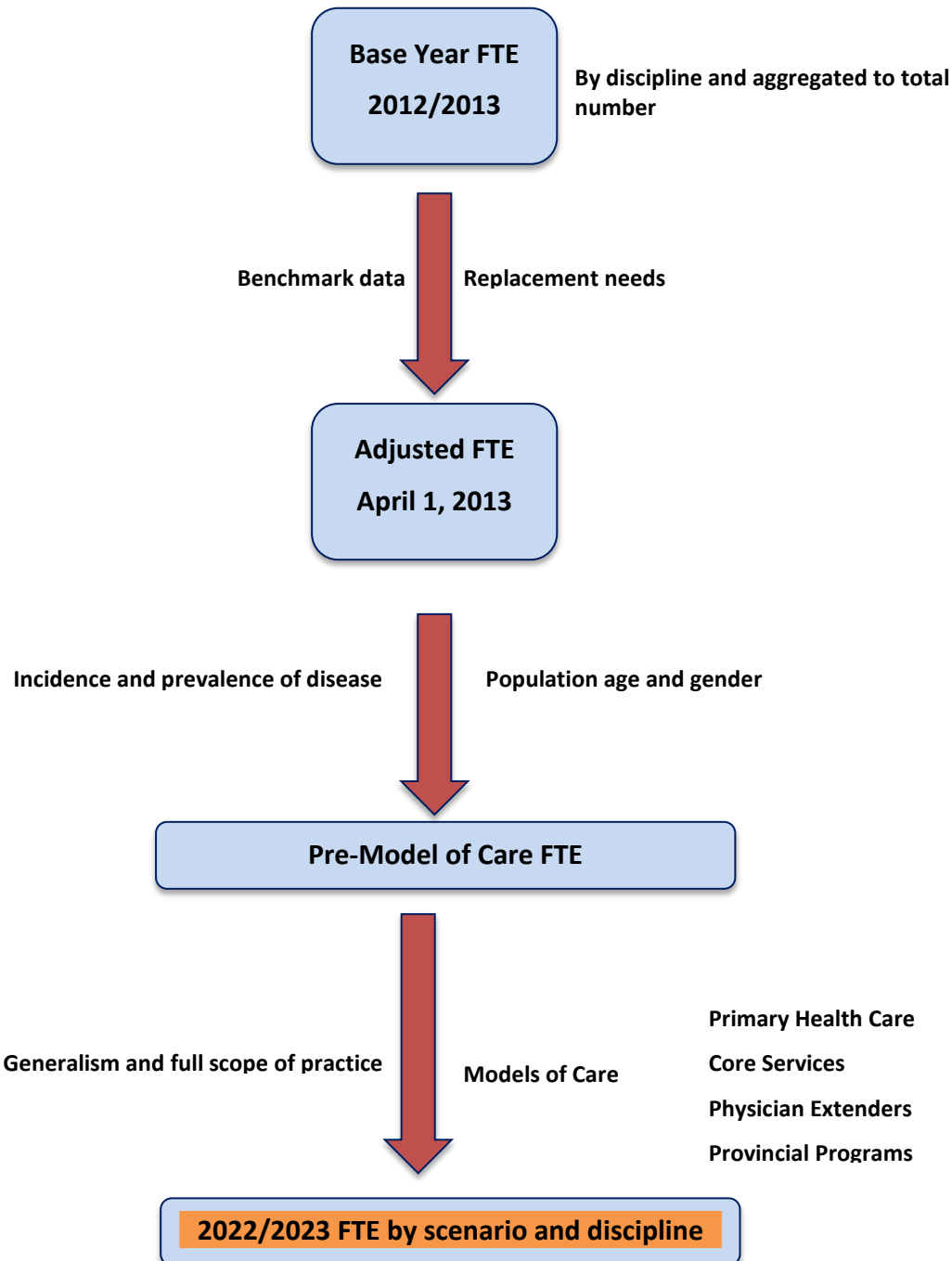
Three ten-year forecast scenarios were developed, using the Adjusted Population Needs-Based Model, resulting in a range of forecasts to guide physician resource planning over the next ten-years. The forecasts are not meant to be prescriptive; rather, they are flexible and subject to change as variables in the model change or are updated, over time, including the impact of health policy and planning variables.

The forecasting addresses the number, mix, and distribution of physicians, across scenarios and inclusive of advancing models of care, such as collaborative models and team-based care. As well, it is sensitive to the geography of Saskatchewan, the academic mandate, and shifts in epidemiology and provider groups. For each of these, the base case is the most likely scenario, given the current state and predictive variables; the low case reflects variables that lead to decreased numbers of physicians (including, significant uptake of collaborative

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models and stable trends of aging and the burden of illness); the high case is the opposite of the low case, reflecting no substantial change in models of care and physician supply variables.

Forecasting is represented, generally, by the following schematic:²



² The underpinning methodology for each element of the schematic is detailed in the report

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The following figure summarizes the three, Base, Low, and High, case scenarios by key determinant with total FTE at F10 (2022/23) and the change between the base year, 2012/13, and F10. The PPR planning range for the coming ten year period ending 2022/23 is a 1.07% (188.1 FTE) to 3.05% (536.0 FTE) annual growth rate in physician FTE with a Base Case annual growth rate of 2.04% (357.8 FTE).

	1	6	7	8	9	10	11	12	13	14	15	16	17	18
	HEALTH SYSTEM PLANNING RELATED VARIABLES													
	BASE YEAR FTE - 2012/13	SUBTOTAL: Replacement Needs	ADJUSTED FTE +/-) Benchmark	ADJUSTED FTE April 1, 2013 (Col 1+Col 7)	+/-) Change Age/ Gender Adj. Population	+/-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	MOC - Primary Health Care	MOC - Core Services	MOC - Physician Extenders	MOC - Provincial Programs	SUBTOTAL: MOC's	TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 (-) Col 1)
BASE CASE SCENARIO	1,758.1	(1,013.0)	123.1	1,881.2	261.6	4.9	2,147.8	(78.3)	0.7	0.0	45.7	(31.9)	2,115.9	357.8
ANNUAL % CHANGE		(5.8%)	0.70%	0.70%			2.22%					(0.2%)	2.04%	2.04%
LOW CASE SCENARIO	1,758.1	(924.0)	(12.4)	1,745.7	261.6	4.9	2,012.3	(133.8)	30.0	(8.0)	45.7	(66.1)	1,946.2	188.1
ANNUAL % CHANGE		(5.3%)	(0.1%)	(0.1%)			1.45%					(0.4%)	1.07%	1.07%
HIGH CASE SCENARIO	1,758.1	(1,236.4)	240.9	1,998.9	261.6	4.9	2,265.5	(30.6)	13.5	0.0	45.7	28.6	2,294.1	536.0
ANNUAL % CHANGE		(7.0%)	1.37%	1.37%			2.89%					0.16%	3.05%	3.05%

The Base Case annual growth rate of 2.04% is higher than the annual population growth of 1.54% (weighted for aging) due to base year shortfalls in specialties when compared to a range of benchmarks. The most significant specialty needs, in excess of the average weighted population growth in the Base Case scenario, are:

- Psychiatry (50.2FTE)
- General Internal Medicine (23.1 FTE)
- Obstetrics and Gynecology (23.9 FTE)
- General Paediatrics (27.6 FTE)
- Subspecialty Paediatrics (14.1 FTE)
- Anaesthesiology (33.8 FTE)
- General Surgery (15.6 FTE)

Annual replacement requirements range from 5.3% in the Low Case scenario to 7.0% in the High Case scenario, with a Base Case rate of 5.8% per annum. Replacement requirements are new recruits required to replace retiring and departing physicians as well as the impact of an increasing female workforce.

To keep the Base Case annual growth rate at 2.04% per annum, the phased introduction of collaborative primary health care is required. In the Base Case, this model of care innovation will reduce the need for family physicians by (78) FTE. Without this innovation, Base Case FTE requirements increase to 435.8 FTE and a 2.5% annual increase in total FTE.

It is important and necessary to annually update both numerator and denominator for Saskatchewan values in comparison to applied benchmarks to ensure continued relevance (such as, dynamic benchmarking will incorporate workload changes as they occur).

The forecast models provide this level of detail for each specialty and specialty across the ten-year planning horizon for the Low, Base, and High case scenarios at the provincial level. As well, granular details are provided to supplement the scenarios to include information on special interests by specialty, assumptions made related

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to program design and delivery by specialty, and the recommended timing of recruitment by specialty. The final tabulation in the report provides the details for Low, Base, and High case scenarios, by specialty and subspecialty, at the level of regional health authorities.

Summary of Recommendations

Ten identified themes categorize the recommendations using key points, as follows:

1. Planning for Physician Resources- Model and Implementation Framework

- That the Base Case PPR and forecast be the strategic framework, direction, and planning for physician resources to 2023
- That the province, by the combined impact of models of care implementation along with planned replacement recruitment, change the current percent mix of generalist physicians, excluding family practice, from 25.4% to 29.4% generalist by 2023, or earlier
- That the High Case and Low Case physician resource forecasts be the upper and lower planning boundaries for physician resources to 2023
- That the Ministry of Health update the physician resource planning model ten-year forecasts annually, and that the forecasts are compared, annually, to actual results

2. Planning for Physician Resources - Model and Methodology

- That an adjusted population-needs based approach to, and methodology for, planning for physician resources be formalized as policy of the Ministry of Health
- That an adjusted population-needs based PPR methodology is based on allocating resources based on population need rather than demand-based planning based on extant utilization and legacy data

3. Defining and Implementing Core Services

- That core physician services be defined as services that are provided to all residents within their geographic service area; variation in access to core services will occur based on population density and distance to other secondary care
- That core services include comprehensive family medicine, emergency care, general internal medicine, general surgery, anaesthesiology, general psychiatry, general paediatrics, general obstetrics, and general diagnostic services
- That the geographic distribution and mix of physician services be adjusted across the province over time to reflect the provision of core services as defined

4. Managing Relative Generalist to Subspecialist Resources

- That difficult to recruit subspecialists be mitigated by maximizing the scope of practice by generalists
- That training programs identify and respond to additional services that are necessary to optimize the services of generalist specialties

5. Defining and Implementing Provincial Services

- That the tertiary/quaternary portion of provincial inpatient surgical services need only be provided at one, or possibly two, designated facilities in the province, reflecting critical mass and accessibility variables, all focused on quality outcomes
- That provincial services be programmed and planned provincially, and managed and operated at a site level as defined by the provincial service

6. Maintaining the Planning for Physician Resources Model

- That the Ministry of Health assign responsibility and mandate for the use, maintenance, and enhancement of physician resource planning to an appropriately skilled unit

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- That the Ministry of Health maintain a provincial physician roster in a robustly re-engineered database
- That the Ministry of Health update the model based on agreed contracted academic FTEs by position by specialty, division, and department; and, that the agreed academic FTE be linked to a named individual and be subdivided into clinical, research, education, and leadership/administration components with notation of estimated percentage time allocations

7. Maintaining the Planning for Physician Resources Model Data

- That the physician resource planning model roster track non-fee-for-service payment status such as sessional, AFP, contract, and organization status College of Medicine (COM) rank, functional specialty, College of Physicians and Surgeons Saskatchewan (CPSS) licensed specialty
- That services be reported for all non-fee-for-service payments in a defined, timely, accurate, and comprehensive manner; reporting by a physician, at a minimum, includes a count of new and follow-up patients, visits, and consultations along with a primary and secondary diagnosis
- That the Ministry of Health work with the CPSS to augment the registry with key added data elements: licensed specialty, status, register history, and limiting conditions on practice

8. Influencing and Managing the Future Supply of Physicians

- That the Ministry of Health take a lead role in advocating at provincial/territorial and pan-Canadian levels for an initial and ongoing review and monitoring of the national supply of physicians relative to population needs
- That the Ministries of Health and Advanced Education and College of Medicine jointly review the size of the undergraduate program and size and mix of postgraduate medical programs in consideration of the number of funded seats, the retention in Saskatchewan of graduates, any pan-Canadian review of the physician supply and the projected health needs of Saskatchewan over the 10 years of this planning for physician resources model and implementation framework
- That the Ministry of Health and College of Medicine and other stakeholders ensure that the curriculum is aligned with research on best practice and system evolution regarding delivery of collaborative care and interprofessional teams
- That the Ministry of Health and College of Medicine revise the specialty allocation of postgraduate residency positions to align with the needs of the planning for physician resources model and in the context of the changing national physician supply
- That SIPPA be reviewed in the context of a rapidly expanding national physician supply and the program size and priorities be realigned to the needs of the planning for physician resources model

9. Updating Academic Medicine

- That the Planning for Physician Resources model and implementation framework be updated, based on agreed academic FTEs by position by specialty, division, and department
- That the agreed academic FTE be linked to each individual
- That the agreed academic FTE be segmented into research, education, and leadership/administration components, using allocations by estimated percentage times

10. Interjurisdictional Collaboration

- That the Western Canadian provinces continue to identify those services that can be provided as interjurisdictional specialty care and to advance such care in a collaborative fashion

Conclusion

There is a strong healthcare dynamic in Saskatchewan, supporting quality of care and system reform and efficiencies. The convergence of multiple initiatives will have a major and positive impact on the residents of

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the province. The glue that binds the initiatives will be the evidence-based planning of the number, mix, and distribution of physicians, incorporating models of collaborative and team-based care with the role optimization of all providers and an unwavering focus on patient-centred care.

Careful clinical planning and the implementation of a core services model will geographically redistribute generalist services to better match local population need. Province-wide planning for sub-specialty services is critical to achieve a balance between family physicians and specialists, and to optimize program delivery.

Chapter 1 INTRODUCTION

1.1 STRATEGIC DIRECTION OF GOVERNMENT OF SASKATCHEWAN

The health care system in Saskatchewan has been characterized, as follows:

- Multi-faceted and complex
- Twelve regional health authorities (Health Regions)
- Athabasca Health Authority
- Saskatchewan Cancer Agency
- Affiliated health care organizations
- Diverse health professionals, many of whom are in private practice
- 26 self-regulated professions and 40,000 employees

The development of evidence-based provincial planning for physician resources (PPP) model and implementation framework enables the Ministry of Health to take a proactive approach towards medical school enrolment, physician training, recruitment and retention, and the delivery of medical services.

Demand for health care is based on patients' preferences for health care against a backdrop of available resources. Need for health care is dependent not on patients' preferences, but on their health status, as determined by a health professional. A fundamental problem occurs when demand and need are not aligned. Canadian systems, in general, provide care to those who seek it, but not necessarily to those who need it.

As demand cannot be ignored, "adjusted" population needs approaches to PPR have emerged to qualify need with some recognition of demand.

The Government of Saskatchewan released its Health Human Resources Plan in December 2011. The future need for 22 health care provider groups was part of the forecasting model in the plan. It was identified, specifically, that further efforts would be required to forecast future need for family physicians and specialists.

In 2012, the Saskatchewan Plan for Growth was launched to position the province for addressing the challenges associated with growth. Two overriding goals were identified:

- To ensure continuing growth in Saskatchewan
- To ensure Saskatchewan is able to meet the challenges associated with growth

Several specific undertakings were identified:

- Investing in the infrastructure required for growth
- Educating, training, and developing a skilled workforce
- Ensuring the ongoing competitiveness of Saskatchewan's economy
- Supporting increased trade, investment, and exports through international engagement
- Advancing Saskatchewan's natural resource strengths, particularly through innovation, to build the next economy
- Ensuring fiscal responsibility through balanced budgets, lower debt and smaller more effective government
- The mission, values, and strategy of the Ministry were reflected in the 2014-2015 Ministry Budget (\$4.99 billion) with key areas to support the health system, in addition to a strategic investment in infrastructure
- \$3.25 billion for Regional Health Authorities (increase of \$107.5 million), including \$24.0 million for population growth
- \$155.7 million for the Saskatchewan Cancer Agency (increase of \$4.9 million) to support enhanced access to cancer services
- \$94.9 million capital investment

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- \$60.5 million for surgical services, to support achievement of the three-month wait time target in all health regions by the end of 2014-2015
- \$9.7 million targeted investment in seniors
- \$4.0 million to advance work to reduce emergency department wait times to zero by 2017 and improve patient flow across the spectrum of care
- \$13.1 million to support innovative approaches that improve access to primary health care, including expanded Collaborative Emergency Centres (CECs)
- \$5.9 million (increase of \$2.6 million) to continue the Rural Family Physician Incentive Program and support a locum pool of 20 rural physicians
- Measures to help reduce costs: Regional Health Authorities and the Saskatchewan Cancer Agency will seek \$51.9 million in efficiencies through sharing of services, attendance management, and reduction of lost time due to injuries, premium pay, and sick time

In addition to these growth-related activities, the Ministry of Health has been active on many other fronts, including:

- Provincial Paediatric Steering Committee, reviewing obesity and pre-gestational diabetes mellitus, subspecialist support and outreach, and out-of-province services
- Paediatric Care Network, utilizing hub and spoke networking that includes telehealth
- Care management pathways in stroke
- Chronic kidney disease steering committee and care management pathways
- Practice effectiveness and metrics that engage physicians in intervention appropriateness and rate variation; related processes are founded on quality improvement and are not punitive; a high importance is placed on patient need and patient-centred care, including collaborative care, new models of care, and all providers functioning at top of license with role optimization
- Initiative to reduce wait times in Emergency Departments
- Mental health and addictions strategic plan
- Improvement of access to primary health care, while improving the experience and outcomes
- Integration of a range of community services with primary health care services
- Enhancement of chronic disease management
- Expansion of Collaborative Emergency Centres

The Ministry of Health has been clear and consistent with its vision and guiding principles planning for physician resources, underlining four key goals³:

- Patient-centred and family-centred care
- Collaborative, inter-professional practices
- Positive, productive, and safe workplaces
- Sufficient number and mix of healthcare professionals

Initiatives aligned with these goals include:

- Lean, a patient-focused approach to reducing waste through elimination of activities that do not add value
- Hoshins, as specific areas of improvement that align with Lean thrive with a flat management structure and a shared vision of a strategic plan; Hoshin Kanri is the planning methodology
- Working Group on Appropriateness and Clinical Variation
- Public health initiatives
- First Nations programs
- Saskatchewan International Physician Practice Assessment (SIPPA)

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³ 2011 Health Human Resources Plan

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- Saskatchewan Surgical Initiative to reduce wait times, to effect change that results in better and safer care, to improve surgical experiences from a patient's perspective, and to ensure sustainability of the improved wait times
- Improved recruitment and retention initiatives

1.2 CONTEXT

The project mandate was to deliver a quality and collaboratively developed PPR for Saskatchewan in order to support the appropriate number, mix, and distribution of physicians practising in the province over the next ten years. This planning occurred at an operational level in Saskatchewan, allowing for a number of variables to be incorporated in a navigational, non-prescriptive tool, adjustable for altered or unpredicted variables. The resulting estimates can be moderated or filtered by policy decisions that include fiscal limitations.

It is important to distinguish between capacity as a “determinant” of need or a downstream consequence. In the case of workforce planning for surgeons, the former implies that need has a “governor” on it (such as, operating room capacity) which cannot be exceeded by a demonstrated need for surgeons. The latter implies surgeon need is projected based on population need, but operating room capacity is a linked, but separate, capacity issue for the health system. Of significance is that definitive policies are not a prerequisite to planning for physician resources, as scenarios can be generated within a range under a given broad policy parameter.

The scope of the study included all population needs as they align with physician services and includes all physician disciplines. The needs of the population drive the distribution and mix of specialties. Forecasting transformed to planning assists, over time, the effective delivery of medically necessary care in a sustainable fashion.

The scope is summarized, as follows:

- Publicly funded family physicians and specialists in Saskatchewan
- Clinical service, teaching, and research
- Recommendations on implementation, monitoring, and evaluation
- Alignment with overall national and provincial health human resource planning
- Alignment with national directions for physician resource planning
- Alignment with the academic mandate of the College of Medicine
- Ten-year evidence-based physician workforce planning model and implementation framework that includes:
  - Changing scopes of practice
  - Increased use of alternative providers
  - Adoption of collaborative, inter-professional team-based care
  - Key influences in primary health care, acute care, and shared care
  - **Excludes** application or monitoring or evaluation of the implementation process
  - **Excludes** planning for non-physician health professionals (but includes the impact of non-physician health professionals and service delivery models)

The project deliverables were defined clearly, as follows:

- Project charter
- Environmental scan - literature - Ministry of Health and stakeholders
- Environmental scan - literature - third party
- Environmental scan - engagement
- Data research and acquisition

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- Data compilation and assessment
- Forecasting Matrix Model
- Draft and final reports
- Knowledge transfer

1.3 APPROACH

There is no single accepted approach to forecasting the need for physicians and their supply. A hybrid methodology was applied to this study, building off the strengths of legacy planning models and taking lessons from their weaknesses. The key elements to improving the usefulness of workforce planning and projections are a true gap analysis, an effective monitoring of key variables, and a comprehension of the environment in which a collaborative workforce provides needed and appropriate, quality services in a timely and accessible fashion. The foundation of the Adjusted Population Needs-Based Model (APNM) is built through detailed data acquisition and analyses, with inclusion in an Environmental Scan.

Key to the hybrid methodology is the ability to adjust validated research metrics that reflect needs and supply through application of qualitative inputs by providers, administrators, managers, and funders of care.

The research methodology incorporated the following:

- Client and stakeholder database (interviews and supporting documents)
- Literature search
- Data acquisition, catalogue, and analysis
- Modeling

Achieving this approach also required considerations of the following:

- Burden of Disease
- Population Risk Adjusted Grouper (Canadian Institute for Health Information)
- Clinical Risk Groups (Saskatchewan)

1.3.1 BURDEN OF DISEASE

The concept of burden of disease took origin at the World Health Organization in 1990. It remains a cornerstone of population health status assessments and comparisons. Rankings among higher income nations are consistently, as follows:

Top ten diseases in terms of mortality, years of life lost due to disability, and overall burden of disease in higher income countries

N	DISEASE-RELATED CAUSES OF MORTALITY	YEARS OF LIFE LOST DUE TO DISABILITY (YLD)	OVERALL BURDEN OF DISEASE (BOD)
1	Ischaemic heart disease	Unipolar depressive disorders	Ischaemic heart disease
2	Stroke and other cerebrovascular disease	Alzheimer's disease and other dementias	Cerebrovascular disease
3	Trachea, bronchus, and lung cancers	Adult onset hearing loss	Unipolar depressive disorders
4	Alzheimer's disease and other	Alcohol use disorders	Alzheimer's disease and other

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N	DISEASE-RELATED CAUSES OF MORTALITY	YEARS OF LIFE LOST DUE TO DISABILITY (YLD)	OVERALL BURDEN OF DISEASE (BOD)
	dementias		dementias
5	Lower respiratory infections	Osteoarthritis	Trachea, bronchus, and lung cancers
6	Chronic obstructive pulmonary disease	Cerebrovascular disease	Adult onset hearing loss
7	Colon and rectal cancers	Chronic obstructive pulmonary disease	Chronic obstructive pulmonary disease
8	Diabetes mellitus	Diabetes mellitus	Diabetes mellitus
9	Hypertensive heart disease	Endocrine disorders	Alcohol use disorders
10	Breast cancer	Age-related vision disorders	Osteoarthritis

1.3.2 POPULATION RISK ADJUSTED GROUPE (PRAG)

In March 2013, the Canadian Institute for Health Information launched a project to develop a population health status grouping methodology. The goal of the project was to develop a methodology, by 2015, that reflects Canada's population and health care system, meets the needs of Canadian clinical administrators and health care researchers, and capitalizes on the large amount of health care data available at Canadian Institute for Health Information (CIHI).

A population health grouping methodology creates clinical profiles for individuals, as well as resource indicators, that describe their current and future health system needs. PRAG will classify the population based on clinical characteristics. It will assist CIHI and its clients in monitoring population health, understanding care utilization patterns, explaining variations in resource use, and providing a foundation for funding models.

Population grouping methodologies have many applications in managing, evaluating, and conducting research on a health care system; the methodology is driven clinically and groups the entire population. Its foundation is a set of groups, or cells, that describe a person's clinical conditions and the severity of those conditions, with a strong focus on chronic conditions.

Datasets under consideration as feasible are, as follows:

- Patient-level physician billing data: These data provide clinical and cost information related to physician care, essentially due to a large subset of the population whose only interaction with the health system is through physician office visits
- Hospital abstracts describing inpatient and day surgery episodes: Significant health system resources are invested in hospitals, and the subset of the population that receives care in hospital tends to have more health problems and greater health system needs than the general population
- Client assessments done in continuing care facilities and in the home care setting: These assessments provide information about functional status for a subset of the population that has very high health system needs

Other health sectors not listed above (such as emergency departments and public drug programs) are to be considered after the initial development project has been completed.

The CIHI initiative is based, initially, on data from Ontario, Saskatchewan, Alberta, and British Columbia, due to the completeness of datasets provided to CIHI. The product will be Statistical Analysis System (SAS) software

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code, which will be shared with the provincial ministries of health, with the first iteration scheduled to be available in 2015.

1.3.3 CLINICAL RISK GROUPS (CRG)

Saskatchewan is one of the provinces participating in the CIHI population risk adjusted grouper methodology development. The three-digit code level represents the first three characters of the ICD-9 code whereas the category level is based on the broad ICD-9 groupings of diseases and injuries. A little more than one-third of the diagnostic codes at the three-digit code level on the physician claims data match the most responsible diagnosis and close to one-half match any of the diagnoses codes on the linked abstract. At the category level, close to 4 out of 5 diagnostic codes on the physician claims data match one of the diagnosis codes on the linked abstract.

The Saskatchewan Health Quality Council has developed, and continues to enhance, Clinical Risk Groups as a comprehensive population health burden of disease model. CRGs are a risk-adjustment tool and clinically based classification system used to measure a population's burden of illness.

CRG attributes include:

- Population based classification system
- Individually linked longitudinal data set with annual information from 03/04 to 12/13 with the following variables:
  - Demographics of age, gender, geography
  - First Nations registration status and recipients receiving social services flag (SES proxy)
  - Exposure status, birth and death indicators
- Uses encounter data (family physician and specialist physician claims, emergency department visits, and inpatient abstract and discharge abstract data) to assign individuals into health states (chronic):
- Mutually exclusive; hence, multiple health state categories and hierarchical rules applied
- Estimates the amount and type of disease

The attributes and outputs of this model strongly align with the primary need assessment model of choice for physician resource planning. CRGs have been shown to outperform models based on age, gender, and socio-economic status alone. The primary advantages of using CRGs in a population level forecast model are that the building blocks and resultant forecasts are more clinically relevant than the traditional age-gender model, thereby producing information that is more actionable than the traditional model.

Challenges of the CRG methodology include:

- Misclassification of prevalent cases (case definitions)
- Lack of risk factor data (body mass index, smoking, diet, exercise, environment)
- Systematic underestimation of treated prevalence not true prevalence (wash out periods)
- Unmeasured system changes that could affect access and hence, health status ascertainment over time
- Variation in access across planning zones (impacts ascertainment of health status)
- Quality and variation in FFS diagnosis data
- Only have comprehensive activity and cost data for the last year (missing inflation for many sectors)
- Need to validate the model (split sample?)
- Need to develop the analytical plan and more sophisticated statistical prediction models
- Registry data issues – moving forward (no premium)
- Missing important sectors (Home Care, Public Health, and out-of-province utilization)

1.3.4 SUMMARY

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In summary, the CRG model, methodology, and data align with the attributes of an APNM by integrating:

- Health status using socio-economic and disease state
- Population demography at the census tract level
- Population geography at the community level
- Health service demand through health care utilization data
- Estimation of resource consumption
- Ability to model the relationship between service demand and full-time equivalency requirements at the individual discipline level (“n” of seventy-eight, currently)

1.4 FORECASTING MATRIX MODEL

The Forecasting Model is internet-enabled and uses robust architecture (Microsoft SQL Server as the database platform and Tableau Software as the business intelligence layer); it incorporates appropriate statistical modeling (multiple, ordinary least squares) linear regression, Markov stock/flow, simulation, and others.

CONCEPTUAL DESIGN

The current business environment has been modeled in terms of the processes and the data structures, (Family Physician and RCPSC specialties), 10-year determinants of need (population, disease, core services,), determinants of supply (current roster, FTE, productivity, IMG)

Detailed functional and non-system requirements were identified and new techniques introduced to define the required processing and data structures. Statistical methodology was determined at this stage through detailed data analysis.

A conceptual model (visual representations) description of the forecast and planning software model design was prepared.

DESIGN PRINCIPLES

Key design principles include:

- Best Practice
- Complete
- Cost-effective
- Flexible
- Inclusive
- Relevant
- Reliable
- Replicable
- Timely

BUSINESS PRINCIPLES

Key business principles included:

- *Benchmarked* - The model enables users to discern differences between the results in comparison to valid external benchmarks. Benchmarking enables informed comparison, analysis, and, where appropriate, assimilation of external benchmarks to the model.

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- *Application* - Benchmarks required careful analysis and evaluation prior to application within a model. Achievement of service volume improvements did not occur at the expense of quality; however, in some cases, greater volume did equate to improved outcomes.
- *Interpretation* - In order to be considered a valid benchmark, the source had to originate in one of a peer-reviewed discipline-specific journal article, a publication from an authoritative body (such as, U.K. Royal College of Physicians), a national workforce planning authority (such as, U.K. National Health Service, Australia Department of Health), and be timely. If a comparable benchmark could not be identified from one of these sources, no benchmark was cited for that discipline.
- *Evidence-based forecasting* - The model delivers forecasts based upon quality evidence.
- *Evidence-based planning* - The model enables strategic planning by integrating directional (strategic and policy) determinants as identifiable variables (core services, collaborative care)

DETAILED DESIGN

- *Methodology* - data flow model diagram notation templates (Gane-Sarson Standard) Microsoft Visio Professional 2010
- *Logical* - identify, model, and document the business data requirements of the system being designed. Nested from Level 0 (context) to Level 1 (major functions), to Level 2 (subroutines)
- *Physical* - a physical database design and a set of program specifications are created using the logical system specification and technical system specification
- *Entity behaviour model* - identify, model, and document the events that affect each entity and the sequence in which these events occur

BUILD

Per detailed design specifications

- User interfaces are simple and efficient with “under the hood” capability for more complex analytics
- Data interfaces – to core data sources (such as, FTE files, demography, geography)
- Business logic (processes and calculations) in Tableau Software

Chapter 2 ENVIRONMENTAL SCAN OF THE CURRENT STATE

2.1 INTRODUCTION TO THE ENVIRONMENTAL SCAN

The Environmental Scan is a validated current state assessment using the best available qualitative and quantitative data, providing an inventory of physician and population health data, and a structure to assess and analyze research findings, literature, and engagement findings. Where gaps were identified, targeted efforts were directed to achieve their resolution. All findings were assessed for quality in terms of relevance, timeliness, and reliability, following which further analysis was undertaken. In the aggregate, the details of the scan provide a foundation for data management and workforce planning and projections.

A comprehensive Environmental Scan satisfies four key objectives:

- (1) Create, document, verify, and report findings from the stakeholder perspective of their current state and future needs
- (2) Create, document, analyze, and report findings from a data and research perspective of stakeholder current state and potential future needs
- (3) Cultivate a deeper understanding by stakeholders of the project, methodology, and objectives in order to create greater support for the end results
- (4) Research, document, analyze, and report findings from the broader provincial, national, and international environments on specific subjects impacting physician resource planning

Engagement of physicians and the medical leadership was both fundamental and critical. The nature of the engagement involved relationship-building at multiple levels: SMA senior staff and Board of Directors, SMOs and health region leadership, College of Medicine, inclusive of the Dean's office, departmental and divisional heads, and individual groups of physicians. These contacts were iterative and ongoing, consistent with the principle of transparency.

Key elements of the scan have been organized by six themes and summarized, as follows:

- National physician resource planning
- Provincial physician resource planning
- Characteristics of the Saskatchewan population
- Physician supply in Saskatchewan
- Physician services utilization in Saskatchewan
- Academic Medicine in Saskatchewan

Interdependent processes informed the six themes, as follows:

LITERATURE SEARCH - MINISTRY OF HEALTH AND STAKEHOLDERS

- Strategic directions - health human resources with emphasis on physician workforce
- Strategic directions - health system organizational design (Primary Health Care, Networks, Regionalization), academic medicine, financing and funding, accountability and performance, governance, labour relations
- Inventory - healthcare system governance structure
- Inventory - current remuneration system including fee-for-service, contract, sessional
- Inventory - provincial academic medicine services
- Stakeholder profiles, including, role and mandate, scope of services, referral in/out, primary to tertiary
- Major capital capacity expansion plans, including major hospital additions and expansions, community health centres
- Analysis and review - MOH Project Management

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LITERATURE SEARCH - THIRD PARTY

National and international literature searches were undertaken, using a key word and subject matrix. Search topics included physician resource planning, physician workforce planning, FTE methodologies, and emerging methodologies of PPR by discipline in the search criteria.

Targeted expert and stakeholder web sites were searched, including EuroObservatory, United States Council on Graduate Medical Education, United Kingdom Royal College of Physicians, American Association of Medical Colleges, American Board of Medical Specialties, Royal College of Physicians and Surgeons of Canada, College of Family Physicians of Canada, Association of Faculties of Medicine of Canada, and the United Kingdom National Health Service

Other relevant web sites were searched, including the Canadian Association for Health Services and Policy Research, United Kingdom Centre for Workforce Intelligence, Organization for Economic Cooperation and Development, World Health Organization, and the World Bank.

Research of grey literature included the following:

- Relevant reports recommended by Provincial Advisory Committee (PAC) and Technical Work Group (TWG) members, and other stakeholders
- Comparable organizations within Canada, United States, Western Europe, and Australia
- Conference proceedings
- Leading (higher impact rated) discipline-specific journals (typically, the higher quality rated journals contain insightful research based articles specific or related to physician resource planning)
- Survey reports from Canadian Medical Association, Saskatchewan Medical Association, the Royal College of Physicians and Surgeons of Canada, and the College of Family Physicians of Canada, on physician trends (lifestyle, hours work, practice profile, contemplated changes, preferred payment models)
- In-province surveys of physicians, including family physicians; the latter have rapidly evolving practice profiles and insight specific to Saskatchewan and its communities, adding value to calibrating the full-time equivalency of family physicians providing community **family practice** on a comprehensive (obstetrics, on-call, after- hours care) basis and compared to part-time or focused practice profiles
- Government reports, in particular special studies relating to health human resources
- Analysis and review of Ministry of Health project management

STAKEHOLDER ENGAGEMENT

This was a critical aspect of study throughout the project and was undertaken in detail and through iterative feedback. This component of the study brought forward essential qualitative supplements to the study metrics. The engagement process planning focused on one of methodology, interview templates, and logistics. Interviews focused on one of three primary subject areas: strategic, methodological, or operational.

Key Stakeholders:

- Ministry of Health
  - Senior Leadership
  - Policy Staff
  - Planning Staff
  - Data Analytic Staff
- Health Regions
  - Senior Management
  - Physician Leadership

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- Physicians by Discipline
  - Cypress
  - Five Hills
  - Heartland
  - Kelsey Trail
  - Keewatin Yatthé
  - Mamawetan Churchill River
  - Prairie North
  - Prince Albert Parkland
  - Regina Qu'Appelle
  - Saskatoon
  - Sun Country
  - Sunrise
  - Athabasca
- Saskatchewan Cancer Agency
- College of Medicine
  - Acting Dean and Dean
  - Vice-Provost
  - Associate and Assistant Deans
  - Department Heads
  - Division Chiefs
- Saskatchewan Medical Association
  - Senior Staff
  - Elected Officials
- College of Physicians and Surgeons of Saskatchewan
  - Senior Staff
  - Elected Officials
- Health Quality Council
- Provincial Association of Interns and Residents of Saskatchewan
- Student Medical Society of Saskatchewan
- First Nations Communities
- Saskatchewan Communities other than First Nations

DATA RESEARCH

Data research included the data sets listed in the methodology. Clarification of privacy and access to information requirements were identified in the Project Charter phase so that time sensitive steps and procedures related to information access were initiated as early as possible.

Typically, no single registry file was completely reliable; therefore, the approach was a data based (“match,” “search/replace,” “join”) reconciliation across multiple data sources and merged complementary elements in order to resolve conflicting elements.

Population and Physician Assessment

- Association of Faculties of Medicine of Canada (annual statistical report by medical school of undergraduate enrolment and status)

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- Canadian Residency Matching Service (CaRMS) current data update, which was integral to understanding future physician supply from the Canadian medical education system and applicants from abroad (Canadian and foreign)
- Canadian Post-M.D. Education Registry Service (CAPER) current data update, which was integral to understanding residency program enrolment by year, by location, by discipline, and by medical school of graduation
- College Physicians and Surgeons Saskatchewan (CPSS) registry file of publicly available data points by physician (preserving confidentiality)
- Saskatchewan Medical Association (SMA) cross-referencing where required (preserving confidentiality)
- College of Medicine (COM) and medical programs, utilizing faculty appointments (full-time, clinical/part-time) as a registry file of shareable member data points; data on protected research time, education time commitments, and leadership roles were examined (preserving confidentiality)
- Medical Services Plan (MSP) files including detailed MSP claims files, with 3-year history, by physician; required to inform FTE profile, services delivered, patient place of residence and trends in all the proceeding factors (preserving confidentiality)
- Alternative payment files from Ministry and HA alternative payments by physician and by service; required to inform FTE profile (preserving confidentiality)
- CIHI reports on physician workforce migration, gender, special studies (FTE methodology, services, payments)
- Demography, including age, gender, and ten-year forecasts (base and range) at geographic planning unit level (RHA level of granularity at a minimum); Government of Saskatchewan Bureau of Statistics database
- Health status, including epidemiology, survey, public health, disease (communicable and non-communicable) incidence and prevalence, provincially, and in comparison nationally
- Geography, including measures of rurality and remoteness, commute time to access, and referral patterns for geographic planning units
- Utilization data, including institutional/non-Institutional, physician, and other providers⁴
- Need, including examination of potential underlying indicators of health services current, future, and unmet need (socio-economic indices, composite indices of health need as compared to actual utilization, measures of access to specialist consultation, secondary and tertiary treatment, comprehensive primary health care, and others, as determined to be relevant to the study)

2.2 NATIONAL PHYSICIAN RESOURCE PLANNING

Physician workforce planning occurs in a constantly changing and complex environment that is characterized by population needs, policies, fiscal reality, academic mandates, and geography. It requires a continuous flow of relevant, accurate qualitative and quantitative information and data, with a relatively constant process of modeling and reporting.

Awareness, understanding, and integration of critical contextual developments are essential in achieving a quality PPR. A PPR cannot plan for all developments; however, it can ensure purposeful awareness and appropriate integration of the relevant developments. It informs a critical component of the health human

⁴ HA profiles of institutional utilization (acute care beds, average lengths of stay, case acuity, OR theatres, OR procedures, OR case time, emergency rooms, and clinics). The purpose of gathering and assessing this information is not to identify capacity issues but to provide trend information on trajectories of utilization. This trend information will be compared to population health status and disease incidence and prevalence data for converging or diverging trends from population versus institutional utilization perspectives. Underutilization (e.g., surgeons) can be evident through data analysis and this has direct bearing on assessment of the baseline current state of the physician workforce.

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resource (HHR) spectrum. HHR planning, in turn, occurs in the overarching strategic directions of government, the broader needs of the population, and service and infrastructure realities.

Physician workforce planning is dependent, to no small degree, on aggregate activities at the national level, with little cross-jurisdictional coordination of policies, programs, compensation models, delivery models, and education. This paradox is correctable, and patchwork efforts are directed at resolutions. Much remains to be done, perhaps no greater than at the level of medical education; however, progress can be identified in a variety of undertakings, albeit without significant coordination. That notwithstanding, the following national issues, all linked to physician resource planning, have been identified for expanded consideration at a jurisdictional level.

COLLABORATIVE CARE

Key to addressing the health and social services needs of residents of Saskatchewan are collaborative and team-based care. Collaborative care is central to workforce and clinical service planning, with a substantial and sustained impact on primary health care and outcomes. Collaborative care teams are providers that bring separate and shared knowledge together to support a comprehensive range of high quality, effective health care services. Collaborative care is integral to workforce and service planning, especially in a number of primary health care and social services settings. It is the centrepiece of the proposed model of care and delivery that would address many of the challenges faced in Saskatchewan, including the 2011 Primary Health Care Framework, advanced by the Saskatchewan Medical Association.

There are four key lessons identified as the elements of a successful approach to collaborative care:

- Shared philosophy and values, operating from a patient-centred, harm-reduction perspective
- No single complement of membership is recommended as a collaborative model, due to variations in need; rather, collaborative care should be responsive to the challenges of a specific geographic unit and avoid a “cookie cutter” approach
- Community development beyond the walls of the centre
- Mutual respect among providers, fostering strong communication and alignment of goals

PATIENT-CENTRED CARE

Patient-centred care (PCC) receives greater reference than attention in Canadian health care. Saskatchewan is proving to be an exception with its focus on PCC. A tenet of resource and service planning is the central position of the patient and, not infrequently, this requires a shift in thinking and models. Perhaps most importantly is an understanding that PCC is a care model and not simply a concept.

The four attributes of patient-centred care, described by the Institute of Medicine in 2001, are, as follows:

- Comprehensiveness of care
- Coordination and communication
- Support for the patient and his or her empowerment
- Timely access

QUALITY OF CARE

A framework, supporting the many dimensions of quality, is essential in assessing population need. The Institute of Medicine (IOM) definition of the core attributes of quality care has withstood the test of time:

- Safe: avoiding injuries to patients from care that is intended to provide benefit
- Effective: providing services based on scientific knowledge to all who could benefit, and refraining from providing services to those not likely to benefit

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- Patient-centred: providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient values guide informed clinical decisions
- Timely: reducing waits and, sometimes, harmful delays for both those who receive and those who give care
- Efficient: avoiding waste, including waste of equipment, supplies, ideas, and energy
- Equitable: providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socio-economic status

The Saskatchewan Health Quality Council (HQC) was created by government in 2002 in response to a recommendation from the Fyke Commission. Review of a series of indicators between 2004 and 2008 identified quality problems across sectors and geography, providing opportunities to evolve improvement projects, working directly with regions and agencies. As part of this, the Quality Improvement Network provided a learning community and provincial forum for local quality leaders to advance quality care in the province.

Four priorities accelerated excellence in care in Saskatchewan, based on high-performing systems elsewhere in the world:

- Building leadership for quality
- Building improvement skills
- Engaging providers
- Creating a measurement platform

Significant investments of resources and skillsets have positioned Saskatchewan at the forefront of quality initiatives and improvement, including the use of administrative datasets and Lean skills and knowledge.

CORE SERVICES

Conceptually, core services are uncomplicated, noted to be an evidence-based understanding of population health service needs that carry expectations of timely and efficient access. At a level of detail, the application of core services is a complex challenge. Canadian experience with defining and implementing core services is best demonstrated in British Columbia, Manitoba, Ontario, and Nova Scotia. It is important to stress that a jurisdiction must identify its own core health and social services; core services from one jurisdiction are not importable automatically.

GENERALISM

The Council on Graduate Medical Education (COGME) in the United States has noted the decline in interest in most of the **generalist** specialties, especially in the context of declining postgraduate matching in family medicine, general internal medicine, and general paediatrics. The shortage of **generalists** in Canada is no less acute and, regardless of evidence of advancing corrective measures by Deans and Deputy Ministers, a system impact of change in educational policy will take several years to be evident.

Generalism is seen, by most, as a central piece of improved access, core services, and patient-centred care. In Saskatchewan, the leadership of UGME, PGME, and most disciplines offered support for generalism.

PRIMARY HEALTH CARE REFORM AND RENEWAL

In recent years, there has been a shift away from “traditional” family medicine in urban settings and the practice has become more specialized. In rural settings, however, a general practitioner still typically provides a broad, comprehensive range of services. This is one factor, among many, that has posed challenges for patients accessing services in a timely manner. Governments have responded with different approaches, frequently

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under the banner of “primary care reform.” These approaches have included reforms to service delivery (group practice models, integrated allied health professionals) and physician compensation, in an attempt to improve quality of and access to care.

There is a widening dissonance between traditional primary care services and the evolution of primary health care, witnessed across most settings (particularly, urban) and jurisdictions. Initiatives focused on strengthening primary health care services continue to be developed and implemented across Canada. A significant challenge is posed through the implementation of new care models in parallel with the creation of new funding models. It has been observed that some care models can increase physician compensation, substantially. In some jurisdictions, however, patients’ access to services has been reported by many to be in decline, despite the success of programs that require a rostering agreement between patients and a provider or group of providers.

In recent years, there has been dissolution of the homogeneity of family medicine in urban settings. The traditional legacy role of a family physician in the community has been on the decline with the emergence of more customized primary health care practice models. Urban family physicians have long been withdrawing from the provision of services in an acute setting, eliminating emergency department service, surgical assisting, obstetrical services, and the management of hospital inpatients. As models of care across the continuum evolve, so too will the roles of primary health care physicians. Frequently, the diversity is influenced by an individual physician’s desire to design his or her practice to align with a desired lifestyle or the unique needs of the local community that is being served. This evolution explains the establishment by the College of Family Physicians of Canada of 18 special interest sections.

In rural communities, family physicians tend to deliver a more comprehensive service offering, as the smaller populations in these communities cannot reasonably support a high number of individual physicians to meet care needs.

HOSPITAL CARE

Clinical service models, across programs, have evolved over time to leverage human resources and scope of practice, while maintaining quality care for patients and families. Since its inception in the mid-1990s, the role of hospitalist medicine has grown and expanded in the provision of hospital care. In 2009, the New England Journal of Medicine estimated that almost 40% of inpatient care was being provided by hospitalists in the United States. There is a significant literature developing with respect to the hospitalist - **generalist** and specialist care - and the shifting roles with most responsible physician and core competencies.

Hospitalist care is a work-in-progress across many jurisdictions, nationally and internationally, with respect to credentialing, standards, and compensation. Key issues will continue to be workload measures and their application in workforce planning and compensation models. In addition to compensation and standards of care, ongoing issues are internal processes, including transfer of care and backup.

REGIONALIZATION

Provincial and integrated regional planning has replaced hospital-centric planning in virtually all provinces. Governance models to oversee health service delivery in the provinces and territories continue to evolve, albeit without stable underpinning.

Steven Lewis characterized regionalization in four dimensions :

- Geographic definition
- Devolved authority rather than self-identity
- Consolidation of authority
- Responsibility for a range of services spanning the continuum of care

TECHNOLOGY

The cost of health care continues to rise across Canada, and is a pressing challenge for all jurisdictions. Saskatchewan is no different in this regard. Technology, in the broadest sense, plays a key role on both sides of the cost and savings ledger. The adage, “best test first,” was coined to indicate the test that delivers the least diagnostic ambiguity with the most quality would improve patient care and save costs. Health technology assessment (HTA) is a significant challenge, given the state and volume of ongoing change, driven internally by research and externally by industry. Pharmacotherapies, along with diagnostic and surgical equipment, are the best examples of this state of change that demands cost/benefit assessment and evaluation.

Technology evolution impacts PPR in a very significant way. Technology-enabled, non-invasive surgery has had a profound impact. The “heart” is no longer the domain of one or two specialties; interventional radiology, interventional cardiology, vascular surgery, and cardiac surgery are evolving in significant ways, with direct impact on PPR.

POPULATION DEMAND AND EXPECTATIONS

Canadians are accustomed to the standards and quality that characterize our health system. All developed countries are facing the same cost and sustainability challenge with aging and increasing population. There is an expectation of rapid access to high quality service, regardless of circumstance. Government policy on access to health services sets standards and has included many explicit decisions around access. These policies directly impact physician workforce planning assumptions. Patient expectations can be both reasonable and unreasonable; knowing the difference is integral to clinical service planning.

2.3 PROVINCIAL PHYSICIAN RESOURCE PLANNING

The context of Ministry expectations requires attention to a wide range of environmental (economy), societal (need versus want), structural (distribution of capacity), health resource (physicians and other providers in an integrated environment), and governmental (budget, policy, strategy, clinical service plan) variables.

A compounding factor is the layered complexity of 13 health regions (or authorities), each with its own governance (including senior management and a board of directors), strategic plan (although these are seen to parallel that of Saskatchewan Health), providers, culture, and constituencies, characterized by unique features and pressures. Regional administration of care, in its various forms across the country, tends to cycle in and out of centralization and decentralization, implying that there is no single answer to the management structure for health care delivery. It is true, however, especially in the context of central authority and peripheral administration, that no single solution is adaptable to all settings.

Physician resource planning touches on a substantial number of elements of health service planning and delivery. As well, the output of a study of this nature is not one of simple metrics that are derived from a merger of the quantitative need and supply determinants. While this is essential, and required to be validated and benchmarked, the final deliverables incorporate qualitative assessments that reflect stakeholder positions and secondary data.

In addition to the strategic direction of Government of Saskatchewan, as described, other specific initiatives in Saskatchewan are relevant to PPR, as follows:

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LEAN

Saskatchewan's health care system has benefited from Lean, a patient-focused approach to reducing waste by eliminating activities that do not add value. Employees and providers provide value-added and innovative solutions; everything else is eliminated, simplified, reduced, or integrated. More than anything, Lean is a mindset that empowers employees and reduces waste.

While Lean has been in use for many years in a variety of settings, Saskatchewan is the first jurisdiction in Canada to apply Lean processes across its entire health care system. The health regions, Saskatchewan Cancer Agency, and the Ministry of Health have launched more than 700 Lean projects, with greater than 1,000 anticipated by 2016.

HOSHINS

With targets of Better Health, Better Care, Better Value, and Better Teams, health system leaders in Saskatchewan identified three areas for improvement breakthroughs, referred to as Hoshins in the Hoshin Kanri approach. This is a systematic planning methodology for planning long-range key entity objectives. This policy deployment aligns with Lean as a tool and progresses through four steps:

- Create a strategic plan
- Develop tactics
- Take action
- Review and adjust

Hoshin Kanri is a planning methodology and thrives with a flat management structure and a shared vision of a strategic plan; these two are the most reliable predictors of success. The three areas, initially identified for improvement were:

- By March 2014, improve access and connectivity in primary health care innovation sites and use early learnings to build foundational components for spread across the province
- Transform the patient experience through sooner, safer, and smarter surgical care
- Foster a safety culture with a focus on patient and staff safety

Continuing Hoshins are:

- Strengthening mental health and addictions services
- Rural family physician supply
- Emergency department waits and patient flows

APPROPRIATENESS AND CLINICAL VARIATION

The Working Group on Appropriateness and Clinical Variation in Saskatchewan has been applying a six-step process that applies valid metrics and includes representatives from surgery, anaesthesia, primary health care, medical imaging, physiotherapy, and the Ministry of Health. The nonjudgmental approach has been one of curiosity, seeking to measure and understand variation.

Practice variations are defined as variations in treatment profiles across geographic areas or variations in individual physician profiles that cannot be explained by differences in health needs. Medical treatment decisions involve a complex interaction in individual physician-patient encounters. Inevitably, where there are medical decisions, there will be medical variations.

Practice variations often result from physician decisions about how to practice. In order to address practice variations in a strategic way, it is necessary to have insights about the determinants of physician behaviour, and

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ways in which behaviour can be changed to achieve better patient-focused outcomes and increased efficiency in service delivery.

Some degree of variation is warranted and the existence of variation does not necessarily make its reduction appropriate. The important issues in assessing practice variation are quality and productivity. Practice guidelines and state-of-the-art information systems are essential in order to assess the appropriateness of practice profiles, without unwarranted intrusion or interference with the art and science of medical practice. Methods to reduce inappropriate variations should focus on supply-sensitive services, such as physician visits, repeat visits, referrals, and hospitalizations, especially for chronic illnesses.

The complexities of medical decision-making, exacerbated by a number of variables that are weighted and incorporated differently by individual physicians, inevitably lead to practice variations. The ambiguity and exponential growth of medical knowledge are, perhaps, the variables with the greatest impact on clinical variations. The mere existence of variation, well documented in many areas of clinical medicine, does not, by itself, make its reduction required or desirable.

The greater the degree to which a service is discretionary, the greater is the chance that variation may occur. Practice styles and economic incentives will continue to be prominent in these regards, unless there is fundamental change in how physicians make decisions and how they are paid. While characteristics of patient populations will always be diverse, including individual thresholds for interventions, patient involvement in the decision process is one approach that can neutralize the diversity. Physician supply imbalance will be more difficult to reverse, or to address through options that otherwise confront variations. A reasoned strategy is to promote the elements of reform that are based on the provision of information; addressing physician supply and distribution will be a longer-term challenge.

FIRST NATIONS

The Aboriginal population in Saskatchewan is large in number and integral to the social and cultural fabric of the province. As well, there are wider health challenges unique to the Aboriginal Peoples. The Aboriginal population is growing at a greater rate than the general population of Saskatchewan.

Data from the 2011 National Household Survey, reported by Statistics Canada, shows the Saskatchewan population of self-identified Aboriginals was 157,740 or 15.6% of the total population. This is comparable to 141,890 or 14.7% of the total population in the 2006 census.

Of the provincial total of the Aboriginal population, 53.2% lived on reserve; 6.2% of the population of Saskatoon self-identified as Aboriginal; 6.6% of the population of Regina self-identified as Aboriginal; 23.5% of the population of Prince Albert self-identified as Aboriginal.

In comparison to non-Aboriginal people, Aboriginal people:

- Are more likely to live in homes in need of major repairs
- Are less likely to have at least a high school education
- Are less likely to be employed
- Have lower median incomes
- Have higher incidences of poor health and lower life expectancies
- Are more likely to be the victim of a violent crime

It is important to note that Northern Medical Services characterizes the census data as misleading and painting an incomplete picture. Addressing the needs of Aboriginal health is one of the strategic directions of the Ministry. There is a significant HIV population in the northern part of the province. Further, the incidence of tuberculosis is 90 times higher than the rate elsewhere in Saskatchewan and Canada, including both primary

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tuberculosis in the younger population and latent tuberculosis in the elderly. The co-infectivity of HIV and Hepatitis C is the highest in the world.

Further, significant data holdings are held within First Nations communities and have not been available, generally, at the regional or provincial level. As well, the provision of hospital and medical services is shared by the provincial and federal jurisdictions, further conflating First Nations data. Examples and more granular data are found at Northern Medical Services and health regions, especially the two northern regions and one health authority; however, First Nations health issues are prominent, to varying degrees, throughout the province.

The evolution of care for First Nations communities follows two paths: access to required care provided by western medicine, and traditional healing. In both instances, the presence of timely and effective care in the home and the community is of primary importance.

The care provided through Northern Medical Services (Department of Family Medicine at COM) is provided, as follows:

- La Ronge (salaried) 14.0 head count and 11.0 FTE
- Ile-a-la-Crosse (salaried) 6.0 FTE
- Three sites with “in and out” services (APP):
  - La Loche (6.0)
  - Stony Rapids (4.0)
  - Pelican Narrows (2.0)

NMS also supports approximately 200 specialist clinics per year.

INTERNATIONAL MEDICAL GRADUATES

The Saskatchewan International Physician Practice Assessment (SIPPA) is operated by the College of Medicine, with support from the Ministry, health regions, the Physician Recruitment Agency of Saskatchewan (PRAS), and the College of Physicians and Surgeons of Saskatchewan. It evolved from a pilot to a program in 2012. Initially, the program was limited to physicians from the United Kingdom, United States, Australia, New Zealand, Ireland, and South Africa; it has since expanded, particularly relevant to physicians residing in Canada but ineligible for licensure in other provinces. It moves through three inter-dependent stages:

- Pre-screening
- Orientation and Centralized Assessment (three weeks)
- Clinical Field Assessment (six or twelve weeks)

From January 2011 to January 2014, 118 completed SIPPA including the 6-12 week clinical field assessment (CFA). Forty-seven failed to complete SIPPA in the same time period. Currently, 113 physicians are practising in the province as a result of the SIPPA program, largely in rural or regional communities.

Since 2013, the College of Medicine has dedicated postgraduate positions for IMGs in the first iteration of the Canadian Residency Matching Service (CaRMS). Also, family medicine seats have been allowed to revert to IMG seats, if unfilled in the first iteration. IMGs who match to the University of Saskatchewan through CaRMS are required to pass a mandatory pre-residency assessment. Finally, all funding is linked to return-of-service agreements.

SASKATCHEWAN SURGICAL INITIATIVE

In 2009, as a result of the findings from the Patient First review, Saskatchewan's Ministry of Health began working with specialists, health regions, and health care providers on a plan for improving the experience of Saskatchewan surgical patients. This was the beginning of the Saskatchewan Surgical Initiative.

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The ultimate goal of the Saskatchewan Surgical Initiative is to demonstrate to patients that health care in the province can be accessible, safe, sustainable, and of the highest quality.

The plan of the Saskatchewan Surgical Initiative includes:

- Reducing surgical wait times to no more than three months within four years (by 2014);
- Making changes that result in better and safer care for surgical patients
- Improving the experiences of Saskatchewan surgical patients
- Ensuring that short wait times can be sustained into the future

The Saskatchewan Surgical Initiative is guided by the cooperative effort of two important advisory groups:

- The Guiding Coalition represents the front line experience and is constituted by physicians, nurses, therapists and other providers, representatives from every health region, health care unions, regulatory bodies, the Health Quality Council, Ministry of Health, and patient advisors.
- The Executive Sponsorship group represents higher-level decision makers with strategic leadership, advice and direction for the Surgical Initiative and advocates for patients' needs. Its membership comes from the Health Quality Council, Regina Qu'Appelle, Saskatoon and Cypress health regions, the Saskatchewan Union of Nurses, the College of Physicians and Surgeons of Saskatchewan, the Saskatchewan Medical Association, the Saskatchewan Registered Nurses Association, Kaizen Institute lean advisors, senior leaders of the Ministry of Health, and patient advisors.

The initiative has been successful and the data continue to be measured and to improve. In the context of this study, the impact going forward will include the assessment of workforce requirements and system capacity.

PRIMARY HEALTH CARE

The Framework for Achieving a High Performing Primary Health Care System in Saskatchewan was published in 2012 as a road map for a patient-centred primary health care system, designed to ensure timely access to appropriate care with assistance to navigate services and supports for maintaining good health. Saskatchewan Health developed this framework for communities, patients and providers, Regional Health Authorities, and other service delivery partners; it followed widespread consultation with multiple stakeholders and stakeholder groups.

Implementing the framework is still a work-in-progress; while various milestones have yet to be achieved, the document is considered to be as valid today as when originally published. It is more detailed than related and supportive documents, such as the primary health care vision of the SMA. The thematic title (Patient-Centred; Community-Designed; Team-Delivered) is consonant with the principles that underpin the methodology of this study.

The framework underlines the provider of primary health care being one of several health professions and is responsive to the results of stakeholder engagement, and includes the following:

- Offer every person in Saskatchewan access to a Primary Health Care Team that meets their everyday health needs and helps them navigate the rest of the system; every team will include or be connected to a family physician
- Be rooted in community and designed in collaboration with patients and communities
- Reflect the communities it serves, with specific attention to First Nations communities and Métis communities
- Be flexible in designing teams and service delivery, in order to match community needs with resources and assets
- Include independent family physician practices, primary health care services managed by Regional Health Authorities, and the First Nations primary health care delivery system

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- Use a flexible funding approach, with decision-making located closest to the patient and community and Regional Health Authorities
- Have clear aims, accountabilities, and expectations for providers and Regional Health Authorities
- Use a continuous improvement approach to ensure progress towards aims related to patient and family experience, health outcomes, and sustainability

Foundational planning for primary health care has been based on high level targets.

CANCER CARE

The Saskatchewan Cancer Agency serves the entire Saskatchewan population of 1,122,537 (Ministry of Health Covered Population 2013) from two Cancer Centres (the Allan Blair Cancer Centre [ABCC], located in Regina, and the Saskatoon Cancer Centre [SCC], located in Saskatoon). Of the 750 agency employees, the physician FTE complement is 53.3, as follows:

- One Senior Medical Officer, 15.5 Medical Oncologists, four Paediatric Oncologists, 10.8 Haematologists, 15 Radiation Oncologists, and 7 Clinical Associates
- **Excludes** four FTE Gynaecologic Oncologists, who are contracted by Regina Qu'Appelle and Saskatoon Health Regions, but who provide clinical services within ABCC and SCC

Physicians at both centres are involved in academics, clinical service, and research. Current employment and incorporation contracts do not define specific expectations. The SCA provides services for the prevention, detection, and treatment of malignant disease. The Community Oncology Program of Saskatchewan (COPS) enables SCA to work together with the health regions to provide specific types of chemotherapy treatments in certified hospitals. COPS provide cancer patients with care, treatment and support in or closer to their home communities. There are 16 COPS centres located in hospitals throughout Saskatchewan.

The SCA is working towards having more physician “extenders” (described in other sections), which may be Family Physicians, Hospitalists, Nurses, and/or Pharmacists who can assume some functions currently performed by Oncologists. This would improve skill-task alignment, and free Oncologists to perform tasks that require their level of expertise. As SCA does not currently have residency-training programs, there are no residents or fellows to perform some of the tasks that are done by learners in other jurisdictions; although, the current plans include developing a residency program.

There is lack of clarity in the lines of authority and accountability over matters that span health regions. For example, who should be accountable for variation and appropriateness across the province? Who should look after variations in outcomes for surgical oncology, and assessing the importance of critical mass?

The distributed learning model of the College of Medicine is expected to place increased teaching expectations on SCA staff, which are already challenged to supply services. Drivers of workload over next 5-10 years relating to increased demand for treatment and palliative services include:

- Increasing cancer incidence
- Aging population
- Increasing survival (which increases cancer prevalence)
- Increased number and types of treatments including multiple “lines” of chemotherapy treatments and more pre-operative treatments

Current projections at a national level suggest that there will be significant shortfalls in the supply of medical oncologists relative to demand and need. Inadequate supply of medical oncologists and/or the inability to recruit medical oncologists will adversely affect supply of practitioners and will likely necessitate other models of care, with increased use of “extenders” throughout the system. Similarly, a shortfall in Radiation Oncologists is anticipated to occur in three to five years (also a national issue with a direct impact on SCA recruitment).

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2.4 CHARACTERISTICS OF THE SASKATCHEWAN POPULATION

The province of Saskatchewan has the fifth largest population in Canada and the second lowest population density, outside of the territories. Regions in the northern half of the province have very low population densities, with isolated rural small communities being typical.

Figure 1 - Population by Jurisdiction, 2011

Rank	Name	Population (000's) (2011 Census)	Percent of national 2011 population	% growth (2006–11)	Land area (000's) (km ²)	Population density (/km ²)
1	 Ontario	12,851	38.40%	5.70%	909	14.1
2	 Quebec	7,903	23.60%	4.70%	1,357	5.8
3	 British Columbia	4,400	13.10%	7.00%	923	4.8
4	 Alberta	3,645	10.90%	10.80%	640	5.7
5	 Manitoba	1,208	3.60%	5.20%	552	2.2
6	 Saskatchewan	1,033	3.10%	6.70%	588	1.8
7	 Nova Scotia	922	2.80%	0.90%	53	17.4
8	 New Brunswick	751	2.20%	2.90%	71	10.5
9	 Newfoundland and Labrador	514	1.50%	1.80%	371	1.4
10	 Prince Edward Island	140	0.40%	3.20%	6	24.7
11	 Northwest Territories	41	0.10%	0	1,143	0
12	 Yukon	34	0.10%	11.60%	475	0.1
13	 Nunavut	32	0.10%	8.30%	1,878	0
Total Canada		33,474	100%		8,966	3.73

Source: Statistics Canada

Since 2008, population growth has averaged 1.6% per annum, reflecting economic rebounds and growth. At the regional level, virtually all (97%) of the ten-year growth has been in the Prince Albert Parkland, Regina Qu'Appelle, and Saskatoon health regions, with the majority of growth occurring in the regional centres of Prince Albert, Regina, and Saskatoon. In summary, the population is relatively small, centred in urban locations, and with many small rural and often isolated communities.

First Nation, or Registered Indian, populations experienced growth of 2.8%; Registered Indian status accounted for 10% of the provincial population. This has important ramifications for service delivery planning and PPR (for example, service utilization paid by federal authorities, and potential “data flight” and differential service utilization compared to the non-Registered Indian population).

The interprovincial migration trend of a net outflow (NIPM) to other provinces has reversed in Saskatchewan since 2006/07. The last five years have averaged a net in-migration of 2,200.

Immigration to the province has been steadily increasing since 2002. In 2007, 3,517 immigrants arrived in Saskatchewan.

In Saskatchewan, the percentage of population age 65 years and over is comparable to the national average of 14.5%. Numerous regions have a higher proportion age 65 years and over than the national and provincial averages. Only the three northern most regions are materially lower than the provincial average; Cypress, Five Hills, Kelsey Trail, Sun Country, and Sunrise health regions are greater than the provincial average.

2.4.1 POPULATION FORECAST TO 2023

Population forecasts were provided by Government of Canada (GOC) Statistics Canada to 2022/23⁵. The PPR forecast horizon is the ten-year period from 2014 to 2023. The year 2012/13 is the “current” or “base” year for the PPR forecasts. March 31, 2013 is the effective date of the physician roster using 2012/13 payment and CPSS registry data. The population is forecast to increase at an annual rate of 1.46%. The RHA growth rates range

⁵ <http://www.statcan.gc.ca/daily-quotidien/140917/dq140917a-cansim-eng.htm>

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from (0.26%) in Keewatin Yatthe to 2.33% in Athabasca. Statistics Canada issues seven forecast scenarios; one low growth, five medium growth, and one high growth scenario. This report uses one of the medium growth scenarios, scenario #5 'Projection scenario M5: medium-growth, 2009/2010 to 2010/2011 interprovincial migration trends'. Statistics Canada scenario #5 key assumptions are a Canadian total fertility rate that reaches 1.67 births per woman in 2021/2022 and remains constant thereafter; a Canadian life expectancy that reaches 87.5 years for males and 89.1 years for females in 2062/2063; interprovincial migration based on the trends observed between 2009/2010 and 2010/2011; a national immigration rate that reaches 0.75% in 2022/2023 and remains constant thereafter; an annual number of non-permanent residents (Canada) that reaches 864,600 in 2021 and remains constant thereafter; a national net emigration rate of 0.19%. The base population for these projections is derived from the official preliminary postcensal estimates of the population for Canada, provinces and territories as of July 1, 2013. For more detail on the assumptions and scenarios, refer to the Statistics Canada projection report (catalogue 91-520) and the Statistics Canada technical report (catalogue 91-620).

Figure 2 Provincial Population - Key Trends 2013 to 2015

PERIOD - SASKATCHEWAN	Population at beginning period	Natural increase	Net interprovincial migration	Net international migration	Total net migration	Total growth	Total growth
	number	number	number	number	number	number	percent
2015							
July to September	1,133,637	..	..	..	..	..	..
April to June	1,130,537	1,641	(1,444)	2,903	1,459	3,100	0.27
January to March	1,129,061	1,262	(1,133)	1,347	214	1,476	0.13
2014							
October to December	1,126,567	1,184	(74)	1,384	1,310	2,494	0.22
July to September	1,122,283	1,791	(549)	3,042	2,493	4,284	0.38
April to June	1,118,064	1,603	(1,095)	3,711	2,616	4,219	0.38
January to March	1,114,176	1,212	(229)	2,905	2,676	3,888	0.35
2013							
October to December	1,111,005	1,131	(439)	2,479	2,040	3,171	0.29
July to September	1,106,122	1,715	(76)	3,244	3,168	4,883	0.44
April to June	1,100,053	1,531	543.00	3,995	4,538	6,069	0.55
January to March	1,096,446	1,151	(504)	2,960	2,456	3,607	0.33

Source: Statistics Canada (<http://www.statcan.gc.ca/pub/91-002-x/2015002/t328-eng.htm>)

2.4.2 POPULATION HEALTH INDICES

Saskatchewan population health indices trending includes:

- Dependency ratios (number of dependents per 100 people of working age in the subpopulation) have generally declined between 2001 and 2011
- Saskatchewan has a higher potential years life lost (PYLL) rate than the national average in the sample periods, 2000-2002, and 2005-2007
- Nationally, Aboriginal populations had PYLL rates 88% and 145% higher for males and females respectively, than the non-Aboriginal averages
- The provincial life expectancy results, both at birth and at age 65, were comparable to national averages. At the regional levels, the three most northern areas stood out as having statistically significant lower life expectancy. This is consistent with prior information on mortality (all cause) rates and PYLL
- Saskatchewan, from 2002 to 2011, seems to be trending to the national all cancer age-standardized incidence rates (male and female)

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- In 2007, 1.3 million Canadians (4.8% of Canadians – 4.2% of girls and women, and 5.3% of boys and men, 12 years of age and older) reported having heart disease (PHAC, 2009); Saskatchewan prevalence at 5.0% was 4% higher than the national self-reported average of 4.8% ($1.04 \times 4.8 = 5.0$)
- The age-standardized prevalence of diabetes mellitus among Canadians, aged one year and older, increased by 70% in ten years, from 3.3% in 1998/99 to 5.6% in 2008/09 (source: PHAC, 2009). Saskatchewan has seen an increase in prevalence from 4.8% in 1998/99 to 5.6% in 2008/09
- Incidence of End Stage Renal Disease (ESRD) in Saskatchewan is 1,747 per 100,000 population compared to 1,593 nationally. Prevalence of ESRD (total n = 1,117) in Saskatchewan is 3.1% lower at 108.43 per 100,000, compared to 111.9 nationally. Kidney transplant as a treatment was lowest in Manitoba (33%) and Saskatchewan (32%)
- Saskatchewan, in 2009, was slightly above the national average for death rates due to cerebrovascular disease, namely 42 per 100,000 compared to 38.9 nationally
- The age standardized prevalence of arthritis in Canada and Saskatchewan in 2011 was 14.2 and 15.3 respectively, with Saskatchewan being 7.7% higher than the national self-reported survey average
- An analysis of the 2006 CCHS on mental health revealed the following information on prevalence: the past-year (2005/2006) prevalence of any type of provider use for mental health reasons in Canada was 9.5% (95% CI-9.1%, 10.0%). Saskatchewan was 9.8% (8.3%, 11.3%)

2.5 PHYSICIAN SUPPLY IN SASKATCHEWAN⁶

In Canada, the annual count of physicians receiving at least one clinical payment, excluding imaging and laboratory specialists, has been increasing by a mean of 2.7% between 2007/08 and 2011/12. Saskatchewan counts grew by an average 2.9%, with a range of 2.1% to 3.4% over the same period. Alberta had the highest average annual increase at 4.6% and New Brunswick the lowest, at 1.1%. Nationally, population growth averaged 1.18% per annum over the same period.

All health regions, with the exception of Athabasca Health Authority, experienced an increase in the absolute count of family physicians. Saskatchewan, in aggregate, increased the count of family physicians by 15.1%, compared to 13.2% nationally. Saskatchewan had 101 family physicians per 100,000 population, compared to 109 per 100,000 population, nationally. Substantial variation in the number of family physicians per 100,000 population exists at the regional level, namely, from 40 in Athabasca to 116 in Prairie North. In Canada, 72.3% of family physicians and 77% of specialists are Canadian trained compared to 37.7% and 56.4%, respectively, in Saskatchewan.

All regions with specialists in 2008 experienced an increase in count by 2012. Saskatchewan, in aggregate, increased the count of specialists by 22.7% compared to 16.6%, nationally. Saskatchewan, in aggregate, had 81 specialist physicians per 100,000 population compared to 106 per 100,000 population, nationally. Due to the small number of specialists and the relative populations outside the two largest health regions, SHR and RQHR, results at the regional level of specialist counts should be viewed with caution and not over-interpreted.

High level data suggest Saskatchewan had 13.3% fewer physician FTE than the national mean (namely, 608 residents per physician compared to 537 per physician FTE, nationally), fewer medical specialists per surgical specialist (ratio of 1.35 compared to 2.01, nationally), and a higher proportion of family physicians per specialist physicians (ratio of 1.53 compared to 1.31, nationally).

⁶ Canadian Institute for Health Information (National Physician Database, 2013) (Scott's Medical Database, 2013); National Physician Survey, 2013; Ministry of Health, Government of Saskatchewan; College of Physicians and Surgeons of Saskatchewan

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The gender shift continues to unfold in the physician workforce, albeit at a slower rate of increase in recent years. Between 2001/02 and 2008/09 the percentage of the female workforce, measured against the total workforce, increased 1.5%, annually, compared to 0.8%, annually, between 2008/09 and 2011/12. Saskatchewan, at 31.3% female, second lowest nationally, can expect the percentage to increase to the national average in the coming years, meaning a higher annual rate of increase than other provinces. This will impose a significant impact on FTE growth in the future.

The average physician age in Saskatchewan has been constant in the 49.2 to 49.6 years range over the five-year period ending 2012, and slightly lower than the national average age.

The 2013 National Physician Survey, Saskatchewan specific, reported that 22.3% of respondents aged 55-64 years planned to retire from clinical practice within two years and an unknown percentage of those age 65 years and greater. The Saskatchewan response rate was 14.1% for family physicians and 21.4% for other specialists. The family physician response rate was the lowest among all jurisdictions. The specialist response rate at 21.4% was higher than the national average of 17.8%.

In Saskatchewan, over the period 2005 to 2011, 23.8% of IMGs received full licensure from the CPSS, 28.7% received provisional licensure, 10.9% a supervised locum license, 33% unsupervised locum license, and 3.7% a special license.

IMGs given full licensure in Saskatchewan during the five-year period 2007 to 2011 qualified in India (7.9%), Libya (5.5%), Pakistan (9.3%), South Africa (38.6%), and the remainder from other countries (38.7%). IMGs, given other licensure status (provisional, locum tenens), obtained a medical degree from a greater number of countries, but most were from the same four countries as those given full licensure.

Of the 1,132 IMGs licensed in 2007 to 2011, 58.2% were licensed as family physicians, 23.7% as medical specialists, and 10.4% as surgical specialists.

Canadians studying abroad (CSA) present a number of challenges to the Canadian health system, including Saskatchewan. They are “lost” to the system for a period of years and are often overlooked in physician workforce planning as a result. They compete for residency positions with IMGs at a time when integration of IMGs is a priority for the health system. Studying abroad is very expensive, and it can be inferred that CSAs, most frequently, come from affluent and influential backgrounds.

In an overall comparison of the Saskatchewan physician workforce to the Canadian averages, the data reveal:

- A mix, slightly over-weighted (4.6%) in family physicians and under-weighted in medical specialists (4.7%)
- 18.9% fewer physicians per 100,000 population
- 4.7% more male physicians than the national average
- 13% fewer Canadian born family physicians, and 4.5% fewer specialist physicians

The CPSS registry file of 10,369 individuals was narrowed to 3,344 physicians with approved licenses in 'good standing' during 2012/13. The resulting list of 3,344 was next filtered for interns/residents, inactive licenses, locum tenens physicians, students (including 'JURSI'), senior life, and telemedicine licensure, reducing the registry list to 2,136. The final count was 2,106 individual physicians that had both an active licensure status and received one dollar (\$1.00) or more in payments during 2012/13. Of the 2,198, 203 received less than \$25,000 in total payments in 2012/13. These individuals were excluded from subsequent FTE calculations resulting in a net final head count of 1,995.

An analysis of gender, by specialty, highlights the following:

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- 59.7% of family physicians are male, and 73.3% of general practice physicians are also male. Nationally, 57.6% were male and 36.2% of first year residency trainees, in 2012/13, were male. The Saskatchewan data may be explainable by the prevalent gender of IMGs
- A large gender shift is still underway in **family practice** and will continue for a number of years before stabilizing close to 60% female/40% male
- Psychiatry is 39.6% female compared to 66.3% of first year residency trainees, nationally, in 2012/13
- General paediatrics is 43.9% female compared to 83.4% of first year residency trainees, nationally, in 2012/13
- Cardiology was 9.2% female, Gastroenterology 10.4% female, General Internal Medicine 26.7% female, Medical Oncology 15.9% female, compared to 47.1% of first year residency trainees, nationally, in 2012/13

Gender shift will continue to impact materially PPR and FTE workforce planning over the next twenty years. Due to the initial imbalance, this will be of greater significance in Saskatchewan than in other provinces, especially in General Practice/Family Medicine.

Typically, at the national level, annual turnover in the current workforce averages 3.5%. Turnover in counts of physicians occurs through departures to other jurisdictions or abroad, retirement, death, and leaving practice. Turnover in FTEs occurs for the same reasons plus the change in FTE value as one progresses through each age cohort. In Saskatchewan, there is an annual turnover rate among FFS physicians in the 7.44% to 7.75% range, per annum, which is more than twice the national average. As seen earlier in this report, this is attributable, largely, to the departure of IMGs to other jurisdictions, within or outside Canada.

CPSS has an optional field in its licensure forms for a physician to declare a “field of practice.” CPSS does not monitor the field accuracy, and it is only updated if a physician indicates a change. The licensed specialty was inserted as the default value if the field was blank, and then modified based on “reason for payment” from a physician by review of RHA payments in 2012/13 (such as, GP Hospitalist or House Officer contract for service). Based on this approach, the 890.5 Family Physicians FTEs were sorted into categories: family physicians (653.3 FTE), Emergency Medicine (64.8 FTE), and other special interests (110 FTE) such as surgical assistant (27.0 FTE) and critical care associate (35.4 FTE). These latter two special interests were the dominant “fields of practice” other than Family Physicians. Emergency Medicine (EM) includes only those FTEs where the majority of income was earned in the emergency department. It does not include those with significant EM earnings, but still less than 50% of total earnings. The calculations included a count of physicians who earned more than \$10,000 from the emergency room call program. In this case, there were 206 such physicians compared to an FTE value of 64.8 for those with more than 50% of earnings from the emergency department.

Trends in **family practice** include: high annual turnover, increase in care of elderly as a special interest, increase in hospitalist medicine, clinical associate, and emergency medicine special interests, and a decline in newborn deliveries. Patients in rural and northern areas tended to have lower patient–provider continuity of PHC, and higher patient–clinic continuity of PHC, than those in more urban areas.

- The overall supply of physicians in the five-year period 2008 to 2012 in Saskatchewan increased 18.4% (15.1% for family physicians and 22.7% for specialists). Nationally, overall physician supply increased 14.8% (13.2% for family physicians and 16.6% for specialists) (source: CIHI)

2.6 PHYSICIAN SERVICES UTILIZATION IN SASKATCHEWAN

Key highlights on the utilization of physician services are:⁷

- Saskatchewan experienced a 0.8% increase in FTE between 2007/08 to 2012/13, while all other jurisdictions experienced a decline
- Saskatchewan had a 15.3% decline in services per 1,000 population; there was a national decline of 12.5% in services per 1,000 population; over the past five years, the demand for laboratory services in Saskatchewan has increased by 15% (about the midpoint increase for provinces from Ontario to the west)
- Saskatchewan FFS surgical specialists provided 10.2% more services per FTE than the national average (5,670 to 5,144)
  - Compared to the provinces from Ontario west, Saskatchewan was 2% above the Ontario services/FTE, 23% above Manitoba, 17% higher than Alberta, and 12% higher than British Columbia
  - Saskatchewan had a 2.2% surgical services increase per FTE between 2007/08 to 2012/13 compared to a 1.5% increase per FTE nationally
  - Saskatchewan had a 0.8% increase in surgical services per 1,000 population; there was a national increase of 11.3% in services per 1,000 population
- Saskatchewan FFS medical specialists provided 19.6% more services per FTE than the national average (5,433 to 4,544)
  - Compared to the provinces from Ontario west, Saskatchewan was 11% above the Ontario services/FTE, 6% below Manitoba, 17% higher than Alberta, and 25% higher than British Columbia.
  - Saskatchewan had a 7.2% increase in medical services per FTE, between 2007/08 to 2012/13, compared to a 2.3% increase per FTE, nationally
  - Saskatchewan had a 9.9% increase in medical services per 1,000 population; there was a national increase of 11.5% in services per 1,000 population
- Fee-for-service physicians in Saskatchewan are providing more services per FTE than most other provinces; these calculations and assessments do not include services compensated by alternative payment plans, which comprise an increasing proportion of physician payments and services; in Saskatchewan, in 2012/13, 29.6% of all physician payments were non-FFS, making the impact highly material
- Hospital discharges have remained essentially constant in the period 2008/09 to 2012/13; this is consistent with national trends towards emphasis on non-inpatient based care and shorter lengths of inpatient stay
- There are 24 hospitals with less than one discharge per day including 10 with less than one discharge every other day; inpatient units with low volumes are inherently expensive to operate.
- Hospitals themselves are multi-purpose, often serving as the physician office location in small communities; hospitals also provide an ambulatory, emergency, and diagnostic capacity.
- Small hospitals allow patients to recuperate closer to home; nevertheless, they are relatively more expensive to operate.
- RHAs 1 (29.9%), 5 (16%), and 8 (21.2%) are seeing a significant decline in discharges; discharge declines are seen across most hospitals with the exception being the largest hospitals, namely Regina General (11.7% increase) and Royal University Hospital (19.2% increase)
- Between 2008/09 and 2013/14 most provider services, as measured by the number of inpatient days stay, accessed out of province by Saskatchewan residents declined; the only higher volume services to increase significantly over the period were adult cardiology and neurology, paediatric gastroenterology, cardiology, and neurology, paediatric surgical cardiac, general, and orthopaedic, and

⁷ Canadian Institute for Health Information (National Physician Database, 2013)

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adult surgical plastic; in summary there is a significant quantity of services accessed out-of-province by Saskatchewan residents that is considered in the physician workforce forecast.

2.7 ACADEMIC MEDICINE IN SASKATCHEWAN

There has been an undercurrent of concern at the College of Medicine with respect to its probationary accreditation status, discomfort with unknown or misunderstood dimensions with the evolution of an academic clinical funding plan, an impression of an imbalance of research, and an imbalance of teaching (UGME). All of these variables are being addressed by the COM, with positive outcomes.

The accreditors highlighted, particularly, deficiencies in undergraduate teaching and lower research funding, when compared to institutions receiving comparable operating funding from the university. Considerable more time was spent by faculty on service than on research and undergraduate teaching, apparently due to increased service demands. The responding document from the COM called for a renewed focus on teaching and research, underpinned by restructuring and enhanced distributed education. Functional strategies, commitments, and targets accompanied each objective.

At the departmental and divisional levels, with few exceptions, there are co-existent perceptions of being under-resourced in physician resources and little faith of resolution, with parallel concerns about the ability to sustain recruitment in the absence of stability. The under-resourcing creates a clinical overload that has taken precedence over teaching and research activities.

At the same time, there is a firm conviction in the academic mission and its position in the provision of services, support, and education in Saskatchewan. The anticipation and arrival of a new Dean and the strategic direction (with or without additional resources) carries with it major expectations.

Each department and division tells its own story; it would be a disservice to either summarize or generalize the issues, and each must be reviewed on its own accord (background data and summaries are provided in the Environmental Scan).

PPR in Saskatchewan cannot be isolated from resolution of the issues being addressed by academic medicine. At one time, the stress was limited to somewhat artificial boundaries between Regina and Saskatoon. While these boundaries are less intense today, they still exist, but are less significant than the pressures on the service, teaching, research, and administration commitments at the university.

As of 2013 46% of physicians practicing in Saskatchewan had completed their MD degree in-province with the next lowest rate was Newfoundland at 62% followed by Manitoba at 65%⁸. The most obvious consequence is a disproportionate reliance on IMGs to fill the gap; however, these individuals are by far the most mobile among physicians, accounting for the high turnover rate seen in Saskatchewan, consistently exceeding 7% of the workforce per annum.

The COM faculty for 2012/13 was the equivalent of 41.2 FTE academic. These are 100% academic FTE whereas seventy five percent (75%) is the maximum academic percent for any one individual. At 25% academic (typical mean for full-time medical faculty) the 41.2 FTE is equivalent to 165 individuals.

COM ranks 12th of 17 in the ratio of full-time faculty per trainee and 9th in total faculty per trainee. If a faculty is at the lower end of ratio of full-time faculty per trainee, it underscores the importance of and growing dependency on skilled, committed, long-term part-time community preceptors. An additional stress to

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⁸ The graduate retention data are determined six months after graduation, in that year, and do not capture off-cycle graduates or those who obtain fellowship positions elsewhere. Source: Scott's Medical Database, 2013, Canadian Institute for Health Information.

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academic medicine in Saskatchewan has been the return of a number of academic physicians to community care.

The implementation plan for a new vision has called for a realignment of resources and priorities, and reformed governance. Three objectives were confirmed:

- Re-align faculty complement, informed by principles
- Re-conceptualize research, aligning time and resources between the research mission of the college and the provision of clinical service
- Restructure college governance and partnerships

The Ministry of Health bases the current number of PGME positions at the COM on an assessment of need. The PGME program is committed to increased generalism and its importance across departments and divisions (consonant with the RCPSC). That notwithstanding, there are two significant areas where PGME is lacking control:

- National mobility is of increasing significance
- Scope of clinical practice is the choice of the individual resident, and its limitation will impact the choices of where to practice

The faculty PGME leadership supports changing the PGME system so that the first year of postgraduate training is limited to eight to ten specialties, rather than the current 35 specialties. The PGME goal supports flexibility during training, using a robust model that avoids the blunt instruments implemented after the Barer-Stoddart report. However, PGME changes are notably difficult to implement quickly. This is in the context of an increasing awareness of medical unemployment and underemployment. This is a complex issue that is being researched and analyzed on many fronts. Prominent are the Steering Committee of the National Physician Employment Summit and the F/P/T Committee on Health Workforce. The root causes of this are multi-faceted, including limitations to existing planning models, data on population needs, and learning environments that reflect patient needs.

The UGME philosophy is metaphorically the production of stem cells, to later be differentiated in the pursuit of postgraduate training. The goal has been to initiate that differentiation in the fourth year; however, some occurs during the third year or even earlier.

Currently, UGME is attempting to nurture an environment that leads to more **generalists**, especially General Internal Medicine and Paediatrics. Achieving this goal will require a greater engagement by **generalists** as part of the academic mission. Over time, greater pressure will be placed on increased numbers of clinical preceptors and those who are candidates to become preceptors. The ultimate driver of success in UGME programs is thought to be an increase in the number of participating **generalists**. Currently, it has been observed that the divisional commitment to UGME initiatives is inversely proportional to the number of members in a division.

Chapter 3 FORECAST MODEL

3.1 PRINCIPLES

Following are guiding principles in the context of PPR forecast modeling:

(1) **Transparent**

All aspects of the methodology, model, and forecasts are fully described, including any limitations and assumptions made

(2) **Patient-centered**

For any given assumption, the default position is towards the approach that supports optimal patient-centred health care

(3) **Appropriate to population need**

Model variables incorporate available indicators of population need for health care services including indicators of health service utilization (physician services delivered in hospital and office settings) by demographic and geographic population segments, and disease incidence and prevalence (chronic conditions), by demographic and geographic population segments

(4) **Affordable now and sustainable in the future**

For any given assumption, the default position is towards the alternative that delivers optimum patient-centred health care with the lowest cost option

(5) **Equitable across the geographic distribution of the population**

Incorporate local access to defined physician core services with referral access to added services

(6) **Preserve and enhance quality of care**

The selected option (e.g. core service model) for a given assumption will preserve or enhance quality of care (acceptable, appropriate, accessible, efficient, effective, and safe)

(7) **Supports appropriate access to needed services**

Incorporate local access to defined physician core services, with timely access to added referral services

(8) **Active, robust practitioner engagement**

Comprehensive environmental scan through engagement of local, regional, and provincial practitioner representatives

(9) **Aligned with appropriate inter-professional and intra-professional, innovative, delivery models**

Incorporate models of care that support role optimization of health professions (such as, physician specialties, **physician extenders**)

(10) **Designed in context of government and stakeholder health system strategic priorities and plans**

Be aligned with validated strategic priorities and plans of government, health authorities, faculties of medicine, colleges, and professional associations

(11) **Inclusive of relevant determinants of current physician supply**

Incorporate relevant determinants, including physician age, gender, practice location, migration, full-time equivalency, relative workload and hours of work, and call requirements; follow RCPSC and CFPC definitions of recognized specialties; secondary views by special interest for CFPC physicians

(12) **Inclusive of relevant determinants of future physician supply**

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Incorporate relevant determinants including students and residents by medical school by status (Canadian resident, international medical graduate, trainee fellows) by year, by specialty

(13) Predicated on productive, sustainable, quality, benchmarked workload

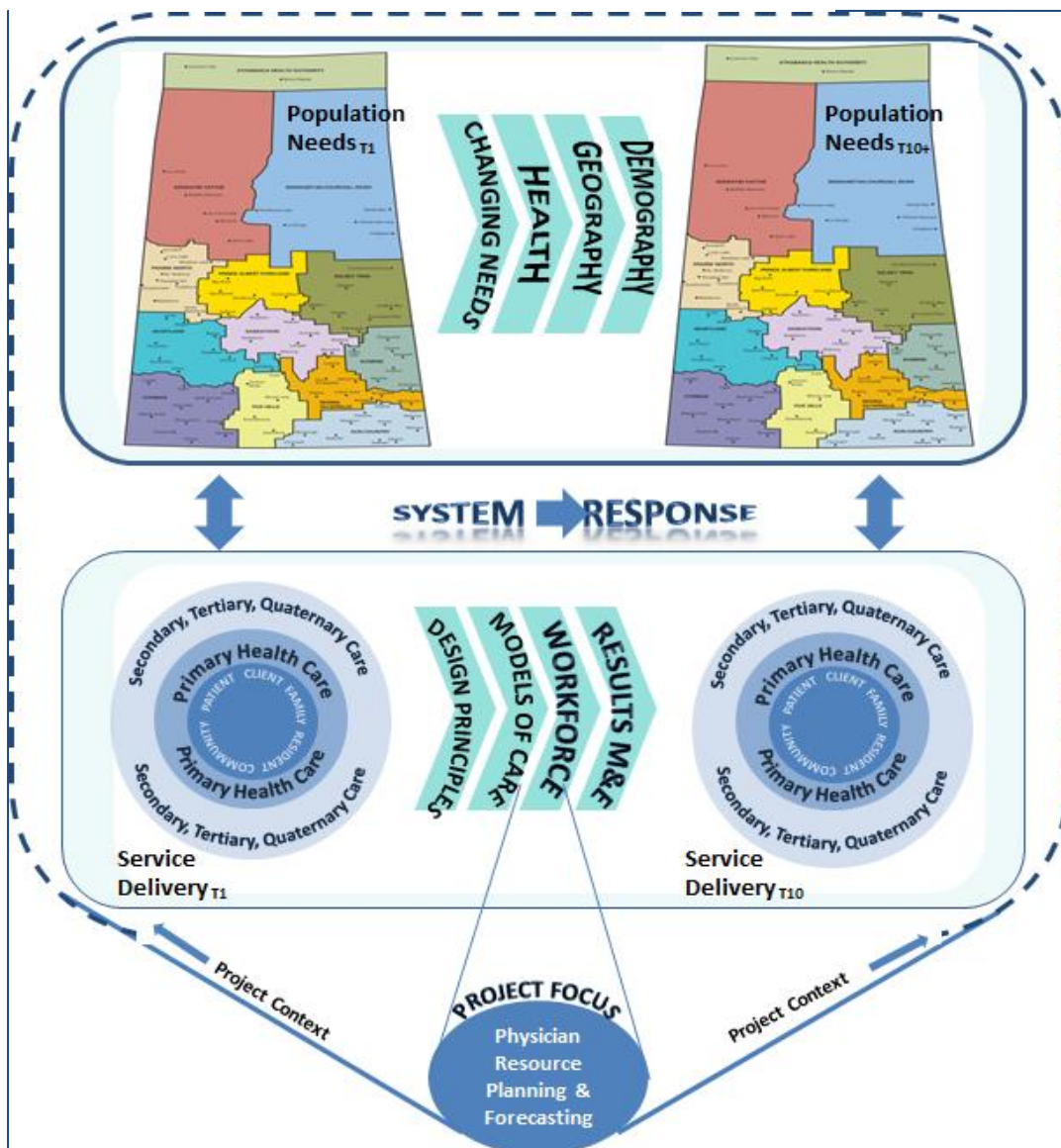
Define and integrate full-time equivalence, sustainable call rota, sentinel qualitative and quantitative service and population benchmarks

3.2 MODEL DESIGN

3.2.1 CONTEXT

Awareness, understanding, and integration of critical contextual developments are essential to achieving a quality physician resource planning model and implementation framework.

Figure 3 - PRP Contextual Model



A PPR cannot plan for all developments; however, it can ensure purposeful awareness and appropriate integration of the relevant developments.

A PPR informs one, albeit critical, component of the health human resource (HHR) spectrum. HHR planning, in turn, occurs in the context of Government and Ministry of Health overarching strategic directions, the broader needs of the population, and service and infrastructure realities.

A PPR directly or indirectly touches



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on most, if not all, aspects of a health system. Actions on PPR will have a ripple effect on primary, secondary, tertiary care, alternative care providers, and payment system budgets.

For these reasons, it is important when reviewing a PPR, to do so in context, particularly when determining subsequent strategic directions and actions.

3.2.2 SCOPE

The Royal College of Physicians and Surgeons of Canada (RCPSC) currently recognizes sixty-five disciplines/specialties.⁹ The RCPSC excludes diploma (cytopathology) and special program (palliative medicine) certification from the list of sixty-five. Based upon RCPSC supplementary training requirements and overall experience, another 11 areas of expertise are recognized in this report, (nine paediatric medical subspecialties and two paediatric surgical subspecialties). The scope of PPR work, therefore, includes 76 RCPSC specialties. The scope of work with respect to CFPC includes Family Medicine and Family Medicine with special competence in Emergency Medicine. General Practice status completes the total scope of PPR work at 78 disciplines/specialties.

The scope of work excludes areas of special interest related to RCPSC specialties. Individual changeability, lack of examination with certification, and the practicalities associated with literally hundreds of special interests preclude their consideration. Family Medicine, representing approximately 50% of the physician workforce, special interests is an emerging scope of work.

3.2.3 RESEARCH

A detail research, review, and analysis of governmental and stakeholder information was conducted as part of the Environmental Scan phase and carried forward to this the Forecasting phase.

DOCUMENT REVIEW

Review and assess strategic priorities of the Ministry of Health as relates to PPR including:

- Saskatchewan Surgical Initiative
- Primary Health Care - Saskatchewan is working to strengthen its primary health care system to better serve the needs of patients and communities
- Emergency Department Waits and Patient Flow Initiative - A priority initiative to improve how patients navigate the health system and to ensure that, by 2017, no one waits for care in emergency departments
- Physician Recruitment Agency of Saskatchewan - Provincial agency to recruit and retain more physicians to rural and urban Saskatchewan
- Patient First Review - Research, findings, and recommendations on creating a more patient-centred health system and improving the performance, efficiency, and cohesiveness of the organizations and individuals who make up the health system
- Patient- and Family-Centred Care - Approach adopted by the Saskatchewan health system to respond to the needs, values and preferences of patients and families by working collaboratively with them
- Saskatchewan's Health Human Resources Plan - Saskatchewan's guide to inform health workforce strategies and policies
- Aboriginal Health - The provincial government works with the federal government and First Nations and Métis peoples to address the needs of Aboriginal peoples in Saskatchewan

⁹ The RCPSC and the authors of this report use the terms 'discipline' and 'specialty' interchangeably.

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- Incorporate current healthcare system governance structure, including regional health authorities (RHAs) and Saskatchewan Cancer Agency
- Incorporate current remuneration system including fee-for-service, alternative payment and academic funding plans, while being sensitive to the potential for introduction of a new funding model(s)
- Clinical and academic functions (service, teaching, research and administration) of physicians within the University of Saskatchewan College of Medicine (COM)
- Service delivery profiles (refer in/out, primary to quaternary) to Saskatchewan residents and south eastern Alberta, Lloydminster, and south western Manitoba
- Provincial direction in the recruitment and retention of International Medical Graduates (IMGs)
- Regional Health Authority and MOH capital capacity expansion plans (major hospital additions and/or expansions, community health centres)

INTERVIEWS

Interviews were conducted to inform the Environmental Scan phase and subsequent Forecast phase with the opinion, experience, and expertise of individuals and groups associated with key elements of the health system. Interview findings have been reported in the Environmental Scan report.

LITERATURE REVIEW

A key word and subject matrix was created to guide literature searches. Key search words and subjects included 'physician resource planning', 'Full-time equivalent methodologies', '[specialty name] physician workforce planning' in the search criteria.

Research grey literature including, but not limited to:

- Stakeholders - Shareable relevant reports from PAC and TWG members
- Comparable organizations within Canada, United States, Western Europe, and Australia
- Conference proceedings
- Discipline-specific peer-reviewed journals, typically the higher quality rated journals will contain insightful articles specific or related to PPR (such as, Journal of General Internal Medicine)
- Survey reports from Canadian Medical Association (2013 - last comprehensive survey), Saskatchewan Medical Association (SMA), and CFPC on physician trends (lifestyle, hours of work, practice profile, contemplated changes, and preferred payment models); particularly valuable in this regard are client specific surveys of physicians, including family physicians; the latter have rapidly evolving practice profiles and insight specific to Saskatchewan and communities which are valuable in calibrating the FTE of family physicians doing "true" community **family practice** on a 24/7 comprehensive (including obstetrics, on-call, after-hours care) basis versus 9/5 versus half-time in community and half-time in a hospital (hospitalist, surgical assistant)

WEB-BASED SEARCH

- "Expert" websites – such as, Euro Observatory, USA Council on Graduate Medical Education National Advisory Committee (GMENAC), UK Royal College of Physicians, American Association of Medical Colleges, American Board of Medical Specialties, the Advisory Board USA, and UK National Health Service and DOH
- "Other" websites – namely, OECD, WHO, World Bank
- Research databases such as PubMed

3.2.4 DATA CATALOGUE

The following table itemizes the primary data sets accessed, analyzed, and reported on in the Environmental Scan Report and input to the forecast model.

CATEGORY	DESCRIPTION	TIME PERIOD	PRIMARY SOURCE(S)
NEED			
1 Geographic	Postal code file linked to community, RHA levels for SK residents and physicians	2013-2014	Government of Saskatchewan e-Health
2 Populations	2006-2012 SK resident population data by age cohort, gender, region, and province 2013-2023 SK resident population data by age cohort and gender at provincial level	Historical (at community level) and forecast (at provincial level)	Government of Canada (GOC), Statistics Canada
3 Epidemiology	Incidence and prevalence data, such as chronic disease	2000 onward	CIHI Statistics Canada Community Health Survey
4 Chronic disease	See 3, 6, and 7	2003-2004 to 2012-2013	Ministry of Health Provincial programs CIHI Statistics Canada
5 Hospital Utilization	Admissions, deliveries, ED visits, day procedures, by hospital	2008-2009 to 2012-2013	Ministry of Health
6 Health status	Provincial Clinical Risk Groupers (CRG)	2003-2004 to 2012-2013	Health Quality Council
7 Health indices	Health indicators, such as dependency ratios, life expectancy, potential years life lost	2000-2012	CIHI Statistics Canada
8 Aboriginal people	Supplemental demographic, health status, utilization, geographic information	See above	See above
9 Wait times	Wait time data on surgical services (no reliable data on medical services)	2012 and 2013	Ministry of Health Surgical Services Initiative
SUPPLY			

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CATEGORY	DESCRIPTION	TIME PERIOD	PRIMARY SOURCE(S)
1 Current roster - baseline	Demographics of the current registered physician workforce (see also "Supply Assessment Model")	As of November 2013 with ten-year history	College of Physicians and Surgeons of Saskatchewan
2 Current roster - payments	MSP fee-for-service and shadow billings, block funding, salary, third party payments, academic and other physician payment data	April 1, 2012-March 31, 2013 and shadow billing (2013-2014 not available at time of reporting)	Medical Services Branch, Regional Health Authorities, College of Medicine, Saskatchewan Cancer Agency
3 CIHI benchmark and comparator data	Inter-provincial comparator physician counts, FTE counts, age, gender, migration	2008-2009 to 2012-2013	CIHI National Physician Database Scott's Medical Database
4 Medical education	National data on UGME and PGME programs for all faculties of medicine	2004-2013	Canadian Post-MD Education Registry and Canadian Resident Matching Service databases and web sites Association of Faculties of Medicine of Canada
5 National and provincial workforce current state and trends	National and provincial feedback from physicians members of CMA, RCPSC, and CFPC, using a standardized detailed survey (scope of practice, hours and type of work, trends)	2007 2010 2013	National Physician Survey (CMA, RCPSC, CFPC)

3.2.5 DATA LIMITATIONS

Each research source comes with limitation(s); however, each limitation was mitigated through the use of corroborating evidence, standardized interview questionnaires, iterative data refinement to improve accuracy and quality, and the conduct testing, revision, and validation of preliminary analytic results with stakeholders.

The analyzed data spanned 2003/04 to 2012/13. This time frame was long enough to permit trend identification and analysis. Within the data the following limitations were noted:

- (1) Access to services – Very good data on access to services are recorded by RHAs and SCA, and collected and reported by MOH on surgical wait times and lists. Data on access to medical consultation and services wait times and lists were not available. Validated data on residents without a family physician were spotty. It was, therefore, not possible to incorporate this element as detailed in the original work plan.

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- (2) Active physicians – The CPSS registry file of 10,369 individuals was narrowed to 3,344 physicians with approved licenses in “good standing” (2012/13) by matching to itemized individual license status records in the CPSS registry file. The list of 3,344 then was filtered for interns/residents, inactive licenses, locums, students (including “JURSI”), senior life, and telemedicine licensure, reducing the registry list to 2,228. This list then underwent further review and reconciliation to RHA, SCA, and COM payment and member lists, Alternative Funding Plan (AFP) rosters, COM academic appointment lists, and a wide range of website-sourced information. The result was reduction by a further 30 physicians with active licenses but who did not earn any payments in the year. The final count was 2,198 individual physicians that had both an active license and received one dollar (\$1.00) or more in payments during 2012/13. Of the 2,198, 203 received less than \$25,000 in total payments in 2012/13, meaning they worked on an infrequent basis or were only present for one month or so during the year. Of the 203, 35% had an estimated age over age 65, 70% were family physicians, and the gender distribution was 43% female/57% male. The most prominent characteristic among the 203 was an estimated age exceeding 65 years. The final count of physicians was 1,995 (source: Environmental Scan Section 5.4).

These added review steps added integrity to the resulting final roster information.

Limitation: A more recent roster (based on the fiscal year 2013/14) was not available since payment data for the year is not ready for analysis until a minimum three months after the end of the fiscal year, or June 30, 2014 at the earliest.

Matching payment data to individual physicians was conducted manually as there was no common identification to link across different payment files; RHA and SCA payments files were all by last and first names, with frequent spelling and naming errors.

- (3) It was determined that the CPSS unique lifetime ID was the most appropriate identifier for the roster and for future updates to the roster. The other possible alternative was the MOH MSP billing number; however, because this number relates to financial payments, it was seen as less appropriate for use as a province-wide unique identifier. Further, RHAs collect the CPSS ID as part of the appointment process and the MOH receives the full CPSS registry file on a weekly updated basis. So, the basic business processes were already in place to make the CPSS ID functional as a unique identifier.

Limitation: The COM does not record the CPSS ID. The RHAs and SCA do not record the CPSS ID in their payment systems. The MOH MSP fee-for-service files include the CPSS ID; however, it was uniformly incorrect due to a problem with the source file from eHealth Provider Registry. The interface file between the CPSS and eHealth Provider Registry requires further work to remedy this problem.

- (4) Academic Time – The COM is in the midst of major organizational restructuring. Individual, specific data on protected academic time was not available. When complete, individual faculty agreements will establish a percentage distribution between clinical and academic (research, teaching, and academic leadership) time, whether funded by an alternative payment plan or another source. In the interim, an income-based formula was applied to determine the academic percentage of each FTE for each full time and continuing status faculty member. The academic percentage FTE was calculated as the factor of ‘academic’ income over total income from all sources.

Limitation: The percentage of total income approach is not ideal but is a reasonable, evidence-based option. The Forecast Model specifically provides for disaggregation of an FTE into clinical and academic components by individual.

- (5) Functional Specialty – Functional specialty (cardiologist who spends 50% of professional time doing ‘general internal medicine’) is a complex, time-intensive construct to define and to maintain. For example, an individual can, and often does, change functional status in response to changes in local physician supply, such as the recruitment of a general internal medicine specialist enabling a cardiologist

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to revert to full-time cardiology, which in turn decreases cardiology referrals outside that RHA. A second significant complication is blurring of the definitional line between licensed and functional specialty (to practise cardiology, one must also practise general internal medicine). This report uses licensed specialty except in a few (less than 2%) instances where an individual is licensed in one specialty but has, often, for many years, functioned 100% in another specialty. In these instances, the individual is reassigned to their functional specialty.

Limitation: Inevitably, some individuals who entered the system under a particular license specialty, but have and always will practice under another, will be incorrectly categorized.

- (6) Licensed Specialty – The CPSS registry is the best and most appropriate source of information on licensed specialty, by individual. The CPSS information was refined through analysis of other sources, (payment coding by RHA and internet website searches). This analysis resulted in substantial changes for those whose CPSS specialty license was either “internal medicine” or “paediatrics.” For example many listed by CPSS with the speciality license of “internal medicine” were reassigned to a subspecialty (such as, cardiology or nephrology). The same outcome held true for those with a specialty license of “paediatrics.”

Limitation: Ideally, the CPSS listed specialty would be the definitive source for licensed specialty. Any other option will always generate some degree of error.

- (7) Payments – Block-funded contracts are paid to groups rather than individuals, making the determination of full-time (FTE) equivalency a greater challenge. Corroborating evidence was used to mitigate this weakness - Alternative Funding Plan (AFP) FTE budget status, COM work status (full-time, part-time, and retired), CPSS registry status, and income from all other sources for each physician (in particular RHA payments from Annual Reports). In some cases, the block payment was divided equally across the known list of individuals working for the payee.

Limitation: Without individual level income data, some FTE assignments will be incorrectly ascribed.

- (8) Timing - Changes in physician counts and FTEs occurring after March 31, 2013 will not be reflected in the baseline of the forecast projections. This is particularly important in certain subspecialties with small numbers. The final report will include specific recommendations on maintaining the roster of physicians in a current and accurate manner to ensure the quality of the planning for physician resources forecast model and supporting database.

Limitation: Use of roster data for 2012/13 will create timing issues with respect to the currency of roster information. A system of ongoing updating of the model database to “current day” physician counts and FTEs can eliminate timing differences to reproduce an updated forecast.

- (9) Shadow Billing – To replace the legacy income-based FTE calculations with workload-based calculations will require much improved shadow billing data. On average, in Saskatchewan in 2009/10, shadow-billing data only supported 18% of total actual alternate payments (source: CIHI-Saskatchewan Patient Level Physician Billing Data - Pilot Project).

Saskatchewan alternative clinical payments to physicians grew five-fold in the last decade, from approximately \$29 million in 2000 to \$161 million in 2009, representing 9.5% of total clinical payments in 2000, and 29.2% in 2009. Physicians in Saskatchewan who are paid through alternative payment plans are requested to provide information on the services that they provide through shadow billings, but the extent to which these services are comprehensive or accurate is poor.

Due to the increasing proportion of alternative payments, information on the services provided by physicians paid through alternative payments is important to supplement fee-for-service information to draw a more complete picture of physician remuneration and service utilization. Prior to utilizing the shadow billing claims, it is important to examine the coverage and data quality of these claims.

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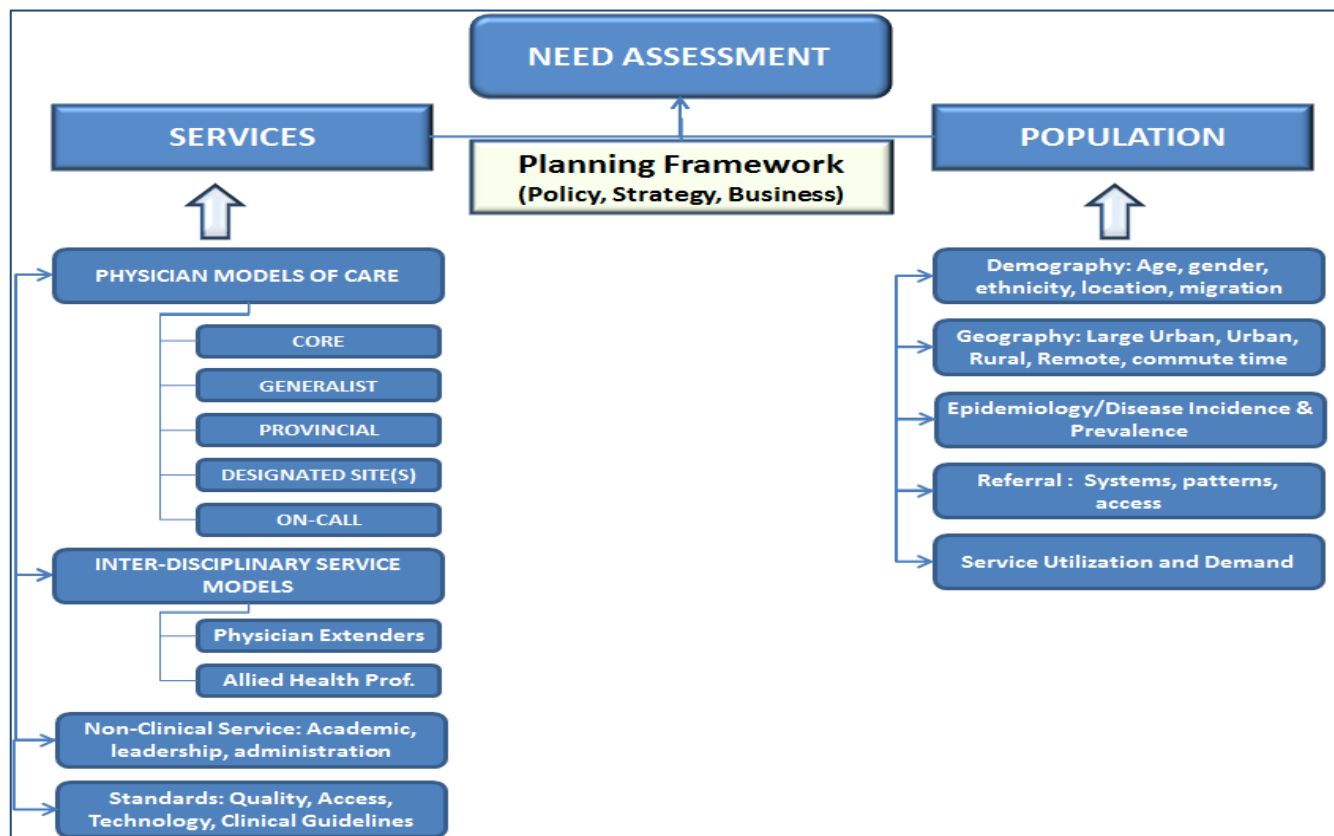
Overall, the percentage of shadow billing payments to actual alternative clinical payments for all physician specialties has remained relatively constant through time at approximately 18% to 20%. Total shadow billing payments by fiscal quarter have also remained stable through time. Corroborating evidence was used to mitigate this weakness - Alternative Funding Plan (AFP) FTE budget status, COM work status (full-time, part-time, and retired), CPSS registry status, and income from all other sources for each physician (in particular RHA payments from Annual Reports).

Limitation: Poor quality shadow billing data constrains the ability to compare relative workload within specialties.

3.3 NEED ASSESSMENT

The forecast model assessing population need for physician services is framed by the model illustrated below. Determinants of physician need include population demography, geography, and disease, system of referral and access, and service utilization. Service-based determinants of physician need include models of care, inter-disciplinary service models, non-clinical service requirements, and service standards.

Figure 4 - Forecast Model - Need Assessment Schematic



These determinants represent the materially key variables in forecasting physician workforce requirements. The forecast model approach to each determinant is described in the succeeding subsections.

3.3.1 POPULATION - DEMOGRAPHY

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3.3.1.1 Methodology Note

Historic population data (2013 and earlier) are derived by the Ministry of Health using counts of medically insured Saskatchewan residents, by RHA and community (Residence Code) of residence according to the postal code. Forecast population to 2022/23 uses the the GOC Statistics Canada forecast . The different files used to inform historic and forecast populations by RHA result in some differences between the last historic year, 2013 (per medical insurance data), and the base year for forecasts, also 2013 (per Statistics Canada data). The PPR forecast uses the GOC Statistics Canada forecasts in its model and methodology.

It is necessary in the model and methodology to forecast physician requirements at the community and community catchment level, particularly for **family practice** and some of the **generalist** specialties. For this reason it was necessary to create population forecasts at the community level. This task was done, sequentially, as follows:

- (1) Create complete list of communities (hamlet, village, town, city, and rural areas)
- (2) Calculate the annual percent change in historic population between 2003 and 2013 from the Ministry of Health community level historic population file
- (3) Apply the same percent change to the forecast period, 2014 to 2023, using the 2013 historic population as the base year.
- (4) Reconcile the community level population at 2023 from the preceding step with the GOC Statistics Canada forecast for the same year.
- (5) Allocate the net difference between GOC Statistics Canada and community level forecasts across all communities in a proportionate manner so the end result by community reconciles to the GOC Statistics Canada forecast as at 2023.

The end result assumes a continuation of historic regional and community level population patterns into the future, with subsequent adjustment to reconcile to the provincial level forecasts.

3.3.1.2 Population Age and Gender

The Government of Canada, Statistics Canada provided the population forecast data. Physician service utilization, as measured by fee-for-service billing and services, exhibit a substantially linear relationship with age. The exponential trend line for male and female residents of Saskatchewan differ in the child bearing years 15-39 years and after age 80 years when males consume more services than females of the same age. Both the pattern and quantity of health service utilization by the population differs by gender.

Figure 5 - Demography - Forecast Population by RHA, 2014 - 2023

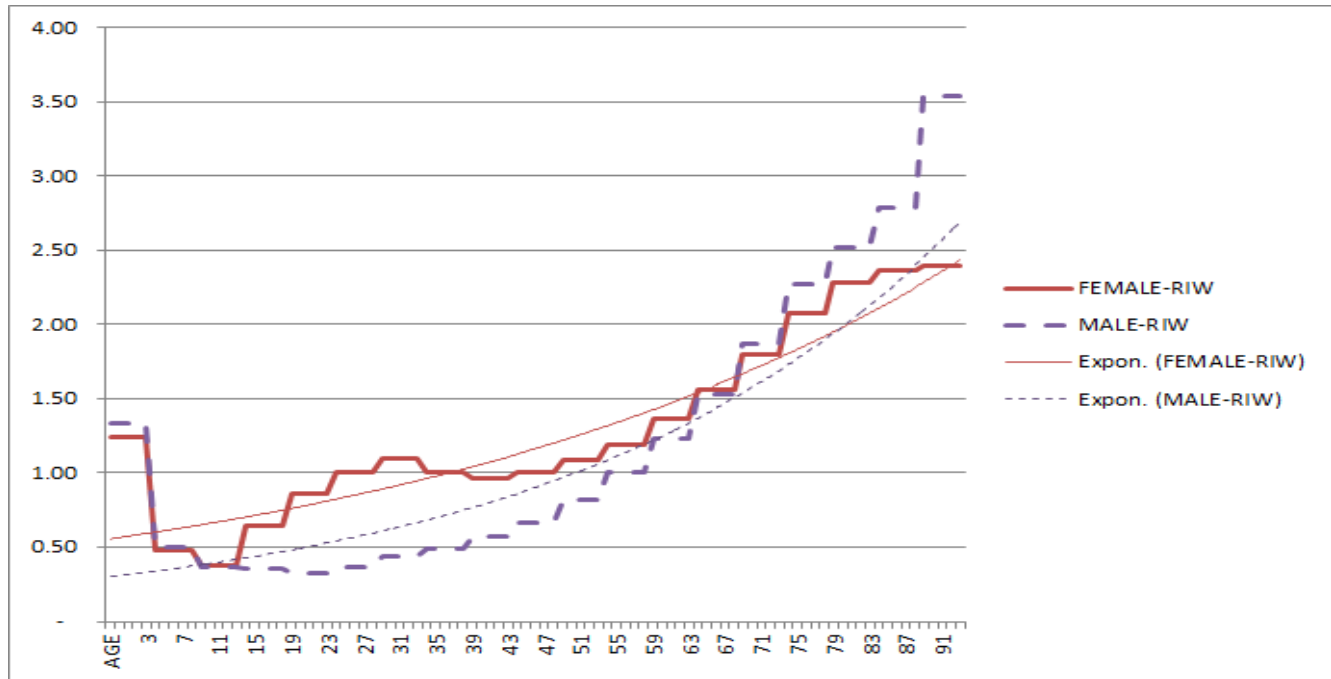
Demography- Forecast Population by RHA, 2014 to 2023													
RHA	BASE YEAR												Annual % Change
ID	RHA NAME	2012	2013	FY1 -2014	FY2 -2015	FY3 -2016	FY4 -2017	FY5 -2018	FY6 -2019	FY7 -2020	FY8 -2021	FY9 -2022	FY10 -2023
1	Sun Country	58064	57,255	58,057	58,877	59,651	60,359	61,544	62,772	64,103	65,435	66,574	67,419
2	Five Hills	54272	54,992	55,394	55,794	56,132	56,392	57,082	57,792	58,573	59,335	59,902	60,183
3	Cypress	44000	44,112	44,575	45,045	45,476	45,851	46,585	47,345	48,175	49,001	49,675	50,123
4	Regina Qu'Appelle	270820	273,578	277,811	282,104	286,594	291,106	294,948	298,293	301,260	304,365	308,254	313,107
5	Sunrise	57874	57,930	58,620	59,321	59,970	60,547	61,598	62,685	63,867	65,043	66,020	66,700
6	Saskatoon	323154	326,841	332,365	338,011	344,082	350,303	354,713	359,100	362,964	366,895	372,001	378,489
7	Heartland	44240	43,839	44,393	44,965	45,508	46,005	46,871	47,775	48,760	49,752	50,601	51,231
8	Kelsey Trail	40288	41,895	42,218	42,562	42,881	43,160	43,789	44,454	45,196	45,944	46,561	46,978
9	Prince Albert Parkland	95479.2	80,061	80,798	81,546	82,219	82,790	84,006	85,266	86,648	88,016	89,108	89,792
10	Prairie North	77826.8	78,633	79,785	80,953	82,051	83,049	84,695	86,395	88,227	90,055	91,610	92,753
11	Mamawetan Churchill River	10318	23,789	23,933	24,089	24,232	24,352	24,671	25,010	25,393	25,779	26,093	26,294
12	Keewatin Yatthe	11368	11,835	11,762	11,692	11,613	11,524	11,527	11,537	11,565	11,592	11,583	11,524
13	Athabasca Health Authority	2682	2,638	2,688	2,740	2,789	2,836	2,905	2,976	3,053	3,130	3,198	3,252
TOTAL		1,090,386	1,097,400	1,112,400	1,127,700	1,143,200	1,158,272	1,174,932	1,191,400	1,207,784	1,224,341	1,241,180	1,257,845

Source: Government of Canada, Statistics Canada

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The forecast model includes the relative intensity weight (RIW, relative consumption of physician services) by age and gender. These RIW values are applied as the population demography changes over the ten-year forecast period.

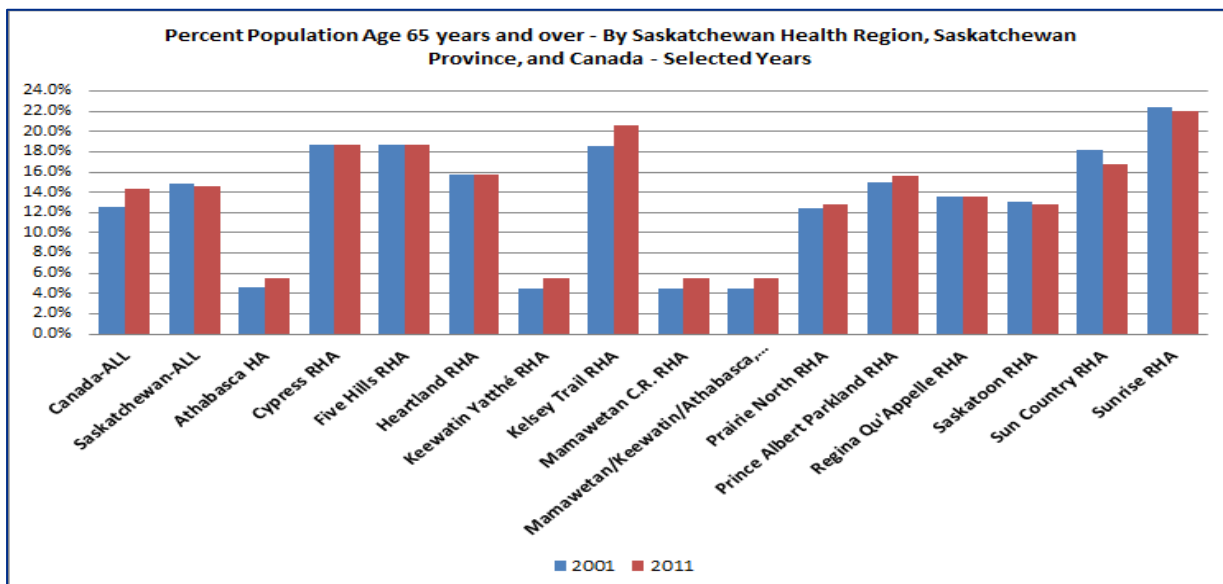
Figure 6 – Relative consumption by Saskatchewan residents of physician services by age and gender



Saskatchewan percentage population age 65 years and over is comparable to the national average of 14.5%. Numerous RHAs have a higher proportion age 65 years and over than the national and provincial averages. Only the three northern most RHAs are materially lower than the provincial average, and Cypress, Five Hills, Kelsey, Sun Country, and Sunrise are above the provincial average.

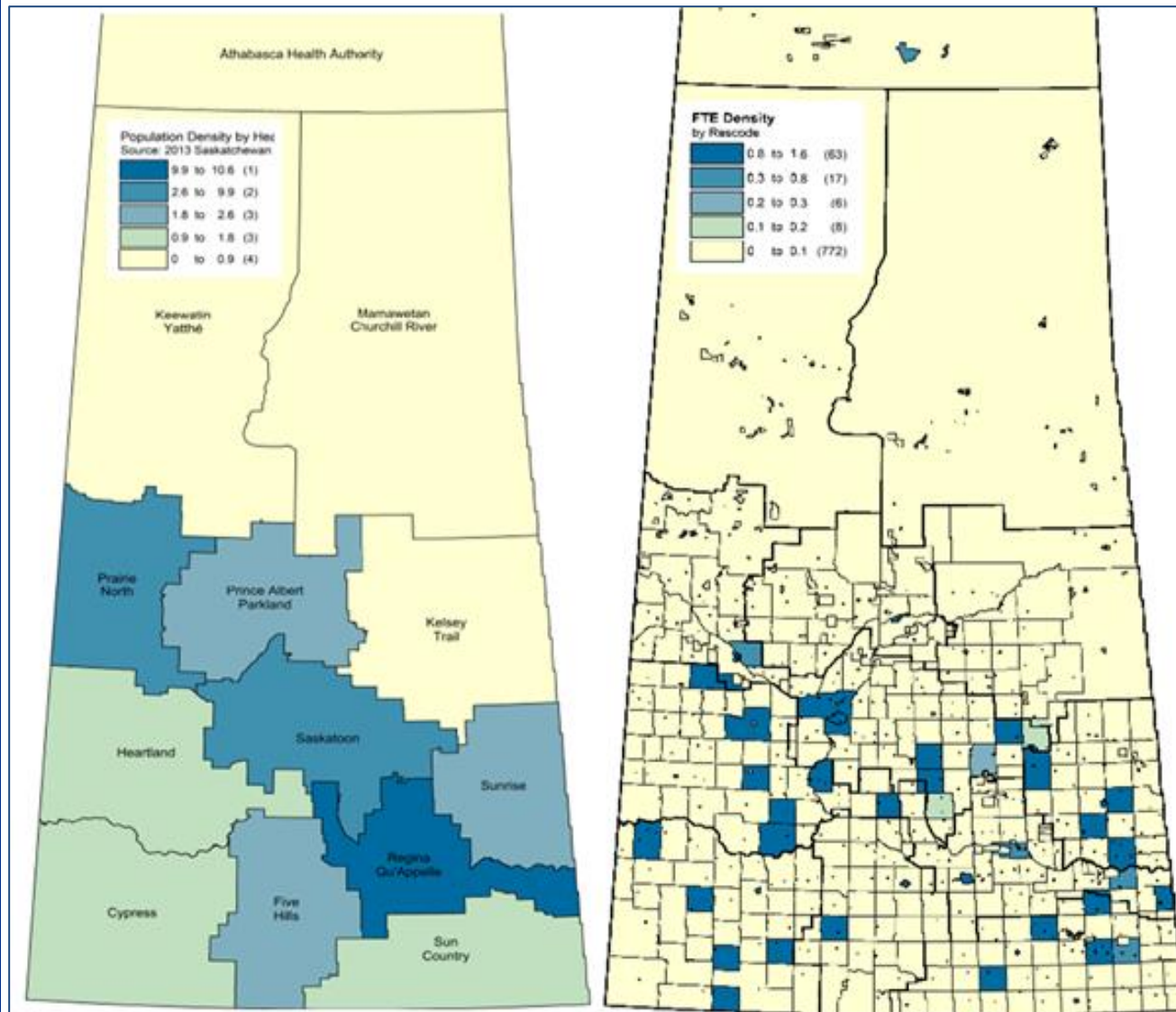
The forecast model incorporates relative age differences at the RHA level.

Figure 7 - Percent Population Age 65 + By SK Health Region, Province, and Canada - Selected years



3.3.2 GEOGRAPHY

Figure 8 - RHA Population Density and GP Physician Density, 2012/13



Geography is a key determinant of access to services. Saskatchewan, similar to most provinces, has vast regions with low population and a few areas with high density population (left side of figure opposite). Rural low density areas surround larger population centres while remote areas maybe many hours from a major population centre. Proximity to physician services (**family practice** FTE by local geographic code - right hand side of figure opposite) directly impacts utilization of services.

Physician models of care allow the forecast model to mitigate the effect of differences in relative access to physician services experienced by residents of remote, rural, and town/city areas. More specifically models of care for primary health care (collaborative care and core services) place physician services in geographically more accessible locations for rural residents. These models are described in detail in subsequent subsections.

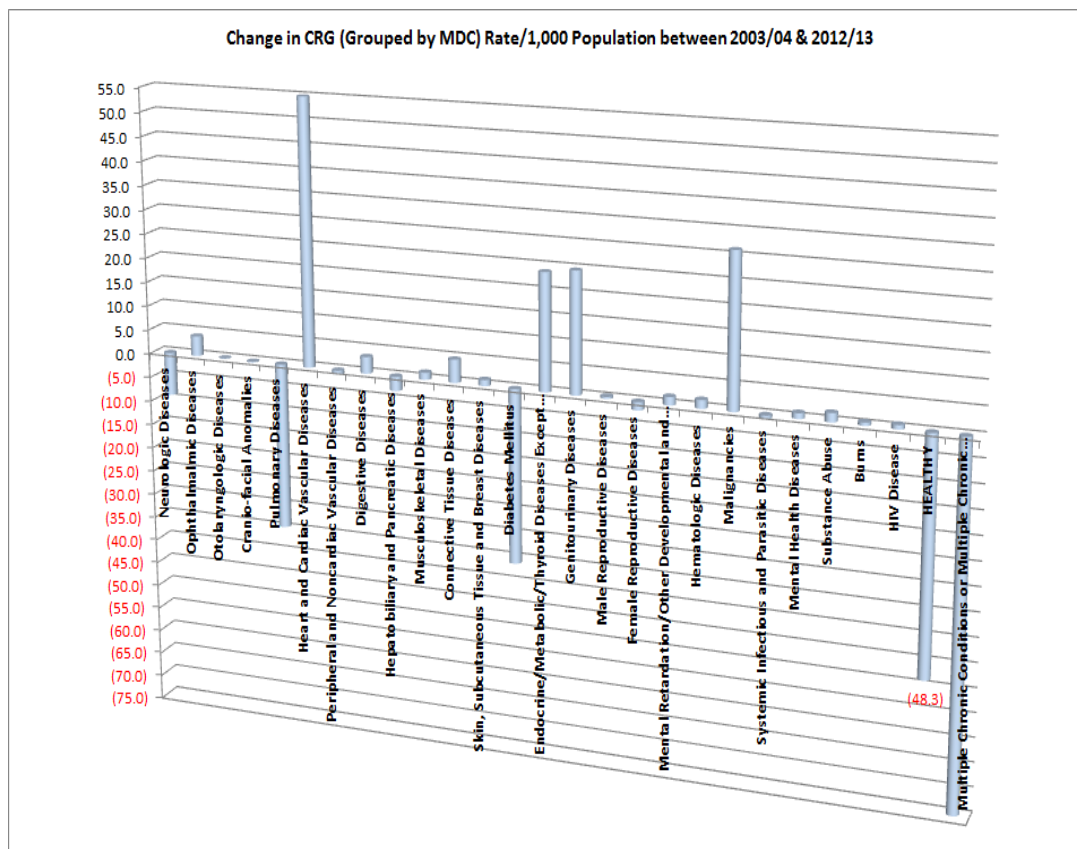
3.3.3 DISEASE INCIDENCE AND PREVALENCE

Clinical Risk Grouper (CRG) is a tool used to further analyze the health profile of a population beyond that of age, gender, socio-economic status, and ethnicity. This grouping system places individuals into health risk groups based on their history of health services received. CRGs place individuals into one of 270 different identifiers (“cells”), each representing a different health state. These groups will identify a person who has accessed health services for certain health conditions, such as heart conditions, cancer, depression, or diabetes. By tracking health service utilization, a rough profile of an individual’s health status can be determined and a prediction of future health service consumption can be applied.

The attributes of the CRG methodology are:

- Population based classification systems
- Uses encounter data (physician claims, emergency visit, day surgical procedures, and inpatient stays to assign individuals into health states (chronic)
- Mutually exclusive; hence, multiple health state categories and hierarchical rules applied
- Estimates the amount and type of disease and is much more clinically relevant
- Prediction performance is better than age/gender, age/gender weighted for utilization rates, and socio-economic status alone
- CRGs are hierarchical meaning, for example, if a person suffers from both migraines and diabetes, this individual will be placed into the diabetes CRG; this can cause a number of challenges from an analytics perspective, however, in an attempt to rule out some of the major, frequently overlapping conditions, several CRGs are reserved for multiple conditions; for instance, a group exists for people with congestive heart failure as well as diabetes

Figure 9 - Change in Clinical Risk Group Rate/1,000, 2003/04 to 2012/13



The PPR forecast model links CRGs to specific physician specialties based on the fee-for-service relationship over ten years with each CRG. This enables identification of a linear regression statistical relationship between CRG incidence and need for specific physician specialties, such as lung cancer and thoracic surgeons.

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The following figure lists the highest incident CRGs for the year 2012/13 in Saskatchewan.

Figure 10 – Clinical Risk Groups, Province-Wide Rates/1,000 population, 2012/13

SASKATCHEWAN, Rate per 1000 Population (where rate/1,000 exceeds 1.0) by Major Diagnostic Group (MDC) by Clinical Risk Group (CRG), by RHA, 2012/13																
MDC_DESCRIPTION	CRG	CRG DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	MEAN
HEALTHY	1000	Healthy	453.5	450.0	436.7	547.0	408.8	615.8	402.7	436.2	474.7	563.3	1,752.4	159.0	616.3	542.3
Heart and Cardiac Vascular Diseases	5237	Chronic Disorders of Arteries and Veins	123.3	138.3	137.4	113.3	151.8	115.9	130.7	127.1	90.2	105.6	137.4	10.9	9.7	116.9
Heart and Cardiac Vascular Diseases	6150	Advanced Coronary Artery Disease and Other Dominant Ch	34.0	43.5	41.3	37.6	48.5	32.0	39.1	42.1	32.8	32.7	51.9	5.6	-	36.1
UNCLASSIFIED	4000	Multiple Minor Chronic PCDs	26.9	36.1	30.1	34.6	33.7	36.0	27.1	23.7	23.5	21.1	44.5	4.0	9.7	31.6
UNCLASSIFIED	2030	1 Significant Acute Illness Excluding ENT	29.7	28.1	21.8	30.9	26.6	27.4	20.5	22.6	23.5	32.0	83.3	5.4	29.8	28.2
Malignancies	6281	Prostate Malignancy and Other Chronic Disease Level 2	28.7	33.2	29.8	28.5	43.0	25.4	29.0	28.7	26.0	21.1	16.8	1.9	-	27.6
UNCLASSIFIED	9999	unkn	23.3	30.7	29.8	27.2	26.8	26.3	25.3	23.5	19.1	29.6	40.9	4.8	7.5	26.5
Mental Health Diseases	3755	Depression	24.0	25.1	20.9	31.8	20.6	31.3	20.8	21.1	17.6	15.5	28.1	1.7	-	26.3
Genitourinary Diseases	7002	Chronic Renal Failure - 2 or More Other Dominant Chronic	24.4	30.6	25.9	25.9	29.5	23.1	24.8	24.3	19.0	14.5	16.0	1.5	-	23.5
Endocrine and Metabolic and Thyroid Diseases	5439	Chronic Metabolic and Endocrine Diagnoses - Major	13.8	18.2	16.5	21.5	19.8	19.8	15.5	20.4	24.0	24.3	108.7	6.9	28.0	21.0
Endocrine and Metabolic and Thyroid Diseases	3446	Chronic Thyroid Disease	17.8	20.5	21.8	19.3	16.8	26.3	19.4	16.4	12.9	15.4	20.7	2.1	2.6	20.3
Heart and Cardiac Vascular Diseases	5179	Congestive Heart Failure	21.0	21.2	17.9	26.7	17.3	19.9	17.8	12.0	12.4	14.0	25.1	1.4	6.3	20.0
UNCLASSIFIED	2020	1 Significant Acute Illness - Span 90 Excluding ENT	17.3	20.7	15.9	23.1	18.4	20.1	13.7	17.5	17.1	16.3	53.8	5.1	32.4	19.9
Endocrine and Metabolic and Thyroid Diseases	3445	Hyperlipidemia	17.2	16.1	16.4	20.6	14.0	12.9	13.2	14.0	10.3	10.7	15.9	-	-	15.0
Mental Health Diseases	5747	Bi-Polar Disorder	8.8	11.1	9.8	11.0	7.1	20.4	11.4	10.2	13.3	11.7	19.1	0.6	3.0	13.7
Diabetes Mellitus	6145	Diabetes and Other Chronic Disease Level 2	10.9	17.0	11.5	12.5	15.7	10.5	10.9	12.2	13.5	10.1	19.0	1.4	-	12.0
Digestive Diseases	3274	Chronic Gastrointestinal Diagnoses - Minor	8.6	13.8	10.5	11.9	13.9	10.2	9.0	7.1	7.2	9.7	22.5	2.6	6.3	10.6
Musculoskeletal Diseases	6180	History of Hip Fracture Age > 64 and Other Dominant Chron	6.5	10.9	8.0	7.2	8.1	11.7	8.1	8.3	9.0	7.3	5.5	-	-	8.9
UNCLASSIFIED	6270	Two Other Moderate Chronic Diseases	11.1	9.3	11.1	8.4	13.4	8.1	9.5	11.6	6.4	5.7	5.4	1.4	-	8.6
Ophthalmalmic Diseases	3080	Chronic Eye Diagnoses - Minor	5.5	6.7	5.2	8.0	6.4	9.9	6.5	5.1	6.5	6.4	19.8	3.7	14.9	7.9
Mental Health Diseases	3756	Chronic Mental Health Diagnoses - Minor	3.6	3.6	4.8	7.0	3.7	8.8	3.5	6.0	6.2	7.0	19.9	-	6.0	6.7
Heart and Cardiac Vascular Diseases	5012	History of Transient Ischemic Attack	5.3	8.9	1.8	9.7	6.5	3.5	2.2	7.3	15.8	3.6	10.1	0.5	-	6.7
Substance Abuse	6251	Moderate Chronic Substance Abuse and Other Moderate C	6.4	8.0	6.0	6.5	7.6	5.1	6.7	5.7	4.6	4.1	6.6	-	-	5.8
Malignancies	8641	Secondary Malignancy	4.6	7.1	6.4	4.8	7.0	5.1	7.0	6.7	4.9	4.4	4.5	0.5	-	5.3
UNCLASSIFIED	2040	1 Significant Acute ENT Illness - Span 90	5.5	4.2	4.2	5.3	4.4	5.9	3.7	2.9	3.7	4.5	12.0	-	-	5.1
Connective Tissue Diseases	5390	Connective Tissue Disease and Vasculitis	4.1	4.2	3.4	6.2	6.5	5.7	5.3	2.8	3.6	3.0	4.8	-	-	5.1
Ophthalmalmic Diseases	5075	Blindness, Visual Loss, and Chronic Eye Diagnoses - Major	4.4	5.0	4.3	5.3	4.4	5.5	4.2	3.8	3.7	4.5	8.6	0.6	6.0	4.9
Musculoskeletal Diseases	3357	Osteoarthritis	3.7	4.7	4.5	4.7	4.3	5.6	4.5	4.1	4.4	4.2	13.8	1.8	-	4.9
Musculoskeletal Diseases	5354	Osteoporosis	3.4	4.8	4.9	4.5	4.8	5.0	4.0	3.6	3.5	2.9	4.9	-	-	4.4
Female Reproductive Diseases	3525	Other Chronic Gynecological Diagnoses	3.7	4.7	3.6	4.5	3.0	5.0	2.6	3.2	3.2	4.0	11.8	0.7	6.3	4.3
Mental Health Diseases	5749	Depressive and Other Psychoses	2.7	1.6	2.6	5.9	3.5	5.1	2.0	3.0	2.7	3.1	6.3	-	-	4.2
Ophthalmalmic Diseases	3078	Glaucoma	2.6	8.8	2.5	4.1	2.5	4.9	3.3	1.7	2.5	2.2	4.3	-	-	3.9
Mental Health Diseases	6170	Schizophrenia and Other Dominant Chronic Disease	3.9	4.2	4.2	3.8	4.5	4.2	4.6	4.6	2.9	2.5	2.3	-	-	3.9
Heart and Cardiac Vascular Diseases	5191	Coronary Atherosclerosis	4.6	5.5	4.3	4.1	4.2	3.4	3.2	2.8	3.0	3.2	9.7	2.6	4.5	3.8
Musculoskeletal Diseases	5394	Spondyloarthropathy and Other Inflammatory Arthropathic	4.1	4.3	4.1	3.8	5.1	3.5	4.1	2.8	2.2	2.5	3.2	-	-	3.5
Mental Health Diseases	3754	Attention Deficit / Hyperactivity Disorder2	2.4	3.8	0.8	3.3	1.7	5.0	2.0	2.7	3.4	3.3	6.2	-	-	3.5
UNCLASSIFIED	6250	Other Dominant Chronic Disease and Moderate Chronic Su	2.7	4.9	2.9	4.7	5.0	2.9	3.1	2.8	3.0	1.9	2.2	-	-	3.5
Digestive Diseases	5270	Chronic Gastrointestinal Diagnoses - Moderate	3.2	4.3	3.0	3.7	3.2	4.0	2.9	2.9	2.1	3.0	2.3	-	-	3.4
Genitourinary Diseases	5473	Chronic Renal Failure	2.3	3.9	5.5	3.9	4.5	3.2	2.9	2.7	1.9	3.0	2.6	-	-	3.3
Heart and Cardiac Vascular Diseases	6111	Congestive Heart Failure and Diabetes	2.7	3.3	2.5	4.7	3.8	2.6	2.1	3.4	2.5	2.7	5.7	-	-	3.2
Mental Health Diseases	6201	Psychiatric Disease (Except Schizophrenia) and Other Mod	3.2	3.0	3.1	3.5	3.3	3.4	3.1	3.2	2.2	1.8	2.2	-	-	3.1
Diabetes Mellitus	6143	Diabetes and Other Moderate Chronic Disease	2.8	4.2	2.8	3.3	3.0	3.1	3.1	2.8	3.1	2.2	3.7	-	-	3.1
Diabetes Mellitus	6144	Diabetes and Hypertension	2.7	4.7	2.6	3.7	3.8	2.3	2.8	2.8	2.5	2.3	3.3	-	-	2.9
Skin, Subcutaneous Tissue and Breast Diseases	3409	Psoriasis	2.0	2.3	2.6	2.7	2.3	4.1	2.3	2.2	2.0	2.3	4.7	-	-	2.9
Neurologic Diseases	3019	Chronic Neuromuscular and Other Neurological Diagnoses	3.4	2.2	2.5	2.9	2.6	3.0	2.7	2.7	2.4	3.0	6.7	-	4.5	2.9
Heart and Cardiac Vascular Diseases	6130	Cerebrovascular Disease and Diabetes	2.5	4.1	4.9	2.5	5.5	2.4	4.4	3.8	2.3	2.1	2.2	-	-	2.9
Genitourinary Diseases	6100	Chronic Renal Failure and Other Dominant or Moderate Ch	0.6	1.5	0.4	4.4	3.7	2.4	0.5	1.1	5.1	1.8	10.2	-	-	2.9
Female Reproductive Diseases	3524	Infertility - Female	2.4	1.7	1.9	3.6	1.8	3.5	1.7	1.7	1.3	2.5	3.3	-	-	2.8

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3.3.4 SERVICES ACCESSED OUT OF PROVINCE, WITHIN CANADA, BY SASKATCHEWAN RESIDENTS

Residents of Saskatchewan have consumed a fairly consistent level of physician services out-of-province in Canada over the three year period 2010/11 to 2012/13, with annual patients increasing 4.6% per annum. These figures excluded services provided by physicians paid on a non-FFS basis. Thirty percent (30%) was for General Practitioner services, of which a substantial percentage was delivered in Lloydminster, Alberta. Seventy-eight percent of services were delivered in Alberta. **The forecast model assumes a decrease in paediatric and internal medicine out-of-province physician service utilization over the forecast period, the decrease being a direct result of added recruitment indicated in the forecast results.**

Figure 11 - Services, Payments, and Costs for Out-of-Province, in Canada, (Fee-For-Service (only)) Services, 2011/12

SPECIALTY DESCRIPTION	2010-11			2012-13			Annual Change 10/11 to 12/13				
(per Reciprocal Naming Convention)	Services	Patients	Payments	Services	Patients	Payments	Services	Payments	Patients		
General Practitioner	222,842	97,587	51.5%	10,311,852	220,487	98,922	50.0%	10,396,486	(0.5%)	0.4%	0.7%
Pathology & Microbiology	167,688	17,954	9.5%	3,346,285	196,540	18,564	9.4%	3,855,275	8.6%	7.6%	1.7%
Internal Medicine	37,569	16,472	8.7%	3,130,874	41,289	17,455	8.8%	3,295,027	5.0%	2.6%	3.0%
General Surgery	18,156	10,121	5.3%	3,045,175	18,973	10,664	5.4%	3,165,095	2.2%	2.0%	2.7%
Anaesthesia	66,422	3,645	1.9%	2,747,749	72,136	3,944	2.0%	3,023,130	4.3%	5.0%	4.1%
Diagnostic Radiology	24,574	12,631	6.7%	2,026,215	28,170	14,593	7.4%	2,175,382	7.3%	3.7%	7.8%
Paediatrics	13,746	4,052	2.1%	1,033,502	17,801	3,968	2.0%	1,260,310	14.7%	11.0%	(1.0%)
Orthopedic Surgery	7,555	4,491	2.4%	1,149,037	8,628	4,963	2.5%	1,150,457	7.1%	0.1%	5.3%
Obstetrics/Gynecology	11,142	6,349	3.4%	1,015,108	11,315	6,397	3.2%	1,033,425	0.8%	0.9%	0.4%
Psychiatry	15,316	2,479	1.3%	1,000,392	14,138	2,494	1.3%	969,177	(3.8%)	(1.6%)	0.3%
Otolaryngology	4,055	2,624	1.4%	579,935	6,529	4,083	2.1%	870,914	30.5%	25.1%	27.8%
Ophthalmology	8,251	4,074	2.2%	686,022	10,539	4,345	2.2%	832,048	13.9%	10.6%	3.3%
Plastic Surgery	1,611	1,036	0.5%	269,178	2,183	1,315	0.7%	482,076	17.8%	39.5%	13.5%
Urology	2,553	1,754	0.9%	350,195	3,070	1,904	1.0%	343,006	10.1%	(1.0%)	4.3%
Neurology	2,564	1,555	0.8%	265,417	2,688	1,525	0.8%	279,998	2.4%	2.7%	(1.0%)
Neurosurgery	1,357	581	0.3%	299,936	1,005	560	0.3%	244,892	(13.0%)	(9.2%)	(1.8%)
Dermatology	4,051	1,651	0.9%	163,614	3,293	1,841	0.9%	174,321	(9.4%)	3.3%	5.8%
Physical Medicine	650	279	0.1%	59,233	844	342	0.2%	76,361	14.9%	14.5%	11.3%
Therapeutic Radiology	219	82	0.0%	23,150	388	89	0.0%	28,126	38.6%	10.7%	4.3%
Medical Genetics	40	22	0.0%	3,876	79	32	0.0%	6,283	48.8%	31.0%	22.7%
TOTAL	610,361	189,439	100.0%	31,506,743	660,095	198,000	100.0%	33,661,788	4.1%	3.4%	2.3%

Figure 12 - Costs by jurisdiction providing out-of-province (in Canada), service to Saskatchewan residents (Fee-For-Service (only)), 2011/12

Saskatchewan Residents seen Out-of-Province, \$Payment by Specialty by Province/Country, 2012/13								
Specialty Name	AB	MB	BC	MARITIMES	ONT	QUE	TOTAL	%
General Practitioner	7,630,573	1,475,109	847,551	74,499	345,387	23,367	10,396,486	30.9%
Internal Medicine	2,738,809	279,848	123,879	16,493	123,348	12,650	3,295,027	9.8%
Lab & Microbiology	3,677,638	17,606	94,389	556	64,861	226	3,855,275	11.5%
General Surgery	2,637,336	354,415	83,850	8,993	73,998	6,504	3,165,095	9.4%
Anaesthesia	2,593,778	157,313	115,288	12,050	132,025	12,676	3,023,130	9.0%
Diagnostic Radiology	1,867,319	226,764	31,955	5,761	42,381	1,202	2,175,382	6.5%
Paediatrics	1,096,429	60,727	43,927	6,232	51,876	1,119	1,260,310	3.7%
Orthopaedic Surgery	843,479	168,760	52,087	1,757	74,628	9,745	1,150,457	3.4%
Obstetrics & Gynaecology	774,008	146,247	54,881	11,907	45,656	726	1,033,425	3.1%
Psychiatry	747,221	48,179	96,293	7,031	54,759	15,693	969,177	2.9%
Otolaryngology	819,551	25,028	17,619	1,624	6,385	707	870,914	2.6%
Ophthalmology	692,922	63,314	40,422	3,187	31,775	427	832,048	2.5%
Plastic & Reconstructive Surgery	421,053	20,546	21,455	1,275	15,136	2,610	482,076	1.4%
Urological Surgery	267,188	43,437	13,030	1,529	16,898	924	343,006	1.0%
Internal Medicine - Neurology	221,466	34,250	14,008	970	8,230	1,074	279,998	0.8%
Neurological Surgery	143,455	51,337	25,473	5,809	18,254	564	244,892	0.7%
Dermatology	146,677	6,906	4,421	12,976	2,982	359	174,321	0.5%
Physical Medicine/Physiatry	58,132	5,890	5,847	175	5,427	890	76,361	0.2%
Therapeutic Radiology & Nuclear Medicine			2,301		25,825		28,126	0.1%
TOTAL	27,377,033	3,185,676	1,688,677	172,825	1,139,831	91,464	33,655,506	100%
% DISTRIBUTION	81.3%	9.5%	5.0%	0.5%	3.4%	0.3%	100.0%	0.0%

High cost services, e.g., defibrillator-pacemaker implant, were provided out-of-province to an average 205 Saskatchewan residents per year in the period 2010/11 to 2012/13. Defibrillator-pacemaker implants (30%),

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transplantation (heart, lung, liver, kidney) procedures (24%), and cochlear (22%) implants were the most prevalent high cost services.

3.3.5 REFERRAL – INTRA-PROVINCIAL

Subspecialists are, and will continue to be, concentrated in Saskatoon and Regina. The population density outside these cities remains too low in the forecast period to support **subspecialists** being resident outside the two major cities. **Family physician and non-subspecialist referral to subspecialties patterns will remain the same in the forecast period.**

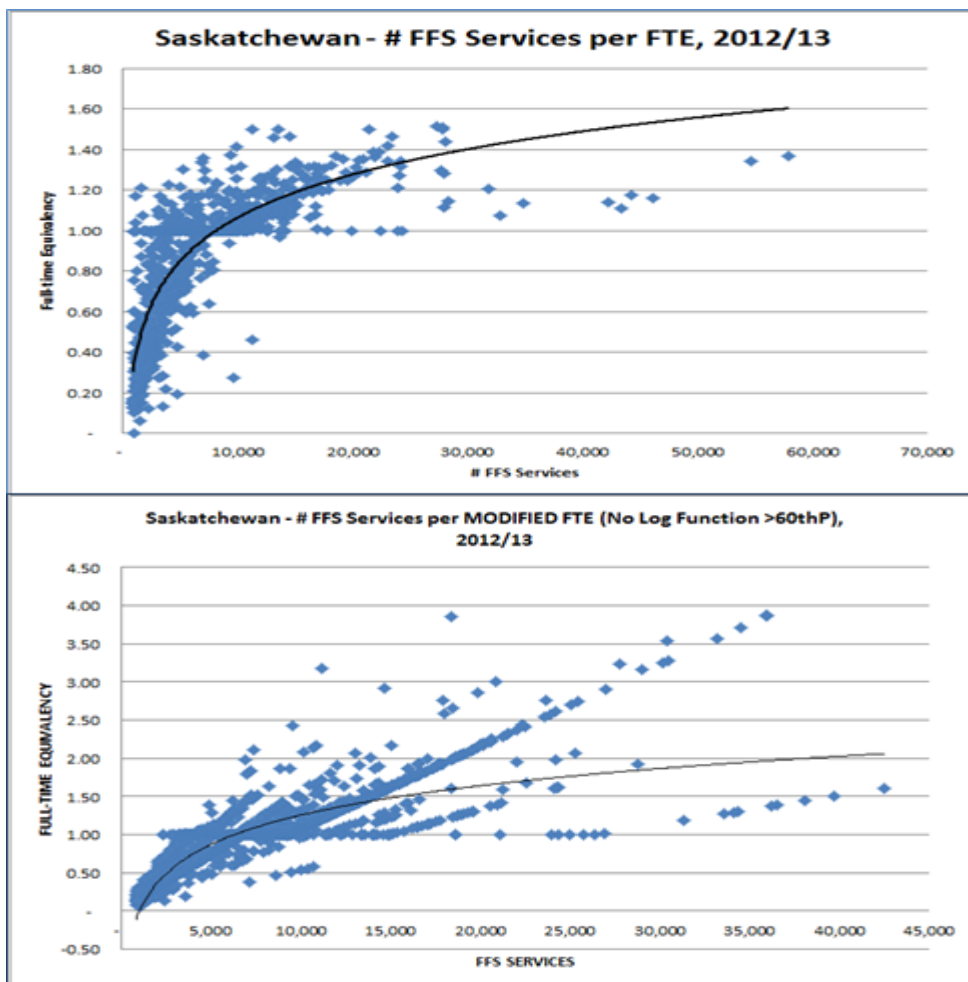
3.3.6 SERVICE UTILIZATION AND DEMAND

The following two graphs illustrate the compression effect of the CIHI FTE methodology for those physicians earning more than the 60th percentile (refer to CIHI FTE Methodology). The first graph is using the nationally accepted CIHI methodology and is the basis for reasonably equitable comparisons across provinces.

The second graph applies a linear formula to earnings above the 60th percentile. The second graph illustrates the high frequency of physicians working greater than 1.0 FTE in Saskatchewan on a linear comparative basis.

PPR FTE calculations use the CIHI methodology (upper graph). The challenge created by the evidence in the lower graph is both economic and workload in nature.

Figure 13 - Comparison Saskatchewan FFS FTE- CIHI Log >60th P and CIHI Linear >60th P



Economic theory points to an increase in FTEs lowering average incomes, assuming pent up demand is relatively neutral (a large assumption). Workload logic suggests the FTE levels in the lower graph are not sustainable on a long-term basis necessitating an increase in physicians to relieve workload pressure.

The forecast model for future physicians is based on a 1.0 FTE workload meaning as physicians working more than 1.0 FTE currently retire, the model replaces them with more than one physician.

3.3.7 PHYSICIAN MODELS OF CARE

The Ministry of Health planning and policy for models of care have a direct impact on the PPR. Assumptions made regarding physician models of care (MOC) design and delivery materially impact forecasting for each specialty in a comprehensive PPR.

The following subjects are current examples of physician models of care:

- Collaborative Primary Health Care (expansion of team-based PHC)
- Core Services (general paediatrics, general surgery, general internal medicine)
- Provincial programs (e.g., neurosurgery) and Designated Subspecialized Centres (e.g., pediatric subspecialty surgery)
- Physician extenders in specialty physician services

The forecast model allows for planning and policy based adjustments to the physician resource planning model. Further; the forecast model software is both comprehensive and flexible so as all variables of need, supply, and planning and policy (e.g., models of care) can be easily updated and forecasts revised to reflect new strategies and updated data (e.g., latest roster of physicians).

Assumptions made regarding MOC in the forecast model include the following four key subject areas:

1. **Collaborative team-based Primary Health Care** (see Key Definitions) where primary health care services are delivered in formal collaborative teams including **family practice** physicians and skilled, trained collaborative care team members. This collaborative model extends the delivery of primary health care beyond the physician skills and resources alone to a greater number of patients. The end results are greater population coverage and access to primary health care services.
2. **Core Physician Services**; whereby access to certain core physician services is defined from the city level down to, and including, rural and remote levels and related catchment areas. The consensus practice in Canada is to include the following as core physician services: comprehensive family practice, emergency medicine, general internal medicine, general surgery (and corresponding anaesthesia services), and general psychiatry, general paediatrics, and obstetrics/gynaecology, supported by general laboratory (specimen collection and transport, ECG) and diagnostic imaging (screening, routine diagnostic and imaging, x-ray) services.
3. **Provincial and designated subspecialized services**; where designated services have provincial oversight and, in addition, are delivered in a managed network of locations or at a designated site. With the population of approximately one million, certain subspecialty services warrant either a provincially managed network or single site designation.
4. **Generalist** services; where the need to recruit **subspecialists** is balanced by **generalist** physician specialists working to full scope of practice including areas of special interest supported by supplementary training (such as, general pediatrician with both a special interest and training in childhood respiratory and rheumatic conditions).

Treatment in the forecast model of the aforementioned MOCs is described in the following subsections.

3.3.7.1 Collaborative team-based Primary Health Care

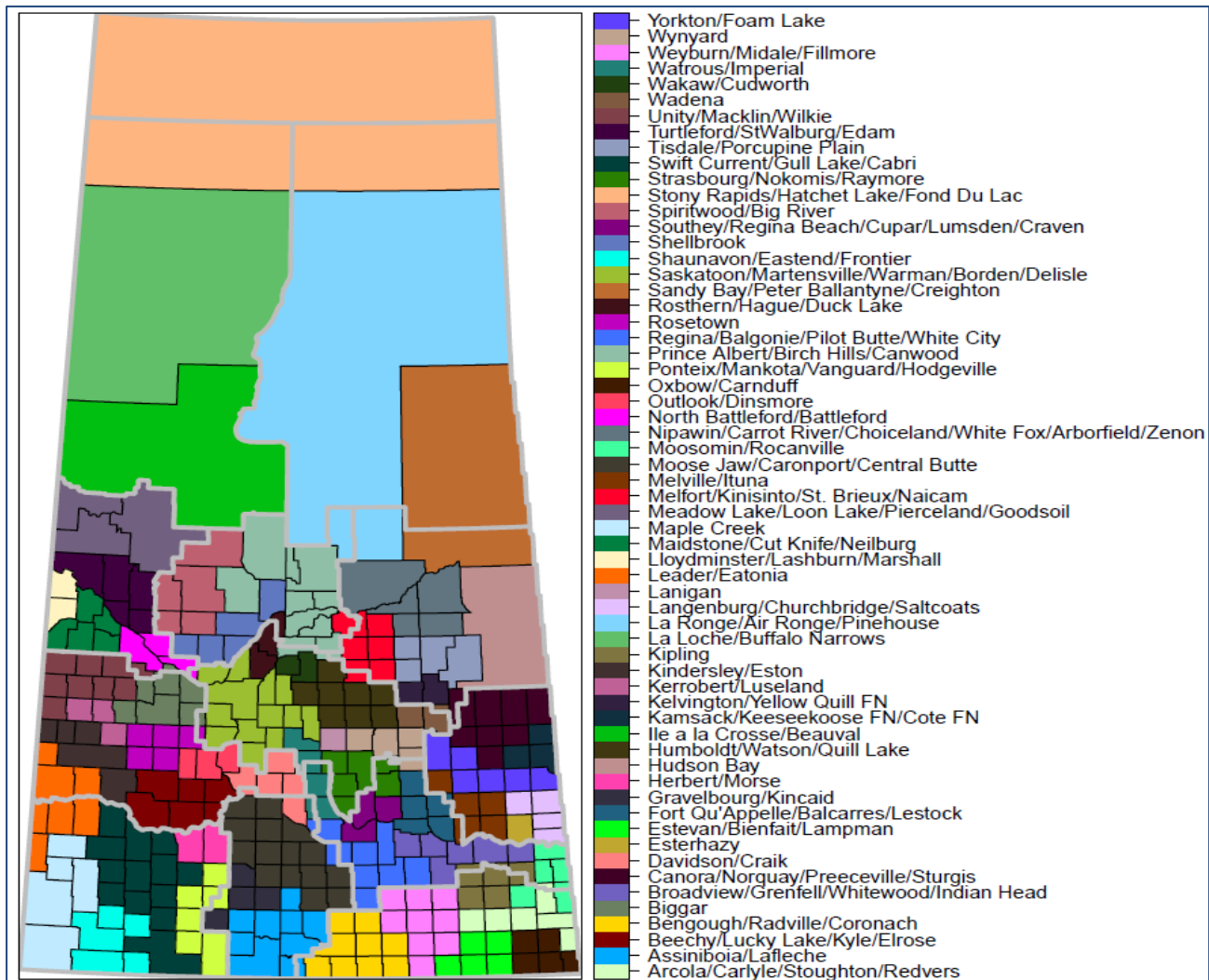
In the base year, 2012/13, there were 825.7 FTE family physicians comprised of 715.4 FTE physicians engaged in family practice, or 1.0 FTE per 1,534 residents of the province, plus 110.3 FTE engaged the majority of time in an area of special interest such as hospital medicine. The 715.4 FTE figure includes those attending at walk-in and after-hour settings.

In the next figure the 715.4 FTE family physicians have been mapped to sixty one (61) primary health care geographic clusters. The clusters are partially based upon groupings of community catchment areas for

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established primary health care teams. Communities not yet covered by a primary health care team were grouped based on patient patterns of care seeking for primary physician services, population totals, and geographic proximity. Groupings do not necessarily imply formal linkages among established primary health care teams.

Figure 14 – Primary Health Care Practice clusters (61) and health regions (v. 26Nov2014)



In 2012/13 there was a provincial average of 1.0 FTE family physician per 1,534 residents. One (1.0) FTE family physician, on average, will provide 8,100 services per annum at a rate of thirty two patient visits per day and fee-for-service visit (only) fees of \$280,000. This equates to an average 1,534 patients at 5.3 visits each per annum (the 2012/13 actual average per family physician was 5.3 visits per resident unadjusted for full-time equivalency per MOH Medical Service Branch Annual Report).

The forecast model itemizes a Low, Base, and High Case scenario for the forecast period to 2022/23. Each scenario is predicated on family physicians providing comprehensive, coordinated, and continuing care to the clustered communities. The Low and Base Case scenarios expand both the number, geographic distribution, provider mix, and capacity of the current primary health care teams beyond their current levels. The following figure itemizes the Low, Base, and High Case scenarios for the 61 PHC community clusters. **Both the 'count' (column 2) and FTE's (columns 3 through 9) are based upon physician office address location as at March 31, 2012.** The Low Case scenario calls for a decrease of (58.3) FTE at a ratio of 1.0 FTE per 1,930 population , the

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Base Case an increase of 37.9 FTE (ratio 1.0 FTE/1,683) , and the High Case an increase of 126.3 FTE (ratio 1.0 FTE/1,507. All scenarios use an age-adjusted forecast population per PHC community cluster.

Figure 15 - Family Practice Physician FTE by Community/Catchment Clusters under Low, Base, and High Case scenarios

1	2	3	4	5	6	7	8	9
Primary Health Care (PHC) Clusters (n of 61)	COUNT - 2012/13 (ex. SI)	FULL-TIME EQUIVALENTS (FTE)						
		FTE -Current - 2012/13 (ex. SI) *	LOW CASE SCENARIO		BASE CASE SCENARIO		HIGH CASE SCENARIO	
			FTE 2022/23	FTE Change 12/13 to 22/23	FTE 2022/23	FTE Change 12/13 to 22/23	FTE 2022/23	FTE Change 12/13 to 22/23
Arcola/Carlyle/Stoughton/Redvers	3	1.6	4.4	2.8	5.0	3.4	6.0	4.4
Assiniboia/Lafleche	4	4.3	4.4	0.1	5.1	0.8	6.1	1.8
Beechy/Lucky Lake/Kyle/Elrose	1	1.0	2.1	1.1	2.4	1.4	2.9	1.8
Bengough/Radville/Coronach	2	2.3	2.8	0.5	3.2	0.9	3.8	1.5
Biggar	4	3.9	3.2	(0.7)	3.7	(0.2)	4.4	0.5
Broadview/Grenfell/Whitewood/Indian Head	4	2.5	7.8	5.3	8.9	6.4	10.6	8.1
Canora/Norquay/Preeceville/Sturgis	6	4.4	6.7	2.3	7.7	3.3	9.1	4.7
Davidson/Craik	2	2.1	2.7	0.6	3.1	1.0	3.7	1.6
Esterhazy	7	5.5	2.8	(2.7)	3.2	(2.3)	3.8	(1.7)
Estevan/Bienfait/Lampman	9	8.9	10.6	1.7	12.2	3.3	14.6	5.6
Fort Qu'Appelle/Balcarres/Lestock	4	3.0	5.6	2.7	6.5	3.5	7.7	4.7
Gravelbourg/Kincaid	3	2.6	1.3	(1.4)	1.5	(1.2)	1.8	(0.9)
Herbert/Morse	1	1.4	1.7	0.3	1.9	0.5	2.3	0.9
Hudson Bay	3	3.0	2.7	(0.3)	3.1	0.1	3.7	0.7
Humboldt/Watson/Quill Lake	13	11.6	8.4	(3.2)	9.7	(1.9)	11.5	(0.1)
Ile a la Crosse/Beauval	11	5.2	2.2	(3.0)	2.5	(2.7)	3.0	(2.2)
Kamsack/Keeseekoose FN/Cote FN	7	5.3	3.4	(1.9)	3.9	(1.4)	4.7	(0.6)
Kelvington/Yellow Quill FN	2	2.3	1.7	(0.6)	1.9	(0.4)	2.3	(0.0)
Kerrobert/Luseland	1	1.3	2.0	0.7	2.3	1.0	2.7	1.4
Kindersley/Eston	7	6.9	5.6	(1.2)	6.5	(0.4)	7.7	0.9
Kipling	2	2.1	1.9	(0.2)	2.2	0.1	2.6	0.5
La Loche/Buffalo Narrows	8	6.1	2.8	(3.3)	3.2	(2.9)	3.8	(2.3)
La Ronge/Air Ronge/Pinehouse	14	12.1	6.9	(5.2)	8.0	(4.1)	9.5	(2.6)
Langenburg/Churchbridge/Saltcoats	1	1.0	3.5	2.5	4.0	3.0	4.8	3.8
Lanigan	1	4.1	1.2	(2.9)	1.4	(2.7)	1.7	(2.4)
Leader/Eatonia	2	2.3	2.3	(0.0)	2.6	0.3	3.1	0.8
Lloydminster/Lashburn/Marshall (15 GPs at FTE=9.0 (i.e.17 GPs less 2 SI)	15	9.0	9.7	0.6	11.1	2.1	13.3	4.2
Maidstone/Cut Knife/Neilburg	5	3.8	3.6	(0.2)	4.1	0.3	4.9	1.1
Maple Creek	5	5.1	2.5	(2.6)	2.9	(2.2)	3.4	(1.7)
Meadow Lake/Loon Lake/Pierceland/Goodsoil	20	14.4	9.1	(5.4)	10.4	(4.0)	12.4	(2.0)
Melfort/Kinisinto/St. Brieux/Naicam	11	11.2	9.1	(2.1)	10.5	(0.7)	12.5	1.3
Melville/Ituna	5	5.7	5.9	0.2	6.8	1.0	8.1	2.3
Moose Jaw/Caronport/Central Butte	28	28.2	26.8	(1.4)	30.8	2.6	36.7	8.5
Moosomin/Rocanville	8	9.4	4.6	(4.7)	5.3	(4.0)	6.3	(3.0)
Nipawin/Carrot River/Choiceland/White Fox/Arboretum/Zenon Park	12	5.1	7.9	2.7	9.1	3.9	10.8	5.7
North Battleford/Battleford	27	27.4	13.6	(13.8)	15.6	(11.8)	18.6	(8.7)
Outlook/Dinsmore	2	2.2	3.3	1.0	3.7	1.5	4.5	2.2
Oxbow/Carnduff	3	3.3	3.5	0.1	4.0	0.7	4.7	1.4
Ponteix/Mankota/Vanguard/Hodgeville	1	1.0	1.8	0.8	2.1	1.1	2.5	1.5
Prince Albert/Birch Hills/Canwood	63	57.5	33.7	(23.8)	38.7	(18.7)	46.2	(11.3)
Regina/Balgonie/Pilot Butte/White City	173	146.8	140.6	(6.2)	161.2	14.4	169.3	22.5
Rosetown	5	4.8	2.9	(1.9)	3.3	(1.5)	3.9	(0.9)
Rosthern/Hague/Duck Lake	5	4.7	4.3	(0.4)	4.9	0.2	5.9	1.2
Sandy Bay/Peter Ballantyne/Creighton	1	0.1	4.6	4.5	5.3	5.2	6.3	6.2
Saskatoon/Martensville/Warman/Borden/Delisle	228	184.2	177.5	(6.7)	202.4	18.2	207.6	23.4
Shaunavon/Eastend/Frontier	3	1.8	3.0	1.3	3.5	1.7	4.2	2.4
Shellbrook	3	2.3	5.3	3.1	6.1	3.9	7.3	5.0
Southey/Regina Beach/Cupar/Lumsden/Craven	1	0.6	5.7	5.1	6.6	6.0	7.9	7.2
Spiritwood/Big River	2	1.6	3.9	2.3	4.4	2.9	5.3	3.7
Stony Rapids/Hatchet Lake/Fond Du Lac	4	3.4	2.7	(0.7)	3.1	(0.3)	3.7	0.3
Strasbourg/Nokomis/Raymore	1	1.0	2.5	1.5	2.9	1.9	3.4	2.4
Swift Current/Gull Lake/Cabri	24	23.3	17.0	(6.4)	19.5	(3.8)	23.3	(0.1)
Tisdale/Porcupine Plain	7	4.4	5.3	0.9	6.0	1.6	7.2	2.8
Turtleford/StWalburg/Edam	5	3.2	7.1	3.9	8.1	5.0	9.7	6.6
Unity/Macklin/Wilkie	5	4.6	5.6	1.0	6.5	1.9	7.7	3.1
Wadena	1	1.2	1.3	0.2	1.5	0.3	1.8	0.6
Wakaw/Cudworth	1	1.0	1.5	0.5	1.8	0.8	2.1	1.1
Watrous/Imperial	6	4.0	2.1	(1.9)	2.4	(1.6)	2.9	(1.1)
Weyburn/Midale/Fillmore	12	13.0	10.5	(2.5)	12.1	(0.9)	14.4	1.4
Wynyard	3	1.4	1.7	0.4	2.0	0.6	2.4	1.0
Yorkton/Foam Lake	16	17.8	16.5	(1.3)	19.0	1.2	22.7	4.9
TOTAL	833	715.5	657.2	(58.3)	753.5	37.9	841.8	126.3
ANNUAL PERCENT CHANGE				(0.8%)		0.5%		1.8%

The forecast model assumes gradual implementation of changes in PHC teams in the forecast years.

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* Current (Head) Count (Column 2) and Current FTE in 2012/13 (Column 3) were derived from a detail review and accounting of fee-for-service and RHA payments, as reported in the Annual RHA Report for 2012/13, to individual doctors. Current FTE excludes vacancies. Current FTE is not a head count but a value based on income earned relative to other family doctors (see Section 3.4.1.4 for explanation of methodology).

Figure Notes (the note numbers below correspond to Column numbers indicated in the first row of the preceding Figure)

1. List of the sixty one (61) primary health care clusters based on service pattern seeking behaviour. The forecast model to 2022/23 is predicated on collaborative PHC teams of which a family practice physician (FP) is one of a number of professions within the PHC team.
2. Current 833 head count of family practice physicians as of 2012/13, excluding special interest physicians (e.g., hospitalists, critical care associates, emergency medicine), by PHC cluster.
3. Current 715.5 family practice FTE as of 2012/13, excluding 110 special interest FTE (e.g., hospitalists, critical care associates, emergency medicine), by PHC cluster.
4. Is the number of FP FTE (657.2 FTE) required by PHC cluster under the Low Case scenario. The next subsection, 3.3.7.3, provides additional detail on calculation methodology for the Low Case PHC scenario.
5. Is the difference in FTE (58.3 FTE decrease, (0.8%) per annum) between column 1 (current FTE) and column 3 (FTE 2022/23) Low Case scenario.
6. Is the number of FP FTE (753.5 FTE) required by 2022/23 under the Base Case scenario. The next subsection, 3.3.7.3, provides additional calculation methodology detail on the Base Case PHC scenario.
7. Is the difference in FTE (37.9 FTE increase, 0.5% per annum) between column 1 (current FTE) and column 5 (FTE 2022/23).
8. Is the number of FP FTE (841.8 FTE) required by 2022/23 under the High Case scenario. The next subsection, 3.3.7.3, provides additional calculation methodology detail on the High Case PHC scenario.
9. Is the difference in FTE (126.3 increase FTE, 1.8% per annum) between column 1 (current FTE) and column 7 (FTE 2022/23)

LOW, BASE, AND HIGH CASE PRIMARY HEALTH CARE SCENARIO'S

Collaborative primary health care teams are described as “providers that bring separate and shared knowledge together to support a comprehensive range of high quality, effective health-care service.” The team may include for example, a family physician, dietician, nurse, and/or pharmacist, among others, noting that no two teams need be identical.

Collaborative primary health care is a priority initiative in most provinces, e.g., the Ontario, Nova Scotia, and Saskatchewan healthcare delivery systems. Many jurisdictions are piloting expanded roles for PHC team members including family practice nurses and nurse practitioners. The approach is predicated on role optimization of each member of a multi-disciplinary team of health care providers.

Many challenges must be addressed before a successful collaborative care model can be achieved. Planners caution that the process will take time, require extensive broad based engagement and consultation, and detailed careful analysis, planning, and payment/economic model reform. The Consultants advise that optimal team-based care outcomes require a common economic/financial model for all members of each PHC team and that mixed payment models (fee-for-service MD, salaried nurse, capitation top-up) within the same PHC team lead to conflicting incentives.

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1 BASE CASE SCENARIO

The Base Case scenario assumes incremental expansion of a collaborative primary health care model with 1.0 family physician (FP) and 1.0 physician assistant or nurse practitioner FTE per 2,000 population. This ratio is based on the experience in the United Kingdom Primary Care Trust, USA Veterans Administration health network, and Ontario health system.

The Base Case **Scenario** figure below shows the Family Physician replacement needs annually (Line 4) due to turnover (separations) in the Base Case. Line 6 shows the impact of a phased collaborative care team expansion beginning F5 (2017/18) and Line 11 the annual and Line 16 cumulative (column “n”) population aligned (formally or informally) with a collaborative primary health care team.

The overall impact of Base Case **Scenario** for collaborative care results in the number of family physician FTEs increasing from 715 FTE in 2012/13 to 753.5 FTEs in 2022/23, a 0.5% annual increase over the ten-year period.

	a	b	c	d	e	f	g	h	i	j	k	l	m	n
1	BASE CASE - GP Physician Extender		T0	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	10-Yr
2	ELEMENT	NOTE	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Change
3	FTE	Beginning GP FTE ¹	715	715	727	740	752	764	771	774	774	770	764	
4	Less:	Replacement Needs (turnover declining from 9% to 6.8% over the forecast period)		(65)	(64)	(62)	(61)	(60)	(58)	(57)	(56)	(55)	(53)	(590)
5	Plus:	Recruitment (replacement plus growth)		77	76	75	73	73	71	70	69	68	67	718
6	Less:	Impact of expanded PHC team implementation ²		0	0	0	0	(7)	(10)	(13)	(17)	(20)	(23)	(93)
7	Net:	Ending GP FTE	715.4	727.4	739.7	752.1	764.1	770.8	773.9	773.6	770.1	763.5	753.5	38.0
8		POPULATION PER NET GP FTE (excluding Special Interest GP FTE)	1,534	1,529	1,525	1,520	1,516	1,524	1,539	1,561	1,590	1,626	1,669	8.1%
9		POPULATION PER GROSS GP FTE (Including Special Interest GP FTE)	1,234	1,254	1,274	1,294	1,315	1,336	1,357	1,379	1,401	1,423	1,456	15.2%
10														
11	KEY DRIVER -	Population 'enrollment' ³	Annual	0	0	0	0	23,364	35,046	46,728	58,410	70,092	81,774	315,414
12	1GP+1PE per	General Practitioner FTE	Annual	0	0	0	0	7	10	13	17	20	23	90
13	2,000 pop.	PHC Team added FTE	Annual	0	0	0	0	12	18	24	30	36	42	162
14														
15														
16	Growth	Population 'enrollment'	Cummulative	0	0	0	0	23,364	58,410	105,138	163,548	233,640	315,414	315,414
17	Growth	Physician Extender FTE	Cummulative	0	0	0	0	12	30	54	84	120	162	162
	NOTES:													
	¹ 825.5 FTE less (110) GP FTE equalling 715.5 FTE that are contracted/working full-time in a non-family practice special interest (eg., hospitalist)													
	² NPs were providing care in PHC during base year (2012/13) – the incremental “physician extenders” starting in 2017/18 would be incremental													
	³ The number of population attending a family practice comprised of a GP and expanded PHC Team (eg. NP, Physician Assist.)													

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2 LOW CASE SCENARIO

The overall impact of Low Case **Scenario** for collaborative care results in the number of family physician FTEs decreasing from 715 FTE in 2012/13 to 657.2 FTEs in 2022/23, a (0.8%) annual decrease over the ten-year period.

	a	b	c	d	e	f	g	h	i	j	k	l	m	n
1	LOW CASE - GP Physician Extender		T0	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	10-Yr
2	ELEMENT	NOTE	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Change
3	FTE	Beginning GP FTE ¹	715	715	727	740	752	764	764	756	742	720	692	
4	Less:	Replacement Needs (turnover declining from 7.4% in F1 to 5.4% in F4)		(53)	(54)	(55)	(41)	(41)	(41)	(41)	(40)	(39)	(37)	(441)
5	Plus:	Recruitment (replacement plus growth)		65	66	67	53	55	54	54	53	52	51	570
6	Less:	Impact of expanded PHC team implementation ²		0	0	0	0	(14)	(21)	(28)	(35)	(41)	(48)	(187)
7	Net:	Ending GP FTE	715.4	727	740	752	764	764	756	742	720	692	657	(58)
8		POPULATION PER NET GP FTE (excluding Special Interest GP FTE)	1,534	1,529	1,525	1,520	1,516	1,539	1,576	1,629	1,700	1,793	1,914	19.9%
9		POPULATION PER GROSS GP FTE (Including Special Interest GP FTE)	1,234	1,268	1,304	1,340	1,378	1,417	1,456	1,497	1,539	1,582	1,638	24.7%
10														
11	KEY DRIVER -	Population 'enrollment' ³	Annual	0	0	0	0	47,280	70,920	94,560	118,200	141,840	165,480	638,280
12	1GP+1PE per	General Practitioner FTE	Annual	0	0	0	0	14	21	28	35	41	48	187
13	2,000 pop.	PHC Team added FTE	Annual	0	0	0	0	24	36	48	60	72	84	324
14														
15														
16	Growth	Population 'enrollment'	Cummulative	0	0	0	0	47,280	118,200	212,760	330,960	472,800	638,280	638,280
17	Growth	Physician Extender FTE	Cummulative	0	0	0	0	24	60	108	168	240	324	324
	NOTES:	¹ 825.5 FTE less (110) GP FTE equalling 715.5 FTE that are contracted/working full-time in a non-family practice special interest (eg., hospitalist)												
		² NPs were providing care in PHC during base year (2012/13) – the incremental “physician extenders” starting in 2017/18 would be incremental												
		³ The number of population attending a family practice comprised of a GP and expanded PHC Team (eg, NP, Physician Assist.)												

3 HIGH CASE

The overall impact of High Case **Scenario** for collaborative care results in the number of family physician FTEs increasing from 715.4 FTE in 2012/13 to 841.8 FTEs in 2022/23, a 1.8% annual increase over the ten-year period.

	a	b	c	d	e	f	g	h	i	j	k	l	m	n
1	HIGH CASE - GP Physician Extender		T0	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	10-Yr
2	ELEMENT	NOTE	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Change
3	FTE	Beginning GP FTE ¹	715	707	720	733	746	758	772	786	800	814	828	
4	Less:	Replacement Needs (turnover declining from 7.4% in F1 to 6.4% in F4)		(52)	(53)	(54)	(55)	(56)	(57)	(58)	(59)	(60)	(61)	(566.6)
5	Plus:	Recruitment (replacement plus growth)	(8)	65	66	67	68	70	71	72	73	74	75	692.8
6	Less:	Impact of expanded PHC team implementation ²		0	0	0	0	0	0	0	0	0	0	0.0
7	Net:	Ending GP FTE	707	720	733	746	758	772	786	800	814	828	842	126
8		POPULATION PER NET GP FTE (excluding Special Interest GP FTE)	1,534	1,545	1,539	1,533	1,527	1,521	1,516	1,510	1,505	1,500	1,403	(9.4%)
9		POPULATION PER GROSS GP FTE (Including Special Interest GP FTE)	1,234	1,241	1,249	1,256	1,264	1,271	1,279	1,287	1,294	1,302	1,321	6.6%
10														
11	KEY DRIVER -	Population 'enrollment' ²	Annual	0	0	0	0	0	0	0	0	0	0	0
12	1GP+1PE per	General Practitioner FTE	Annual	0	0	0	0	0	0	0	0	0	0	0
13	2,000 pop.	PHC Team added FTE	Annual	0	0	0	0	0	0	0	0	0	0	0
14														
15														
16	Growth	Population 'enrollment'	Cummulative	-	-	-	-	-	-	-	-	-	-	-
17	Growth	Physician Extender FTE	Cummulative	-	-	-	-	-	0	0	0	0	0	-
	NOTES:	¹ 825.5 FTE less (110) GP FTE equalling 715.5 FTE that are contracted/working full-time in a non-family practice special interest (eg., hospitalist)												
		² NPs were providing care in PHC during base year (2012/13) – the incremental “physician extenders” starting in 2017/18 would be incremental												
		³ The number of population attending a family practice comprised of a GP and expanded PHC Team (eg, NP, Physician Assist.)												

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3.3.7.2 Core Services

The concept of “core services” has been implemented in different ways in a number of provinces. A key objective is to enable timely access for all residents to a defined range of primary and secondary care services, and referring patients for tertiary and quaternary services. The consensus practice in Canada is to include the following as physician core services: comprehensive family practice, emergency medicine, general internal medicine, general surgery (and corresponding anesthesia services), and general psychiatry, general pediatrics, and obstetrics, supported by general laboratory (specimen collection and transport, ECG) and medical imaging (screening, routine diagnostic and imaging, x-ray) services.

There are many aspects to consider in designing and implementing a core services model. Detailed clinical service planning across all services is required to successfully implement a core service model. Some of the key determinants include:

- (1) Definition of reasonable access time (“x” minutes driving time to PHC)
- (2) Definition of community categories (rural, hamlet, village, town, city)
- (3) Criteria for rurality/remoteness and determinants of a service delivery model that is unique to remote communities (air ambulance, fly-in PHC)
- (4) Balancing need for appropriate access with factors such as maintenance of competency and affordability in low volume situations, recruitment realities in rural and remote areas
- (5) Critical mass of a given specialty to function in a sustainable manner (can a single specialist function reasonably in a sustainable manner or is there a minimum number of specialists required in a given catchment area).

The following table illustrates how core services are distributed in the forecast model. A check mark indicates the physical presence of the service within a given community category (such as, Town-Med 2000-2999 population) with primary health care (PHC) in the community. Commute times to the community from surrounding rural areas are plotted using geographical, population, and travel route data. Concentric circles of increasing distance/time to access are drawn outward from a given community to establish catchment areas and thus, service population and ultimately the number and type of physician disciplines required.

COMMUNITY CATEGORY	PHC	Emergency Medicine	General Internal Medicine	General Surgery (& Anesthesia)	General Psychiatry	General Pediatrics	Obstetrics/ Gynaecology	Laboratory/ Radiology
Remote rural area								
Rural Area								
Hamlet (<250)								
Village (250-999)								
Town-Sm (1000-1999)	¹⁰	* ¹¹						* ¹²

¹⁰ Based on identified needs, Saskatchewan communities in the 1,000-1,999 category receive primary health services from either visiting PHC providers or from PHC providers located in the community

¹¹ In addition to access to ground and air (fixed wing and rotary) emergency medical services, a number of Saskatchewan communities in the 1,000 to 1,999 category, although not all, currently maintain facility based emergency medical services and basic laboratory and radiology services. The Ministry is improving stability and access to health care services through new initiatives such as Collaborative Emergency Centres (CECs). CECs offer expanded access to primary health care providers and the assurance that 24/7 emergency service is available for patients.

¹² Includes Laboratory technologists conducting specimen collection, transport, and results reporting and Diagnostic Imaging technologists performing general radiology exams.

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COMMUNITY CATEGORY	PHC	Emergency Medicine	General Internal Medicine	General Surgery (& Anesthesia)	General Psychiatry	General Pediatrics	Obstetrics/ Gynaecology	Laboratory/ Radiology
Town-Med (2000-3000)	☒	☒						* ¹²
Town-Lg (3000-4999)	☒	☒						* ¹²
Urban-Sm (5000-9999)	☒	☒						* ¹²
Urban-Lg (10000-+)	☒	☒	☒	☒	☒	☒	☒	☒

The configuration of core services has a direct material impact on PPR planning and forecasting. A core services model is not a requirement or prerequisite of a PPR in any way. In the absence of a core service model, the PPR is merely required to make assumptions, make them clear and transparent, prior to generating a PPR planning model and forecast. The following table identifies the key assumptions driving the number of core service specialists required under the low, base, and high case scenarios.

SPECIALTY	NOTES	LOW CASE	BASE CASE	HIGH CASE
Comprehensive family practice in context of Collaborative Primary Health Care Teams	Based upon the experience in the United Kingdom Primary Care Trust, USA Veterans Administration health network, Ontario and Saskatchewan health systems, and CFPC advice on panel size.	See prior subsection 3.3.7.1	See prior subsection 3.3.7.1	See prior subsection 3.3.7.1
General Internal Medicine	1.0 FTE is 16 weeks as inpatient ward attending physician. 14 weeks hospital inpatient consultation and outpatient clinic service. 14 weeks private office practice. 1.0 FTE averages 1 service per year per resident less than age 18 years 5,100 total services per year	18,000 per 1.0 FTE	17,100 per 1.0 FTE	16,286 per 1.0 FTE
General Pediatrics	1.0 FTE averages 1 service per year per resident less than age 18 years 5,100 total services per year	22,500 per 1.0 FTE or 5,400 under age 18 per 1.0 FTE	21,375 per 1.0 FTE or 5,100 under age 18 per 1.0 FTE	20,357 per 1.0 FTE
Psychiatry	1.0 FTE averages 2,178 consultations	10,625 per 1.0 FTE	10,141 per 1.0 FTE	9,658 per 1.0 FTE

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SPECIALTY	NOTES	LOW CASE	BASE CASE	HIGH CASE
Obstetrics and Gynaecology – normal newborn	O&G delivered 65% of newborns in SK in 2012/13, GPs 34% (highest rate among provinces). Midwives < 1% (8% in USA, 5% in UK ¹³) About 11%-13% of newborns require admission to a NICU (Level 2 or 3) post-partum. 1.0 FTE averages 270 newborn deliveries (normal and c-section) per year.	19,000 per 1.0 FTE or 3,600 female age 15 to 44 per 1.0 FTE. 40% of newborns delivered by O&G, 60% by GPs and GPs with special interest/training in “Maternity and Newborn Care”.	18,050 per 1.0 FTE or 3,400 female age 15 to 44 per 1.0 FTE. 60% of newborns delivered by O&G	17,190 per 1.0 FTE or 3,250 female age 15 to 44 per 1.0 FTE. Maintain current state with 65% of deliveries done by O&G specialists. 40% of all newborns are normal, 24% with c-section, and remaining 36% are induced or with ventouse or forceps.
General Surgery	1.0 FTE averages 120 inpatient and 540 outpatient procedures per year. 640 operating room hours per year or 14 hours per week for 46 weeks.	17,500 per 1.0 FTE	16,625 per 1.0 FTE	15,833 per 1.0 FTE
Diagnostic Imaging	13,500 to 14,500 examinations and readings per 1.0 FTE	17,100 per 1.0 FTE	16,300 per 1.0 FTE	15,485 per .10 FTE
General Pathology		Specimen collection, transport, and reporting with two central sites (Saskatoon, Regina) in a hub and spoke model of service	No change in current service delivery model	No change in current service delivery model

¹³ Mapping maternity care: the configuration of maternity care in England Birthplace in England research programme. Final report part 3, NHS, Nov/2011

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BASE CASE SCENARIO

The base case scenario requires an additional 130.1 FTE to achieve the desired population per FTE ratio by geographic region and RHA.

Numeric values that are boxed (e.g., GIM in RHA 7) indicate core FTE and services that will likely be delivered by specialists residing outside the RHA, rather than in the RHA. The reasons being a) low population density in general, and b) no urban centre with a minimum 10,000 population (per preceding chart) within the RHA.

BASE CASE -FORECAST - MODEL OF CARE - CORE SERVICES				2022/23							
RHA	RHA	Core Service Community	Population 2012/13	GIM	Paediatrics	Psychiatry	O&G	Anaesthesia	General Surgery	Diagnostic Imaging	Total
1	Sun Country	Weyburn/Estavan	58,064	3.9	3.2	6.3	3.6	7.3	4.1	4.1	32.4
2	Five Hills	Moose Jaw	54,272	3.5	2.8	5.6	3.2	6.5	3.6	3.7	28.9
3	Cypress	Swift Current	44,000	2.9	2.3	4.7	2.7	5.4	3.0	3.1	24.1
4	Regina Qu'Appelle	Regina	270,820	18.3	14.6	29.3	16.6	33.7	18.8	19.2	150.6
5	Sunrise	Yorkton	57,874	3.9	3.1	6.2	3.5	7.2	4.0	4.1	32.1
6	Saskatoon	Saskatoon	323,154	22.1	17.7	35.5	20.1	40.7	22.8	23.2	182.1
7	Heartland	Rosetown/ Kindersley	44,240	3.0	2.4	4.8	2.7	5.5	3.1	3.1	24.6
8	Kelsey Trail	Nipawin/ Melfort	40,288	2.7	2.2	4.4	2.5	5.1	2.8	2.9	22.6
9	Prince Albert Parkland	Prince Albert	82,479	5.3	4.2	8.4	4.8	9.7	5.4	5.5	43.2
10	Prairie North	Lloydminster/ North Battleford	77,827	5.4	4.3	8.7	4.9	10.0	5.6	5.7	44.6
	Mamawetan Churchill										
11	River	La Ronge	23,318	1.5	1.2	2.5	1.4	2.8	1.6	1.6	12.6
12	Keewatin Yatthé	La Loche	11,368	0.7	0.5	1.1	0.6	1.2	0.7	0.7	5.5
	Athabasca Health										
13	Authority	Stony Rapids	2,682	0.2	0.2	0.3	0.2	0.3	0.2	0.2	1.6
CORE SERVICE FORECAST TOTAL			1,090,386	73.6	58.8	117.8	66.7	135.3	75.7	77.2	605.1
ACTUAL SPECIALIST FTE TOTAL				48.2	29.7	69.9	56.5	135.3	60.1	75.2	475.0
VARIANCE - FORECAST TO ACTUAL				(25.3)	(29.1)	(47.9)	(10.2)	0.0	(15.6)	(2.0)	(130.1)

FOOTNOTE: Numeric values with a box around them (e.g., GIM in RHA 7) indicate core FTE and services that will likely be delivered by specialists residing outside the RHA, rather than in the RHA. The reasons being a) low population density in general, and b) no urban centre with a minimum 10,000 population within the RHA.

LOW CASE SCENARIO

The low case scenario requires an additional 114.4 FTE to achieve the desired population per FTE ratio by geographic region and RHA.

LOW CASE -FORECAST - MODEL OF CARE - CORE SERVICES				2022/23							
RHA	RHA	Core Service Community	Population 2012/13	GIM	Paediatrics	Psychiatry	O&G	Anaesthesia	General Surgery	Diagnostic Imaging	Total
1	Sun Country	Weyburn/Estavan	58,064	3.7	3.0	6.3	3.5	6.3	3.9	3.9	30.6
2	Five Hills	Moose Jaw	54,272	3.3	2.7	5.7	3.2	5.6	3.4	3.4	27.3
3	Cypress	Swift Current	44,000	2.8	2.2	4.7	2.6	4.7	2.9	2.9	22.8
4	Regina Qu'Appelle	Regina	270,820	17.4	13.9	29.5	16.5	29.2	17.9	17.9	142.3
5	Sunrise	Yorkton	57,874	3.7	3.0	6.3	3.5	6.2	3.8	3.8	30.3
6	Saskatoon	Saskatoon	323,154	21.0	16.8	35.6	19.9	35.3	21.6	21.6	172.0
7	Heartland	Rosetown/ Kindersley	44,240	2.8	2.3	4.8	2.7	4.8	2.9	2.9	23.3
8	Kelsey Trail	Nipawin/ Melfort	40,288	2.6	2.1	4.4	2.5	4.4	2.7	2.7	21.3
9	Prince Albert Parkland	Prince Albert	82,479	5.0	4.0	8.5	4.7	8.4	5.1	5.1	40.8
10	Prairie North	Lloydminster/ North Battleford	77,827	5.2	4.1	8.7	4.9	8.7	5.3	5.3	42.1
	Mamawetan Churchill										
11	River	La Ronge	23,318	1.5	1.2	2.5	1.4	2.5	1.5	1.5	11.9
12	Keewatin Yatthé	La Loche	11,368	0.6	0.5	1.1	0.6	1.1	0.7	0.7	5.2
	Athabasca Health										
13	Authority	Stony Rapids	2,682	0.2	0.1	0.3	0.2	0.3	0.2	0.2	1.5
CORE SERVICE FORECAST TOTAL			1,090,386	69.9	55.9	118.4	66.2	117.4	71.9	71.9	571.5
ACTUAL SPECIALIST FTE TOTAL				48.2	29.7	69.9	56.5	117.4	60.1	75.2	457.1
VARIANCE - FORECAST TO ACTUAL				(21.6)	(26.2)	(48.5)	(9.7)	0.0	(11.8)	3.3	(114.4)

FOOTNOTE: Numeric values with a box around them (e.g., GIM in RHA 7) indicate core FTE and services that will likely be delivered by specialists residing outside the RHA, rather than in the RHA. The reasons being a) low population density in general, and b) no urban centre with a minimum 10,000 population within the RHA.

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HIGH CASE SCENARIO

The high case scenario requires an additional 161.6 FTE to achieve the desired population per FTE ratio by geographic region and RHA.

HIGH CASE - FORECAST - MODEL OF CARE - CORE SERVICES				2022/23							
RHA	RHA	Core Service Community	Population 2012/13	GIM	Paediatrics	Psychiatry	O&G	Anaesthesia	General Surgery	Diagnostic Imaging	Total
1	Sun Country	Weyburn/Estevan	58,064	4.1	3.3	7.0	3.9	8.6	4.3	4.3	35.5
2	Five Hills	Moose Jaw	54,272	3.7	3.0	6.2	3.5	7.7	3.8	3.8	31.7
3	Cypress	Swift Current	44,000	3.1	2.5	5.2	2.9	6.4	3.2	3.2	26.4
4	Regina Qu'Appelle	Regina	270,820	19.2	15.4	32.4	18.2	39.9	19.8	19.8	164.7
5	Sunrise	Yorkton	57,874	4.1	3.3	6.9	3.9	8.5	4.2	4.2	35.1
6	Saskatoon	Saskatoon	323,154	23.2	18.6	39.2	22.0	48.2	23.9	23.9	199.1
7	Heartland	Rosetown/ Kindersley	44,240	3.1	2.5	5.3	3.0	6.5	3.2	3.2	26.9
8	Kelsey Trail	Nipawin/ Melfort	40,288	2.9	2.3	4.9	2.7	6.0	3.0	3.0	24.7
9	Prince Albert Parkland	Prince Albert	82,479	5.5	4.4	9.3	5.2	11.4	5.7	5.7	47.2
10	Prairie North	Lloydminster/ North Battleford	77,827	5.7	4.6	9.6	5.4	11.8	5.9	5.9	48.8
	Mamawetan Churchill										
11	River	La Ronge	23,318	1.6	1.3	2.7	1.5	3.3	1.7	1.7	13.8
12	Keewatin Yatthé	La Loche	11,368	0.7	0.6	1.2	0.7	1.5	0.7	0.7	6.1
	Athabasca Health										
13	Authority	Stony Rapids	2,682	0.2	0.2	0.3	0.2	0.4	0.2	0.2	1.7
CORE SERVICE FORECAST		TOTAL	1,090,386	77.2	61.8	130.2	73.2	160.2	79.4	79.4	661.5
ACTUAL SPECIALIST FTE		TOTAL		48.2	29.7	69.9	56.5	160.2	60.1	75.2	499.9
VARIANCE - FORECAST TO ACTUAL				(29.0)	(32.1)	(60.3)	(16.7)	0.0	(19.3)	(4.2)	(161.6)

FOOTNOTE: Numeric values with a box around them (e.g., GIM in RHA 7) indicate core FTE and services that will likely be delivered by specialists residing outside the RHA, rather than in the RHA. The reasons being a) low population density in general, and b) no urban centre with a minimum 10,000 population within the RHA.

NOTES TO BASE, LOW, AND HIGH CASE SCENARIOS – CORE SERVICES

The Base, Low, and High Case scenarios for Core Services are exclusive of subspecialties in Psychiatry and Obstetrics and Gynecology, i.e., Forensic Psychiatry, Gynecologic Oncology, Maternal Fetal Medicine, Urogynecology, and Gynecologic Reproductive Endocrinology & Infertility. These subspecialties are included separately under the column entitled “MOC- Provincial Programs” in RHA’s 4 and 6.

3.3.7.3 On-call Services

The forecast model adjusts the number of physicians by specialty to ensure a sustainable on-call rotation. The adjustment is sensitized to the “service” more so than the specialty (such as, tertiary intensive care first call is generally not sustainable at a frequency of less than one week in five, whereas rheumatology on-call service is sustainable at one week in two given the low frequency and urgency of calls).

3.3.7.4 Physician Extenders in Specialty Physician Services

Physician Extenders (PEs)¹⁴ see the same types of patients as a physician but, generally, patients seen by a PE require more routine and straightforward care. **Physician Extenders** perform generic tasks such as taking medical histories, conducting physical exams, making a diagnosis and treating illnesses, ordering and interpreting tests, counseling on preventive health care, assisting in surgery, making referrals and in many cases writing prescriptions. Specialized procedures (insertion of central access lines and chest tubes, invasive diagnostic procedures, ambulatory surgery) performed by PEs are

The Canadian Medical Association (CMA) describes physician assistants as "highly skilled health care professionals who work alongside physicians to improve access to care, reduce wait times, and enhance the quality of care."

¹⁴ Note that Physician Assistants are not licensed in Saskatchewan; also, Nurse Practitioners are established currently and included in current state assessment

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specific to a particular clinical field or setting, not unlike those undertaken by physicians and are commensurate with adequate formal or informal postgraduate training. A **physician extender** may, by training, come from a number of professional backgrounds but is most often either a physician assistant (PA), advance practice nurse (APN), or nurse practitioner (NP).

The physician assistant (PA) is one form of **physician extender**. PAs only work within the scope of the supervising MD. A PA may come from a variety of training backgrounds including nursing, nurse practitioner, psychologist, or physiotherapist. The PA profession has expanded fairly rapidly since 2005 in Canada. PAs in Canada work for physician(s) under their supervision in semiautonomous roles delivering delegated medical services that the physician would otherwise do themselves. As such, a PA scope of practice mirrors that of their supervising licensed physician, thus provides greater service capability for the physician. In Manitoba, the PA program has grown from three clinical assistants to about 100 working in Winnipeg, plus another 12 to 20 in the province's rural areas. Currently, there are approximately 400 PAs working in Canada—mostly in Manitoba and Ontario—with another 160 students enrolled in PA programs. Alberta Health Services has launched a two year demonstration PA program placing PAs in select facilities across the province. The Alberta Ministry of Health is amending its Health Professions Act to include PAs. The Canadian Association of Physician Assistants is the governing body for physician assistants. Physician assistant training programs in Canada are currently offered at McMaster University (BSc.), University of Toronto/Northern Ontario Medical School (BScPA), and the University of Manitoba (Masters PA).

The Base, Low, and High Case scenarios make specific assumptions regarding the impact of PEs on the forecasted need for physicians. The health professions having the most direct impact on forecasted needs are those who can, in a substitute role, perform delegated tasks and functions that result in increased efficiency for the physician specialist.

Nurse practitioners (NPs) are expanding in numbers in Canada. To date, they most frequently work either independently (solo practice in remote or northern communities), or independently within a team and own a patient roster separate from an MD. The growth of NPs in Saskatchewan is demonstrated with the increase in registration from 42 in 2004 to 193 in October 2014. Advance practice nurses have taken additional training. A nurse endoscopist, as discussed later, is a good example. These individuals work under the direction of an MD in a defined scope of practice and extend the MD expertise and resource by performing tasks that they would otherwise do themselves.

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The following table describes where PE's have been applied in the forecast model in the Low, Base, and High Case scenarios.

SPECIALTY	NOTES	LOW CASE	BASE CASE	HIGH CASE
RCPSC Specialists				
Gastroenterology - Screening ¹⁵	Nurse Endoscopists in supervised roles in larger centres	Nurse Endoscopists in supervised roles in RUH and RGH with 20% reduction in Gastroenterologist endoscopy time.	No nurse endoscopists	Current state – no nurse endoscopists
Nephrology ¹⁶ - End Stage Kidney Disease	GP as junior doctor doubles capacity of each nephrologist	Ratio of 100 patients on renal replacement therapy per 1.0 FTE Nephrologist and 0.8 FTE GP	Midrange ratio of 75 patients on RRT per 1.0 FTE Nephrologist and 0.6 FTE GP.	Maintain current state – Ratio of 48 patients on RRT per 1.0 FTE Nephrologist
Psychiatry – General	National average is 1 FTE per 7,900 population and SK has 1 FTE per 14,400 population	Increase FTE 36 to 1.0 FTE per 10,625 population per benchmarks while moving focus to acute caseload, augment with increased psychologist (currently approximately 440 full practicing across province - CPS), GP SI, mental health counsellors, and integrated collaborative MOC's	Increase FTE 42% to 1.0 FTE per 10,141 population while moving focus toward more acute caseload and augment with increased psychologist and GP SI workforce.	Increase FTE 49% to an average of 1 FTE per 9,658 population.
Urology ¹⁷ - CDM Physician Extender	Percent patients seen by Urologist that could be evaluated/treated by a physician extender (PA or NP)	30% to 40% with two PE's working in the physician practice. PE sees an average of 50-60 patients per four-day clinic week.	20% with one PE working in the physician practice. PE sees an average of 20-30 patients per four-day clinic week.	0% with zero PE's working in the physician practice
RCPSC Subspecialists (Subsp)-Paediatric	Increase the capacity for paediatric CDM management by better utilizing physician extenders and general	Move to benchmark ¹⁸ subspecialist to general paediatrician mix of 0.84 to 1.0. Expand general pediatrician workforce with "special interests,"	Maintain current subspecialist to general paediatrician mix of 0.87 to 1.0. Maintain expanded scope of general paediatrician practice.	Move to national average subspecialist to general paediatrician mix of 1.10 to 1.0.

¹⁵ Gastroenterology Workforce Service Review, Health Workforce New Zealand Board, March 2011

¹⁶ British Renal Association, JSC for Renal Medicine, 08.24, 5 June 2008, Workforce Requirements For Nephrology Over The Next 5-10 Years, Draft document from the Workforce Group, (Baker, R., Barker, L., Mason P. Chair)

¹⁷ Husmann, D., Routh, J.C., et. Al., Pediatric Urology Workforce and Fellowship Surveys'2006-2010, Society for Pediatric Urology

¹⁸ U.K. RCPCH, Facing the Future: A Review of Paediatric Services, April 2011

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SPECIALTY	NOTES	LOW CASE	BASE CASE	HIGH CASE
Family Physician – Special Interests	paediatricians	e.g., Respiriology, Neurology		
	Extend subspecialty capacity through planned linkage of GP SI's to subspecialties.	Implement GP SI to subspecialty integration, with 15%-20% impact, across all GP SI areas, i.e. ○ Geriatric Medicine- SI Care of Elderly ○ Psychiatry – SI Addiction Medicine ○ Paediatrics General – SI Child/Adolescent Health ○ Paediatrics Developmental – SI Developmental Disabilities ○ Anaesthesia – SI Anaesthesia (augment) ○ General Internal Medicine – SI Hospital Medicine ○ Psychiatry – SI Mental Health ○ Respiriology – SI Respiratory Medicine	Implement GP SI to subspecialty integration, with 15% -20% impact, in: ○ Geriatric Medicine- SI Care of Elderly ○ Psychiatry – SI Addiction Medicine	Maintain current state with no formal GP SI to subspecialty integration.

Physician Extender –benefits include:

Benefit	continued...	
(a) Work directly for Team in a collaborative care setting or for the physician or physician group practice setting, thereby enhancing direct accountability	(d) Since PEs perform controlled delegated tasks the physician would otherwise perform themselves, the capacity of each service, physician and physician group is markedly increased	(g) Lower pressure on difficult to recruit subspecialties

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(b) As a regulated licensed profession (ON, NB, and pending in MB and AB) can obtain independent practitioner insurance	(e) PEs working for a service, physician or physician group, extend the physician capacity into areas of unmet need, e.g., CPI triage, patient counseling and preventative care	(h) Lower overall costs of physician services while improving access
(c) Motivations, interests, skills and continuous professional development purposely align with the needs of MD physicians	(f) Improve access to services without impacting quality	

Risks associated with physician extenders may include issues of lower quality in the absence of proper supervision, higher cost if task and function overlap occurs, and legal/insurance if the proper legislation and regulation is not in place.

SUMMARY – PHYSICIAN EXTENDERS

- Base Case **Scenario** – the forecast model assumes integration of increased planned family physician special interest FTEs in geriatric medicine and addiction medicine, and a change in the current **subspecialist** to general paediatrician mix from 0.87 to 1.0 to 0.70 to 1.0. Maintain expanded scope of general paediatrician practice.
- Low Case **Scenario** – the forecast model applies assumptions as described in the preceding Base Case plus integration of **physician extenders** in gastroenterology, nephrology, psychiatry, and urology while implementing planned expansion of general paediatrician workforce with “special interests”, such as, Respiriology, Neurology, and planned implementation of GP SI to subspecialty integration, with 15%-20% impact, across all GP SI areas
- High Case **Scenario** – the forecast model assumes **no physician extenders** are engaged in any family practice, specialist, or **subspecialist** services.

3.3.8 PROVINCIAL PROGRAMS

A Provincial Program Network (PPN) is a provincial subspecialty service provided at more than a single site with provincial oversight by a single committee or entity.

A specialty example is Neurosurgery where a relatively small population is best served by a provincial program that maintains critical mass (quality) and intra-specialty support and on-call programs (spine, vascular, trauma, and paediatric). Oversight to this specialty can be provided by an academic infrastructure that includes a provincial training program, not achievable in co-existence with a second site. The strengths are documented in the multidisciplinary Neurology/Neurosurgery Planning Advisory Group Summary (Ontario; Hamilton Niagara Haldimand Brant LHIN), as part of developing a LHIN-wide, ideal service delivery model:

- Coordinated continuum of care
- Best practice guidelines
- Specialized teams
- Network of care
- Interdisciplinary support
- Health promotion and disease prevention
- Acute care with hub and spoke model (tertiary – large secondary – small community – rehabilitation centre)

The related neuroscience clusters include common intake and referral processes, system navigation and patient portals, seamless information management, and triage. An international confirmation of the criticality of infrastructure for both service and teaching is provided as Neurosurgery (Adult) at NHS England 05 June 2013. As well, safe facilities and services underpin the *British Neurosurgical Workforce Plan 2000-2015: A Report from the Society of British Neurological Surgeons*.

A sub-specialty example is geriatric team-based care that incorporates a team-based point of entry, care that is internal to the team, and a navigation responsibility whereby the team or the team-based Geriatrician (or GP with specialized training in care-of-the-elderly) undertakes subsequent referrals to other specialists. It could be anticipated that increased resources would be required in the areas of geriatric psychiatry and neurology, and fewer in other medical subspecialties¹⁹. A geriatric team could be anticipated to require increased primary resources and decreased subspecialty resources by 10% (for the geriatric population). In a personal communication (June 9, 2011), Dr. Ken Rockwood from Dalhousie University stated, . . . *it is worth considering the importance role of the geriatrician to deal with older adults who have multiple, interacting medical and social problems. The role has of the geriatrician has been undervalued and underutilized.*

Provincial Program Network benefits include:

Benefit	continued...
(a) Progression towards comprehensive primary health care	(e) As part of CDM, improved uptake of clinical practice guidelines and measurement of care to provides linkages between applications and improved outcomes
(b) Strengthens patient-physician relationship	(f) Rational referrals and consistent patient follow-up
(c) Enhances health outcomes and process efficiencies	(g) Critical mass and optimal teaching
(d) A natural site for chronic disease management (CDM) initiatives	(h) Avoidance of duplicated services

¹⁹ Hogan DB, Borrie M, Basran JFS et al. *Specialist physicians in geriatrics – report of the Canadian Geriatrics Society Physician Resource Work Group. Can Ger J; 2012: 15 (3): 68-79*

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Four PPNs are described in context of the forecast model assumptions for their respective low, base, and high case scenarios as follows:

3.3.8.1 Cardiac and Cardiothoracic Surgery

CARDIAC SURGERY	Current State (31/03/2013)	BENCHMARK	LOW CASE (Scenario)	BASE CASE (Scenario)	HIGH CASE (Scenario)
ENVIRONMENTAL SCAN REPORT Reference	Section 19.3.2 (literature references, benchmarks, narrative descriptions)				
Count	6.0		8.0	8.0	8.0
Full-time equivalents	6.8		7.0	7.5	7.7
Minimum on-call rotation	1 in 3				
Benchmark 1 – FTE/Population	1: 160,200	1: 200,000			
Benchmark 2		n/a			
SCENARIO FTEs			Add 0.2 by F10	Add 0.7 by F10	Add 0.9 by F10
DESCRIPTION	Cardiac Surgery is that branch of surgery concerned with diseases of the pericardium, heart and great vessels. The resident who has completed training in Cardiac Surgery is expected to function as an independent consultant with respect to the diagnosis and management of patients with cardiovascular disease, including the provision of surgical intervention when indicated and postoperative care.				
Provincial program: Key specialty-specific criteria	Low volume (in 2008 the national average coronary artery bypass (CABG) procedures per surgeon was 115), high complexity service		Data suggest 100 to 125 open heart procedures per year (including coronary artery bypass procedures, valve replacements, and other operations requiring the use of cardiopulmonary bypass) per hospital is the minimum requirement from a quality standpoint and that there is a greater variation in adjusted mortality rates for teams doing lower volumes of procedures as compared with those doing a high volume.		

3.3.8.2 Laboratory Medicine

Laboratory Medicine	Current State (31/03/2013)	BENCHMARK	LOW CASE (Scenario)	BASE CASE (Scenario)	HIGH CASE (Scenario)
ENVIRONMENTAL SCAN REPORT Reference	Section 20.3 (literature references, benchmarks, narrative descriptions)				
Count	43.0				
Full-time equivalents	40.7 (21.3 Anatomic P., 9.6 General P., 5.8 Hematological P.,		49.2	50.1	51.0

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Laboratory Medicine	Current State (31/03/2013)	BENCHMARK	LOW CASE (Scenario)	BASE CASE (Scenario)	HIGH CASE (Scenario)
Minimum on-call rotation	1.0 Forensic P., 2.0 Medical Biochem, 1 Neuro P.); ex. PhD staff, Medical Microbiology.				
Benchmark 1 – Surgical Cases/1.0 FTE Pathology	3,435	3,285 (Alberta, CLS and UK RCP)	3,235	3,235	3,235
Benchmark 2 – Specimens/ 1.0 FTE Pathology	4,584	4,000 (Alberta, CLS and UK RCP)	4,000	4,000	4,000
SCENARIO FTEs	Currently higher workload than benchmarks and only four RHA's with resident pathologists.	As workload already exceeds benchmarks; the 3 Scenarios foresee an increase in FTE.	Increase current FTE by 1.8 to align with Benchmark. Downsize to two central sites.	Increase current FTE by 1.8 to align with Benchmark. Remain with 4 sites.	Increase current FTE by 1.8 to align with Benchmark
DESCRIPTION	Pathology services are already quite centralized with only 4 RHA's having resident pathologists. The low scenario is based on two central sites rather than four and the base and high scenarios project no significant change in service model				
Provincial program: Key specialty-specific criteria	Centralized service (two locations) with Provincial oversight for resource management, quality assurance, and collection system monitoring				

3.3.8.3 Neurosurgery

NEUROSURGERY	Current State (31/03/2013)	BENCHMARK	LOW CASE (Scenario)	BASE CASE (Scenario)	HIGH CASE (Scenario)
ENVIRONMENTAL SCAN REPORT Reference	Section 19.3.6 (literature references, benchmarks, narrative descriptions)				
Count	11.0		8.0	10.0	11.0
Full-time equivalents	11.0		6.9	9.2	11.0
Minimum on-call rotation	1 in 3				
Benchmark 1 – FTE/Population	1: 99,000	1: 150,000			
Benchmark 2	202 surgical procedures (30% minor)/year	250 surgical procedures (5% - 10% minor)/year			
SCENARIO FTEs	2,035 operations per million population	1,025 – 1,642 operations per million population	Do not replace retirements	Do not replace retirements	No Change (replace retirements)
DESCRIPTION	Neurosurgery is the specialty of surgery dedicated to the diagnosis, surgical and non-surgical management of congenital abnormalities, trauma and diseases				

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NEUROSURGERY	Current State (31/03/2013)	BENCHMARK	LOW CASE (Scenario)	BASE CASE (Scenario)	HIGH CASE (Scenario)
Provincial program: Key specialty-specific criteria	affecting the nervous system, its blood supply, and supporting structures (source: RCPSC). Low volume (1,025-1642 procedures per million population), high complexity service				

3.3.8.4 Vascular Surgery

VASCULAR SURGERY	Current State (31/03/2013)	BENCHMARK	LOW CASE (Scenario)	BASE CASE (Scenario)	HIGH CASE (Scenario)
ENVIRONMENTAL SCAN REPORT Reference	Section 19.3.15 (literature references, benchmarks, narrative descriptions)				
Count	7.0				
Full-time equivalents	6.35		7.7	7.5 FTE	8.0
Minimum on-call rotation	1 in 3				
Benchmark 1 – FTE/Population	1: 172,000	1: 175,000			
Benchmark 2	n/a	n/a			
SCENARIO FTEs			Add 1.3 FTE by F10.	Add 1.0 FTE by F10	Add 1.6 FTE (4.0 per each of 2 sites)
DESCRIPTION	Vascular Surgery is that branch of surgery concerned with the diagnosis and management of congenital and acquired diseases of the arterial, venous, and lymphatic circulatory systems. This is exclusive of the vessels intrinsic to the heart, the intracranial vessels, and the thoracic aorta, where surgery would require cardiopulmonary pump support.				
Provincial program: Key specialty-specific criteria	Low volume (550-600 new lung cancer cases per year province-wide), high complexity service		Minimum case volumes for quality assurance (60 lung resections per 1.0 FTE)		

3.3.9 DESIGNATED SUBSPECIALIZED CENTRES

Designated subspecialized centres provide, from a single site, highly specialized service(s) province-wide for patients with low volume, complex (multiple comorbid conditions, multiple specialty consultations), and sometimes severe (acute), conditions. Designated subspecialized centres are staffed by a small, critical mass of **subspecialists** and highly skilled allied health professionals. Oversight is provided by a single committee or entity. Outreach and province-wide follow up are also attributes of this model. Two different examples of what could evolve in Saskatchewan are: minimally invasive gynaecological surgery (Regina) and gynaecological oncology (Saskatoon). The minimally invasive gynaecological surgery program in Regina is already advanced and is recognized nationally for both teaching and service provision. With the example of gynaecological oncology, there would be an evolution from the current state of two specialists in Regina and two in Saskatoon. This highly technical surgical sub-specialty, that also includes the administration of chemotherapy, is an example where improved outcomes would be seen with a single site of delivery, to include shared clinical care and problem solving, in addition to improved on-call demands. If a fifth gynaecological oncologist was sited in Saskatoon, the eventual retirement of one in Regina would be a natural time for the subsequent replacement

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to go, as well, to Saskatoon; it would then be a natural process for the remaining gynaecological oncology service in Regina to transfer to Saskatoon²⁰.

The new Children's Hospital will offer an institutional base for designated subspecialization services. The range of subspecialties is to be confirmed; some of those subspecialties will be provincial subspecialized services, while others will be required in Regina, as well. The greater the degree of generalism, the more likely the service will be provided elsewhere in the province. The greater the degree of subspecialty care, the less likely the service will be provided elsewhere in the province. The direct benefit to physician resource planning is the focus on services that are provincial rather than duplicated regionally. Other benefits that will accrue are improved outcomes, increased research and focused education when not distributed.

Designated Subspecialized Centres benefits include:

Benefit	continued...
(a) Improved clinical outcomes for Saskatchewan patients	(d) More efficient use of subspecialized human resources
(b) Improved access times and follow up	(e) Concentration of resources leads to greater opportunity for research and education
(c) Improved on-call demands	(f) Significantly more robust multi-disciplinary team functioning

Two designated subspecialty centres are described in context of the forecast model assumptions for their respective low, base, and high case scenarios as follows:

3.3.9.1 Paediatric Surgery

(SPECIALIZED) PAEDIATRIC SURGERY	Current State (31/03/2013)	BENCHMARK	LOW CASE (Scenario)	BASE CASE (Scenario)	HIGH CASE (Scenario)
ENVIRONMENTAL SCAN REPORT Reference	Section 19.3.11 (literature references, benchmarks, narrative descriptions)				
Count	3.0		4.0	4.0	5.0
Full-time equivalents	2.0		3.9	3.9	4.1
Minimum on-call rotation	1 in 3				
Benchmark 1 – FTE/Population	1:80,000 (<age 18)	1:109,000 (<age 18)			
Benchmark 2					
SCENARIO FTEs			1 added FTE.	1 added FTE	Requires 3.0 FTE /site if 2 sites
DESCRIPTION	Specialized paediatric surgery: Includes neonatal surgery, complex surgical conditions requiring specialized expertise, and surgical conditions with other associated disorders. Complex paediatric surgery located at one site with 3.0 FTE with 'general' pediatric surgery offered at a second site by 1.0 FTE.				

²⁰ The short- and long-term shortfall of required gynaecologic oncologists (Wallace AH, Havrilesky LJ, Valea FA. Projecting the need for gynecologic oncologists for the next 40 years. *Obstet Gynecol* 2010 Dec; 116(6): 1366-1372) compels the need to achieve efficiency and quality through centres of excellence

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(SPECIALIZED) PAEDIATRIC SURGERY	Current State (31/03/2013)	BENCHMARK	LOW CASE (Scenario)	BASE CASE (Scenario)	HIGH CASE (Scenario)
Provincial program: Key specialty-specific criteria	Low volume, high complexity (neonatal surgery 100 cases per year and a minimum of 60 to remain a viable centre - - source: British Assoc. Paediatric Surgeons).		Subspecialized multi-disciplinary expertise, (complex surgical conditions) require specialists in the fields of anaesthesia (anaesthetists should not perform occasional paediatric cases), oncology, radiology, intensive care, physiotherapy, and nursing (source: British Assoc. Paediatric Surgeons).		

Non-subspecialist paediatric surgery includes a list of common surgical complaints often dealt with in a non-specialized centre (inguinal hernia, circumcision, and emergency procedures: appendectomy, repair of incarcerated inguinal hernia, and less complex trauma). Such surgery can be safely performed outside a designated specialized centre.

3.3.9.2 Thoracic Surgery

THORACIC SURGERY	Current State (31/03/2013)	BENCHMARK	LOW CASE (Scenario)	BASE CASE (Scenario)	HIGH CASE (Scenario)
ENVIRONMENTAL SCAN REPORT Reference	Section 19.3.13 (literature references, benchmarks, narrative descriptions)				
Count	3.0				
Full-time equivalents	3.0		3.4	3.4	4.4
Minimum on-call rotation	1 in 3				
Benchmark 1 – FTE/Population	n/a	n/a			
Benchmark 2	55 complex lung resections per FTE per year	60 complex lung resections per FTE per year			
SCENARIO FTEs			Add 0.5 FTE by F10	Add 0.5 FTE by F10	Add 1.0 FTE by F10
DESCRIPTION	Thoracic Surgery is that branch of surgery concerned with congenital and acquired diseases of the chest wall, mediastinum, lungs, trachea, pleura, esophagus, stomach and diaphragm. Thoracic surgery in the Canadian healthcare system is a tertiary/quaternary level clinical service. Services include: • Lung cancer: diagnosis, staging, and treatment, including coordinating multimodality therapy. • Manage with proficiency and expertise, thoracic surgical emergencies including trauma. • Pulmonary resection for cancer, including bronchial or double sleeve resections. • Pneumothorax: primary and secondary. • Pleural effusions: malignant, hemothorax, chylothorax, empyema, parapneumonia				
Provincial program: Key specialty-specific criteria	Low volume (550-600 new lung cancer cases per year province-wide), high complexity service		Minimum case volumes for quality assurance (60 lung resections per 1.0 FTE)		

3.3.10 NON-CLINICAL SERVICES

The forecast model adjusts for the academic portion of each FTE, so as not to overstate the clinical FTE used in the forecasting.

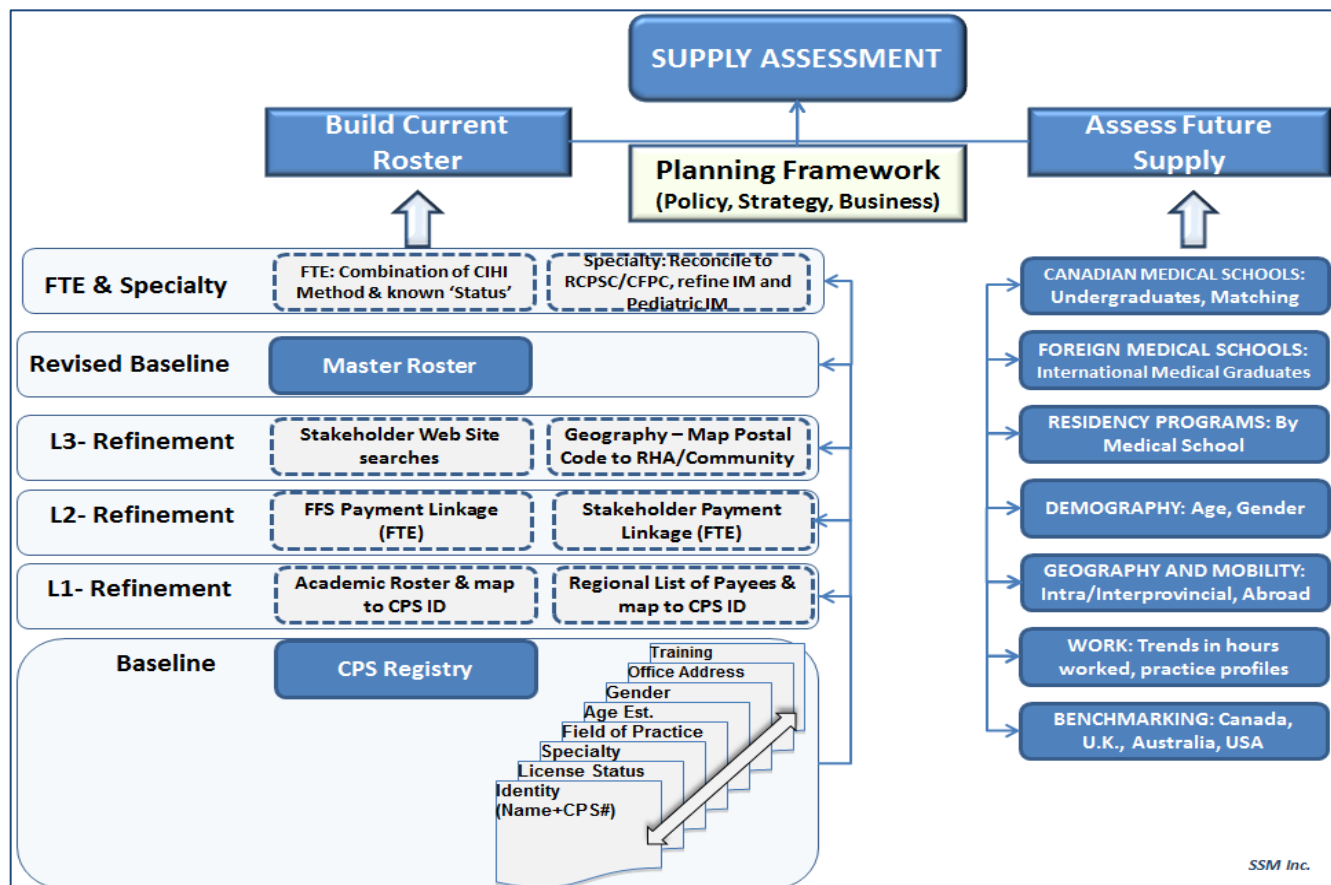
The COM is in the midst of a major organizational restructuring. Individual, specific data on protected academic time were not available. When complete, individual faculty agreements will establish a percentage distribution between clinical and academic (research, teaching, and academic leadership) time, whether funded by an alternate payment plan or another source. In the interim, the forecast model has relied upon an income based formula to determine the academic percentage of each FTE for each full time and continuing status faculty member. The academic percentage FTE was calculated as the result of academic income over total income from all sources.

Limitation: The percent of total income approach is not ideal but is a reasonable, evidence-based option. The Forecast Model specifically provides for disaggregation of an FTE into clinical and academic components by individual.

3.4 SUPPLY ASSESSMENT

The forecast model assessing physician supply is framed by the model illustrated below. Determinants of physician supply include the many variables comprising the current roster of physicians and a set of defined variables determining the future supply of physicians.

Figure 16 - Forecast Model - Supply Assessment Schematic





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These determinants represent materially key variables in forecasting physician workforce supply. The forecast model approach to each determinant is described in the succeeding subsections

3.4.1 CURRENT ROSTER

3.4.1.1 Baseline

The CPSS registry file of 10,369 individuals was narrowed to 3,344 physicians with approved licenses in “good standing” (2012/13) by matching to itemized individual license status records in the CPSS registry file.

3.4.1.2 Refinements

The list of 3,344 was then filtered for interns/residents, inactive licenses, locums, students (including “JURSI”), senior life, and telemedicine licensure, reducing the registry list to 2,228. This list then underwent further review and reconciliation to RHA, SCA, and US COM payment and member lists, Alternative Funding Plan (AFP) rosters, COM academic appointment lists, and a wide range of website-sourced information. The result was reduction by a further 30 physicians with active licenses but who did not earn any payments in the year.

3.4.1.3 Revised Baseline

The adjusted count was 2,198 individual physicians that had both an active license and received one dollar (\$1.00) or more in payments during 2012/13. Of the 2,198, 203 received less than \$25,000 in total payments in 2012/13, meaning they worked on an infrequent basis or were only present for one month or so during the year. Of the 203, 35% had an estimated age over age 65, 70% were family physicians, and the gender distribution was 43% female/57% male. The most prominent characteristic among the 203 was an estimated age exceeding 65 years. The final count of physicians was 1,995 (source: Environmental Scan Section 5.4).

3.4.1.4 FTE and Specialty

A full-time equivalency was calculated for each of the 1,995 physicians using a modified version of the CIHI methodology as described below. **The end result was a count of 1,995 physicians and a FTE of 1,759 for the fiscal year 2012/13.** The total population mean FTE was 0.88, median 1.0 FTE, and 0.87 to 0.90 at 95% confidence interval. There were 491 in 4th quartile of 1.08 to 1.74 FTE, 230 in 3rd quartile of 1.01 to 1.07, 778 in 2nd quartile of 0.71 to 1.0, and 496 in first quartile of 0.04 to 0.70 FTE.

The forecast model will generate a count greater than 1.0 to replace a doctor with an FTE higher than 1.0 and a count of 1.0 for those with less than 1.0 FTE.

The Health Canada definition of an FTE (“Canadian Institute for Health Information (CIHI)” methodology) with a modification was used.

CIHI FTE “MODIFIED” METHODOLOGY

Full-time Equivalency (FTE): The Health Canada definition of an FTE (“Canadian Institute for Health Information (CIHI)” methodology) with modification as noted in (d), (e), and (f), below. This methodology is the national standard in the public health sector for converting physician earnings to FTE. The details of this method are as follows:

a) All payments, fee-for-service, block funded, salary, third party, on-call, sessional, etc. paid out in fiscal 2012/13) to each uniquely identified (CPSS ID number) physician within each discipline (General Practice, Nephrology), are rank ordered, smallest to largest. Physicians are sorted into percentiles. The 40th and 60th percentiles are computed as follows:

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(# of physicians within the group) x (0.4) = 40th percentile physician

(# of physicians within the group) x (0.6) = 60th percentile physician

b) FTE assignment is made using the following procedure:

Any ranked physician > 40th percentile, and < 60th percentile is assigned a value of 1.0 FTE

Any ranked physician (i.e., "physician X") < 40th percentile is assigned an FTE equal to:

- *(\$ value of payment to physician X) divided by (\$ value of payment to 40th percentile physician)*

Any ranked physician (i.e., physician Y) > 60th percentile is assigned an FTE equal to:

- *1 + (log of \$ value of payment to physician Y) / (\$ value of 60th percentile)*

c) The methodology creates some compression in the range above the 60th percentile, but avoids assignment of extreme values (e.g., 4.0 FTE) to very high earning physicians.

Modification to CIHI Methodology

d) FTE calculations need to include non-fee-for-service payments, (contract payments, paid by the MOH to RHAs to physicians), with the modification, as follows:

- Gross non-fee-for-service payments by individual or specialty group, were collected from all Regional Health Authorities and reconciled to block payments reported by the MOH. These non-FFS payments were added into the preceding FTE formula to arrive at a more accurate estimate of FTE equivalents
- For national benchmarking to population per FTEs, the denominator (FTEs) was calculated from CIHI national data which included reported FFS data by specialty groups and adjusted for CIHI reported block payment data by specialty group

e) Where a specialty had a provincial count of less than twenty, the consultant examined additional parameters to assess individual FTE status. Examples of other parameters included whether the physician had a full-time position at the College of Medicine, whether corroborating information (e.g., departmental interviews) indicated work status, and whether grey literature from within the province indicated status. By necessity, this added step increased the length of the process.

f) Individuals aged seventy years or older in 2013 have been removed from the FTE calculations on the assumption they will not be actively practising beyond the first year or two of the ten-year forecast beginning in 2014. There will be exceptions to this rule; however, in the interests of methodological consistency, the rule has been applied uniformly.

g) Individuals earning less than \$25,000 in total income in 2012/13 were removed from the FTE calculations on the assumption they were casual, semi-retired, or locum physicians.

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Figure 17 - Physician FTE by Specialty and RHA of practice, 2012/13

Saskatchewan, Full-time Equivalents by Specialty by Regional Health Authority, 2012/13														
Specialty	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
Anatomical Pathology	-	2.0	-	6.7	-	10.6	-	-	2.0	-	-	-	-	21.3
Diagnostic Radiology	0.2	1.6	1.8	26.9	1.8	37.2	-	-	2.5	3.1	-	-	-	75.2
Forensic Pathology	-	-	-	-	-	1.0	-	-	-	-	-	-	-	1.0
General Pathology	-	-	-	5.6	-	2.8	-	-	-	1.2	-	-	-	9.6
Hematological Pathology	-	-	-	2.8	-	3.0	-	-	-	-	-	-	-	5.8
Medical Biochemistry	-	-	-	1.0	-	1.0	-	-	-	-	-	-	-	2.0
Medical Microbiology	-	-	-	1.0	-	-	-	-	-	-	-	-	-	1.0
Neuropathology	-	-	-	-	-	1.0	-	-	-	-	-	-	-	1.0
Neuroradiology	-	-	-	-	-	1.0	-	-	-	-	-	-	-	1.0
Nuclear Medicine	-	-	-	2.0	-	3.0	-	-	-	-	-	-	-	5.0
Radiation Oncology	-	-	-	7.0	-	9.5	-	-	-	-	-	-	-	16.5
Diagnostic/Therapeutic Total	0.2	3.6	1.8	53.0	1.8	70.1	-	-	4.5	4.3	-	-	-	139.4
Emergency Medicine	-	1.5	-	0.6	-	3.7	-	-	-	-	-	-	-	5.8
Family Medicine (EM)	-	-	-	20.4	-	33.6	-	-	-	-	-	-	-	54.0
General Practice (EM)	-	-	-	10.9	-	-	-	-	-	-	-	-	-	10.9
Emergency Medicine Total	-	1.5	-	31.8	-	37.2	-	-	-	-	-	-	-	70.6
Family Medicine Total (inc. 110.3 Spec.Interest, 715.4 FP)	32.3	38.0	35.8	216.4	40.5	260.2	25.8	25.8	63.9	60.1	12.2	11.3	3.4	825.7
Cardiology	-	2.1	-	11.4	-	14.3	-	-	-	-	-	-	-	27.8
Clinical Immunology and Allergy	-	-	-	-	-	2.2	-	-	-	-	-	-	-	2.2
Critical Care Medicine	-	-	-	3.0	0.5	-	-	-	-	-	-	-	-	3.5
Dermatology	-	-	-	2.2	-	2.2	-	-	-	0.1	-	-	-	4.5
Endocrinology and Metabolism	-	-	-	3.3	-	3.2	-	-	-	-	-	-	-	6.5
Gastroenterology	-	-	-	6.6	0.4	5.3	-	-	-	-	-	-	-	12.3
General Internal Medicine	-	3.1	2.1	10.6	3.2	25.2	-	-	4.6	1.6	-	-	-	50.4
Geriatric Medicine	-	-	-	1.3	-	2.0	-	-	-	-	-	-	-	3.3
Hematology	-	-	-	1.0	-	10.4	-	-	-	-	-	-	-	11.4
Infectious Diseases	-	-	-	4.1	-	4.6	-	-	-	-	-	-	-	8.6
Medical Genetics	-	-	-	-	-	2.4	-	-	-	-	-	-	-	2.4
Medical Oncology	-	-	-	5.4	-	7.4	-	-	-	-	-	-	-	12.8
Nephrology	-	-	0.3	5.8	-	11.5	-	-	-	-	-	-	-	17.6
Neurology	-	-	-	5.6	-	12.6	-	-	-	-	-	-	-	18.1
Occupational Medicine	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Physical Medicine and Rehabilitat	-	-	-	2.2	-	7.4	-	-	-	-	-	-	-	9.6
Psychiatry	3.3	2.6	2.0	10.6	2.0	37.9	-	-	4.4	8.7	-	-	-	71.6
Psychiatry Child and Adolescent	-	-	-	3.3	-	-	-	-	-	-	-	-	-	3.3
Psychiatry Geriatric	-	-	-	-	-	1.4	-	-	-	-	-	-	-	1.4
Public Health & Preventative Mec	-	-	-	1.0	-	4.3	-	1.0	1.0	0.1	-	-	-	7.5
Respirology	-	-	-	3.4	-	13.3	-	-	-	0.1	-	-	-	16.8
Rheumatology	-	-	-	2.8	-	8.7	-	-	-	-	-	-	-	11.5
Medical Total	3.3	7.8	4.4	83.6	6.1	176.9	-	1.0	10.0	10.6	-	-	-	303.7
Maternal/Fetal Medicine	-	-	-	1.0	-	-	-	-	-	-	-	-	-	1.0
Neonatology	-	-	-	3.0	-	5.6	-	-	-	-	-	-	-	8.6
Obstetrics and Gynecology	-	2.6	1.0	15.6	3.0	25.3	-	-	4.5	4.8	-	-	-	56.8
Obstetrics and Gynecology Total	-	2.6	1.0	19.6	3.0	30.9	-	-	4.5	4.8	-	-	-	66.5
Pediatric Cardiology	-	-	-	-	-	2.6	-	-	-	-	-	-	-	2.6
Pediatric Critical Care Medicine	-	-	-	1.0	-	2.0	-	-	-	-	-	-	-	3.0
Pediatric Developmental	-	-	-	-	-	0.4	-	-	-	-	-	-	-	0.4
Pediatric Emergency Medicine	-	-	-	-	-	4.8	-	-	-	-	-	-	-	4.8
Pediatric Endocrinology and Met	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Pediatric Gastroenterology	-	-	-	-	-	1.0	-	-	-	-	-	-	-	1.0
Pediatric Hematology	-	-	-	-	-	1.0	-	-	-	-	-	-	-	1.0
Pediatric Hematology/Oncology	-	-	-	1.0	-	-	-	-	-	-	-	-	-	1.0
Pediatric Infectious Diseases	-	-	-	-	-	2.0	-	-	-	-	-	-	-	2.0
Pediatric Medical Oncology	-	-	-	-	-	2.0	-	-	-	-	-	-	-	2.0
Pediatric Nephrology	-	-	-	1.2	-	-	-	-	-	-	-	-	-	1.2
Pediatric Neurology	-	-	-	-	-	2.0	-	-	-	-	-	-	-	2.0
Pediatric Respirology	-	-	-	-	-	1.3	-	-	-	-	-	-	-	1.3
Pediatric Rheumatology	-	-	-	-	-	2.0	-	-	-	-	-	-	-	2.0
Pediatrics - General	-	3.0	2.4	9.4	1.0	8.2	-	0.7	5.1	1.4	-	-	-	31.2
Pediatric Total	-	3.0	2.4	12.6	1.0	29.8	-	0.7	5.1	1.4	-	-	-	56.0
Anesthesiology	-	3.6	2.4	30.3	2.2	55.5	-	-	6.3	1.1	-	-	-	101.4
Cardiac Surgery	-	-	-	3.2	-	1.0	-	-	-	-	-	-	-	4.2
Cardiovascular and Thoracic Surg	-	-	-	-	-	2.6	-	-	-	-	-	-	-	2.6
General Surgery	1.2	3.3	2.3	17.3	3.5	18.7	0.2	1.0	7.0	5.6	-	-	-	60.1
Neurosurgery	-	-	-	6.3	-	5.0	-	-	-	-	-	-	-	11.3
Ophthalmology	-	1.2	1.0	9.3	1.5	10.2	-	-	2.3	1.2	-	-	-	26.7
Orthopedic Surgery	-	1.0	-	12.2	-	22.4	-	-	4.0	0.1	-	-	-	39.7
Otolaryngology - Head and Neck	-	-	-	4.4	-	6.0	-	-	1.0	1.2	-	-	-	12.6
Pediatric Surgery	-	-	-	1.0	-	1.3	-	-	-	-	-	-	-	2.3
Plastic Surgery	-	-	-	5.1	-	6.7	-	-	-	-	-	-	-	11.8
Thoracic Surgery	-	-	-	-	-	2.9	-	-	-	-	-	-	-	2.9
Urology	-	1.1	1.1	3.4	-	7.6	-	-	1.0	-	-	-	-	14.1
Vascular surgery	-	-	-	3.2	-	3.2	-	-	-	-	-	-	-	6.4
Surgical Total	1.2	10.1	6.8	95.8	7.2	143.2	0.2	1.0	21.7	9.1	-	-	-	296.2
TOTAL	37.0	66.7	52.2	512.8	59.7	748.3	26.0	28.6	109.5	90.5	12.2	11.3	3.4	1,758.1

3.4.2 FUTURE SUPPLY

The future supply of practising physicians by specialty is a function of many variables. The dominant variables are the number of graduates (Canadian citizens) of Canadian medical school administered residency programs, foreign doctor recruitment policy and practice, and gender of new doctors.

3.4.2.1 Canadian Medical Schools

Forecasting future supply from Canadian medical school administered residency programs is based upon past and current program size, mix, and duration by medical school. Current 2013 data projects future practice entrant graduates by specialty for the coming seven years with most specialties being of two (e.g., Family Medicine) or five (e.g., Gastroenterology) years duration. Current data from the Association of Faculties of Medicine of Canada (AFMC) and the Canadian Post-M.D. Education Registry (CAPER) allows future supply forecasts out to year six to be done with a high degree of confidence. Foreign physician supply and recruitment is a function of provincial policy and regional recruitment services rather than created from a statistical forecast.

UNDERGRADUATES

In Saskatchewan, 74.5% of practising physicians who hold a Canadian medical school MD, graduated from the COM in Saskatchewan. Of the total practising physicians (count of 1,995), 54% are foreign trained, 13% are Canadian trained in another province, and 33% received their MD from the COM. The percent foreign trained is by far the highest in Canada with the next highest being Manitoba at 36% (source: Environmental Scan Section 8.5.1).

The COM has increased first year enrolment from 84 in 2012 to 100 in 2013. Based on past recruitment, the expansion will translate directly to increased graduates of COM practising in Saskatchewan. This may also translate to greater recruitment to rural Saskatchewan (source: Environmental Scan Section 11.4).

MATCHING

It is difficult to compare CaRMS matching results across provinces given the different entry criteria and IMG stream allocations. In 2013 21.8% and in 2014 9.4% of COM resident positions were unmatched after the first round. At 9.4%, COM ranked third highest in unfilled first round positions of fourteen medical schools, excluding the three French speaking Quebec medical schools. The COM continues to address systemic educational issues that have led to CACMS/LCME Accreditation with Probation.

The size of Canadian medical school administered residency programs has increased tremendously since 2003. The annual CaRMS match has increased 141% from 2003 (1,118 positions) to 2014 (2,693 positions). The greatest increases in residency programs, relative to the overall increase of 141%, are in:

A. Larger programs (>40 positions):

- Emergency Medicine
- Family Medicine
- Internal Medicine

B. Programs (>19 and <40)

- Anatomic Pathology
- Dermatology
- Physician Medicine

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Notably the larger programs with the greatest increase are **generalist** disciplines. Within Internal Medicine, general internal medicine increased 100% based upon practice entry data. Pediatrics at 39% and General surgery at 40% had the lowest increases among the **generalist** disciplines.

Figure 18 - Changed in CaRMS Matched Disciplines 2003 to 2014 and Generalist Disciplines

Discipline	2003 Matched Discipline (#)	2008 Matched Discipline (#)	2014 Matched Discipline (#)	% Change 2003 to 2014 (Relative to overall Change of 141%)	Generalist
Anatomical Pathology	7	15	22	152%	
Anesthesiology	62	106	104	48%	YES
Cardiac Surgery	7	8	7	0%	
Dermatology	5	19	31	369%	
Diagnostic Radiology	43	80	75	53%	YES
Emergency Medicine	20	46	69	174%	YES
Family Medicine	370	947	1184	156%	YES
General Pathology	1	1	4	213%	YES
General Surgery	55	101	86	40%	YES
Hematological Pathology		0	3	n/a	
Internal Medicine	159	350	423	118%	YES-19%
Laboratory Medicine	16	23	2	(62%)	
Medical Genetics	3	8	5	47%	
Medical Microbiology		8	7	n/a	
Neurology	19	36	37	67%	
Neurology - Pediatric		9	6	n/a	
Neuropathology		1		n/a	
Neurosurgery	17	19	14	(13%)	
Nuclear Medicine	3	6	7	95%	
Obstetrics & Gynecology	46	84	92	71%	YES
Ophthalmology	17	35	39	92%	
Orthopedic Surgery	42	73	54	20%	
Otolaryngology - Head & Neck Surgery	12	30	28	95%	
Pediatrics	87	113	135	39%	YES-35%
Physical Medicine & Rehabilitation	8	22	23	133%	
Plastic Surgery	12	23	26	83%	
Psychiatry	68	137	143	78%	YES
Public Health & Preventive Medicine	4	21	9	89%	
Radiation Oncology	20	24	18	(7%)	
Urology	15	31	31	76%	
Vascular Surgery		0	9	n/a	
TOTAL	1118	2376	2693	141%	
% GENERALIST	64.9%	67.7%	70.0%		

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RESIDENCY PROGRAMS

Nationally, family physician positions increased 110% from 1,538 to 3,067 between 2000/01 and 2012/13 (Canadian citizen and permanent resident trainees). Paediatric positions grew 193% from 475 to 1,301. Medical specialties, including paediatrics, grew 133%. Laboratory medicine positions grew 236% and surgical specialties 108%. Overall growth was 124% since 2000/01. Growth at the specialty-specific level was very uneven. For example, ophthalmology grew 152% compared to general surgery at 57%. Emergency medicine grew 253% and general internal medicine by 126% (source: Environmental Scan Section 8.15.3).

The forecast model projects future supply based upon the number of Canadian citizen and permanent resident trainees, by gender, by medical school, by specialty. The FTE equivalency of future supply by specialty is adjusted by the specialty-specific gender mix.

3.4.2.2 Gender Adjustment**DESCRIPTION**

Gender Adjustment is the relative difference between males and females in absolute FTE value between the ages of 25 and 74.

BACKGROUND

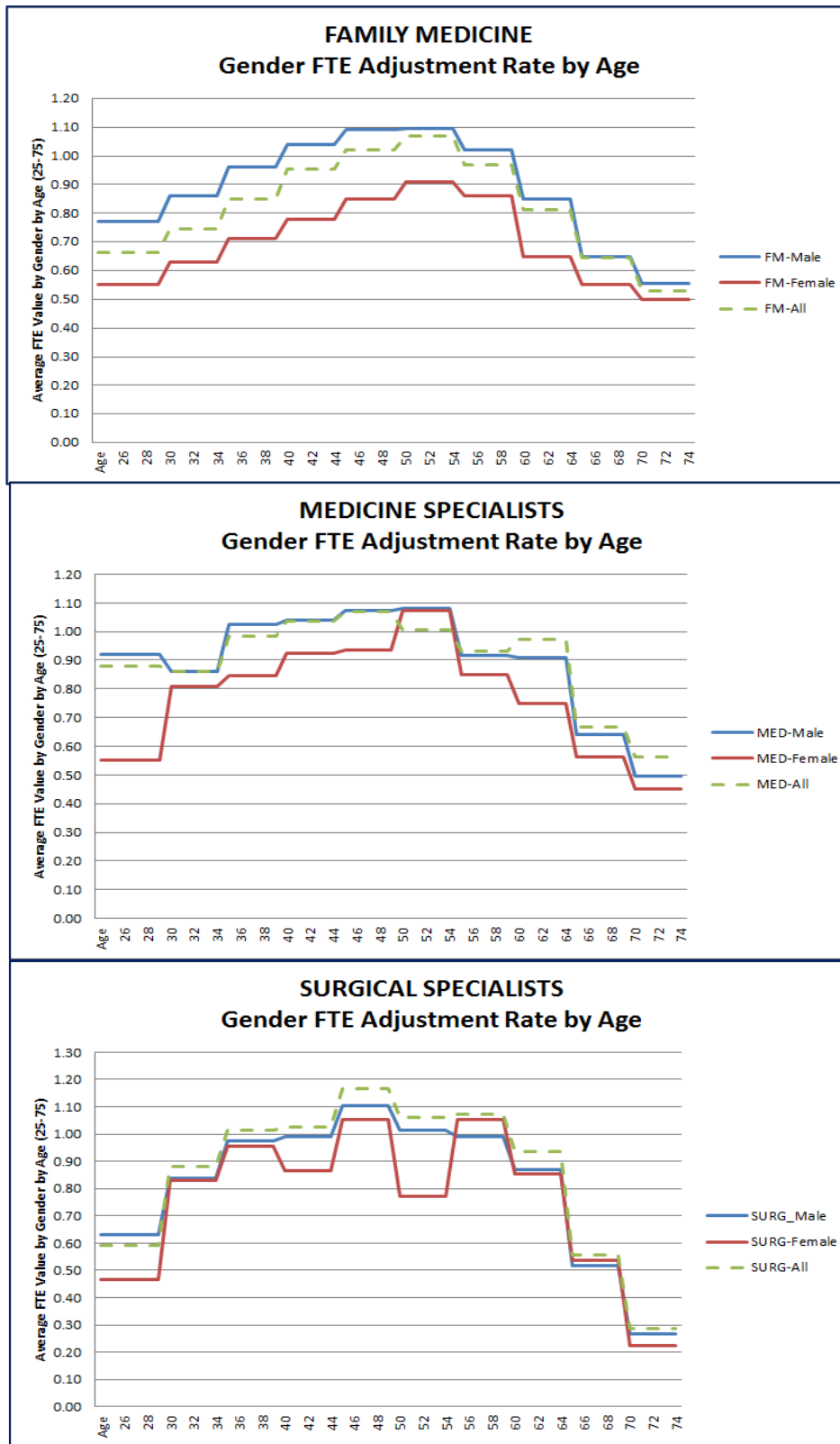
In general, a female physician, over the course of her career, will work less than a male physician. As the proportion of female physicians entering the workforce increases the number of physicians required to replace each retiring male physician increases. In 2012/13 the ratio of female to male FTE in **family practice** was 0.81. A ratio of 0.81 to 1.00 implies recruiting 1.2 females to equal 1.0 FTE and that, over her career, a female family physician will work 0.19 FTE less than a male family physician. Before and after family raising years, females will work similarly or equivalent to males. The Saskatchewan physician workforce is 31.3% female, which is the second lowest nationally. Saskatchewan can expect the percentage to increase to the national average in the coming years meaning a higher annual rate of increase than other provinces. This will impact future FTE supply at a female-to-male FTE ratio of 0.81 in Family Medicine, 0.92 in RCPSC specialties, and 0.85 overall.

FORECAST MODEL – GENDER ADJUSTMENT

RATIO Female/Male FTE	Saskatchewan 2012/13	Nova Scotia 2009/10	Canada 2012/13
Family Practice	0.81 (0.75 to 0.93)	0.84	0.74
All Specialists (RCPSC)	0.92 (0.84 to 0.92)	0.94	0.77
All Physicians	0.85 (0.79 to 0.93)	0.90	0.74

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Figure 19 - FTE Adjustment by Age and Gender; Family Medicine, Medical and Surgical Specialists



The adjacent figures illustrate the FTE adjustment incorporated to the forecast model at an individual physician level by gender and age. Age is adjusted each year over the ten-year forecast.

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3.4.2.3 Separation (Retirement plus Other Attrition) Adjustment

DESCRIPTION

Separation Adjustment is departures from the active physician roster due to retirement, slowing productivity and other attrition (death, from active-clinical to active-non-clinical). Decreased productivity is measured, as a proxy, by the change in predicted FTE value by physician as they move from age 25 to 74 years.

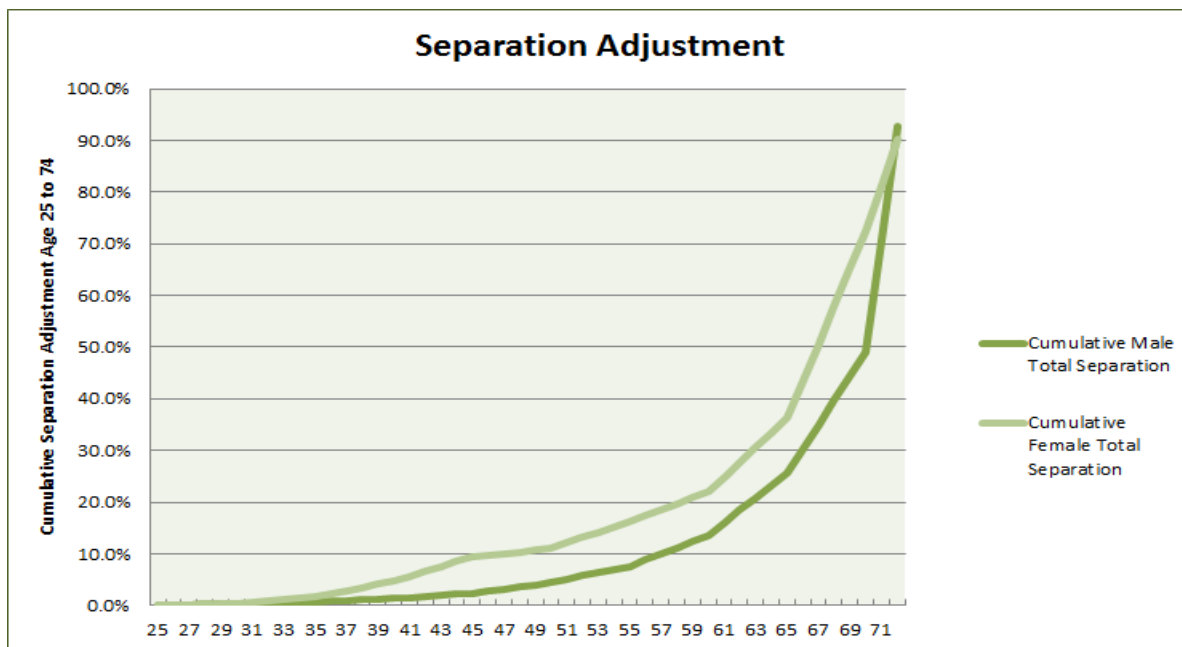
Separation Adjustment is gender and age-specific from age 25 to 74 years and is applied by gender at the same age rates across all specialties.

BACKGROUND

The average physician age in Saskatchewan has been constant, in the 49.2 to 49.6 years range, over the five year period ending 2012 and only slightly lower than the national average age.

The ratio of FTE to count, by age cohort, follows an upward progression from under age 30 years to the 55 to 59 years age cohort, before tapering off to eventual retirement from practice. This progression is consistent with other studies on workload as a physician moves through each age cohort, eventually to full retirement. The ratios in the age cohort progression is modeled into future supply at an individual physician level, not a cohort level.

Figure 20 - Progression to full retirement for male and female physicians by age



The separation rate variable captures the changes in service provision that accompany changes in age. The provincial data (figure above) are reasonably robust in this regard and demonstrate a familiar pattern for both genders as they move through the early to middle to late career stages.

The forecast model assumes a default full retirement at age seventy four in all the Saskatchewan specific physician FTE data analyses in this report. Individuals aged 75 years or older in 2013 have been removed from the FTE calculations on the assumption they will not be practicing actively beyond the first year of the ten-year forecast (2014). There will be exceptions to this rule; however, in the interests of methodology consistency the rule has been applied uniformly.

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3.4.2.4 Geography and Mobility

INTER-PROVINCIAL

- NIPM – Net Inter-Provincial Migration is the net number of physicians leaving and returning to the province annually. Annual inter-provincial net migration in 2012 for Saskatchewan was a negative (1.5%) comprised of (2.9%) for family physicians and 0.0% for specialists. In 2007 inter-provincial net migration was a negative (1.69%) in 2007
- **Base Case Scenario** is negative (1.5%, (2.9%) family physicians, 0% specialists)
- **Low Case Scenario** is negative (1.0%, (2.0%) family physicians, 0% specialists)
- **High Case Scenario** is negative (2.4 %, (4.5%) family physicians, 0% specialists)

Figure 21 - Family Medicine and Specialist Physicians Migrating Between Provinces Who Were in Canada on Both Dec-31-2012, and Dec-31, 2013

Jurisdiction on December 31, 2011	Total Residing in Jurisdiction in 2011	N.L.	P.E.I.	N.S.	N.B.	QUE.	ONT.	MAN.	SASK.	ALTA.	B.C.	Annual Out Migration (2012)	Annual Out Migration (2007)
N.L.	1,134	1,097	0	4	1	0	27	0	0	1	4		
P.E.I.	257	0	251	3	0	0	2	0	1	0	0	2.33%	3.03%
N.S.	2,255	2	0	2,205	6	2	18	0	2	14	6	2.22%	2.62%
N.B.	1,615	2	0	7	1,582	2	17	0	0	1	4	2.04%	2.31%
Que.	17,920	1	0	0	4	17,871	31	0	1	5	7	0.27%	1.30%
Ont.	26,129	9	1	14	3	50	25,934	6	8	47	57	0.75%	0.34%
Man.	2,456	0	0	1	1	3	23	2,394	7	11	15	2.52%	0.57%
Sask.	1,871	0	0	3	0	4	17	1	1,799	21	25	3.85%	1.69%
Alta.	8,126	2	0	2	4	9	28	8	16	7,994	63	1.62%	2.52%
B.C.	9,554	3	1	5	0	10	26	1	8	35	9,461	0.97%	1.37%
Total Migrating Into Jurisdiction in 2012		19	2	41	19	80	192	16	44	136	188	1.04%	0.84%
Total Migrating Out of Jurisdiction in 2012		37	6	50	33	49	195	62	72	132	93	1.04%	0.81%
Total Residing in Jurisdiction in 2012		1,116	253	2,246	1,601	17,951	26,126	2,410	1,843	8,130	9,649		

Note:

1. Saskatchewan Out Migration in 2012 was (72) or (3.85%); and (4.6%) for Family Medicine, Specialists (2.8%). 2007 Family Medicine (4.4%), Specialists (2.4%)
2. Saskatchewan IN-Migration in 2012 was '44' or 2.4%; 1.7% for Family Medicine, Specialists 2.8%. 2007 Family Medicine 1.0%, Specialists 1.5%
3. Saskatchewan NET-Migration in 2013 was '44' minus '72' = '28' or (1.5%); was (2.9%) for Family Medicine, Specialists 0.0%. 2007 Family Medicine (2.52%), Specialists (2.66%)

Figure 22 - Family Medicine and Specialist Physicians Migrating Between Provinces Who Were in Canada on Both Dec-31-2011, and Dec-31, 2012

Jurisdiction on December 31, 2012	Total Residing in Jurisdiction in 2012	Jurisdiction on December 31, 2013										Annual Out Migration (2013)	Annual Out Migration (2007)
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.		
N.L.	1,184	1,120	0	8	2	0	31	1	2	11	8	5.41%	3.03%
P.E.I.	256	0	246	3	0	0	6	0	0	0	1	3.91%	2.62%
N.S.	2,309	0	1	2,246	3	0	35	1	1	14	5	2.73%	2.31%
N.B.	1,652	3	1	6	1,618	2	17	0	1	1	3	2.06%	1.30%
Que.	18,524	1	0	0	7	18,473	25	4	1	8	5	0.28%	0.34%
Ont.	26,878	10	0	21	10	35	26,686	14	13	50	38	0.71%	0.57%
Man.	2,441	0	0	1	0	0	32	2,385	2	7	14	2.29%	1.69%
Sask.	1,908	0	1	3	1	2	17	3	1,839	25	16	3.62%	2.52%
Alta.	8,330	5	0	4	2	5	36	6	11	8,217	43	1.36%	1.37%
B.C.	10,001	1	0	2	1	9	43	11	5	43	9,880	1.21%	0.82%
Total Migrating Into Jurisdiction in 2013		20	3	48	26	53	245	40	36	159	136	1.06%	0.84%
Total Migrating Out of Jurisdiction in 2013		64	10	63	34	51	192	56	69	113	121	1.06%	0.81%
Total Residing in Jurisdiction in 2013		1,140	249	2,294	1,644	18,526	26,931	2,425	1,875	8,376	10,016		

Note:

1. Saskatchewan Out Migration in 2013 for Family Medicine 4.19%, Specialists 2.86%. 2007 Family Medicine 2.52%, Specialists 2.66%
2. Saskatchewan IN-Migration in 2013 was '36' or 1.9%
3. Saskatchewan NET-Migration in 2013 was '36' minus '69' = '33' or (1.7%); Family Medicine (3.0%), Specialists (0.3%)

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RETURN FROM/GO ABROAD

- RFA - Return from Abroad (physicians returning from abroad to practice in Saskatchewan)

The annual number of physicians returning to practice in Saskatchewan, net of those leaving Saskatchewan to practice abroad, is negligible (less than 5 per annum – Source: CIHI).

The combined effect of NIPM and RFA is in the range of 1.0% Low Case to 2.4% High Case decrease per annum. Base Case remains at 1.5%.

Figure 23- Physicians Who Moved Abroad, by Specialty and Jurisdiction, 2013

	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Canada
Total - Family Medicine	0	2	10	6	10	39	5	11	21	17	122
2.0 Medical Specialists	0	0	2	1	9	29	3	5	11	11	71
2.1 Clinical Specialists	0	0	2	1	8	27	3	5	8	10	64
2.2 Laboratory Specialists	0	0	0	0	1	2	0	0	3	1	7
3.0 Surgical Specialists	1	0	1	1	2	12	1	1	4	4	27
Total—All Specialists	1	0	3	2	11	41	4	6	15	15	98
Total—All Physicians	1	2	13	8	21	80	9	17	36	32	220
TOTAL PHYSICIANS	1,140	249	2,294	1,644	18,526	26,931	2,425	1,875	8,376	10,016	73,597
% MOVED ABROAD	0.09%	0.80%	0.57%	0.49%	0.11%	0.30%	0.37%	0.91%	0.43%	0.32%	0.30%

Source: CIHI, 2013

Figure 24- Physicians Who Returned from Abroad, by Specialty and Jurisdiction, 2013

	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Canada
Total - Family Medicine	0	0	4	3	9	36	2	8	11	22	95
2.0 Medical Specialists	1	1	5	2	14	58	8	5	11	13	118
2.1 Clinical Specialists	1	1	5	2	12	55	8	4	10	12	110
2.2 Laboratory Specialists	0	0	0	0	2	3	0	1	1	1	8
3.0 Surgical Specialists	1	0	3	1	14	14	0	0	7	7	47
Total—All Specialists	2	1	8	3	28	72	8	5	18	20	165
Total—All Physicians	2	1	12	6	37	108	10	13	29	42	260
TOTAL PHYSICIANS	1,140	249	2,294	1,644	18,526	26,931	2,425	1,875	8,376	10,016	73,597
% RETURNED FROM ABROAD	0.18%	0.40%	0.52%	0.36%	0.20%	0.40%	0.41%	0.69%	0.35%	0.42%	0.35%

Source: CIHI, 2013

SUMMARY

SCENARIO	ASSUMPTION	DESCRIPTION
BASE	(1.5%) net out migration	(2.9%) family physicians, 0% specialists); Combination of net inter-provincial migration and return from abroad.
LOW	(1.0%) net out migration	(2.0%) family physicians, 0% specialists);
HIGH	(2.4%) net out migration	(4.5%) family physicians, 0% specialists);

3.4.2.5 Work Trends

WORKED HOURS ADJUSTMENT

Description

- Work Hours Adjustment - Expected change in average hours worked per week and per year between 2013/14 (F1) and 2022/23 (F10)

Background

The 2013 National Physician Survey, Saskatchewan specific, reported average hours worked per week, excluding on-call hours, of 61.0 (15% response), up from 53 hours in 2007 (33% response) and from 53.1 (34% response) in 2004. The overall national average was 55 hours per week in 2013, up from 52 hours in 2007 and 51 hours in 2004.

In 2013, the Saskatchewan and national average weeks worked per year were virtually identical at 44.67 and 44.55, respectively.

The average on-call hours per month in the 2013 survey were 145 in Saskatchewan and 110 nationally and 140 and 130 respectively in the 2007 survey.

The Saskatchewan 2013 response rate was 14.1% for family physicians and 21.4% for other specialists. The family physician response rate was the lowest among all jurisdictions. The specialist response rate at 21.4% was higher than the national average of 17.8%.

The forecast model includes an adjustable variable for changes in weeks of work, hours of work, and on-call hours. Depending on the assumption made, the variable will either remain neutral or will increase or decrease forecast FTE requirements.

Forecast Model - Work Hours Adjustment

The pattern of average hours worked per week is increasing to unsustainable levels since 2007, according to the latest National Physician Survey conducted in 2013. Average hours worked will be decreased in the high case scenario and held constant in the base and low case scenarios. The low response rate for 2013 when the marked increase in hours per week was reported precludes a downward adjustment in the base and low case scenarios.

SUMMARY

SCENARIO	ASSUMPTION	DESCRIPTION
BASE	No Change	As doctors currently working >1.0 FTE (Section 4.1.4) retire, the model will replace them with a count of >1.0 doctors thus moving the total forecast physician FTEs towards a 1.0 FTE workload over the 10-year forecast period
LOW	No Change	As above
HIGH	5% reduction in hours worked per week	An overall 5% reduction in hours of work and productivity per doctor.

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3.4.2.6 Practice Profiles - Family Physician

The forecast model incorporates disaggregation of **family physician** full-time equivalency based upon “field of practice.” Field of practice is a subdivision of the general categorization - family physician. A detailed analysis of payments from all RHAs to all family physicians was conducted in order to distinguish field of practice differences.

A Field of Practice prefaced by “SI” (Special Interest) is a physician who receives more than 50% of total income from the Field of Practice (e.g., 1.6 FTE GPs have an 'SI' in 'Care of the Elderly' where more than 50% of total income is for SI services).

FIELD OF PRACTICE	FAMILY PHYSICIANS	FAMILY PHYSICIANS (EM)	TOTAL	% TOTAL
(SI) Administrative	0.7	-	0.8	0.09%
(SI) Anesthesiology	1.6	-	1.6	0.18%
(SI) Care of the Elderly	1.6	-	1.6	0.18%
(SI) Clinical Assistant - Neonatology	4.5	-	4.5	0.51%
(SI) Critical Care Associate	35.4	-	35.4	3.98%
(SI) Emergency Medicine	-	63.8	63.8	7.16%
(SI) Hospital Medicine	19.5	-	19.5	2.19%
(SI) House Officer	9.5	-	9.5	1.0%
(SI) Mental Health	4.7	-	4.7	0.53%
(SI) Neurology	1	-	1	0.11%
(SI) Palliative Care	3.9	-	3.9	0.44%
(SI) Pediatric Emergency Medicine	-	1	1	0.11%
(SI) Psychiatry	0.8	-	0.8	0.09%
(SI) Surgical Assistant	27	-	27	3.03%
(SI) SUBTOTAL (>50% income from SI)	110.2	64.8	175.1	19.66%
Family Practice	715.5	-	715.5	80.35%
TOTAL	825.7	64.8	890.5	100.00%

The forecast model for future FTE requirements for **comprehensive continuing care family practice** uses a current roster of 715.60 FTE as the starting point rather than 890.5 FTE:

The following figure itemizes family physician special interest FTE by RHA for a total 110 FTE which when combined with the 64.8 emergency medicine family physicians equals 175 FTE or the difference between 716 **family practice** physicians and the total family physician FTE of 891.

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Figure 25 - Family Physician Special Interest FTE by RHA and Special Interest, 2012/13

RHAUID	RHA	(SI) Chronic Pain	(SI) Critical Care Associate	(SI) Hematology House Officer	(SI) Hospital Medicine	(SI) Medical Oncology House Officer	(SI) Oncology Clinical Associate	(SI) Surgical Assistant	Administrative Medicine	Anesthesiology	Clinical Assistant - Neonatology	Critical Care Associate	Hospital Medicine	House Officer	Mental Health	Neurology	Palliative Care	Psychiatry	Surgical Assistant	Wascana Rehab Centre	TOTAL
1	Sun Country																				-00
2	Five Hills																		1.72		1.72
3	Cypress																				-00
4	Regina Qu'Appelle		1.00						0.80		4.48	21.47	10.16	1.00	1.28	1.03	1.00		8.81	2.38	53.41
5	Sunrise									0.48									1.07		1.55
6	Saskatoon	1.94		4.08	7.36	2.30	0.52	2.58				11.29	1.23	1.05			2.94	0.79	8.94	1.00	46.02
7	Heartland																				-00
8	Kelsey Trail											1.23									1.23
9	Prince Albert Parkland				0.74														1.83		2.56
10	Prairie North									1.08									2.07		3.15
11	Mamawetan Churchill River																				-00
12	Keewatin Yatthé																				-00
13	Athabasca Health Authority																				-00
	TOTAL	1.94	1.00	4.08	8.10	2.30	0.52	2.58	0.80	1.56	4.48	34.43	11.39	2.05	1.28	1.03	3.94	0.79	24.44	3.38	110.08

3.4.2.7 Practice Profiles – RCPSC (or equivalent) Specialists

The forecast model uses the CPSS licensed specialty as the starting point for specialty assignment by physician. Review and analysis led based upon functional specialty led to reassignment of many physicians from a listed license specialty to their practicing licensed specialty. The largest examples of this reassignment are:

- Fifty (50) of 84 General Paediatrics to subspecialty paediatrics, such as, rheumatology
- One hundred thirty (130) "Internal Medicine" to subspecialty internal medicine, such as, Cardiology
- Eight (8) "Anatomic Pathology" to other laboratory medicine subspecialties, such as, Neuropathology
- Fourteen (14) "General Surgery" to surgical subspecialties, such as, Vascular Surgery

The forecast model uses the net reassigned counts and FTEs by licensed practising specialty to forecast future requirements.

3.4.2.8 Practice Profiles – Academic Service

Each FTE in the forecast model is subdivided into the following four functional subcategories:

- Clinical - Clinical work directly or indirectly related to the patient.
- Teaching (concurrent) and Education - Teaching conducted concurrent to clinical service. Education conducted in the absence of concurrently delivered patient care (classroom, curriculum development, small group sessions)
- Research - Population, translational, applied, or bench research conducted as part of protected research time
- Leadership and Administration - Time spent in a management role leading or participating in department, program, committee work; ideally subdivided into work related to each of the preceding three activities

The academic FTE portion²¹ per faculty member was derived using income data rather than academic hours and service volumes. Contractually agreed data on academic hours and service volumes were not available. The academic FTE portion per faculty member was calculated as the sum of COM paid salary and benefits over total member income.

²¹ Includes education, research, and academic leadership and administration. Concurrent teaching is embedded in clinical work and is therefore considered to be part of the clinical FTE.

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Data on academic time and/or academic work was unavailable and is the subject of ongoing review by the COM and subsequent negotiations with Government. The Forecast Model does specifically allow for adjustment of percentage academic at the individual level once the review process is complete. Adjustment of percentage academic time will have a corresponding impact on percentage non-academic time.

The COM MD roster in 2012/13 there was the equivalent of 41.2 FTE academic. These are 100% academic FTE whereas seventy five percent (75%) is the maximum academic percent for any one individual. At 25% academic (typical mean for full-time MD faculty) the 41.2 FTE is equivalent to 165 individuals. There were approximately 150 full-time tenure track and continuing status MD's at the COM in 2012/13, so the estimate of 165 based on 25% academic time is close.

3.4.2.9 Benchmarking

External benchmarks for each specialty were researched, identified, and compared to current practice in Saskatchewan. Benchmarks fell into two categories as follows:

- (1) Ratio of Population per 1.0 FTE (not population to head count)
- (2) Service volume per FTE (sum of major plus minor surgical cases per 1.0 FTE)

In order to be considered a valid benchmark, the source had to originate in one of a peer-reviewed specialty-specific journal article, a publication from an authoritative body (such as, U.K. Royal College of Physicians), a national workforce planning authority (such as, U.K. National Health Service, Australia Department of Health), and be published after 1999. If a comparable benchmark could not be identified from one of these sources, no benchmark was cited for that specialty.

Benchmarks must be used with caution. These require careful analysis and evaluation prior to application within a model. Achievement of service volume improvements cannot be allowed at the expense of quality; however, in some cases, greater volume may equate to improved outcomes. Lean process and agencies such as Leapfrog USA, along with peer-reviewed literature, provide insight to this process. The Section on "Individual Specialties" in the Environmental Scan Report contains sources for all referenced benchmarks used in the forecast model.

It is important and necessary to annually update both numerator and denominator for Saskatchewan values in comparison to applied benchmarks to ensure continued relevance, i.e., dynamic benchmarking will incorporate workload changes as they occur.

3.4.3 SUMMARY

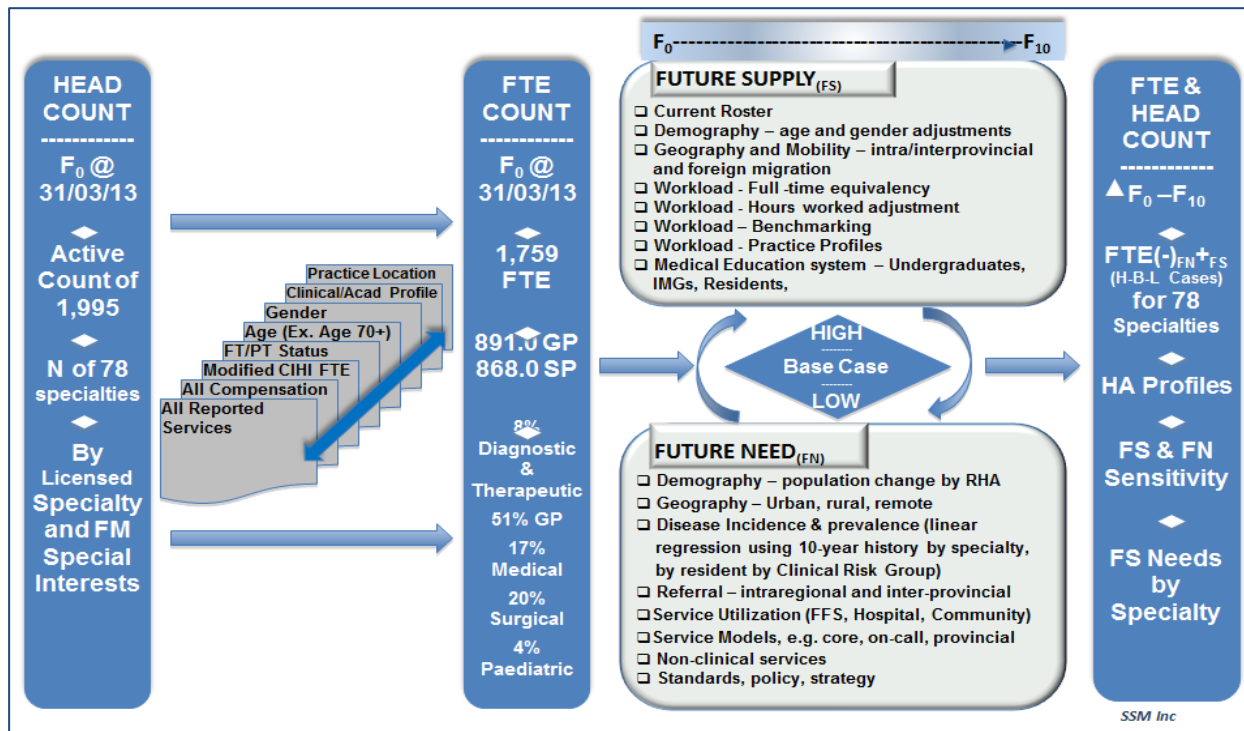
The provincial workforce continues to grow at a net overall rate of 3% to 4% per annum since 2008 (1,660 in 2008 to 1,965 in 2013) after adjusting for the combined effects of migration (international and inter-provincial), College of Medicine postgraduate and IMG recruitment, change in age cohorts, gender shift, death, and retirement within the workforce.

Chapter 4 FORECAST RESULTS

4.1 MODEL

The forecast model, integrating both need and supply assessment, is framed by the model illustrated below. This section provides forecast model results at the provincial and RHA levels by specialty under the base, low, and high case scenarios.

Figure 26 - Integrated Forecast Model



4.2 SUMMARY

The following figure summarizes the three, Base, Low, and High, case scenarios by key determinant with total FTE at F10 (2022/23) and the change between the base year, 2012/13, and F10. The PPR planning range for the coming ten year period ending 2022/23 is a 1.07% (188.1 FTE) to 3.05% (536.0 FTE) annual growth rate in physician FTE with a Base Case annual growth rate of 2.04% (357.8 FTE).

The Base Case annual growth rate of 2.04% is higher than the annual weighted, for aging, population growth of 1.54% due to base year shortfalls in specialties when compared to a range of benchmarks. The most significant specialty needs, in excess of the average weighted population growth, in the Base Case scenario are in Psychiatry (50.2 FTE), General Internal Medicine (23.1 FTE), Obstetrics and Gynecology (23.9 FTE), General Paediatrics (27.6 FTE), Anesthesiology (33.8 FTE), paediatric subspecialties (14.1 FTE) and General Surgery (15.6 FTE). Annual replacement requirements range from 5.3% in the Low Case scenario to 7.0% in the High Case scenario, with a Base Case rate of 5.8% per annum. Replacement requirements are new recruits required to replace retiring and departing physicians as well as the impact of an increasing female workforce. To keep the Base Case annual growth rate at 2.04% per annum, the phased introduction of collaborative care is required in primary health care. In the Base Case this model of care innovation will reduce the need for family physicians by (78) FTE. Without this innovation, Base Case FTE requirements increase to 435.8 FTE and a 2.5% annual increase in total FTE.

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Figure 27 - Forecast Summary, Base, Low and High Scenarios - 2012/13 - 2022/23

Detailed figures by specialty and by RHA are included in the following subsection.

1	6	7	8	9	10	11	12	13	14	15	16	17	18
HEALTH SYSTEM PLANNING RELATED VARIABLES													
	BASE YEAR FTE - 2012/13	SUBTOTAL: Replacement Needs	ADJUSTED FTE + / (-) Benchmark April 1, 2013 (Col 1+Col 7)	+ / (-) Change in Age/ Gender Adj. Population	+ / (-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	MOC - Primary Health Care	MOC - Core Services	MOC - Physician Extenders	MOC - Provincial Programs	SUBTOTAL: MOC's	TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 (-) Col 1)
BASE CASE SCENARIO	1,758.1	(1,013.0)	123.1	1,881.2	261.6	4.9	2,147.8	(78.3)	0.7	0.0	45.7	2,115.9	357.8
ANNUAL % CHANGE		(5.8%)	0.70%	0.70%			2.22%				(31.9)	2.04%	2.04%
LOW CASE SCENARIO	1,758.1	(924.0)	(12.4)	1,745.7	261.6	4.9	2,012.3	(133.8)	30.0	(8.0)	45.7	1,946.2	188.1
ANNUAL % CHANGE		(5.3%)	(0.1%)	(0.1%)			1.45%				(66.1)	1.07%	1.07%
HIGH CASE SCENARIO	1,758.1	(1,236.4)	240.9	1,998.9	261.6	4.9	2,265.5	(30.6)	13.5	0.0	45.7	2,294.1	536.0
ANNUAL % CHANGE		(7.0%)	1.37%	1.37%			2.89%				28.6	3.05%	3.05%
											0.16%		

NTS – ALL REPORTS IN CHAPTER FOR ARE 'NEW' to reflect use of Stats Can population forecasts instead of SK MoF forecasts

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4.3 FORECAST – BASE CASE SCENARIO

The Base Case **Scenario** is depicted in the following figure. The annual percent growth in total provincial physician FTE project in this scenario is 2.04%. Total replacement recruits are 1,013 FTE or an annual attrition rate of 5.8% for net inter-provincial migration, return from abroad, gender adjustment for changing gender mix of future recruits by specialty, separation adjustment due to age and gender, and work hours/sustainability.

FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10) - PROVINCIAL SUMMARY - All RHAs																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Specialty	BASE YEAR FTE - 2012/13	WORKFORCE RESOURCE VARIABLES					HEALTH SYSTEM PLANNING RELATED VARIABLES										TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 - Col 1)
		+ / (-) NPM & RFA	+ / (-) Gender Adjustment	+ / (-) Work Hours	(-) Separations	SUBTOTAL: Replacement Needs	+ / (-) Benchmark	ADJUSTED FTE April 1, 2013 (Col 1+Col 7)	+ / (-) Change in Age/ Gender Adj. Population	+ / (-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	MOC - Primary Health Care	MOC - Core Services	MOC - Physician Extenders	MOC - Provincial Programs	SUBTOTAL: MOC's		
Anatomical Pathology	21.3	0.0	(2.7)	0.0	(6.8)	(9.5)	1.8	23.1	3.5	0.0	26.6	0.0	0.0	0.0	0.0	0.0	26.6	5.3
Diagnostic Radiology	75.2	0.0	(5.8)	0.0	(21.3)	(27.1)	(11.4)	63.8	12.3	0.0	76.1	0.0	1.1	0.0	0.0	1.1	77.2	2.0
Forensic Pathology	1.0	0.0	0.1	0.0	(0.1)	0.1	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.0	1.0	2.1	1.1
General Pathology	9.6	0.0	(1.9)	0.0	(4.7)	(6.6)	0.0	9.6	1.5	0.0	11.1	0.0	0.0	0.0	0.0	0.0	11.1	1.5
Hematological Pathology	5.8	0.0	(0.6)	0.0	(1.4)	(2.0)	0.0	5.8	0.9	0.0	6.7	0.0	0.0	0.0	0.0	0.0	6.7	0.9
Medical Biochemistry	2.0	0.0	(0.6)	0.0	(1.6)	(2.2)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3
Medical Microbiology	1.0	0.0	0.1	0.0	(0.1)	0.1	0.0	1.0	0.2	0.0	1.2	0.0	0.0	0.0	0.8	0.8	2.0	1.0
Neuropathology	1.0	0.0	0.1	0.0	(0.1)	0.1	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.0	1.1	0.1
Neuroradiology	1.0	0.0	0.1	0.0	(0.1)	0.0	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.0	1.1	0.1
Nuclear Medicine	5.0	0.0	(1.3)	0.0	(1.5)	(2.9)	0.0	5.0	0.8	0.0	5.8	0.0	0.0	0.0	0.0	0.0	5.8	0.8
Radiation Oncology	16.5	0.0	(2.5)	0.0	(5.3)	(7.8)	(2.9)	13.6	2.7	0.0	16.3	0.0	0.0	0.0	0.0	0.0	16.3	(0.2)
Diagnostic/Therapeutic Total	139.4	0.0	(14.8)	0.0	(43.0)	(57.8)	(12.5)	126.9	22.7	0.0	149.6	0.0	1.1	0.0	1.8	2.9	152.5	13.1
Emergency Medicine	5.8	0.0	(0.3)	0.0	(1.1)	(1.4)	0.0	5.8	1.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	6.7	1.0
Family Medicine (EM)	54.0	(16.2)	0.9	0.0	(7.9)	(23.1)	0.0	54.0	8.8	0.0	62.8	0.0	0.0	0.0	0.0	0.0	62.8	8.8
General Practice (EM)	10.9	(3.3)	0.3	0.0	(3.5)	(6.4)	0.0	10.9	1.8	0.0	12.6	0.0	0.0	0.0	0.0	0.0	12.6	1.8
Emergency Medicine Total	70.6	(19.4)	1.0	0.0	(12.5)	(31.0)	0.0	70.6	11.6	0.0	82.1	0.0	0.0	0.0	0.0	0.0	82.1	11.6
Family Medicine Total (2012/13 and 2022/23 inc. 110.3 Spec.Interest)	825.7	(247.7)	(71.4)	0.0	(271.1)	(590.3)	7.2	832.9	109.0	0.0	941.9	(78.3)	0.0	0.0	0.0	(78.3)	863.6	37.9
Cardiology	27.8	0.0	(2.6)	0.0	(8.1)	(10.7)	3.8	31.6	4.6	1.1	37.3	0.0	0.0	0.0	0.0	0.0	37.3	9.5
Clinical Immunology and Allergy	2.2	0.0	(0.7)	0.0	(1.9)	(2.6)	0.0	2.2	0.4	0.0	2.6	0.0	0.0	0.0	0.0	0.0	2.6	0.4
Critical Care Medicine	3.5	0.0	0.2	0.0	(0.8)	(0.6)	0.0	3.5	0.6	0.0	4.1	0.0	0.0	0.0	6.5	6.5	10.6	7.1
Dermatology	4.5	0.0	(1.4)	0.0	(3.9)	(5.3)	3.1	7.7	0.8	0.0	8.4	0.0	0.0	0.0	0.0	0.0	8.4	3.9
Endocrinology and Metabolism	6.5	0.0	(1.0)	0.0	(2.4)	(3.4)	3.6	10.1	1.1	0.0	11.1	0.0	0.0	0.0	0.0	0.0	11.1	4.6
Gastroenterology	12.3	0.0	(1.1)	0.0	(6.0)	(7.2)	5.9	18.2	2.0	0.0	20.2	0.0	0.0	0.0	0.0	0.0	20.2	7.9
General Internal Medicine	50.4	0.0	(7.0)	0.0	(19.0)	(26.1)	34.8	85.2	8.3	0.0	93.5	0.0	(19.9)	0.0	0.0	(19.9)	73.6	23.1
Geriatric Medicine	3.3	0.0	(0.0)	0.0	(1.0)	(1.0)	2.7	6.0	0.5	0.0	6.5	0.0	0.0	0.0	0.0	0.0	6.5	3.2
Hematology	11.4	0.0	(0.5)	0.0	(4.6)	(5.1)	0.0	11.4	1.9	0.0	13.3	0.0	0.0	0.0	0.0	0.0	13.3	1.9
Infectious Diseases	8.6	0.0	(0.5)	0.0	(1.5)	(2.0)	0.0	8.6	1.4	0.0	10.1	0.0	0.0	0.0	0.0	0.0	10.1	1.4
Medical Genetics	2.4	0.0	(0.7)	0.0	(0.9)	(1.6)	0.0	2.4	0.4	0.0	2.8	0.0	0.0	0.0	0.6	0.6	3.4	1.0
Medical Oncology	12.8	0.0	(1.5)	0.0	(2.2)	(3.7)	0.0	12.8	2.1	0.0	14.9	0.0	0.0	0.0	0.0	0.0	14.9	2.1
Nephrology	17.6	0.0	(1.5)	0.0	(6.6)	(8.1)	(7.6)	10.0	2.9	0.0	12.9	0.0	0.0	0.0	2.0	2.0	14.9	(2.7)
Neurology	18.1	0.0	(0.9)	0.0	(3.4)	(4.3)	5.0	23.2	3.0	0.0	26.1	0.0	0.0	0.0	0.0	0.0	26.1	8.0
Occupational Medicine	0.5	0.0	0.1	0.0	(0.0)	0.0	0.0	0.5	0.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.1
Physical Medicine and Rehabilitation	9.6	0.0	(0.8)	0.0	(3.6)	(4.4)	(1.3)	8.2	1.6	0.0	9.8	0.0	0.0	0.0	0.0	0.0	9.8	0.2
Psychiatry	71.6	0.0	(9.0)	0.0	(25.5)	(34.5)	30.5	102.1	11.7	2.3	116.0	0.0	1.8	0.0	4.0	5.8	121.8	50.2
Psychiatry Child and Adolescent	3.3	0.0	(0.5)	0.0	(0.5)	(1.0)	2.8	6.1	0.5	0.1	6.7	0.0	0.0	0.0	2.0	2.0	8.7	5.4
Psychiatry Geriatric	1.4	0.0	(0.1)	0.0	(0.4)	(0.5)	0.0	1.4	0.2	0.0	1.7	0.0	0.0	0.0	4.0	4.0	5.7	4.3
Public Health & Preventative Medicine	7.5	0.0	(1.1)	0.0	(1.2)	(2.3)	0.0	7.5	1.2	0.0	8.7	0.0	0.0	0.0	0.0	0.0	8.7	1.2
Respirology	16.8	0.0	(1.6)	0.0	(5.5)	(7.1)	4.8	21.6	2.7	0.0	24.4	0.0	0.0	0.0	0.0	0.0	24.4	7.6
Rheumatology	11.5	0.0	(1.8)	0.0	(3.8)	(5.7)	0.1	11.7	1.9	0.9	14.4	0.0	0.0	0.0	0.0	0.0	14.4	2.9
Medical Total	303.7	0.0	(34.1)	0.0	(103.0)	(137.1)	88.2	391.9	49.8	4.4	446.1	0.0	(18.1)	0.0	19.1	1.0	447.1	143.4

Planning Tool for Physician Resources in Saskatchewan

Final Report

Base Case Scenario continued....

FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10) - PROVINCIAL SUMMARY - All RHAs																		
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		WORKFORCE RESOURCE VARIABLES					HEALTH SYSTEM PLANNING RELATED VARIABLES											
Specialty	BASE YEAR FTE - 2012/13	+/(-) NIPM & RFA	+/(-) Gender Adjustment	+/(-) Work Hours	(-) Separations	SUBTOTAL: Replacement Needs	+/(-) Benchmark	ADJUSTED FTE April 1, 2013 (Col 1+Col 7)	+/(-) Change in Age/ Gender Adj. Population	+/(-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	MOC - Primary Health Care	MOC - Core Services	MOC - Physician Extenders	MOC - Provincial Programs	SUBTOTAL: MOC's	TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 (-) Col 1)
Maternal/Fetal Medicine	1.0	0.0	(0.2)	0.0	(1.1)	(1.3)	0.5	1.5	0.1	0.0	1.6	0.0	0.0	0.0	0.9	0.9	2.5	1.5
Neonatology	8.6	0.0	(3.1)	0.0	(5.9)	(9.0)	0.0	8.6	1.4	0.0	10.1	0.0	0.0	0.0	1.0	1.0	11.1	2.4
Obstetrics and Gynecology	56.8	0.0	(8.2)	0.0	(17.2)	(25.5)	9.4	66.3	9.3	0.0	75.6	0.0	(8.8)	0.0	14.0	5.2	80.7	23.9
Obstetrics and Gynecology Total	66.5	0.0	(11.5)	0.0	(24.2)	(35.7)	9.9	76.4	10.9	0.0	87.3	0.0	(8.8)	0.0	15.9	7.1	94.3	27.8
Pediatric Cardiology	2.6	0.0	(0.2)	0.0	(1.3)	(1.5)	0.1	2.7	0.4	0.0	3.1	0.0	0.0	0.0	0.0	0.0	3.1	0.5
Pediatric Critical Care Medicine	3.0	0.0	0.5	0.0	(0.2)	0.2	0.0	3.0	0.5	0.0	3.5	0.0	0.0	0.0	2.5	2.5	6.0	3.0
Pediatric Developmental	0.4	0.0	(0.0)	0.0	(0.0)	(0.1)	0.3	0.7	0.1	0.0	0.8	0.0	0.0	0.0	1.2	1.2	2.0	1.6
Pediatric Emergency Medicine	4.8	0.0	(0.8)	0.0	(1.2)	(2.0)	0.0	4.8	0.8	0.0	5.5	0.0	0.0	0.0	0.5	0.5	6.0	1.3
Pediatric Endocrinology and Metabolic	0.5	0.0	(0.1)	0.0	(0.4)	(0.6)	0.3	0.8	0.1	0.0	0.9	0.0	0.0	0.0	0.6	0.6	1.5	1.0
Pediatric Gastroenterology	1.0	0.0	(0.2)	0.0	(1.2)	(1.3)	0.2	1.2	0.1	0.0	1.4	0.0	0.0	0.0	0.2	0.2	1.6	0.6
Pediatric Hematology	1.0	0.0	0.1	0.0	(0.1)	0.0	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.4	0.4	1.5	0.5
Pediatric Hematology/Oncology	1.0	0.0	(0.3)	0.0	(0.3)	(0.6)	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.4	0.4	1.5	0.5
Pediatric Infectious Diseases	2.0	0.0	(0.2)	0.0	(0.3)	(0.5)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3
Pediatric Medical Oncology	2.0	0.0	(0.5)	0.0	(1.3)	(1.8)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3
Pediatric Nephrology	1.2	0.0	(0.4)	0.0	(0.3)	(0.6)	0.0	1.2	0.2	0.0	1.4	0.0	0.0	0.0	0.6	0.6	2.0	0.8
Pediatric Neurology	2.0	0.0	(0.2)	0.0	(1.4)	(1.6)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	1.0	1.0	3.3	1.3
Pediatric Respiriology	1.3	0.0	(0.1)	0.0	(0.1)	(0.2)	0.1	1.4	0.2	0.0	1.6	0.0	0.0	0.0	1.4	1.4	3.0	1.7
Pediatric Rheumatology	2.0	0.0	(0.1)	0.0	(1.2)	(1.3)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3
Pediatrics - General	31.2	0.0	(3.4)	0.0	(9.3)	(12.8)	12.9	44.1	5.1	0.0	49.3	0.0	9.6	0.0	0.0	9.6	58.8	27.6
Pediatric Total	56.0	0.0	(6.0)	0.0	(18.7)	(24.7)	14.1	70.0	9.2	0.0	79.3	0.0	9.6	0.0	8.8	18.4	97.6	41.7
Anesthesiology	101.4	0.0	(12.7)	0.0	(29.1)	(41.8)	4.7	106.1	16.6	0.0	122.8	0.0	12.5	0.0	0.0	12.5	135.3	33.8
Cardiac Surgery	4.2	0.0	(0.0)	0.0	(0.5)	(0.5)	(0.8)	3.4	0.7	0.2	4.2	0.0	0.0	0.0	0.0	0.0	4.2	0.0
Cardiovascular and Thoracic Surgery	2.6	0.0	(1.5)	0.0	(1.6)	(3.2)	0.0	2.6	0.4	0.1	3.1	0.0	0.0	0.0	0.0	0.0	3.1	0.5
General Surgery	60.1	0.0	(7.6)	0.0	(18.2)	(25.9)	1.2	61.3	9.8	0.0	71.1	0.0	4.6	0.0	0.0	4.6	75.7	15.6
Neurosurgery	11.3	0.0	(2.7)	0.0	(3.5)	(6.2)	(4.0)	7.3	1.9	0.0	9.2	0.0	0.0	0.0	0.0	0.0	9.2	(2.1)
Ophthalmology	26.7	0.0	(4.8)	0.0	(9.8)	(14.6)	2.5	29.3	4.4	0.0	33.6	0.0	0.0	0.0	0.0	0.0	33.6	6.9
Oral Maxillofacial Surgery	0.1	0.0	(0.1)	0.0	(0.1)	(0.2)	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Orthopedic Surgery	39.7	0.0	(6.0)	0.0	(12.1)	(18.1)	3.7	43.4	6.4	0.0	49.9	0.0	0.0	0.0	0.0	0.0	49.9	10.2
Otolaryngology - Head and Neck Surgery	12.6	0.0	(3.2)	0.0	(5.4)	(8.6)	5.7	18.2	2.0	0.0	20.3	0.0	0.0	0.0	0.0	0.0	20.3	7.7
Pediatric Surgery	2.3	0.0	(0.4)	0.0	(0.5)	(0.9)	1.3	3.6	0.4	0.0	3.9	0.0	0.0	0.0	0.1	0.1	4.0	1.7
Plastic Surgery	11.8	0.0	(1.4)	0.0	(3.5)	(4.9)	1.4	13.2	1.9	0.0	15.2	0.0	0.0	0.0	0.0	0.0	15.2	3.4
Thoracic Surgery	2.9	0.0	(0.1)	0.0	(0.5)	(0.7)	0.0	2.9	0.5	0.0	3.4	0.0	0.0	0.0	0.0	0.0	3.4	0.5
Urology	14.1	0.0	(2.4)	0.0	(5.9)	(8.2)	0.6	14.7	2.3	0.0	17.0	0.0	0.0	0.0	0.0	0.0	17.0	3.0
Vascular surgery	6.4	0.0	(0.3)	0.0	(2.3)	(2.6)	0.1	6.4	1.0	0.3	7.7	0.0	0.0	0.0	0.0	0.0	7.7	1.4
Surgical Total	296.2	0.0	(43.3)	0.0	(93.1)	(136.4)	16.4	312.6	48.4	0.5	361.5	0.0	17.0	0.0	0.1	17.1	378.7	82.4
TOTAL	1,758.1	(267.2)	(180.2)	0.0	(565.7)	(1,013.0)	123.1	1,881.2	261.6	4.9	2,147.8	(78.3)	0.7	0.0	45.7	(31.9)	2,115.9	357.8
ANNUAL % CHANGE		(1.5%)	(1.0%)	0.00%	(3.2%)	(5.8%)	0.70%	0.70%			2.22%					(0.2%)	2.04%	2.04%

Final Report

4.4 LOW CASE SCENARIO

The Low Case **Scenario** is depicted in the following figure. The annual percent growth in total provincial physician FTE project in this scenario is 1.07%. Total replacement recruits are 924 FTE or an annual attrition rate of 5.3% for net inter-provincial migration, return from abroad, gender adjustment for changing gender mix of future recruits by specialty, separation adjustment due to age and gender, and work hours/sustainability.

FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10) - PROVINCIAL SUMMARY - All RHAs																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Specialty	BASE YEAR FTE - 2012/13	WORKFORCE RESOURCE VARIABLES					HEALTH SYSTEM PLANNING RELATED VARIABLES										TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 - Col 1)
		+/- NIPM & RFA	+/- Gender Adjustment	+/- Work Hours	(-) Separations	SUBTOTAL: Replacement Needs	+/- Benchmark	ADJUSTED FTE April 1, 2013 (Col 1+Col 7)	+/- Change in Age/ Gender Adj. Population	+/- Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	MOC - Primary Health Care	MOC - Core Services	MOC - Physician Extenders	MOC - Provincial Programs	SUBTOTAL: MOC's		
Anatomical Pathology	21.3	0.0	(2.7)	0.0	(6.8)	(9.5)	0.9	22.2	3.5	0.0	25.7	0.0	0.0	0.0	0.0	0.0	25.7	4.4
Diagnostic Radiology	75.2	0.0	(5.8)	0.0	(21.3)	(27.1)	(12.5)	62.7	12.3	0.0	75.0	0.0	(3.2)	0.0	0.0	(3.2)	71.9	(3.3)
Forensic Pathology	1.0	0.0	0.1	0.0	(0.1)	0.1	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	1.0	1.0	2.1	1.1
General Pathology	9.6	0.0	(1.9)	0.0	(4.7)	(6.6)	0.0	9.6	1.5	0.0	11.1	0.0	0.0	0.0	0.0	0.0	11.1	1.5
Hematological Pathology	5.8	0.0	(0.6)	0.0	(1.4)	(2.0)	0.0	5.8	0.9	0.0	6.7	0.0	0.0	0.0	0.0	0.0	6.7	0.9
Medical Biochemistry	2.0	0.0	(0.6)	0.0	(1.6)	(2.2)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3
Medical Microbiology	1.0	0.0	0.1	0.0	(0.1)	0.1	0.0	1.0	0.2	0.0	1.2	0.0	0.0	0.0	0.8	0.8	2.0	1.0
Neuropathology	1.0	0.0	0.1	0.0	(0.1)	0.1	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.0	1.1	0.1
Neuroradiology	1.0	0.0	0.1	0.0	(0.1)	0.0	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.0	1.1	0.1
Nuclear Medicine	5.0	0.0	(1.3)	0.0	(1.5)	(2.9)	0.0	5.0	0.8	0.0	5.8	0.0	0.0	0.0	0.0	0.0	5.8	0.8
Radiation Oncology	16.5	0.0	(2.5)	0.0	(5.3)	(7.8)	(2.9)	13.6	2.7	0.0	16.3	0.0	0.0	0.0	0.0	0.0	16.3	(0.2)
Diagnostic/Therapeutic Total	139.4	0.0	(14.8)	0.0	(43.0)	(57.8)	(14.5)	124.9	22.7	0.0	147.6	0.0	(3.2)	0.0	1.8	(1.4)	146.3	6.9
Emergency Medicine	5.8	0.0	(0.3)	0.0	(1.1)	(1.4)	0.0	5.8	1.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	6.7	1.0
Family Medicine (EM)	54.0	(10.8)	0.9	0.0	(7.9)	(17.7)	0.0	54.0	8.8	0.0	62.8	0.0	0.0	0.0	0.0	0.0	62.8	8.8
General Practice (EM)	10.9	(2.2)	0.3	0.0	(3.5)	(5.3)	0.0	10.9	1.8	0.0	12.6	0.0	0.0	0.0	0.0	0.0	12.6	1.8
Emergency Medicine Total	70.6	(13.0)	1.0	0.0	(12.5)	(24.5)	0.0	70.6	11.6	0.0	82.1	0.0	0.0	0.0	0.0	0.0	82.1	11.6
Family Medicine	206.6	(41.3)	(14.0)	0.0	(60.6)	(115.9)	(8.4)	198.2	33.7	0.0	231.9	(33.2)	0.0	0.0	0.0	(33.2)	198.7	(7.9)
General Practice	619.1	(123.8)	(57.5)	0.0	(210.5)	(391.8)	(25.1)	594.0	75.3	0.0	669.3	(100.6)	0.0	0.0	0.0	(100.6)	568.7	(50.4)
Family Medicine Total (2012/13 and 2022/23 inc. 110.3 Spec.Interest)	825.7	(165.1)	(71.4)	0.0	(271.1)	(507.7)	(33.5)	792.2	109.0	0.0	901.2	(133.8)	0.0	0.0	0.0	(133.8)	767.4	(58.3)
Cardiology	27.8	0.0	(2.6)	0.0	(8.1)	(10.7)	(1.3)	26.5	4.6	1.1	32.2	0.0	0.0	0.0	0.0	0.0	32.2	4.4
Clinical Immunology and Allergy	2.2	0.0	(0.7)	0.0	(1.9)	(2.6)	0.0	2.2	0.4	0.0	2.6	0.0	0.0	0.0	0.0	0.0	2.6	0.4
Critical Care Medicine	3.5	0.0	0.2	0.0	(0.8)	(0.6)	0.0	3.5	0.6	0.0	4.1	0.0	0.0	0.0	6.5	6.5	10.6	7.1
Dermatology	4.5	0.0	(1.4)	0.0	(3.9)	(5.3)	2.9	7.5	0.8	0.0	8.2	0.0	0.0	0.0	0.0	0.0	8.2	3.7
Endocrinology and Metabolism	6.5	0.0	(1.0)	0.0	(2.4)	(3.4)	3.5	10.0	1.1	0.0	11.1	0.0	0.0	0.0	0.0	0.0	11.1	4.6
Gastroenterology	12.3	0.0	(1.1)	0.0	(6.0)	(7.2)	5.4	17.6	2.0	0.0	19.6	0.0	0.0	(2.0)	0.0	(2.0)	17.6	5.4
General Internal Medicine	50.4	0.0	(7.0)	0.0	(19.0)	(26.1)	0.0	50.4	8.3	0.0	58.7	0.0	11.1	0.0	0.0	11.1	69.9	19.4
Geriatric Medicine	3.3	0.0	(0.0)	0.0	(1.0)	(1.0)	2.6	5.9	0.5	0.0	6.4	0.0	0.0	0.0	0.0	0.0	6.4	3.1
Hematology	11.4	0.0	(0.5)	0.0	(4.6)	(5.1)	0.0	11.4	1.9	0.0	13.3	0.0	0.0	0.0	0.0	0.0	13.3	1.9
Infectious Diseases	8.6	0.0	(0.5)	0.0	(1.5)	(2.0)	0.0	8.6	1.4	0.0	10.1	0.0	0.0	0.0	0.0	0.0	10.1	1.4
Medical Genetics	2.4	0.0	(0.7)	0.0	(0.9)	(1.6)	0.0	2.4	0.4	0.0	2.8	0.0	0.0	0.0	0.6	0.6	3.4	1.0
Medical Oncology	12.8	0.0	(1.5)	0.0	(2.2)	(3.7)	0.0	12.8	2.1	0.0	14.9	0.0	0.0	0.0	0.0	0.0	14.9	2.1
Nephrology	17.6	0.0	(1.5)	0.0	(6.6)	(8.1)	(9.3)	8.2	2.9	0.0	11.1	0.0	0.0	(2.0)	2.0	0.0	11.1	(6.4)
Neurology	18.1	0.0	(0.9)	0.0	(3.4)	(4.3)	5.0	23.2	3.0	0.0	26.1	0.0	0.0	0.0	0.0	0.0	26.1	8.0
Occupational Medicine	0.5	0.0	0.1	0.0	(0.0)	0.0	0.0	0.5	0.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.1
Physical Medicine and Rehabilitation	9.6	0.0	(0.8)	0.0	(3.6)	(4.4)	(4.4)	5.1	1.6	0.0	6.7	0.0	0.0	0.0	0.0	0.0	6.7	(2.9)
Psychiatry	71.6	0.0	(9.0)	0.0	(25.5)	(34.5)	20.4	92.0	11.7	2.3	105.9	0.0	12.5	(4.0)	4.0	12.5	118.4	46.8
Psychiatry Child and Adolescent	3.3	0.0	(0.5)	0.0	(0.5)	(1.0)	2.7	6.0	0.5	0.1	6.7	0.0	0.0	0.0	2.0	2.0	8.7	5.4
Psychiatry Geriatric	1.4	0.0	(0.1)	0.0	(0.4)	(0.5)	0.0	1.4	0.2	0.0	1.7	0.0	0.0	0.0	4.0	4.0	5.7	4.3
Public Health & Preventative Medicine	7.5	0.0	(1.1)	0.0	(1.2)	(2.3)	0.0	7.5	1.2	0.0	8.7	0.0	0.0	0.0	0.0	0.0	8.7	1.2
Respirology	16.8	0.0	(1.6)	0.0	(5.5)	(7.1)	2.4	19.2	2.7	0.0	22.0	0.0	0.0	0.0	0.0	0.0	22.0	5.2
Rheumatology	11.5	0.0	(1.8)	0.0	(3.8)	(5.7)	(0.8)	10.7	1.9	0.9	13.5	0.0	0.0	0.0	0.0	0.0	13.5	2.0
Medical Total	303.7	0.0	(34.1)	0.0	(103.0)	(137.1)	29.1	332.8	49.8	4.4	387.0	0.0	23.7	(8.0)	19.1	34.8	421.8	118.1

Planning Tool for Physician Resources in Saskatchewan

Final Report

Low Case Scenario continued...

FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10) - PROVINCIAL SUMMARY - All RHAs																		
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		WORKFORCE RESOURCE VARIABLES					HEALTH SYSTEM PLANNING RELATED VARIABLES											
Specialty	BASE YEAR FTE - 2012/13	+ / (-) NIPM & RFA	+ / (-) Gender Adjustment	+ / (-) Work Hours	(-) Separations	SUBTOTAL: Replacement Needs	+ / (-) Benchmark	ADJUSTED FTE April 1, 2013 (Col 1+Col 7)	+ / (-) Change in Age/ Gender Adj. Population	+ / (-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	MOC - Primary Health Care	MOC - Core Services	MOC - Physician Extenders	MOC - Provincial Programs	SUBTOTAL: MOC's	TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 (-) Col 1)
Maternal/Fetal Medicine	1.0	0.0	(0.2)	0.0	(1.1)	(1.3)	0.5	1.5	0.1	0.0	1.6	0.0	0.0	0.0	0.9	0.9	2.5	1.5
Neonatology	8.6	0.0	(3.1)	0.0	(5.9)	(9.0)	0.0	8.6	1.4	0.0	10.1	0.0	0.0	0.0	1.0	1.0	11.1	2.4
Obstetrics and Gynecology	56.8	0.0	(8.2)	0.0	(17.2)	(25.5)	6.1	62.9	9.3	0.0	72.2	0.0	(6.0)	0.0	14.0	8.0	80.2	23.4
Obstetrics and Gynecology Total	66.5	0.0	(11.5)	0.0	(24.2)	(35.7)	6.6	73.0	10.9	0.0	83.9	0.0	(6.0)	0.0	15.9	9.9	93.8	27.3
Pediatric Cardiology	2.6	0.0	(0.2)	0.0	(1.3)	(1.5)	0.0	2.6	0.4	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.4
Pediatric Critical Care Medicine	3.0	0.0	0.5	0.0	(0.2)	0.2	0.0	3.0	0.5	0.0	3.5	0.0	0.0	0.0	2.5	2.5	6.0	3.0
Pediatric Developmental	0.4	0.0	(0.0)	0.0	(0.0)	(0.1)	0.0	0.4	0.1	0.0	0.5	0.0	0.0	0.0	1.2	1.2	1.7	1.3
Pediatric Emergency Medicine	4.8	0.0	(0.8)	0.0	(1.2)	(2.0)	0.0	4.8	0.8	0.0	5.5	0.0	0.0	0.0	0.5	0.5	6.0	1.3
Pediatric Endocrinology and Metabolic	0.5	0.0	(0.1)	0.0	(0.4)	(0.6)	0.3	0.8	0.1	0.0	0.9	0.0	0.0	0.0	0.6	0.6	1.5	1.0
Pediatric Gastroenterology	1.0	0.0	(0.2)	0.0	(1.2)	(1.3)	0.1	1.1	0.1	0.0	1.3	0.0	0.0	0.0	0.2	0.2	1.5	0.5
Pediatric Hematology	1.0	0.0	0.1	0.0	(0.1)	0.0	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.4	0.4	1.5	0.5
Pediatric Hematology/Oncology	1.0	0.0	(0.3)	0.0	(0.3)	(0.6)	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.4	0.4	1.5	0.5
Pediatric Infectious Diseases	2.0	0.0	(0.2)	0.0	(0.3)	(0.5)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3
Pediatric Medical Oncology	2.0	0.0	(0.5)	0.0	(1.3)	(1.8)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3
Pediatric Nephrology	1.2	0.0	(0.4)	0.0	(0.3)	(0.6)	0.0	1.2	0.2	0.0	1.4	0.0	0.0	0.0	0.6	0.6	2.0	0.8
Pediatric Neurology	2.0	0.0	(0.2)	0.0	(1.4)	(1.6)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	1.0	1.0	3.3	1.3
Pediatric Respiriology	1.3	0.0	(0.1)	0.0	(0.1)	(0.2)	0.0	1.3	0.2	0.0	1.5	0.0	0.0	0.0	1.4	1.4	2.9	1.6
Pediatric Rheumatology	2.0	0.0	(0.1)	0.0	(1.2)	(1.3)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3
Pediatrics - General	31.2	0.0	(3.4)	0.0	(9.3)	(12.8)	12.0	43.2	5.1	0.0	48.3	0.0	7.6	0.0	0.0	7.6	55.9	24.7
Pediatric Total	56.0	0.0	(6.0)	0.0	(18.7)	(24.7)	12.4	68.4	9.2	0.0	77.6	0.0	7.6	0.0	8.8	16.4	94.0	38.0
Anesthesiology	101.4	0.0	(12.7)	0.0	(29.1)	(41.8)	(4.3)	97.2	16.6	0.0	113.8	0.0	3.6	0.0	0.0	3.6	117.4	15.9
Cardiac Surgery	4.2	0.0	(0.0)	0.0	(0.5)	(0.5)	(1.1)	3.1	0.7	0.2	3.9	0.0	0.0	0.0	0.0	0.0	3.9	(0.3)
Cardiovascular and Thoracic Surgery	2.6	0.0	(1.5)	0.0	(1.6)	(3.2)	0.0	2.6	0.4	0.1	3.1	0.0	0.0	0.0	0.0	0.0	3.1	0.5
General Surgery	60.1	0.0	(7.6)	0.0	(18.2)	(25.9)	(2.5)	57.6	9.8	0.0	67.5	0.0	4.4	0.0	0.0	4.4	71.9	11.8
Neurosurgery	11.3	0.0	(2.7)	0.0	(3.5)	(6.2)	(6.3)	5.0	1.9	0.0	6.9	0.0	0.0	0.0	0.0	0.0	6.9	(4.5)
Ophthalmology	26.7	0.0	(4.8)	0.0	(9.8)	(14.6)	(6.0)	20.7	4.4	0.0	25.1	0.0	0.0	0.0	0.0	0.0	25.1	(1.6)
Oral Maxillofacial Surgery	0.1	0.0	(0.1)	0.0	(0.1)	(0.2)	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Orthopedic Surgery	39.7	0.0	(6.0)	0.0	(12.1)	(18.1)	4.4	44.1	6.4	0.0	50.6	0.0	0.0	0.0	0.0	0.0	50.6	10.9
Otolaryngology - Head and Neck Surgery	12.6	0.0	(3.2)	0.0	(5.4)	(8.6)	5.2	17.8	2.0	0.0	19.8	0.0	0.0	0.0	0.0	0.0	19.8	7.2
Pediatric Surgery	2.3	0.0	(0.4)	0.0	(0.5)	(0.9)	1.2	3.5	0.4	0.0	3.8	0.0	0.0	0.0	0.1	0.1	3.9	1.6
Plastic Surgery	11.8	0.0	(1.4)	0.0	(3.5)	(4.9)	(1.0)	10.8	1.9	0.0	12.8	0.0	0.0	0.0	0.0	0.0	12.8	1.0
Thoracic Surgery	2.9	0.0	(0.1)	0.0	(0.5)	(0.7)	0.0	2.9	0.5	0.0	3.4	0.0	0.0	0.0	0.0	0.0	3.4	0.5
Urology	14.1	0.0	(2.4)	0.0	(5.9)	(8.2)	(1.9)	12.2	2.3	0.0	14.5	0.0	0.0	0.0	0.0	0.0	14.5	0.4
Vascular surgery	6.4	0.0	(0.3)	0.0	(2.3)	(2.6)	(0.2)	6.2	1.0	0.3	7.5	0.0	0.0	0.0	0.0	0.0	7.5	1.1
Surgical Total	296.2	0.0	(43.3)	0.0	(93.1)	(136.4)	(12.5)	283.8	48.4	0.5	332.7	0.0	8.0	0.0	0.1	8.1	340.8	44.5
TOTAL	1,758.1	(178.1)	(180.2)	0.0	(565.7)	(924.0)	(12.4)	1,745.7	261.6	4.9	2,012.3	(133.8)	30.0	(8.0)	45.7	(66.1)	1,946.2	188.1
ANNUAL % CHANGE		(1.0%)	(1.0%)	0.00%	(3.2%)	(5.3%)	(0.1%)	(0.1%)			1.45%					(0.4%)	1.07%	1.07%

Final Report

4.5 HIGH CASE SCENARIO

The High Case Scenario is depicted in the following figure. The annual percent growth in total provincial physician FTE project in this scenario is 3.05%. Total replacement recruits are 1,236.4 FTE or an annual attrition rate of 7.0% for net inter-provincial migration, return from abroad, gender adjustment for changing gender mix of future recruits by specialty, separation adjustment due to age and gender, and five hours per week reduction in hours worked.

FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10) - PROVINCIAL SUMMARY - All RHAs																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Specialty	BASE YEAR FTE - 2012/13	WORKFORCE RESOURCE VARIABLES					HEALTH SYSTEM PLANNING RELATED VARIABLES										TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 - Col 1)
		+/- NPM & RFA	+/- Gender Adjustment	+/- Work Hours	(-) Separations	SUBTOTAL: Replacement Needs	+/- Benchmark	ADJUSTED FTE April 1, 2013 (Col 1+Col 7)	+/- Change in Age/ Gender Adj. Population	+/- Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	MOC - Primary Health Care	MOC - Core Services	MOC - Physician Extenders	MOC - Provincial Programs	SUBTOTAL: MOC's		
Anatomical Pathology	21.3	(2.1)	(2.7)	(0.6)	(6.8)	(12.2)	2.7	24.0	3.5	0.0	27.5	0.0	0.0	0.0	0.0	0.0	27.5	6.2
Diagnostic Radiology	75.2	(7.5)	(5.8)	(2.0)	(21.3)	(36.7)	(10.4)	64.8	12.3	0.0	77.1	0.0	2.3	0.0	0.0	2.3	79.4	4.2
Forensic Pathology	1.0	(0.1)	0.1	(0.0)	(0.1)	(0.0)	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	1.0	1.0	2.1	1.1
General Pathology	9.6	(1.0)	(1.9)	(0.3)	(4.7)	(7.8)	0.0	9.6	1.5	0.0	11.1	0.0	0.0	0.0	0.0	0.0	11.1	1.5
Hematological Pathology	5.8	(0.6)	(0.6)	(0.2)	(1.4)	(2.7)	0.0	5.8	0.9	0.0	6.7	0.0	0.0	0.0	0.0	0.0	6.7	0.9
Medical Biochemistry	2.0	(0.2)	(0.6)	(0.1)	(1.6)	(2.5)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3
Medical Microbiology	1.0	(0.1)	0.1	(0.0)	(0.1)	(0.1)	0.0	1.0	0.2	0.0	1.2	0.0	0.0	0.0	0.8	0.8	2.0	1.0
Neuropathology	1.0	(0.1)	0.1	(0.0)	(0.1)	(0.0)	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.0	1.1	0.1
Neuroradiology	1.0	(0.1)	0.1	(0.0)	(0.1)	(0.1)	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.0	1.1	0.1
Nuclear Medicine	5.0	(0.5)	(1.3)	(0.1)	(1.5)	(3.5)	0.0	5.0	0.8	0.0	5.8	0.0	0.0	0.0	0.0	0.0	5.8	0.8
Radiation Oncology	16.5	(1.7)	(2.5)	(0.4)	(5.3)	(9.9)	(2.9)	13.6	2.7	0.0	16.3	0.0	0.0	0.0	0.0	0.0	16.3	(0.2)
Diagnostic/Therapeutic Total	139.4	(13.9)	(14.8)	(3.8)	(43.0)	(75.6)	(10.6)	128.8	22.7	0.0	151.5	0.0	2.3	0.0	1.8	4.1	155.6	16.2
Emergency Medicine	5.8	(0.6)	(0.3)	(0.2)	(1.1)	(2.2)	0.0	5.8	1.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	6.7	1.0
Family Medicine (EM)	54.0	(21.6)	0.9	(1.5)	(7.9)	(30.0)	0.0	54.0	8.8	0.0	62.8	0.0	0.0	0.0	0.0	0.0	62.8	8.8
General Practice (EM)	10.9	(4.3)	0.3	(0.3)	(3.5)	(7.8)	0.0	10.9	1.8	0.0	12.6	0.0	0.0	0.0	0.0	0.0	12.6	1.8
Emergency Medicine Total	70.6	(26.5)	1.0	(1.9)	(12.5)	(39.9)	0.0	70.6	11.6	0.0	82.1	0.0	0.0	0.0	0.0	0.0	82.1	11.6
Family Medicine	206.6	(82.6)	(14.0)	(5.6)	(60.6)	(162.8)	12.0	218.6	33.7	0.0	252.2	(7.5)	0.0	0.0	0.0	(7.5)	244.7	38.1
General Practice	619.1	(247.6)	(57.5)	(16.8)	(210.5)	(532.4)	35.9	655.0	75.3	0.0	730.3	(23.1)	0.0	0.0	0.0	(23.1)	707.3	88.1
Family Medicine Total (2012/13 and 2022/23 inc. 110.3 Spec.Interest)	825.7	(330.3)	(71.4)	(22.3)	(271.1)	(695.2)	47.9	873.6	109.0	0.0	982.6	(30.6)	0.0	0.0	0.0	(30.6)	952.0	126.3
Cardiology	27.8	(2.8)	(2.6)	(0.8)	(8.1)	(14.2)	8.8	36.7	4.6	1.1	42.4	0.0	0.0	0.0	0.0	0.0	42.4	14.5
Clinical Immunology and Allergy	2.2	(0.2)	(0.7)	(0.1)	(1.9)	(2.9)	0.0	2.2	0.4	0.0	2.6	0.0	0.0	0.0	0.0	0.0	2.6	0.4
Critical Care Medicine	3.5	(0.4)	0.2	(0.1)	(0.8)	(1.0)	0.0	3.5	0.6	0.0	4.1	0.0	0.0	0.0	6.5	6.5	10.6	7.1
Dermatology	4.5	(0.5)	(1.4)	(0.1)	(3.9)	(5.9)	3.3	7.9	0.8	0.0	8.6	0.0	0.0	0.0	0.0	0.0	8.6	4.1
Endocrinology and Metabolism	6.5	(0.7)	(1.0)	(0.2)	(2.4)	(4.2)	3.6	10.1	1.1	0.0	11.1	0.0	0.0	0.0	0.0	0.0	11.1	4.6
Gastroenterology	12.3	(1.2)	(1.1)	(0.3)	(6.0)	(8.7)	6.5	18.7	2.0	0.0	20.8	0.0	0.0	0.0	0.0	0.0	20.8	8.5
General Internal Medicine	50.4	(5.0)	(7.0)	(1.4)	(19.0)	(32.5)	50.4	100.9	8.3	0.0	109.2	0.0	(31.9)	0.0	0.0	(31.9)	77.2	26.8
Geriatric Medicine	3.3	(0.3)	(0.0)	(0.1)	(1.0)	(1.5)	2.7	6.0	0.5	0.0	6.6	0.0	0.0	0.0	0.0	0.0	6.6	3.3
Hematology	11.4	(1.1)	(0.5)	(0.3)	(4.6)	(6.5)	0.0	11.4	1.9	0.0	13.3	0.0	0.0	0.0	0.0	0.0	13.3	1.9
Infectious Diseases	8.6	(0.9)	(0.5)	(0.2)	(1.5)	(3.1)	0.0	8.6	1.4	0.0	10.1	0.0	0.0	0.0	0.0	0.0	10.1	1.4
Medical Genetics	2.4	(0.2)	(0.7)	(0.1)	(0.9)	(1.9)	0.0	2.4	0.4	0.0	2.8	0.0	0.0	0.0	0.6	0.6	3.4	1.0
Medical Oncology	12.8	(1.3)	(1.5)	(0.3)	(2.2)	(5.3)	0.0	12.8	2.1	0.0	14.9	0.0	0.0	0.0	0.0	0.0	14.9	2.1
Nephrology	17.6	(1.8)	(1.5)	(0.5)	(6.6)	(10.3)	(5.8)	11.8	2.9	0.0	14.7	0.0	0.0	0.0	2.0	2.0	16.7	(0.9)
Neurology	18.1	(1.8)	(0.9)	(0.5)	(3.4)	(6.6)	5.1	23.2	3.0	0.0	26.2	0.0	0.0	0.0	0.0	0.0	26.2	8.0
Occupational Medicine	0.5	(0.1)	0.1	(0.0)	(0.0)	(0.0)	0.0	0.5	0.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.1
Physical Medicine and Rehabilitation	9.6	(1.0)	(0.8)	(0.3)	(3.6)	(5.6)	1.8	11.3	1.6	0.0	12.9	0.0	0.0	0.0	0.0	0.0	12.9	3.3
Psychiatry	71.6	(7.2)	(9.0)	(1.9)	(25.5)	(43.6)	40.6	112.2	11.7	2.3	126.2	0.0	4.1	0.0	4.0	8.1	134.2	62.6
Psychiatry Child and Adolescent	3.3	(0.3)	(0.5)	(0.1)	(0.5)	(1.5)	2.8	6.1	0.5	0.1	6.8	0.0	0.0	0.0	2.0	2.0	8.8	5.5
Psychiatry Geriatric	1.4	(0.1)	(0.1)	(0.0)	(0.4)	(0.7)	0.0	1.4	0.2	0.0	1.7	0.0	0.0	0.0	4.0	4.0	5.7	4.3
Public Health & Preventative Medicine	7.5	(0.7)	(1.1)	(0.2)	(1.2)	(3.2)	0.0	7.5	1.2	0.0	8.7	0.0	0.0	0.0	0.0	0.0	8.7	1.2
Respirology	16.8	(1.7)	(1.6)	(0.5)	(5.5)	(9.2)	7.2	24.0	2.7	0.0	26.8	0.0	0.0	0.0	0.0	0.0	26.8	10.0
Rheumatology	11.5	(1.2)	(1.8)	(0.3)	(3.8)	(7.1)	1.0	12.6	1.9	0.9	15.4	0.0	0.0	0.0	0.0	0.0	15.4	3.8
Medical Total	303.7	(30.4)	(34.1)	(8.2)	(103.0)	(175.7)	128.2	431.9	49.8	4.4	486.1	0.0	(27.9)	0.0	19.1	(8.8)	477.3	173.6

Planning Tool for Physician Resources in Saskatchewan

Final Report

High Case Scenario continued...

FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10) - PROVINCIAL SUMMARY - All RHAs																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
	WORKFORCE RESOURCE VARIABLES						HEALTH SYSTEM PLANNING RELATED VARIABLES													
	BASE YEAR FTE - 2012/13	+ /(-) NIPM & RFA	+ /(-) Gender Adjustment	+ /(-) Work Hours	(-) Separations	SUBTOTAL: Replacement Needs	+ /(-) Benchmark	ADJUSTED FTE April 1, 2013 (Col 1+Col 7)	+ /(-) Change in Age/ Gender Adj. Population	+ /(-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	MOC - Primary Health Care	MOC - Core Services	MOC - Physician Extenders	MOC - Provincial Programs	SUBTOTAL: MOC's	TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 (-) Col 1)		
Specialty																				
Maternal/Fetal Medicine	1.0	(0.1)	(0.2)	(0.0)	(1.1)	(1.4)	0.5	1.5	0.1	0.0	1.6	0.0	0.0	0.0	0.9	0.9	2.5	1.5		
Neonatology	8.6	(0.9)	(3.1)	(0.2)	(5.9)	(10.1)	0.0	8.6	1.4	0.0	10.1	0.0	0.0	0.0	1.0	1.0	11.1	2.4		
Obstetrics and Gynecology	56.8	(5.7)	(8.2)	(1.5)	(17.2)	(32.7)	12.8	69.6	9.3	0.0	78.9	0.0	(5.8)	0.0	14.0	8.2	87.2	30.3		
Obstetrics and Gynecology Total	66.5	(6.6)	(11.5)	(1.8)	(24.2)	(44.2)	13.3	79.8	10.9	0.0	90.6	0.0	(5.8)	0.0	15.9	10.1	100.8	34.3		
Pediatric Cardiology	2.6	(0.3)	(0.2)	(0.1)	(1.3)	(1.8)	0.6	3.2	0.4	0.0	3.6	0.0	0.0	0.0	0.0	0.0	3.6	1.0		
Pediatric Critical Care Medicine	3.0	(0.3)	0.5	(0.1)	(0.2)	(0.1)	0.0	3.0	0.5	0.0	3.5	0.0	0.0	0.0	2.5	2.5	6.0	3.0		
Pediatric Developmental	0.4	(0.0)	(0.0)	(0.0)	(0.0)	(0.1)	0.4	0.8	0.1	0.0	0.9	0.0	0.0	0.0	1.2	1.2	2.1	1.7		
Pediatric Emergency Medicine	4.8	(0.5)	(0.8)	(0.1)	(1.2)	(2.6)	0.0	4.8	0.8	0.0	5.5	0.0	0.0	0.0	0.5	0.5	6.0	1.3		
Pediatric Endocrinology and Metabolic	0.5	(0.1)	(0.1)	(0.0)	(0.4)	(0.6)	0.4	0.9	0.1	0.0	1.0	0.0	0.0	0.0	0.6	0.6	1.6	1.1		
Pediatric Gastroenterology	1.0	(0.1)	(0.2)	(0.0)	(1.2)	(1.5)	0.4	1.4	0.1	0.0	1.5	0.0	0.0	0.0	0.2	0.2	1.7	0.7		
Pediatric Hematology	1.0	(0.1)	0.1	(0.0)	(0.1)	(0.1)	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.4	0.4	1.5	0.5		
Pediatric Hematology/Oncology	1.0	(0.1)	(0.3)	(0.0)	(0.3)	(0.8)	0.0	1.0	0.1	0.0	1.1	0.0	0.0	0.0	0.4	0.4	1.5	0.5		
Pediatric Infectious Diseases	2.0	(0.2)	(0.2)	(0.1)	(0.3)	(0.7)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3		
Pediatric Medical Oncology	2.0	(0.2)	(0.5)	(0.1)	(1.3)	(2.1)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3		
Pediatric Nephrology	1.2	(0.1)	(0.4)	(0.0)	(0.3)	(0.8)	0.1	1.3	0.2	0.0	1.5	0.0	0.0	0.0	0.6	0.6	2.1	0.9		
Pediatric Neurology	2.0	(0.2)	(0.2)	(0.1)	(1.4)	(1.9)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	1.0	1.0	3.3	1.3		
Pediatric Respiriology	1.3	(0.1)	(0.1)	(0.0)	(0.1)	(0.4)	0.3	1.6	0.2	0.0	1.8	0.0	0.0	0.0	1.4	1.4	3.2	1.9		
Pediatric Rheumatology	2.0	(0.2)	(0.1)	(0.1)	(1.2)	(1.6)	0.0	2.0	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.3		
Pediatrics - General	31.2	(3.1)	(3.4)	(0.8)	(9.3)	(16.8)	13.8	45.1	5.1	0.0	50.2	0.0	11.6	0.0	0.0	11.6	61.8	30.6		
Pediatric Total	56.0	(5.6)	(6.0)	(1.5)	(18.7)	(31.8)	16.0	72.0	9.2	0.0	81.2	0.0	11.6	0.0	8.8	20.4	101.6	45.6		
Anesthesiology	101.4	(10.1)	(12.7)	(2.7)	(29.1)	(54.7)	13.7	115.1	16.6	0.0	131.7	0.0	28.5	0.0	0.0	28.5	160.2	58.8		
Cardiac Surgery	4.2	(0.4)	(0.0)	(0.1)	(0.5)	(1.1)	(0.5)	3.7	0.7	0.2	4.6	0.0	0.0	0.0	0.0	0.0	4.6	0.4		
Cardiovascular and Thoracic Surgery	2.6	(0.3)	(1.5)	(0.1)	(1.6)	(3.5)	0.0	2.6	0.4	0.1	3.1	0.0	0.0	0.0	0.0	0.0	3.1	0.5		
General Surgery	60.1	(6.0)	(7.6)	(1.6)	(18.2)	(33.5)	4.8	64.9	9.8	0.0	74.7	0.0	4.7	0.0	0.0	4.7	79.4	19.3		
Neurosurgery	11.3	(1.1)	(2.7)	(0.3)	(3.5)	(7.7)	(1.7)	9.7	1.9	0.0	11.5	0.0	0.0	0.0	0.0	0.0	11.5	0.2		
Ophthalmology	26.7	(2.7)	(4.8)	(0.7)	(9.8)	(18.0)	11.1	37.8	4.4	0.0	42.2	0.0	0.0	0.0	0.0	0.0	42.2	15.5		
Oral Maxillofacial Surgery	0.1	(0.0)	(0.1)	(0.0)	(0.1)	(0.2)	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0		
Orthopedic Surgery	39.7	(4.0)	(6.0)	(1.1)	(12.1)	(23.1)	3.0	42.7	6.4	0.0	49.1	0.0	0.0	0.0	0.0	0.0	49.1	9.4		
Otolaryngology - Head and Neck Surgery	12.6	(1.3)	(3.2)	(0.3)	(5.4)	(10.2)	6.2	18.7	2.0	0.0	20.7	0.0	0.0	0.0	0.0	0.0	20.7	8.2		
Pediatric Surgery	2.3	(0.2)	(0.4)	(0.1)	(0.5)	(1.2)	1.3	3.6	0.4	0.0	4.0	0.0	0.0	0.0	0.1	0.1	4.1	1.8		
Plastic Surgery	11.8	(1.2)	(1.4)	(0.3)	(3.5)	(6.4)	3.8	15.6	1.9	0.0	17.5	0.0	0.0	0.0	0.0	0.0	17.5	5.7		
Thoracic Surgery	2.9	(0.3)	(0.1)	(0.1)	(0.5)	(1.0)	1.0	3.9	0.5	0.0	4.4	0.0	0.0	0.0	0.0	0.0	4.4	1.5		
Urology	14.1	(1.4)	(2.4)	(0.4)	(5.9)	(10.0)	3.2	17.2	2.3	0.0	19.6	0.0	0.0	0.0	0.0	0.0	19.6	5.5		
Vascular surgery	6.4	(0.6)	(0.3)	(0.2)	(2.3)	(3.4)	0.3	6.7	1.0	0.3	8.0	0.0	0.0	0.0	0.0	0.0	8.0	1.6		
Surgical Total	296.2	(29.6)	(43.3)	(8.0)	(93.1)	(174.0)	46.2	342.5	48.4	0.5	391.4	0.0	33.2	0.0	0.1	33.3	424.7	128.5		
TOTAL	1,758.1	(443.0)	(180.2)	(47.6)	(565.7)	(1,236.4)	240.9	1,998.9	261.6	4.9	2,265.5	(30.6)	13.5	0.0	45.7	28.6	2,294.1	536.0		
ANNUAL % CHANGE		(2.5%)	(1.0%)	(0.3%)	(3.2%)	(7.0%)	1.37%	1.37%			2.89%					0.16%	3.05%	3.05%		

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4.6 BASE, LOW, HIGH CASE SCENARIO – NARRATIVE

This subsection is key supplementary information for the Base, Low, and High Case scenarios and includes information on “special interests” by specialty, assumptions made related to program design and delivery by specialty, and recruitment timing recommendations by specialty.

SUPPORTING NARRATIVE - Special Interests by Specialty, Assumptions Program Design, Recruitment Timing Recommendations FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10)															
BASE CASE VALUES											1	2	3	4	5
VARIABLES				HEALTH SYSTEM PLANNING RELATED VARIABLES					ASSUMPTIONS - Program Design/Delivery						
Specialty	Special Interest(s) included are:	BASE YEAR FTE - 2012/13	SUBTOTAL: Replacement Needs	Benchmark	+ / (-) Change in Age/ Gender Adj. Population	+ / (-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	SUBTOTAL: MOC's	TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 (-) Col 1)				PROVINCIAL PROGRAM	RECRUITMENT TIMING RECOMMENDATIONS (for Col 18 FTE)
											BASE	LOW	HIGH		
Anatomical Pathology	1 Hematopathology, 1 Cytopathology	21.3	(9.5)	1.8	3.5	0.0	26.6	0.0	26.6	5.3	No Change in service model; BM's Alberta, R. Maung CDA, U.K.	2 High volume Diagnostic Laboratories in Province	No Change in service model; BM's Alberta, R. Maung CDA, U.K.		Evenly over 10 years
Diagnostic Radiology	7- Interventional, 5- Mammography	75.2	(27.1)	(11.4)	12.3	0.0	76.1	1.1	77.2	2.0	No Change in service model; BM's U.K., Australia	Service consolidation, BM's U.K., Australia	No Change		Evenly over 10 years
Forensic Pathology		1.0	0.1	0.0	0.1	0.0	1.1	1.0	2.1	1.1	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 2.0 RCPSC certified	BY F3
General Pathology	1- Hematology Oncology	9.6	(6.6)	0.0	1.5	0.0	11.1	0.0	11.1	1.5	No Change in service model; BM's Alberta, R. Maung CDA, U.K.	2 High volume Diagnostic Laboratories in Province	No Change in service model; BM's Alberta, R. Maung CDA, U.K.		by F5
Hematological Pathology	1- Transfusion Medicine (see also 'Hematology')	5.8	(2.0)	0.0	0.9	0.0	6.7	0.0	6.7	0.9	SCA Governance	SCA Governance	SCA Governance		by F5
Medical Biochemistry		2.0	(2.2)	0.0	0.3	0.0	2.3	0.0	2.3	0.3	Minimum 2.0 Provincially	2 High volume Diagnostic Laboratories in Province	No Change		BY F3
Medical Microbiology		1.0	0.1	0.0	0.2	0.0	1.2	0.8	2.0	1.0	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 2.0 RCPSC certified	BY F3
Neuropathology		1.0	0.1	0.0	0.1	0.0	1.1	0.0	1.1	0.1	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 1.0 RCPSC certified	BY F3
Neuroradiology		1.0	0.0	0.0	0.1	0.0	1.1	0.0	1.1	0.1	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 1.0 RCPSC certified	BY F3
Nuclear Medicine		5.0	(2.9)	0.0	0.8	0.0	5.8	0.0	5.8	0.8	SCA Governance	SCA Governance	SCA Governance		BY F5
Radiation Oncology		16.5	(7.8)	(2.9)	2.7	0.0	16.3	0.0	16.3	(0.2)	No Change in service model; BM's Australia	No Change in service model; BM's Australia	No Change in service model; BM's Australia		N/A
Diagnostic/Therapeutic Total		139.4	(57.8)	(12.5)	22.7	0.0	149.6	2.9	152.5	13.1					
Emergency Medicine	2- Pediatric EM	5.8	(1.4)	0.0	1.0	0.0	6.7	0.0	6.7	1.0	Volume increase 1.4%/yr; but no expansion in number ER Sites	Volume increase 1.4%/yr; but no expansion in number ER Sites	Volume increase 1.8%/yr; but no expansion in number ER Sites	1,440 hours per FTE	Evenly over ten years
Family Medicine (EM)		54.0	(23.1)	0.0	8.8	0.0	62.8	0.0	62.8	8.8	IBID Emergency Medicine	IBID Emergency Medicine	IBID Emergency Medicine	1,440 hours per FTE	Evenly over ten years
General Practice (EM)		10.9	(6.4)	0.0	1.8	0.0	12.6	0.0	12.6	1.8	IBID Emergency Medicine	IBID Emergency Medicine	IBID Emergency Medicine	1,440 hours per FTE	Evenly over ten years
Emergency Medicine Total		70.6	(31.0)	0.0	11.6	0.0	82.1	0.0	82.1	11.6					
Family Medicine		206.6	(136.6)	1.8	33.7	0.0	242.1	(19.4)	222.7	16.1	See 'MOC PHC'	See 'MOC PHC'	See 'MOC PHC'		Evenly over ten years
General Practice		619.1	(453.7)	5.4	75.3	0.0	699.8	(58.9)	640.9	21.8	See 'MOC PHC'	See 'MOC PHC'	See 'MOC PHC'		Evenly over ten years
Family Medicine Total		825.7	(590.3)	7.2	109.0	0.0	941.9	(78.3)	863.6	37.9	See 'MOC PHC'	See 'MOC PHC'	See 'MOC PHC'		

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SUPPORTING NARRATIVE - Special Interests by Specialty, Assumptions Program Design, Recruitment Timing Recommendations FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10)																				
BASE CASE VALUES										1			2		3		4		5	
		VARIABLES		HEALTH SYSTEM PLANNING RELATED VARIABLES						ASSUMPTIONS - Program Design/Delivery										
Specialty	Special Interest(s) included are:	BASE YEAR FTE - 2012/13	SUBTOTAL: Replacement Needs	Benchmark	+ /(-) Change in Age/ Gender Adj. Population	+ /(-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	SUBTOTAL: MOC's	TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 (-) Col 1)				PROVINCIAL PROGRAM	RECRUITMENT TIMING RECOMMENDATIONS (for Col 18 FTE)					
Cardiology		27.8	(10.7)	3.8	4.6	1.1	37.3	0.0	37.3	9.5	No change service model, BM's Canada, U.K.	Enhanced PHC, GIM Scope Practice, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		Evenly over ten years					
Clinical Immunology and Allergy		2.2	(2.6)	0.0	0.4	0.0	2.6	0.0	2.6	0.4	Minimum 2.0 Provincially	Minimum 2.0 Provincially	Minimum 2.0 Provincially							
Critical Care Medicine		3.5	(0.6)	0.0	0.6	0.0	4.1	6.5	10.6	7.1	No expansion in number Tertiary ICU's	No expansion in number Tertiary ICU's	No expansion in number Tertiary ICU's	5.0 FTE per Tertiary ICU (2 Sites)	BY F5					
Dermatology		4.5	(5.3)	3.1	0.8	0.0	8.4	0.0	8.4	3.9	No change service model, BM's Canada, U.K.	Enhanced PHC scope practice, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		70% BY F5					
Endocrinology and Metabolism		6.5	(3.4)	3.6	1.1	0.0	11.1	0.0	11.1	4.6	No change service model, BM's Canada, U.K.	Enhanced PHC scope practice, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		70% BY F5					
Gastroenterology		12.3	(7.2)	5.9	2.0	0.0	20.2	0.0	20.2	7.9	No change service model, BM's Canada, U.K.	Enhanced PHC scope practice, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		70% BY F5					
General Internal Medicine	2- Critical Care Medicine; 13- Geriatric Medicine	50.4	(26.1)	34.8	8.3	0.0	93.5	(19.9)	73.6	23.1	No change service model, BM's Canada	Enhanced PHC scope practice, BM's Canada, U.K.	No change service model, BM's Canada		70% BY F5					
Geriatric Medicine	3-General Internal Medicine	3.3	(1.0)	2.7	0.5	0.0	6.5	0.0	6.5	3.2	Assume North and South SK Programs; GM Lead with GP (SI) support	Assume North and South SK Programs; GM Lead with GP (SI) support	Assume North and South SK Programs; GM Lead with GP (SI) support		70% BY F5					
Hematology	1- Transfusion Medicine	11.4	(5.1)	0.0	1.9	0.0	13.3	0.0	13.3	1.9					BY F10					
Infectious Diseases	1- Microbiology	8.6	(2.0)	0.0	1.4	0.0	10.1	0.0	10.1	1.4					BY F10					
Medical Genetics	1- Pediatric Developmental	2.4	(1.6)	0.0	0.4	0.0	2.8	0.6	3.4	1.0	Minimum 3.0 Provincially	Minimum 3.0 Provincially	Minimum 3.0 Provincially		BY F3					
Medical Oncology	1- Hematology Oncology	12.8	(3.7)	0.0	2.1	0.0	14.9	0.0	14.9	2.1	SCA Governance	SCA Governance	SCA Governance		BY F10					
Nephrology	2- Transplantation	17.6	(8.1)	(7.6)	2.9	0.0	12.9	2.0	14.9	(2.7)	No change service model, BM's Canada, U.K.	Enhanced PHC scope practice, BM's Canada, U.K.	No change service model, BM's Canada, U.K.	Includes 2.0 transplantation	Through retirements over time					
Neurology		18.1	(4.3)	5.0	3.0	0.0	26.1	0.0	26.1	8.0	No change service model, BM's Canada, U.K.	Enhanced PHC scope practice, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		70% BY F5					
Occupational Medicine		0.5	0.0	0.0	0.1	0.0	0.6	0.0	0.6	0.1					BY F10					
Physical Medicine and Rehabilitation		9.6	(4.4)	(1.3)	1.6	0.0	9.8	0.0	9.8	0.2					BY F10					
Psychiatry	8- Child/Adolescent; 5- Forensic; 4-Mood/Anxiety	71.6	(34.5)	30.5	11.7	2.3	116.0	5.8	121.8	50.2	No change service model, BM's Canada, U.K.	Greater multi-disciplinary service delivery, BM's Canada, U.K.	Greater multi-disciplinary service delivery, BM's Canada, U.K.		70% BY F5					
Psychiatry Child and Adolescent		3.3	(1.0)	2.8	0.5	0.1	6.7	2.0	8.7	5.4	No change service model, BM's Ireland, U.K.	Greater multi-disciplinary service delivery, BM's Canada, U.K.	Greater multi-disciplinary service delivery, BM's Canada, U.K.		70% BY F5					
Psychiatry Geriatric		1.4	(0.5)	0.0	0.2	0.0	1.7	4.0	5.7	4.3					70% BY F5					
Public Health & Preventative Medicine		7.5	(2.3)	0.0	1.2	0.0	8.7	0.0	8.7	1.2					BY F10					
Respirology	1- TB Clinic	16.8	(7.1)	4.8	2.7	0.0	24.4	0.0	24.4	7.6	No change service model, BM's Canada, U.K.	Enhanced PHC scope practice, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		Evenly over ten years					
Rheumatology	1- Hospital Medicine	11.5	(5.7)	0.1	1.9	0.9	14.4	0.0	14.4	2.9					BY F10					
Medical Total		303.7	(137.1)	88.2	49.8	4.4	446.1	1.0	447.1	143.4										
Maternal/Fetal Medicine		1.0	(1.3)	0.5	0.1	0.0	1.6	0.9	2.5	1.5	Province-wide Resource	Province-wide Resource	Province-wide Resource	Minimum 2.0 RCPSC certified	BY F3					
Neonatology		8.6	(9.0)	0.0	1.4	0.0	10.1	1.0	11.1	2.4	No expansion in number tertiary NICU's	No expansion in number tertiary NICU's	No expansion in number tertiary NICU's		BY F10					
Obstetrics and Gynecology	5- Gyne Reproductive Endocrinology & Infertility; 2-MFM; 4-Gyneoncology; 3- Urogynecology	56.8	(25.5)	9.4	9.3	0.0	75.6	5.2	80.7	23.9	No change service model, BM's Canada, Australia	Enhanced PHC scope practice, BM's Canada, U.K.	No change service model, BM's Canada, Australia	Includes 3.0 RCPSC Gyne Oncology	70% BY F5					
Obstetrics and Gynecology Total		66.5	(35.7)	9.9	10.9	0.0	87.3	7.1	94.3	27.8										

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SUPPORTING NARRATIVE - Special Interests by Specialty, Assumptions Program Design, Recruitment Timing Recommendations FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10)																			
BASE CASE VALUES										1		2		3		4		5	
Specialty		SPECIAL INTEREST(S) INCLUDED ARE:		HEALTH SYSTEM PLANNING RELATED VARIABLES						ASSUMPTIONS - Program Design/Delivery						RECRUITMENT TIMING RECOMMENDATIONS (for Col 18 FTE)			
		BASE YEAR FTE - 2012/13	SUBTOTAL: Replacement Needs	Benchmark	+ /(-) Change in Age/ Gender Adj. Population	+ /(-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	SUBTOTAL: MOC's	TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 (-) Col 1)	BASE	LOW	HIGH	PROVINCIAL PROGRAM					
Pediatric Cardiology		2.6	(1.5)		0.1	0.4	0.0	3.1	0.0	3.1	0.5	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 3.0 RCPSC certified	BY F3			
Pediatric Critical Care Medicine		3.0	0.2		0.0	0.5	0.0	3.5	2.5	6.0	3.0	No expansion in number Tertiary PICU's	No expansion in number Tertiary PICU's	No expansion in number Tertiary PICU's	3.0 RCPSC certified plus Pediatrics General with SI	BY F5			
Pediatric Developmental		0.4	(0.1)		0.3	0.1	0.0	0.8	1.2	2.0	1.6	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 2.0 RCPSC certified	BY F3			
Pediatric Emergency Medicine		4.8	(2.0)		0.0	0.8	0.0	5.5	0.5	6.0	1.3	No expansion in number ER Sites	No expansion in number ER Sites	No expansion in number ER Sites		BY F3			
Pediatric Endocrinology and Metabolism		0.5	(0.6)		0.3	0.1	0.0	0.9	0.6	1.5	1.0	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 2.0 (count) RCPSC certified	BY F3			
Pediatric Gastroenterology		1.0	(1.3)		0.2	0.1	0.0	1.4	0.2	1.6	0.6	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 2.0 (count) RCPSC certified	BY F3			
Pediatric Hematology		1.0	0.0		0.0	0.1	0.0	1.1	0.4	1.5	0.5	SCA Governance; Combined Ped Hem/Ped Hem Oncology Service	SCA Governance; Combined Ped Hem/Ped Hem Oncology Service	SCA Governance; Combined Ped Hem/Ped Hem Oncology Service	Minimum 3.0 RCPSC certified (combined with Pediatric Hematology /Oncology)	BY F3			
Pediatric Hematology/Oncology		1.0	(0.6)		0.0	0.1	0.0	1.1	0.4	1.5	0.5	SCA Governance; Combined Ped Hem/Ped Hem Oncology Service	SCA Governance; Combined Ped Hem/Ped Hem Oncology Service	SCA Governance; Combined Ped Hem/Ped Hem Oncology Service		BY F3			
Pediatric Infectious Diseases		2.0	(0.5)		0.0	0.3	0.0	2.3	0.0	2.3	0.3	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 2.0 RCPSC certified	BY F3			
Pediatric Medical Oncology		2.0	(1.8)		0.0	0.3	0.0	2.3	0.0	2.3	0.3	SCA Governance	SCA Governance	SCA Governance	Minimum 2.0 RCPSC certified	BY F3			
Pediatric Nephrology		1.2	(0.6)		0.0	0.2	0.0	1.4	0.6	2.0	0.8	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 2.0 RCPSC certified	BY F3			
Pediatric Neurology		2.0	(1.6)		0.0	0.3	0.0	2.3	1.0	3.3	1.3	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 3.0 RCPSC certified	BY F10			
Pediatric Respiriology		1.3	(0.2)		0.1	0.2	0.0	1.6	1.4	3.0	1.7	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 2.0 RCPSC certified	BY F3			
Pediatric Rheumatology		2.0	(1.3)		0.0	0.3	0.0	2.3	0.0	2.3	0.3	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Minimum 2.0 RCPSC certified	BY F10			
Pediatrics - General		1-Pediatric Palliative	31.2	(12.8)		12.9	5.1	0.0	49.3	9.6	58.8	27.6	CHANGE RATIO Pediatric-General/Pediatric-Specialist from 0.88 to 0.70	CHANGE RATIO Pediatric-General/Pediatric-Specialist from 0.88 to 0.70	CHANGE RATIO Pediatric-General/Pediatric-Specialist from 0.88 to 0.70		70% BY F5		
Pediatric Total			56.0	(24.7)		14.1	9.2	0.0	79.3	18.4	97.6	41.7	Large current deficit; adjusted through "MOC-Provincial Program"	Large current deficit; adjusted through "MOC-Provincial Program"	Large current deficit; adjusted through "MOC-Provincial Program"				

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Supporting Narrative continued...

A specialty with an assumption of “province-wide resource” means any added FTE should be planned, coordinated, and approved provincially, and then recruited by the appropriate RHA, either RHA 04 Regina Qu’Appelle or RHA 06 Saskatoon. **Most of the paediatric subspecialty FTE should be recruited with the first three years of the ten year forecast period.**

SUPPORTING NARRATIVE - Special Interests by Specialty, Assumptions Program Design, Recruitment Timing Recommendations FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2023/24 (F10)																				
BASE CASE VALUES										1			2		3		4		5	
VARIABLES		HEALTH SYSTEM PLANNING RELATED VARIABLES									ASSUMPTIONS - Program Design/Delivery									
Specialty	Special Interest(s) included are:	BASE YEAR FTE - 2012/13	SUBTOTAL: Replacement Needs	+ / (-) Benchmark	+ / (-) Change in Age/ Gender Adj. Population	+ / (-) Change in Disease Incidence/ Prevalence	PRE-MOC FTE (Col's 8+9+10)	SUBTOTAL: MOC's	TOTAL FTE - 2022/23 (Col 11+16)	CHANGE IN FTE 2012/13 to 2022/23 (Col 17 (-) Col 1)				PROVINCIAL PROGRAM	RECRUITMENT TIMING RECOMMENDATIONS (for Col 18 FTE)					
											BASE	LOW	HIGH							
Anesthesiology	4- Critical Care Medicine; 23-Labour/Delivery	101.4	(41.8)	4.7	16.6	0.0	122.8	12.5	135.3	33.8	0.4 FTE per Surgeon	0.44 FTE per Surgeon	0.50 FTE per surgeon		Evenly over ten years					
Cardiac Surgery		4.2	(0.5)	(0.8)	0.7	0.2	4.2	0.0	4.2	0.0	Province-wide Resource	Province-wide Resource	Province-wide Resource	2 Sites for Province; combined C/S and CVT service	N/A					
Cardiovascular and Thoracic Surgery		2.6	(3.2)	0.0	0.4	0.1	3.1	0.0	3.1	0.5	Province-wide Resource	Province-wide Resource	Province-wide Resource		N/A					
General Surgery	1-Colorectal; 3-Trauma; 2-Hepatobiliary; 2-Transplant; 1-Vascular	60.1	(25.9)	1.2	9.8	0.0	71.1	4.6	75.7	15.6					Evenly over ten years					
Neurosurgery	1- Pediatric; 1- Neruoendovascular	11.3	(6.2)	(4.0)	1.9	0.0	9.2	0.0	9.2	(2.1)	Province-wide Resource. BM's Canada and U.K.	Province-wide Resource. BM's Canada and U.K.	Province-wide Resource. BM's Canada and U.K.	2 Sites for Province	Through retirements over time					
Ophthalmology	2- Pediatric	26.7	(14.6)	2.5	4.4	0.0	33.6	0.0	33.6	6.9	No change service model, BM's Canada, U.K.	Enhanced PHC scope practice, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		Evenly over ten years					
Oral Maxillofacial Surgery		0.1	(0.2)	0.0	0.0	0.0	0.1	0.0	0.1	0.0	No change service model, BM's Canada, U.K.		No change service model, BM's Canada, U.K.							
Orthopedic Surgery	2-Pediatric; 4-Sports Medicine; 2-Trauma;	39.7	(18.1)	3.7	6.4	0.0	49.9	0.0	49.9	10.2	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		Evenly over ten years					
Otolaryngology - Head and Neck Surgery		12.6	(8.6)	5.7	2.0	0.0	20.3	0.0	20.3	7.7	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		Evenly over ten years					
Pediatric Surgery		2.3	(0.9)	1.3	0.4	0.0	3.9	0.1	4.0	1.7	Province-wide Resource	Province-wide Resource	Province-wide Resource	1 Site for subspecialty surgery, 2 sites for general surgery	Three at Designated Specialty Centre; 4th= general pediatric surgical procedures					
Plastic Surgery		11.8	(4.9)	1.4	1.9	0.0	15.2	0.0	15.2	3.4	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		Evenly over ten years					
Thoracic Surgery		2.9	(0.7)	0.0	0.5	0.0	3.4	0.0	3.4	0.5	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	Province-wide Resource; based out of single site	1 Site for Province	BY FS					
Urology		14.1	(8.2)	0.6	2.3	0.0	17.0	0.0	17.0	3.0	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		Evenly over ten years					
Vascular surgery		6.4	(2.6)	0.1	1.0	0.3	7.7	0.0	7.7	1.4	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.	No change service model, BM's Canada, U.K.		Evenly over ten years					
Surgical Total		296.2	(136.4)	16.4	48.4	0.5	361.5	17.1	378.7	82.4										
TOTAL		1,758.1	(1,013.0)	123.1	261.6	4.9	2,147.8	(31.9)	2,115.9	357.8										
ANNUAL % CHANGE			(5.8%)	0.70%			2.22%	(0.2%)	2.04%	2.04%										

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4.7 FORECAST – BASE CASE SCENARIO – SUMMARY BY REGIONAL HEALTH AUTHORITY

The Base Case **Scenario** by RHA is depicted in the following figure. The annual percent growth in total physician FTE by RHA varies considerably due to substantial variation in the base year, 2012/13, roster of physicians, and the varying impact of key determinants on each RHA depending on multiple factors including population growth (age/gender weighted), community catchments for **family practice** FTE requirements, etc. Introduction of a core service model of care will require a planned redistribution of FTE from RHAs 04 and 06 to other RHA's as current physician retire or depart the system. Diagnostic/therapeutic, adult medical and all surgical specialties are weighted 25% towards RHA 06 over RHA 04 due to 18% difference in provincial population served and a 7% relative acuity weighting due to distribution of certain tertiary and quaternary program services. Pediatric subspecialties are largely based at the new Children's Hospital with outreach province-wide.

BASE CASE FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2022/23 (F10)																						
Specialty	1-Sun Country			2-Five Hills			3-Cypress			4-Regina Qu'Appelle			5-Sunrise			6-Saskatoon			7-Heartland			
	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	
Anatomical Pathology	0.0	0.0	0.0	2.0	2.5	0.5	0.0	0.0	0.0	6.7	8.4	1.7	0.0	0.0	0.0	10.6	13.2	2.6	0.0	0.0	0.0	
Diagnostic Radiology	0.2	4.1	3.9	1.6	3.7	2.0	1.8	3.1	1.3	26.9	19.2	(7.7)	1.8	4.1	2.3	37.2	23.2	(14.0)	0.0	3.1	3.1	
Forensic Pathology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.1	1.1	0.0	0.0	0.0	
General Pathology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	6.5	0.9	0.0	0.0	0.0	2.8	3.3	0.5	0.0	0.0	0.0	
Hematological Pathology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	3.3	0.5	0.0	0.0	0.0	3.0	3.5	0.5	0.0	0.0	0.0	
Medical Biochemistry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.2	0.2	0.0	0.0	0.0	1.0	1.2	0.2	0.0	0.0	0.0	
Medical Microbiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Neuropathology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.1	0.1	0.0	0.0	0.0	
Neuroradiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.1	0.1	0.0	0.0	0.0	
Nuclear Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.3	0.0	0.0	0.0	3.0	3.5	0.5	0.0	0.0	0.0	
Radiation Oncology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	6.9	(0.1)	0.0	0.0	0.0	9.5	9.4	(0.1)	0.0	0.0	0.0	
Diagnostic/Therapeutic Total	0.2	4.1	3.9	3.6	6.2	2.6	1.8	3.1	1.3	53.0	49.7	(3.3)	1.8	4.1	2.3	70.1	61.6	(8.5)	0.0	3.1	3.1	
Emergency Medicine	0.0	0.0	0.0	1.5	1.8	0.3	0.0	0.0	0.0	0.6	0.7	0.1	0.0	0.0	0.0	3.7	4.2	0.6	0.0	0.0	0.0	
Family Medicine (EM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.4	23.7	3.3	0.0	0.0	0.0	33.6	39.1	5.5	0.0	0.0	0.0	
General Practice (EM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	12.6	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Emergency Medicine Total	0.0	0.0	0.0	1.5	1.8	0.3	0.0	0.0	0.0	31.8	37.0	5.2	0.0	0.0	0.0	37.2	43.3	6.1	0.0	0.0	0.0	
Family Medicine Total (inc. 110.3 Spec.Interest, 715.4 FP)	32.3	42.4	10.1	38.0	40.8	2.8	35.8	33.3	(2.5)	216.4	239.4	23.0	40.5	45.5	5.0	260.2	272.3	12.1	25.8	32.9	7.1	
Cardiology	0.0	0.0	0.0	2.1	2.9	0.7	0.0	0.0	0.0	11.4	15.3	3.9	0.0	0.0	0.0	14.3	19.2	4.9	0.0	0.0	0.0	
Clinical Immunology and Allergy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.6	0.4	0.0	0.0	0.0	
Critical Care Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	5.0	2.0	0.5	0.6	0.1	0.0	5.0	5.0	0.0	0.0	0.0	
Dermatology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	4.1	1.9	0.0	0.0	0.0	2.2	4.1	1.9	0.0	0.0	0.0	
Endocrinology and Metabolism	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	5.6	2.3	0.0	0.0	0.0	3.2	5.5	2.3	0.0	0.0	0.0	
Gastroenterology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	10.8	4.2	0.4	0.7	0.3	5.3	8.7	3.4	0.0	0.0	0.0	
General Internal Medicine	0.0	3.9	3.9	3.1	3.5	0.4	2.1	2.9	0.8	10.6	18.3	7.7	3.2	3.9	0.7	25.2	22.1	(3.1)	0.0	3.0	3.0	
Geriatric Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.6	1.3	0.0	0.0	0.0	2.0	3.9	1.9	0.0	0.0	0.0	
Hematology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.2	0.2	0.0	0.0	0.0	10.4	12.1	1.7	0.0	0.0	0.0	
Infectious Diseases	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	4.7	0.7	0.0	0.0	0.0	4.6	5.3	0.8	0.0	0.0	0.0	
Medical Genetics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	3.4	1.0	0.0	0.0	0.0	
Medical Oncology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	6.3	0.9	0.0	0.0	0.0	7.4	8.6	1.2	0.0	0.0	0.0	
Nephrology	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	(0.1)	5.8	4.3	(1.5)	0.0	0.0	0.0	11.5	10.5	(1.1)	0.0	0.0	0.0	
Neurology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	8.0	2.4	0.0	0.0	0.0	12.6	18.1	5.5	0.0	0.0	0.0	
Occupational Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.1	0.0	0.0	0.0	
Physical Medicine and Rehabilitation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.3	0.1	0.0	0.0	0.0	7.4	7.5	0.2	0.0	0.0	0.0	
Psychiatry	3.3	6.3	3.0	2.6	5.6	3.0	2.0	4.7	2.7	10.6	31.3	20.7	2.0	6.2	4.2	37.9	37.5	(0.5)	0.0	4.8	4.8	
Psychiatry Child and Adolescent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	6.7	3.4	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	
Psychiatry Geriatric	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	1.4	3.7	2.3	0.0	0.0	0.0	
Public Health & Preventative Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.2	0.2	0.0	0.0	0.0	4.3	5.0	0.7	0.0	0.0	0.0	
Respirology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	4.9	1.5	0.0	0.0	0.0	13.3	19.3	6.0	0.0	0.0	0.0	
Rheumatology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	3.6	0.7	0.0	0.0	0.0	8.7	10.9	2.2	0.0	0.0	0.0	
Medical Total	3.3	10.3	6.9	7.8	12.0	4.2	4.4	7.8	3.4	83.6	138.1	54.5	6.1	11.5	5.3	176.9	215.6	38.8	0.0	7.8	7.8	

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Summary by Regional Health Authority continued...

FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2022/23 (F10)																					
Specialty	1-Sun Country			2-Five Hills			3-Cypress			4-Regina Qu'Appelle			5-Sunrise			6-Saskatoon			7-Heartland		
	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23
Maternal/Fetal Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.6	0.6	0.0	0.0	0.0	0.0	0.9	0.9	0.0	0.0	0.0
Neonatology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	4.5	1.5	0.0	0.0	0.0	5.6	6.6	0.9	0.0	0.0	0.0
Obstetrics and Gynecology	0.0	3.6	3.6	2.6	3.2	0.6	1.0	2.7	1.6	15.6	23.6	8.0	3.0	3.5	0.5	25.3	27.1	1.8	0.0	2.7	2.7
Obstetrics and Gynecology Total	0.0	3.6	3.6	2.6	3.2	0.6	1.0	2.7	1.6	19.6	29.7	10.1	3.0	3.5	0.5	30.9	34.5	3.6	0.0	2.7	2.7
Pediatric Cardiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	3.1	0.5	0.0	0.0	0.0
Pediatric Critical Care Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.0	2.0	0.0	0.0	0.0	2.0	3.0	1.0	0.0	0.0	0.0
Pediatric Developmental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.0	1.6	0.0	0.0	0.0
Pediatric Emergency Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	6.0	1.3	0.0	0.0	0.0
Pediatric Endocrinology and Metab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.5	1.0	0.0	0.0	0.0
Pediatric Gastroenterology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.6	0.6	0.0	0.0	0.0
Pediatric Hematology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.5	0.5	0.0	0.0	0.0
Pediatric Hematology/Oncology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.1	0.1	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0
Pediatric Infectious Diseases	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.3	0.0	0.0	0.0
Pediatric Medical Oncology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.3	0.0	0.0	0.0
Pediatric Nephrology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.5	0.3	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0
Pediatric Neurology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.3	1.3	0.0	0.0	0.0
Pediatric Respiriology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	0.0	0.0	0.0	1.3	1.6	0.3	0.0	0.0	0.0
Pediatric Rheumatology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.3	0.0	0.0	0.0
Pediatrics - General	0.0	3.2	3.2	3.0	2.8	(0.2)	2.4	2.3	(0.0)	9.4	14.6	5.2	1.0	3.1	2.1	8.2	17.7	9.5	0.0	2.4	2.4
Pediatric Total	0.0	3.2	3.2	3.0	2.8	(0.2)	2.4	2.3	(0.0)	12.6	21.7	9.1	1.0	3.1	2.1	29.8	49.5	19.7	0.0	2.4	2.4
Anesthesiology	0.0	7.3	7.3	3.6	6.5	2.9	2.4	5.4	3.0	30.3	33.7	3.4	2.2	7.2	4.9	55.5	40.7	(14.8)	0.0	5.5	5.5
Cardiac Surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	3.2	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
Cardiovascular and Thoracic Surger	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	3.1	0.5	0.0	0.0	0.0
General Surgery	1.2	4.1	2.9	3.3	3.6	0.4	2.3	3.0	0.7	17.3	18.8	1.5	3.5	4.0	0.6	18.7	22.8	4.0	0.2	3.1	2.9
Neurosurgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	5.1	(1.2)	0.0	0.0	0.0	5.0	4.1	(0.9)	0.0	0.0	0.0
Ophthalmology	0.0	0.0	0.0	1.2	1.6	0.3	1.0	1.3	0.3	9.3	11.8	2.4	1.5	1.9	0.4	10.2	12.8	2.6	0.0	0.0	0.0
Orthopedic Surgery	0.0	0.0	0.0	1.0	1.3	0.3	0.0	0.0	0.0	12.2	15.4	3.1	0.0	0.0	0.0	22.4	28.1	5.7	0.0	0.0	0.0
Otolaryngology - Head and Neck S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	7.1	2.7	0.0	0.0	0.0	6.0	9.7	3.7	0.0	0.0	0.0
Pediatric Surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.7	0.7	0.0	0.0	0.0	1.3	2.3	1.0	0.0	0.0	0.0
Plastic Surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	6.6	1.5	0.0	0.0	0.0	6.7	8.6	1.9	0.0	0.0	0.0
Thoracic Surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	3.4	0.5	0.0	0.0	0.0
Urology	0.0	0.0	0.0	1.1	1.3	0.2	1.1	1.3	0.2	3.4	4.1	0.7	0.0	0.0	0.0	7.6	9.1	1.6	0.0	0.0	0.0
Vascular surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	3.8	0.7	0.0	0.0	0.0	3.2	3.9	0.7	0.0	0.0	0.0
Surgical Total	1.2	11.3	10.1	10.1	14.2	4.1	6.8	11.0	4.2	95.8	111.3	15.5	7.2	13.1	5.9	143.2	149.7	6.5	0.2	8.6	8.4
TOTAL	37.0	74.8	37.8	66.7	81.0	14.3	52.2	60.2	8.0	512.8	627.0	114.2	59.7	80.8	21.1	748.3	826.6	78.3	26.0	57.5	31.5
ANNUAL % CHANGE			10.2%			2.2%			1.5%			2.2%			3.5%			1.0%			12.1%

Planning Tool for Physician Resources in Saskatchewan

Final Report

Summary by Regional Health Authority continued ...

BASE CASE FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2022/23 (F10)																						
Specialty	8-Kelsey Trail			9-Prince Albert Parkland			10-Prairie North			1-Mamawetan Churchill River			12-Keewatin Yatthé			13-Athabasca Health Authority			PROVINCE-WIDE			
	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	
Anatomical Pathology	0.0	0.0	0.0	2.0	2.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.3	26.6	5.3	
Diagnostic Radiology	0.0	2.9	2.9	2.5	5.5	3.0	3.1	5.7	2.6	0.0	1.6	1.6	0.0	0.7	0.7	0.0	0.2	0.2	75.2	77.2	2.0	
Forensic Pathology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.1	1.1	
General Pathology	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6	11.1	1.5	
Hematological Pathology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	6.7	0.9	
Medical Biochemistry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.3	
Medical Microbiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	1.0	
Neuropathology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.1	0.1	
Neuroradiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.1	0.1	
Nuclear Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.8	0.8	
Radiation Oncology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.5	16.3	(0.2)	
Diagnostic/Therapeutic Total	0.0	2.9	2.9	4.5	8.0	3.5	4.3	7.1	2.7	0.0	1.6	1.6	0.0	0.7	0.7	0.0	0.2	0.2	139.4	152.5	13.1	
Emergency Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	6.7	1.0	
Family Medicine (EM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.0	62.8	8.8	
General Practice (EM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	12.6	1.8	
Emergency Medicine Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.6	82.1	11.6	
Family Medicine Total (inc. 110.3 Spec.Interest, 715.4 FP)	25.8	32.2	6.4	63.9	52.4	(11.5)	60.1	52.8	(7.4)	12.2	12.9	0.7	11.3	5.4	(5.9)	3.4	1.3	(2.1)	825.7	863.6	37.9	
Cardiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.8	37.3	9.5	
Clinical Immunology and Allergy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.6	0.4	
Critical Care Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	10.6	7.1	
Dermatology	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	8.4	3.9	
Endocrinology and Metabolism	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	11.1	4.6	
Gastroenterology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	20.2	7.9	
General Internal Medicine	0.0	2.7	2.7	4.6	5.3	0.7	1.6	5.4	3.8	0.0	1.5	1.5	0.0	0.7	0.7	0.0	0.2	0.2	50.4	73.6	23.1	
Geriatric Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	6.5	3.2	
Hematology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.4	13.3	1.9	
Infectious Diseases	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	10.1	1.4	
Medical Genetics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	3.4	1.0	
Medical Oncology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.8	14.9	2.1	
Nephrology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.6	14.9	(2.7)	
Neurology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.1	26.1	8.0	
Occupational Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.1	
Physical Medicine and Rehabilitati	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6	9.8	0.2	
Psychiatry	0.0	4.4	4.4	4.4	8.4	4.0	8.7	8.7	(0.0)	0.0	2.5	2.5	0.0	1.1	1.1	0.0	0.3	0.3	71.6	121.8	50.2	
Psychiatry Child and Adolescent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	8.7	5.4	
Psychiatry Geriatric	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	5.7	4.3	
Public Health & Preventative Medi	1.0	1.2	0.2	1.0	1.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	8.7	1.2	
Respirology	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.8	24.4	7.6	
Rheumatology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.5	14.4	2.9	
Medical Total	1.0	8.3	7.3	10.0	14.8	4.9	10.6	14.6	4.0	0.0	4.0	4.0	0.0	1.8	1.8	0.0	0.5	0.5	303.7	447.1	143.4	

Planning Tool for Physician Resources in Saskatchewan

Final Report

Summary by Regional Health Authority continued...

FORECAST by RHA, Base Year 2012/13, Forecast Years 2013/14 (F1) - 2022/23 (F10)																					
Specialty	8-Kelsey Trail			9-Prince Albert Parkland			10-Prairie North			1-Mamawetan Churchill River			12-Keewatin Yatthé			13-Athabasca Health Authority			PROVINCE-WIDE		
	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23	BASE YEAR FTE - 2012/13	TOTAL FTE - 2022/23	CHANGE IN FTE 2012/13 to 2022/23
Maternal/Fetal Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.5	1.5
Neonatology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	11.1	2.4
Obstetrics and Gynecology	0.0	2.5	2.5	4.5	4.8	0.3	4.8	4.9	0.1	0.0	1.4	1.4	0.0	0.6	0.6	0.0	0.2	0.2	56.8	80.7	23.9
Obstetrics and Gynecology Total	0.0	2.5	2.5	4.5	4.8	0.3	4.8	4.9	0.1	0.0	1.4	1.4	0.0	0.6	0.6	0.0	0.2	0.2	66.5	94.3	27.8
Pediatric Cardiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	3.1	0.5
Pediatric Critical Care Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	6.0	3.0
Pediatric Developmental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.0	1.6
Pediatric Emergency Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	6.0	1.3
Pediatric Endocrinology and Metabolism	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.5	1.0
Pediatric Gastroenterology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.6	0.6
Pediatric Hematology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.5	0.5
Pediatric Hematology/Oncology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.5	0.5
Pediatric Infectious Diseases	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.3
Pediatric Medical Oncology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.3
Pediatric Nephrology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.0	0.8
Pediatric Neurology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.3	1.3
Pediatric Respiriology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.0	1.7
Pediatric Rheumatology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.3
Pediatrics - General	0.7	2.2	1.5	5.1	4.2	(0.9)	1.4	4.3	2.9	0.0	1.2	1.2	0.0	0.5	0.5	0.0	0.2	0.2	31.2	58.8	27.6
Pediatric Total	0.7	2.2	1.5	5.1	4.2	(0.9)	1.4	4.3	2.9	0.0	1.2	1.2	0.0	0.5	0.5	0.0	0.2	0.2	56.0	97.6	41.7
Anesthesiology	0.0	5.1	5.1	6.3	9.7	3.3	1.1	10.0	8.9	0.0	2.8	2.8	0.0	1.2	1.2	0.0	0.3	0.3	101.4	135.3	33.8
Cardiac Surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	4.2	0.0
Cardiovascular and Thoracic Surgeons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	3.1	0.5
General Surgery	1.0	2.8	1.8	7.0	5.4	(1.6)	5.6	5.6	(0.1)	0.0	1.6	1.6	0.0	0.7	0.7	0.0	0.2	0.2	60.1	75.7	15.6
Neurosurgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	9.2	(2.1)
Ophthalmology	0.0	0.0	0.0	2.3	2.9	0.6	1.2	1.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7	33.6	6.9
Orthopedic Surgery	0.0	0.0	0.0	4.0	5.0	1.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.7	49.9	10.2
Otolaryngology - Head and Neck Surgery	0.0	0.0	0.0	1.0	1.6	0.6	1.2	1.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.6	20.3	7.7
Pediatric Surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	4.0	1.7
Plastic Surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.8	15.2	3.4
Thoracic Surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	3.4	0.5
Urology	0.0	0.0	0.0	1.0	1.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1	17.0	3.0
Vascular surgery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	7.7	1.4
Surgical Total	1.0	7.9	6.8	21.7	25.8	4.1	9.1	19.0	9.9	0.0	4.4	4.4	0.0	1.9	1.9	0.0	0.5	0.5	296.2	378.7	82.4
TOTAL	28.6	56.0	27.4	109.5	109.9	0.4	90.5	102.7	12.2	12.2	25.6	13.3	11.3	10.9	(0.3)	3.4	2.9	(0.5)	1,758.1	2,115.9	357.8
ANNUAL % CHANGE			9.6%			0.0%			1.3%			10.9%			-0.3%			-1.5%			2.0%

Chapter 5 RECOMMENDATIONS

5.1 RECOMMENDATIONS

Following are recommendations that are derived from the aggregation of research, analysis, modeling, and forecasting.

1) IMPLEMENTING PLANNING TOOL FOR PHYSICIAN RESOURCE

The impact of physician resource planning extends to many health professions, particularly nursing. Successful implementation, first and foremost, requires a 'health systems and patient-centric' approach. A health systems approach fosters system-wide integration, coordination, and collaboration. A patient-centric approach fosters quality of care in its broadest sense.

Therefore, it is recommended:

- (1) The Base Case PPR and forecast be the strategic framework, direction, and plan for physician resources to 2023
- (2) The province, by the combined impact of models of care implementation along with planned replacement recruitment, change the current percent mix of **generalist** physicians, excluding family practice, from 25.4% to 29.4% **generalist** by 2023, or earlier
- (3) The High Case and Low Case physician resource forecasts be the upper and lower planning boundaries for physician resources to 2023
- (4) The Ministry of Health ensure that advice, input and participation is obtained from all relevant stakeholders in the implementation of the physician resource planning model within the context of broad clinical services plan
- (5) Implementation of the physician resource planning model is led within the Ministry of Health under the auspices of a broader health human resources mandate
- (6) The Ministry of Health update the physician resource planning ten-year forecasts annually, and that the forecasts are compared, annually, to actual results

2) PLANNING TOOL FOR PHYSICIAN RESOURCES - METHODOLOGY

The objective of an affordable, sustainable healthcare system requires a shift from demand-based to a managed population needs-based approach to physician resource planning.

Therefore, it is recommended:

- (1) An adjusted population-needs based approach to, and methodology for, physician resource planning be formalized as policy of the Ministry of Health
- (2) An adjusted population-needs based PPR methodology is based on allocating resources based on population need rather than demand-based planning based on extant utilization and legacy data

3) DEFINING AND IMPLEMENTING CORE SERVICES

One key objective of the Ministry of Health is a system that delivers equitable access across the geographic distribution of the population, with access, within their geographic service area, to core services and referral access to added services. It is also committed to the provision of a demonstrable high quality of medical care that is ensured by exposure to an appropriate mix and volume of patients, cases, and treatments, and continuous professional development. Variations in access to core services may occur based on population density and distances to secondary, tertiary, or quaternary care. Effective resource planning requires definition of which clinical services are available to the public at local and regional levels.

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In order to enhance quality and sustainability, all core service physicians would function as a single integrated clinical department, and organize their overall care including call, coverage and quality improvement activities at the health regional level.

A clinical services plan must reflect any change in the mix and distribution of specialist disciplines, over time, brought about by the implementation of the core services model, including a detailed operational and functional plan will be a prerequisite.

Therefore, it is recommended:

- (1) Core physician services are defined as services that are provided to all residents within their geographic service area. Variation in access to core services will occur based on population density and distance to other secondary care
- (2) The following physician services are core services:
  - **Comprehensive family practice** across the province
  - Emergency care
  - General internal medicine
  - General surgery and anaesthesia
  - General psychiatry
  - General paediatrics
  - General obstetrics
  - General laboratory (specimen collection and transport) and diagnostic imaging
- (3) All core service physicians are credentialed in their core service specialty
- (4) The geographic distribution and mix of physician services be adjusted across the province over time to reflect the provision of core services as defined

4) MANAGING RELATIVE GENERALIST TO SUBSPECIALIST RESOURCES

SK can mitigate somewhat the need for hard to recruit **subspecialists** by maximizing **generalist** scope of practice. This can be achieved in a planned manner through selective **generalist** recruitment using scope of practice contracts. The absence of this approach will result in service gaps that will continue to be difficult to address, especially in the context of productivity and critical mass. Should the variables change over time, the model and planning process will change, as well.

5) DEFINING AND IMPLEMENTING PROVINCIAL SERVICES

Quality of care is enhanced in a setting that enables exposure to an appropriate mix and volume of patients, cases, and treatments.

Therefore, it is recommended:

- (1) Provincial services (see Section 4.6 – Assumptions Program Design/Delivery for list) are defined as those not provided locally or regionally as a defined core service.
- (2) The tertiary/quaternary portion of provincial inpatient surgical services need only be provided at one or possibly two designated facilities in the province (examples would be one site for Thoracic Surgery and Paediatric Surgery and two sites for Neurosurgery and Cardiac Surgery), reflecting critical mass and accessibility variables, all focused on quality outcomes
- (3) Provincial services be programed and planned provincially, and managed and operated at a site level as defined by the provincial service

6) MAINTAINING THE PLANNING FOR PHYSICIAN RESOURCES TOOL

To remain relevant in a dynamic and evolving healthcare system, the physician resource planning model must be continually maintained and enhanced; data need to be refreshed and variables changed as the environment changes.

Therefore, it is recommended:

- (1) The Ministry of Health assign responsibility and mandate for the use, maintenance, and enhancement of the physician resource planning model to an appropriately skilled unit.
- (2) The Ministry of Health maintain a provincial physician roster in a robustly re-engineered database. The database will support all relevant views of the information including, but not limited to, licensed and functional specialty, clinical, education, research, and leadership/administration FTE, AFP FTE, address of primary practice location, College of Medicine rank, status, and other elements, as identified
- (3) The Ministry of Health update the model based on agreed contracted academic FTEs by position by specialty, division, and department; and, that the agreed academic FTE be linked to a named individual and be subdivided into clinical, research, education, and leadership/administration components with notation of estimated percentage time allocations
- (4) The physician resource planning model 'Workforce Resource Variables' be maintained as follows:
  - NIPM/ RFA
Be maintained in collaboration with the CPSS through enhanced tracking using the CPSS Registry
  - Gender
Be maintained annually through gender-based FTE analysis
  - Work Hours
Be held at zero impact unless evidence to the contrary, with particular attention to **family practice** currently averaging 60 hours worked per week according to the most recent national physician survey, albeit with a 13% response rate
  - Separations
Be maintained annually through physician resource planning model Master Roster updating and analysis
  - Benchmark FTE Adjustment
Be maintained and enhanced by Ministry of Health with expert panel input
Be treated as physician resource planning model boundaries (Low, Base, and High)
  - Specialist Physician Profile
Be maintained consistent with formal Ministry of Health, COM, and other agreement(s)
  - Family physician Profile (community family practice, special interests, etc.))
Be maintained through collaborative Ministry of Health, SMA annual survey (single page, available on-line)
  - Collaborative Care
Be maintained according to information provided by the Clinical Service Delivery Planning - Collaborative Care initiative (information from electronic medical record) and through periodic provider billing data analysis
  - Core Services

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Be maintained according to information provided by the Core Services initiative and through periodic provider billing data analysis

- Population Change

Be updated annually from the Ministry of Finance at a community, RM, RHA , and provincial level by individual age (not five-year cohorts) and gender

- Disease Incidence and Prevalence

Be maintained with annual updates from Health Quality Council Saskatchewan to the comprehensive Clinical Risk Group data by RHA. Small cell sizes prohibit maintenance at the local geographic code level.

7) MAINTAINING THE PHYSICIAN RESOURCE PLANNING DATA

Certain data gaps must be closed in order to increase the quality of the physician resource planning model.

Therefore, it is recommended:

- (1) The physician resource planning model roster track non-fee-for-service payment status such as sessional, AFP, contract, and organization status (COM rank, functional specialty, CPSS licensed specialty)
- (2) Services are reported for all non-fee-for-service payments in a defined, timely, accurate, and comprehensive manner; reporting by a physician, at a minimum, includes a count of new and follow-up patients, visits, and consultations along with a primary and secondary diagnosis
- (3) Ministry of Health work with the CPSS to augment the registry with key added data elements: “licensed” specialty - for example, ‘internal medicine’ would not be used and instead replaced with the subspecialty of certification or designation of ‘general internal medicine’; “status” - active, member; register history - for example, provisional postgraduate trainee, full; and conditions on practice permit - for example, provisional, full, none

8) INFLUENCING AND MANAGING THE FUTURE SUPPLY OF PHYSICIANS

The Canadian medical postgraduate education system has expanded by 57% since 2000 compared to a population increase of 7.3%. Canada, with its comparatively high quality of life, compensation levels, single public payer system, and the global portability of a Canadian medical education, attracts large numbers of foreign-trained physicians and medical students each year. The University of Saskatchewan College of Medicine has participated in this increase through undergraduate enrolment and matching postgraduate positions. Depending on issues such as physician productivity and changing models of care, the possibility of surplus/excess/oversupply of physicians could itself create demand. Opportunities to practice as physicians in Canada may become more competitive in face of the defined need-based physician resource plans.

Therefore, it is recommended:

- (1) The Ministry of Health take a lead role in advocating at provincial/territorial and pan-Canadian levels for an initial and ongoing review and monitoring of the national supply of physicians relative to population needs; in particular the ratio of family physicians to specialists, ratio of **generalists** to **subspecialists**, supply relative to population need by specialty, foreign physician recruitment, and international medical graduate pathway to practice must be reviewed and evaluated
- (2) The Ministries of Health and Advanced Education and the University of Saskatchewan College of Medicine jointly review the size of the undergraduate program and size and mix of postgraduate medical programs in consideration of the number of funded seats, the retention in Saskatchewan of graduates, any pan-Canadian review of the physician supply and the projected health needs of Saskatchewan over the 10 years of this physician resource planning model

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- (3) Population needs be made clear to the College of Medicine undergraduates so career counselling and decision-making can result in much greater alignment between supply and need
- (4) The Ministry of Health and the University of Saskatchewan College of Medicine and other stakeholders ensure that the curriculum is aligned with research on best practice and system evolution regarding delivery of collaborative care and interprofessional teams
- (5) The Ministry of Health and the University of Saskatchewan College of Medicine revise the specialty allocation of postgraduate residency positions to align with the needs of the physician resource planning model and in the context of the changing national physician supply
- (6) The Ministry of Health and the University of Saskatchewan College of Medicine review and revise postgraduate training programs with focus on the **generalist** disciplines and a short of list of select subspecialty programs; Saskatchewan population size and distribution is too small and dispersed to support sufficient specialty specific trainers and educators to enable offering a full slate of residency training programs.
- (7) SIPPA be reviewed in the context of a rapidly expanding national physician supply and the program size and priorities be realigned to the needs of the physician resource planning model

9) UPDATING ACADEMIC MEDICINE

Certain data gaps must be closed in order to increase the quality of the physician resource planning model.

Therefore, it is recommended:

- (1) The physician resource planning model be updated based upon agreed contracted academic FTEs by position by specialty, division, and department
- (2) The agreed academic FTE be linked to each individual
- (3) The agreed academic FTE be subdivided into research, education, and leadership/administration components with allocation of estimated percentage times

10) INTER-JURISDICTIONAL COLLABORATION

Critical mass and quality care are aligned with highly technical and quaternary specialties, such as the referral of paediatric cardiac surgery to Edmonton

Therefore, it is recommended:

- (1) The Western Canadian Provinces should be encouraged to continue to identify those services that could be provided as inter-jurisdictional specialty care and to advance such care in a collaborative fashion.

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A.2 Acronyms and Initialisms

Following is a list of acronyms and initialisms used in the Environmental Scan, accompanied by the source phrases:

• ADM	Assistant Deputy Minister
• AFMC	Association of Faculties of Medicine of Canada
• AFP	Academic Funding Plan
• APNM	Adjusted Population Needs-Based Model
• APP	Alternative Payment Plan
• ASIR	Age-Standardized Incidence Rate
• CAPERS	Canadian Post-M.D. Education Registry Service
• CaRMS	Canadian Resident Matching Service
• CCHS	Canadian Community Health Survey
• CDM	Chronic Disease Management
• CEC	Collaborative Emergency Centre
• CFPC	College of Family Physicians of Canada
• CHC	Community Health Centre
• CHR	Cypress Health Region
• CIHI	Canadian Institute for Health Information
• CMA	Canadian Medical Association
• CNA	Canadian Nurses Association
• COGME	Council on Graduate Medical Education (United States)
• COM	College of Medicine (University of Saskatchewan)
• COPS	Community Oncology Program of Saskatchewan
• CPSS	College of Physicians and Surgeons of Saskatchewan
• CRG	Clinical Risk Groups
• CSA	Canadians Studying Abroad
• CTAS	Canadian Triage and Acuity Scale
• DAD	Discharge Abstract Data
• DALY	Disability adjusted life years
• DM	Deputy Minister
• ED	Emergency Department
• EM	Emergency Medicine
• EMS	Emergency Medical Services
• ERCP	Emergency Room Coverage Program
• ESRD	End Stage Renal Disease
• FFS	Fee-for-service
• FHHR	Five Hills Health Region
• FP	Family Physician
• FTE	Full-Time Equivalent
• GFT	Geographic Full-Time
• GIM	General Internal Medicine
• GMENAC	Council Graduate Medical Education National Advisory Committee
• HHR	Health Human Resources
• HHR	Heartland Health Region
• HQC	Health Quality Council
• HTA	Health Technology Assessment

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• IBS	Irritable bowel syndrome
• IMG	International Medical Graduate
• IOM	Institute of Medicine
• JURSI	Junior Undergraduate Rotating Student Intern
• KTHR	Kelsey Trail Health Region
• KYHR	Keewatin Yatthé Health Region
• LOS	Length of Stay
• MCRHR	Manawatan Churchill River Health Region
• MHC	Mental health care
• MOH	Ministry of Health
• MSP	Medical Service Plan
• NACRS	National Ambulatory Care Reporting System
• NHS	National Health Service
• NIPM	Net of Inter-Provincial Migration
• NMS	Northern Medical Services
• NP	Nurse Practitioner
• NPS	National Physician Survey
• NPDB	National Physician Database
• PA	Physician Assistant
• PAC	Project Advisory Committee
• PAIRS	Provincial Association of Interns and Residents of Saskatchewan
• PAPHR	Prince Albert Parkland Health Region
• PBCN	The Peter Ballantyne Cree Nation Health Services Inc.
• PCC	Patient Centred Care
• PCN	Primary Care Network
• PE	Physician Extender
• PGME	Postgraduate Medical Education
• PHC	Primary Health Care
• PHN	Public Health Nurse
• PNHR	Prairie North Health Region
• PRAG	Population Risk Adjusted Grouper
• PRAS	Physician Recruitment Agency of Saskatchewan
• PPRP	Planning for Physician Resources
• PSA	Practitioner Staff Affairs
• PWP	Physician Workforce Planning
• PYLL	Potential Years Lost Life
• RCPSC	Royal College of Physicians and Surgeons of Canada
• RHA	Regional Health Authority
• RN	Registered Nurse
• RQHR	Regina Qu'Appelle Health Region
• SCA	Saskatchewan Cancer Agency
• SCHR	Sun Country Health Region
• SERI	Socio-economic risk index
• SES	Socio-Economic Status
• SHR	Saskatoon Health Region
• SHR	Sunrise Health Region
• SIPPA	Saskatchewan International Physician Practice Assessment
• SK	Saskatchewan

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- SMA Saskatchewan Medical Association
- SMSS Student Medical Society of Saskatchewan
- TWG Technical Working Group
- UGME Undergraduate Medical Education
- US University of Saskatchewan
- WTE Whole-Time Equivalent

A.3 Definitions

The following definitions apply throughout the Environmental Scan and the Final Report.

ALTERNATIVE PAYMENT PLAN (APP)

Alternative payment plans are models of compensation for physicians who are not paid on a fee-for-service basis, but are salaried, sessional, or hired on a service contract; these physicians submit encounter claims (shadow billings) for administrative purposes only.

ACADEMIC FUNDING PLAN (AFP)

Academic funding plans are a form of block funding; there are different governance structures and remuneration scales for AFPs; however, the conceptual model incorporates remuneration for clinical service, teaching, research, and administration, and includes an accountability framework.

CLINICAL SERVICES FORECASTING

Clinical services forecasting is a forward-looking projection based upon assumptions regarding key determinants of population need and workforce supply.

CLINICAL SERVICES PLANNING

Clinical service planning is the process of shaping the future forecast according to organizational strategy, policy, and objectives.

COLLABORATIVE CARE

Providers who bring separate and shared knowledge together in support of a comprehensive range of high quality, effective health care service constitute collaborative care teams.

EFFECTIVE PRODUCTIVITY

The Western and Northern Health Human Resource Planning Forum defined “effective productivity” as an increase in outputs per unit of input where there is evidence of improved quality of care and improved health outcomes that contribute to achieving health system goals.

FULL-TIME EQUIVALENT

The Health Canada/Canadian Institute for Health Information FTE methodology is the national standard in the public health sector for converting physician earnings to FTE (notable is the lack of integrity of the model, directly proportional to the uptake of non-fee-for-service compensation; the details of this approach are as follows:

All payments (fee-for-service), block funded, salary, third party, on-call, sessional (totaling \$634 million in 2009/10) to each uniquely identified (Provincial ID number) physicians within each functional specialty during a one year period (2009/10), were rank ordered, smallest to largest. Physicians are sorted into percentiles. The 40th and 60th percentiles are computed as follows:

$$(\# \text{ of physicians within the group}) \times (0.4) = 40\text{th percentile physician}$$

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(# of physicians within the group) x (0.6) = 60th percentile physician

FTE assignment is made using the following procedure:

Any ranked physician > 40th percentile, and < 60th percentile is assigned a value of 1.0 FTE

Any ranked physician (i.e., "physician X") < 40th percentile is assigned an FTE equal to:

(\$ value of payment to physician X) divided by (\$ value of payment to 40th percentile physician)

Any ranked physician (i.e., physician Y) > 60th percentile is assigned an FTE equal to:

1 + (log of \$ value of payment to physician Y) / (\$ value of 60th percentile)

The methodology creates some compression in the range above the 60th percentile, but avoids assignment of extreme values (e.g., 4.0 FTE) to very high earning physicians.

INDEPENDENT AND DEPENDENT VARIABLES

These terms distinguish between two types of quantities being considered, separating them into those available at the start of a process and those being created by it, where the latter (dependent variables) are dependent on the former (independent variables); the independent variable is typically the variable representing the value being manipulated or changed, and the dependent variable is the observed result of the independent variable being manipulated; for example, with respect to clinical services planning, the independent variable of inter-jurisdictional migration can influence the dependent variable of future supply.

LICENSED AND FUNCTIONAL SPECIALTY

Licensed and functional specialties of physicians are conceptually and analytically very important; the functional specialty, in almost all cases, is the same as the licensed specialty; for Canadian trained physicians, the licensed specialty is determined by certification by the Royal College of Physicians and Surgeons or the College of Family Physicians of Canada; in a few cases, such as a General or Family Practitioner working solely in the Emergency Department, the functional specialty may differ from the licensed specialty.

NET (EXPORT)/IMPORT

Health human resource planning at the community and regional levels requires examination of patterns of service utilization by local residents and those who commute to a community to receive care; this is also true of providers who commute outside a primary location to other communities to deliver care; this pattern of commuting to access or to provide care is the export/import of services; net export means the residents of a given community or region access more services outside their community or region than they do within it; net import means the opposite, providing more services within the community or region than are accessed outside it.

NURSE PRACTITIONER

A nurse practitioner (NP) is a registered nurse with additional educational preparation and experience. An NP possesses competencies to autonomously diagnose, order and interpret diagnostic tests, prescribe pharmaceuticals, and perform specific procedures within their legislated scope of practice.

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PATIENT-CENTRED CARE

Patient-centred is a health delivery system organized around the holistic needs of patient and family. The four attributes of patient-centred care, described by the Institute of Medicine in 2001 are, as follows:

- Comprehensiveness of care
- Coordination and communication
- Support for the patient and his or her empowerment
- Timely access

QUALITY

The Institute of Medicine (IOM) definition of the core attributes of quality care is, as follows:

- Safe: avoiding injuries to patients from the care that is intended to help them
- Effective: providing services based on scientific knowledge to all who could benefit, and refraining from providing services to those not likely to benefit
- Patient-centred: providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient values guide all clinical decisions
- Timely: reducing waits and, sometimes, harmful delays for both those who receive and those who give care
- Efficient: avoiding waste, including waste of equipment, supplies, ideas, and energy
- Equitable: providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socio-economic status

ROLE OPTIMIZATION

Also referred to as working “top-of-license,” role optimization encourages each professional to provide services to the maximum skill level attainable, as part of an integrated team, and, always, in a patient-centred model. In essence, the goal is to maximize individual scopes of service to deliver timely, quality and accessible care to patients.

SENTINEL SERVICES

Sentinel services represent a significant proportion of the workload for a particular discipline or profession; these are determined by true patient need and not likely influenced heavily by individual discretion; for example hip or knee replacements in orthopaedics, deliveries in obstetrics, cholecystectomies and mastectomies in general surgery, and cataract surgery in ophthalmology (Ontario: Expert Panel on Health Professional Human Resources, 2001).

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A.4 Specialties

Physician resource planning includes each of the specialties, types, and categories listed in the table below.

#	CATEGORY	SPECIALTY	#	CATEGORY	SPECIALTY
1	Diagnostic & Therapeutic	Anatomical Pathology	41	Medical	Occupational Medicine
2	Diagnostic & Therapeutic	Diagnostic Radiology	42	Medical	Pain Medicine
3	Diagnostic & Therapeutic	Diagnostic Radiology-Interventional	43	Medical	Respirology
4	Diagnostic & Therapeutic	General Pathology	44	Medical - Paediatric	Respirology-Paediatric
5	Diagnostic & Therapeutic	Hematological Pathology	45	Medical	Rheumatology
6	Diagnostic & Therapeutic	Medical Biochemistry	46	Medical - Paediatric	Rheumatology-Paediatric
7	Diagnostic & Therapeutic	Medical Genetics	47	Medical - Paediatric	Paediatrics
8	Diagnostic & Therapeutic	Medical Microbiology	48	Medical - Paediatric	Adolescent Medicine
9	Diagnostic & Therapeutic	Neuropathology	49	Medical - Paediatric	Developmental Paediatrics
10	Diagnostic & Therapeutic	Nuclear Medicine	50	Medical - Paediatric	Paediatric Hematology/Oncology
11	Diagnostic & Therapeutic	Radiation Oncology	51	Obstetrics & Gynecology	Obstetrics and Gynecology
12	Diagnostic & Therapeutic	Clinical Pharmacology and Toxicology	52	Obstetrics & Gynecology	Gynecologic Oncology
13	Diagnostic & Therapeutic	Forensic Pathology	53	Obstetrics & Gynecology	Gynecologic Reproductive Endocrinology & Infertility
14	Diagnostic & Therapeutic	Neuroradiology	54	Obstetrics & Gynecology	Maternal-Fetal Medicine
15	Diagnostic & Therapeutic	Paediatric Radiology	55	Medical - Paediatric	Neonatal-Perinatal Medicine
16	Diagnostic & Therapeutic	Transfusion Medicine	56	Psychiatry	Psychiatry
17	Emergency Medicine	Emergency Medicine	57	Psychiatry	Child and Adolescent Psychiatry
18	Emergency Medicine	Paediatric Emergency Medicine	58	Psychiatry	Forensic Psychiatry
19	Medical	Dermatology	59	Psychiatry	Geriatric Psychiatry
20	Medical	Hematology	60	Public Health	Public Health & Preventative Medicine
21	Medical	Internal Medicine	61	Surgical	Anesthesiology
22	Medical	Neurology	62	Surgical	Cardiac Surgery
23	Medical - Paediatric	Neurology-Paediatric	63	Surgical - Paediatric	Cardiac Surgery-Paediatric
24	Medical	Physical Medicine & Rehabilitation	64	Surgical	General Surgery
25	Medical	Cardiology	65	Surgical	Neurosurgery
26	Medical - Paediatric	Cardiology-Paediatric	66	Surgical	Ophthalmology
27	Medical	Clinical Immunology and Allergy	67	Surgical	Orthopedic Surgery
28	Medical	Critical Care Medicine	68	Surgical - Paediatric	Orthopedic Surgery-Paediatric
29	Medical - Paediatric	Critical Care Medicine-Paediatric	69	Surgical	Otolaryngology - Head and Neck Surgery
30	Medical	Endocrinology and Metabolism	70	Surgical	Plastic Surgery
31	Medical - Paediatric	Endocrinology and Metabolism-Paediatric	71	Surgical	Urology
32	Medical	Gastroenterology	72	Surgical	Colorectal Surgery
33	Medical - Paediatric	Gastroenterology-Paediatric	73	Surgical	General Surgical Oncology
34	Medical	General Internal Medicine (GIM)	74	Surgical - Paediatric	Paediatric Surgery
35	Medical	Geriatric Medicine	75	Surgical	Thoracic Surgery
36	Medical	Infectious Diseases	76	Surgical	Vascular Surgery
37	Medical - Paediatric	Infectious Diseases-Paediatric	77	Family Medicine	Family Medicine
38	Medical	Medical Oncology	78	General Practice	General Practice
39	Medical	Nephrology		Family Practice	Family Medicine (EM)
40	Medical - Paediatric	Nephrology-Paediatric		Family Practice	Family Medicine (SI)-Addiction Medicine
				Family Practice	Family Medicine (SI)-Family Practice Anesthesia
				Family Practice	Family Medicine (SI)-Child and Adolescent Health
				Family Practice	Family Medicine (SI)-Chronic Pain
				Family Practice	Family Medicine (SI)-Developmental Disabilities
				Family Practice	Family Medicine (SI)-Emergency Medicine
				Family Practice	Family Medicine (SI)-Global Health
				Family Practice	Family Medicine (SI)-Health Care of the Elderly
				Family Practice	Family Medicine (SI)-Hospital Medicine
				Family Practice	Family Medicine (SI)-Maternity and Newborn Care
				Family Practice	Family Medicine (SI)-Mental Health
				Family Practice	Family Medicine (SI)-Occupational Medicine
				Family Practice	Family Medicine (SI)-Palliative Care
				Family Practice	Family Medicine (SI)-Prison Health
				Family Practice	Family Medicine (SI)-Respiratory Medicine
				Family Practice	Family Medicine (SI)-Sport and Exercise Medicine

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A.5 Clinical Risk Groups

CRG_ CODE	CRG Description	MDC_ CODE	MDC_DESCRIPTION
5820	Burns - Extreme	27	Burns
5390	Connective Tissue Disease and Vasculitis	11	Connective Tissue Diseases
5117	Anomaly Skull and Facial Bones	4	Cranio-facial Anomalies
5120	Cleft Lip and Palate	4	Cranio-facial Anomalies
5424	Diabetes	13	Diabetes Mellitus
7023	Diabetes - 2 or More Other Dominant Chronic Diseases	13	Diabetes Mellitus
7020	Diabetes - Advanced Coronary Artery Disease - Other Dominant Chronic Disease	13	Diabetes Mellitus
7070	Diabetes - Cerebrovascular Disease - Hypertension	13	Diabetes Mellitus
7021	Diabetes - Cerebrovascular Disease - Other Dominant Chronic Disease	13	Diabetes Mellitus
7022	Diabetes - Chronic Obstructive Pulmonary Disease - Other Dominant Chronic Disease	13	Diabetes Mellitus
7071	Diabetes - Hypertension - Other Dominant Chronic Disease	13	Diabetes Mellitus
6140	Diabetes and Advanced Coronary Artery Disease	13	Diabetes Mellitus
6142	Diabetes and Asthma	13	Diabetes Mellitus
6144	Diabetes and Hypertension	13	Diabetes Mellitus
6145	Diabetes and Other Chronic Disease Level 2	13	Diabetes Mellitus
6141	Diabetes and Other Dominant Chronic Disease	13	Diabetes Mellitus
6143	Diabetes and Other Moderate Chronic Disease	13	Diabetes Mellitus
9010	Dialysis with Diabetes	13	Diabetes Mellitus
3274	Chronic Gastrointestinal Diagnoses - Minor	8	Digestive Diseases
5270	Chronic Gastrointestinal Diagnoses - Moderate	8	Digestive Diseases
3273	Chronic Ulcers	8	Digestive Diseases
5442	Chronic Endocrine, Nutritional, Fluid, Electrolyte and Immune Diagnoses - Moderate	14	Endocrine and Metabolic and Thyroid Diseases Except
5439	Chronic Metabolic and Endocrine Diagnoses - Major	14	Endocrine and Metabolic and Thyroid Diseases Except
3446	Chronic Thyroid Disease	14	Endocrine and Metabolic and Thyroid Diseases Except
3445	Hyperlipidemia	14	Endocrine and Metabolic and Thyroid Diseases Except
5441	Obesity	14	Endocrine and Metabolic and Thyroid Diseases Except
3523	Chronic Pelvic Inflammatory Disease	17	Female Reproductive Diseases
3524	Infertility - Female	17	Female Reproductive Diseases
3525	Other Chronic Gynecological Diagnoses - Minor	17	Female Reproductive Diseases
5478	Anomalies of Kidney or Urinary Tract	15	Genitourinary Diseases
5479	Chronic Genitourinary Diagnoses	15	Genitourinary Diseases
5473	Chronic Renal Failure	15	Genitourinary Diseases
7002	Chronic Renal Failure - 2 or More Other Dominant Chronic Diseases	15	Genitourinary Diseases
7001	Chronic Renal Failure - Diabetes - Other Dominant Chronic Disease	15	Genitourinary Diseases
6100	Chronic Renal Failure and Other Dominant or Moderate Chronic Disease	15	Genitourinary Diseases
9020	Dialysis without Diabetes	15	Genitourinary Diseases
5474	Kidney Transplant Status	15	Genitourinary Diseases
5475	Major Anomalies of the Kidney and Urinary Tract	15	Genitourinary Diseases
5477	Nephritis	15	Genitourinary Diseases
3483	Recurrent Urinary Tract Infections	15	Genitourinary Diseases
3482	Vesicoureteral Reflux	15	Genitourinary Diseases
1000	Healthy	32	HEALTHY
1001	Healthy Non User	32	HEALTHY
7040	Advanced Coronary Artery Disease - Peripheral Vascular Disease - Other Dominant C	6	Heart and Cardiac Vascular Diseases
7041	Advanced Coronary Artery Disease - 2 or More Other Dominant Chronic Diseases	6	Heart and Cardiac Vascular Diseases
6152	Advanced Coronary Artery Disease and Other Chronic Disease Level 2	6	Heart and Cardiac Vascular Diseases
6150	Advanced Coronary Artery Disease and Other Dominant Chronic Disease	6	Heart and Cardiac Vascular Diseases
6151	Advanced Coronary Artery Disease and Other Moderate Chronic Disease	6	Heart and Cardiac Vascular Diseases
5183	Angina and Ischemic Heart Disease	6	Heart and Cardiac Vascular Diseases
5186	Atrial Fibrillation	6	Heart and Cardiac Vascular Diseases
5190	Cardiac Device Status	6	Heart and Cardiac Vascular Diseases
5187	Cardiac Dysrhythmia and Conduction Disorders	6	Heart and Cardiac Vascular Diseases
7050	Cerebrovascular Disease - 2 or More Other Dominant Chronic Diseases	6	Heart and Cardiac Vascular Diseases
6130	Cerebrovascular Disease and Diabetes	6	Heart and Cardiac Vascular Diseases
6133	Cerebrovascular Disease and Other Chronic Disease Level 2	6	Heart and Cardiac Vascular Diseases
6131	Cerebrovascular Disease and Other Dominant Chronic Disease	6	Heart and Cardiac Vascular Diseases
6132	Cerebrovascular Disease and Other Moderate Chronic Disease	6	Heart and Cardiac Vascular Diseases
5004	Cerebrovascular Disease with Infarction or Intracranial Hemorrhage	6	Heart and Cardiac Vascular Diseases
5013	Cerebrovascular Disease without Infarction	6	Heart and Cardiac Vascular Diseases
3196	Chronic Cardiovascular Diagnoses - Minor	6	Heart and Cardiac Vascular Diseases
5237	Chronic Disorders of Arteries and Veins - Major	6	Heart and Cardiac Vascular Diseases
3244	Chronic Disorders of Arteries and Veins - Minor	6	Heart and Cardiac Vascular Diseases
5177	Complex Cyanotic and Major Cardiac Septal Anomalies	6	Heart and Cardiac Vascular Diseases
5179	Congestive Heart Failure	6	Heart and Cardiac Vascular Diseases
7015	Congestive Heart Failure - Cerebrovascular Disease - Other Dominant Chronic Diseas	6	Heart and Cardiac Vascular Diseases
7016	Congestive Heart Failure - 2 or More Other Dominant Chronic Diseases	6	Heart and Cardiac Vascular Diseases
7013	Congestive Heart Failure - Chronic Obstructive Pulmonary Disease - Other Dominant	6	Heart and Cardiac Vascular Diseases
7011	Congestive Heart Failure - Diabetes - Cerebrovascular Disease	6	Heart and Cardiac Vascular Diseases
7010	Congestive Heart Failure - Diabetes - Chronic Obstructive Pulmonary Disease	6	Heart and Cardiac Vascular Diseases
7012	Congestive Heart Failure - Diabetes - Other Dominant Chronic Disease	6	Heart and Cardiac Vascular Diseases
7014	Congestive Heart Failure - Peripheral Vascular Disease - Other Dominant Chronic Dise	6	Heart and Cardiac Vascular Diseases
6113	Congestive Heart Failure and Cerebrovascular Disease	6	Heart and Cardiac Vascular Diseases
6115	Congestive Heart Failure and Dementing Disease	6	Heart and Cardiac Vascular Diseases
6111	Congestive Heart Failure and Diabetes	6	Heart and Cardiac Vascular Diseases

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CRG_ CODE	CRG Description	MDC_ CODE	MDC_DESCRIPTION
6117	Congestive Heart Failure and Other Chronic Disease Level 2	6	Heart and Cardiac Vascular Diseases
6114	Congestive Heart Failure and Other Dominant Chronic Disease	6	Heart and Cardiac Vascular Diseases
6116	Congestive Heart Failure and Other Moderate Chronic Disease	6	Heart and Cardiac Vascular Diseases
6112	Congestive Heart Failure and Peripheral Vascular Disease	6	Heart and Cardiac Vascular Diseases
5191	Coronary Atherosclerosis	6	Heart and Cardiac Vascular Diseases
5188	History of Coronary Artery Bypass Graft	6	Heart and Cardiac Vascular Diseases
5182	History of Myocardial Infarction	6	Heart and Cardiac Vascular Diseases
5189	History of Percutaneous Transluminal Coronary Angioplasty	6	Heart and Cardiac Vascular Diseases
5012	History of Transient Ischemic Attack	6	Heart and Cardiac Vascular Diseases
5192	Hypertension	6	Heart and Cardiac Vascular Diseases
5180	Other Cardiovascular Diagnoses - Major	6	Heart and Cardiac Vascular Diseases
5181	Valvular Disorders	6	Heart and Cardiac Vascular Diseases
3195	Ventricular and Atrial Septal Defects	6	Heart and Cardiac Vascular Diseases
5655	Acute Lymphoid Leukemia	21	Hematologic Diseases
8655	Acute Lymphoid Leukemia (Metastatic/Complicated)	21	Hematologic Diseases
5656	Acute Non-Lymphoid Leukemia	21	Hematologic Diseases
8656	Acute Non-Lymphoid Leukemia (Metastatic/Complicated)	21	Hematologic Diseases
5610	Chronic Hematological and Immune Diagnoses - Moderate	21	Hematologic Diseases
3613	Chronic Hematological Diagnoses - Minor	21	Hematologic Diseases
5652	Chronic Lymphoid Leukemia	21	Hematologic Diseases
8652	Chronic Lymphoid Leukemia (Metastatic/Complicated)	21	Hematologic Diseases
5653	Chronic Non-Lymphoid Leukemia	21	Hematologic Diseases
8653	Chronic Non-Lymphoid Leukemia (Metastatic/Complicated)	21	Hematologic Diseases
5607	Coagulation Disorders	21	Hematologic Diseases
5660	Hodgkin's Lymphoma	21	Hematologic Diseases
8660	Hodgkin's Lymphoma (Metastatic/Complicated)	21	Hematologic Diseases
5605	Immune and Leukocyte Disorders	21	Hematologic Diseases
5654	Multiple Myeloma	21	Hematologic Diseases
8654	Multiple Myeloma (Metastatic/Complicated)	21	Hematologic Diseases
5665	Non-Hodgkin's Lymphoma	21	Hematologic Diseases
8665	Non-Hodgkin's Lymphoma (Metastatic/Complicated)	21	Hematologic Diseases
5606	Sickle Cell Anemia	21	Hematologic Diseases
5310	Alcoholic Liver Disease	9	Hepatobiliary and Pancreatic Diseases
5314	Chronic Pancreatic and Liver Disorders - Moderate	9	Hepatobiliary and Pancreatic Diseases
3317	Gallbladder Disease	9	Hepatobiliary and Pancreatic Diseases
5269	Gastrointestinal Anomalies	9	Hepatobiliary and Pancreatic Diseases
5266	Inflammatory Bowel Disease	9	Hepatobiliary and Pancreatic Diseases
5311	Major Liver Disease except Alcoholic	9	Hepatobiliary and Pancreatic Diseases
9030	HIV Disease	29	HIV Disease
3510	Benign Prostatic Hyperplasia	16	Male Reproductive Diseases
3511	Prostate Disease, Infertility, and Benign Neoplasms - Male	16	Male Reproductive Diseases
8646	Brain and Central Nervous System Malignancies	22	Malignancies
5662	Breast Malignancy	22	Malignancies
8662	Breast Malignancy (Metastatic/Complicated)	22	Malignancies
6280	Breast Malignancy and Other Chronic Disease Level 2	22	Malignancies
6211	Breast Malignancy and Other Moderate Chronic Disease	22	Malignancies
5657	Colon Malignancy	22	Malignancies
8657	Colon Malignancy (Metastatic/Complicated)	22	Malignancies
8651	Digestive Malignancy (Metastatic/Complicated)	22	Malignancies
5664	Genitourinary Malignancy	22	Malignancies
8664	Genitourinary Malignancy (Metastatic/Complicated)	22	Malignancies
8649	Kidney Malignancy (Metastatic/Complicated)	22	Malignancies
8647	Lung Malignancy (Metastatic/Complicated)	22	Malignancies
5695	Malignancy NOS/NEC	22	Malignancies
8001	Multiple Dominant Primary Malignancies	22	Malignancies
8002	Multiple Non-Dominant Primary Malignancies	22	Malignancies
3698	Neoplasm of Uncertain Behavior	22	Malignancies
5658	Other Malignancies	22	Malignancies
8658	Other Malignancies (Metastatic/Complicated)	22	Malignancies
6282	Other Nondominant Malignancy and Other Chronic Disease Level 2	22	Malignancies
6231	Other Nondominant Malignancy and Other Moderate Chronic Disease	22	Malignancies
8650	Ovarian Malignancy (Metastatic/Complicated)	22	Malignancies
8648	Pancreatic Malignancy (Metastatic/Complicated)	22	Malignancies
5661	Plasma Protein Malignancy	22	Malignancies
8661	Plasma Protein Malignancy (Metastatic/Complicated)	22	Malignancies
5663	Prostate Malignancy	22	Malignancies
8663	Prostate Malignancy (Metastatic/Complicated)	22	Malignancies
6281	Prostate Malignancy and Other Chronic Disease Level 2	22	Malignancies
6221	Prostate Malignancy and Other Moderate Chronic Disease	22	Malignancies
8641	Secondary Malignancy (Metastatic/Complicated)	22	Malignancies
3408	Skin Malignancy	22	Malignancies
5006	Alzheimer's Disease and Other Dementias	24	Mental Health Diseases
3754	Attention Deficit / Hyperactivity Disorder	24	Mental Health Diseases
5747	Bi-Polar Disorder	24	Mental Health Diseases
3756	Chronic Mental Health Diagnoses - Minor	24	Mental Health Diseases

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CRG_ CODE	CRG Description	MDC_ CODE	MDC_DESCRIPTION
5751	Chronic Mental Health Diagnoses - Moderate	24	Mental Health Diseases
3757	Chronic Stress and Anxiety Diagnoses	24	Mental Health Diseases
5748	Conduct, Impulse Control, and Other Disruptive Behavior Disorders	24	Mental Health Diseases
6162	Dementing Disease and Other Chronic Disease Level 2	24	Mental Health Diseases
6160	Dementing Disease and Other Dominant Chronic Disease	24	Mental Health Diseases
6161	Dementing Disease and Other Moderate Chronic Disease	24	Mental Health Diseases
3755	Depression	24	Mental Health Diseases
5749	Depressive and Other Psychoses	24	Mental Health Diseases
5744	Eating Disorder	24	Mental Health Diseases
5002	Extrapyramidal Diagnoses	24	Mental Health Diseases
5750	Major Personality Disorders	24	Mental Health Diseases
6290	Psychiatric Disease (Except Schizophrenia) and Other Chronic Disease Level 2	24	Mental Health Diseases
6201	Psychiatric Disease (Except Schizophrenia) and Other Moderate Chronic Disease	24	Mental Health Diseases
5743	Schizophrenia	24	Mental Health Diseases
6172	Schizophrenia and Other Chronic Disease Level 2	24	Mental Health Diseases
6170	Schizophrenia and Other Dominant Chronic Disease	24	Mental Health Diseases
6171	Schizophrenia and Other Moderate Chronic Disease	24	Mental Health Diseases
5584	Severe / Profound Mental Retardation	24	Mental Health Diseases
5583	Chromosomal Anomalies and Syndromes Except Down's	20	Mental Retardation and other Developmental and Co
5589	Developmental Delay NOS / NEC / Mixed	20	Mental Retardation and other Developmental and Co
3592	Developmental Language Disorder	20	Mental Retardation and other Developmental and Co
5582	Down's Syndrome	20	Mental Retardation and other Developmental and Co
5010	Hydrocephalus and Other Brain Anomalies	20	Mental Retardation and other Developmental and Co
5588	Mild / Moderate Mental Retardation	20	Mental Retardation and other Developmental and Co
5178	Other Major Congenital Heart Diagnoses Except Valvular	20	Mental Retardation and other Developmental and Co
5585	Pervasive Development Disorder	20	Mental Retardation and other Developmental and Co
5350	Amputation and Bone Disease	10	Musculoskeletal Diseases
3358	Chronic Joint and Musculoskeletal Diagnoses - Minor	10	Musculoskeletal Diseases
3356	Chronic Pain	10	Musculoskeletal Diseases
9070	Congenital Quadriplegia, Diplegia or Hemiplegia	10	Musculoskeletal Diseases
5352	Crystal Arthropathy	10	Musculoskeletal Diseases
5348	Curvature or Anomaly of the Spine	10	Musculoskeletal Diseases
5351	Disc Disease and Other Chronic Back Diagnoses	10	Musculoskeletal Diseases
3017	Gait Abnormalities	10	Musculoskeletal Diseases
6181	History of Hip Fracture Age > 64 and Other Moderate Chronic Disease	10	Musculoskeletal Diseases
6182	History of Hip Fracture Age > 64 and Other Chronic Disease Level 2	10	Musculoskeletal Diseases
6180	History of Hip Fracture Age > 64 and Other Dominant Chronic Disease	10	Musculoskeletal Diseases
5344	History of Hip Fracture Age > 64 Years	10	Musculoskeletal Diseases
5353	Joint Replacement	10	Musculoskeletal Diseases
5343	Major Congenital Bone, Cartilage, and Muscle Diagnoses	10	Musculoskeletal Diseases
3357	Osteoarthritis	10	Musculoskeletal Diseases
5354	Osteoporosis	10	Musculoskeletal Diseases
5349	Pelvis, Hip, and Femur Deformities	10	Musculoskeletal Diseases
9100	Progressive Muscular Dystrophy or Spinal Muscle Atrophy	10	Musculoskeletal Diseases
5391	Rheumatoid Arthritis	10	Musculoskeletal Diseases
9090	Spina Bifida	10	Musculoskeletal Diseases
5345	Spinal Stenosis	10	Musculoskeletal Diseases
5394	Spondyloarthropathy and Other Inflammatory Arthropathies	10	Musculoskeletal Diseases
5003	Acquired Hemiplegia	1	Neurologic Diseases
9080	Acquired Quadriplegia or Permanent Vegetative State	1	Neurologic Diseases
5007	Cerebral Palsy NOS	1	Neurologic Diseases
3019	Chronic Neuromuscular and Other Neurological Diagnoses - Minor	1	Neurologic Diseases
5011	Chronic Neuromuscular/Other Neurological Diagnoses - Moderate	1	Neurologic Diseases
5014	Epilepsy	1	Neurologic Diseases
3018	Migraine	1	Neurologic Diseases
5005	Neurodegenerative Diagnoses Except Multiple Sclerosis and Parkinson's	1	Neurologic Diseases
5001	Progressive Neurological Diagnoses	1	Neurologic Diseases
3557	Prematurity - Birthweight < 1000 Grams	19	Newborns and Neonatal Diseases
5075	Blindness, Visual Loss, and Chronic Eye Diagnoses - Major / Moderate	2	Ophthalmalmic Diseases
3079	Cataracts	2	Ophthalmalmic Diseases
3080	Chronic Eye Diagnoses - Minor	2	Ophthalmalmic Diseases
3078	Glaucoma	2	Ophthalmalmic Diseases
5074	Macular Degeneration	2	Ophthalmalmic Diseases
3099	Chronic Ear Diagnoses except Hearing Loss	3	Otolaryngologic Diseases
3100	Chronic Hearing Loss	3	Otolaryngologic Diseases
3101	Other Chronic Ear, Nose, and Throat Diagnoses	3	Otolaryngologic Diseases
5241	Leg Varicosities with Ulcers or Inflammation	7	Peripheral and Noncardiac Vascular Diseases
5238	Peripheral Vascular Disease	7	Peripheral and Noncardiac Vascular Diseases
5138	Asthma	5	Pulmonary Diseases
6242	Asthma and Hypertension	5	Pulmonary Diseases
6291	Asthma and Other Chronic Disease Level 2	5	Pulmonary Diseases
6241	Asthma and Other Moderate Chronic Disease	5	Pulmonary Diseases
3141	Chronic Bronchitis	5	Pulmonary Diseases
7030	Chronic Obstructive Pulmonary Disease - Advanced Coronary Artery Disease - Other	5	Pulmonary Diseases
7031	Chronic Obstructive Pulmonary Disease - 2 or More Other Dominant Chronic Disease	5	Pulmonary Diseases



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CRG_ CODE	CRG Description	MDC_ CODE	MDC_DESCRIPTION
6121	Chronic Obstructive Pulmonary Disease and Advanced Coronary Artery Disease	5	Pulmonary Diseases
5133	Chronic Obstructive Pulmonary Disease and Bronchiectasis	5	Pulmonary Diseases
6110	Chronic Obstructive Pulmonary Disease and Congestive Heart Failure	5	Pulmonary Diseases
6120	Chronic Obstructive Pulmonary Disease and Diabetes	5	Pulmonary Diseases
6124	Chronic Obstructive Pulmonary Disease and Hypertension	5	Pulmonary Diseases
6125	Chronic Obstructive Pulmonary Disease and Other Chronic Disease Level 2	5	Pulmonary Diseases
6122	Chronic Obstructive Pulmonary Disease and Other Dominant Chronic Disease	5	Pulmonary Diseases
6123	Chronic Obstructive Pulmonary Disease and Other Moderate Chronic Disease	5	Pulmonary Diseases
9110	Cystic Fibrosis	5	Pulmonary Diseases
9050	Dependence on a Mechanical Ventilator	5	Pulmonary Diseases
5132	Major Respiratory Anomalies	5	Pulmonary Diseases
3142	Other Chronic Pulmonary Diagnoses	5	Pulmonary Diseases
5134	Other Major Chronic Pulmonary Diagnoses	5	Pulmonary Diseases
5707	Secondary Tuberculosis	5	Pulmonary Diseases
3410	Chronic Skin Diagnoses - Minor	12	Skin, Subcutaneous Tissue and Breast Diseases
5404	Chronic Skin Ulcer	12	Skin, Subcutaneous Tissue and Breast Diseases
3409	Psoriasis	12	Skin, Subcutaneous Tissue and Breast Diseases
5405	Significant Skin and Subcutaneous Tissue Diagnoses	12	Skin, Subcutaneous Tissue and Breast Diseases
5784	Chronic Alcohol Abuse	25	Substance Abuse
5782	Cocaine Abuse	25	Substance Abuse
5786	Drug Abuse - Cannabis/NOS/NEC	25	Substance Abuse
3789	Drug Abuse Related Diagnoses	25	Substance Abuse
6292	Moderate Chronic Substance Abuse and Other Chronic Disease Level 2	25	Substance Abuse
6251	Moderate Chronic Substance Abuse and Other Moderate Chronic Disease	25	Substance Abuse
5783	Opioid Abuse	25	Substance Abuse
5785	Other Significant Drug Abuse	25	Substance Abuse
5706	Chronic Infections Except Tuberculosis	23	Systemic Infectious and Parasitic Diseases
2050	1 Significant Acute ENT Illness	33	UNCLASSIFIED
2040	1 Significant Acute ENT Illness - Span 90	33	UNCLASSIFIED
2020	1 Significant Acute Illness - Span 90 Excluding ENT	33	UNCLASSIFIED
2030	1 Significant Acute Illness Excluding ENT	33	UNCLASSIFIED
2060	1 Significant Acute Procedure	33	UNCLASSIFIED
2010	2 or More Significant Acute Illnesses from Different MDCs Excluding ENT	33	UNCLASSIFIED
7060	3 or More Other Dominant Chronic Diseases	33	UNCLASSIFIED
9060	History of a Major Organ Transplant	33	UNCLASSIFIED
4000	Multiple Minor Chronic PCDs	33	UNCLASSIFIED
6260	One Other Dominant Chronic Disease and One or More Moderate Chronic Disease	33	UNCLASSIFIED
6261	One Other Dominant Chronic Disease and Other Chronic Disease Level 2	33	UNCLASSIFIED
6293	One Other Moderate Chronic Disease and Other Chronic Disease Level 2	33	UNCLASSIFIED
6240	Other Dominant Chronic Disease and Asthma	33	UNCLASSIFIED
6210	Other Dominant Chronic Disease and Breast Malignancy	33	UNCLASSIFIED
6250	Other Dominant Chronic Disease and Moderate Chronic Substance Abuse	33	UNCLASSIFIED
6230	Other Dominant Chronic Disease and Other Nondominant Malignancy	33	UNCLASSIFIED
6220	Other Dominant Chronic Disease and Prostate Malignancy	33	UNCLASSIFIED
6200	Other Dominant Chronic Disease and Psychiatric Disease (Except Schizophrenia)	33	UNCLASSIFIED
9040	Total Parenteral Nutrition	33	UNCLASSIFIED
6190	Two Other Dominant Chronic Diseases	33	UNCLASSIFIED
6270	Two Other Moderate Chronic Diseases	33	UNCLASSIFIED
-9,999	Unknown	u/k	UNCLASSIFIED